

**PKFokam Conference on Science & Technology  
9th Edition  
7 – 9 June 2022  
PKFokam Institute of Excellence  
Emana Campus, Yaoundé - Cameroon**



#### Scientific Committee

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Prof. Dr. **NGOSONG Christopher** , University of Buéa, Cameroon

*Dear colleagues and friends,*

*the PKFokam Conference on Science and technology is unique. This conference mobilizes scientific talents, engineers, inventors and contributors who have shown commitment in various «technological arts». They are invited to share the results of their achievement, and more importantly to go beyond scientific publications by developing „spin-of“to valorize on the ground the results of their research activities We hope that you find the conference informative and worthwhile.*

*We would like to express our sincere gratitude to all participants. Many of you have contributed with very interesting abstracts. We are very grateful to have well known experts in their respective fields .We want to thank each of them. Thank you to all attendees of 2022 conference, and for those who couldn't make it, we hope to see you next year during the 10th edition*

**Dr. Nestor KAMDEM**

**The PKFokam Conference Coordinator**

*Dear colleagues and participants,*

*we warmly welcome you to yet another edition, namely the 9<sup>th</sup> Edition of the PKFokam Conference on Science and Technology that takes place primarily at the main campus of the PKFokam Institute of Excellence in Yaoundé, with virtual attendance of participants from all over the world.*

*As it was since the first edition, the Conference aims at setting up a useful and practical platform where researchers can meet with policymakers and potential investors in order to address African problems and make the world a better place to live in.*

*This year's edition comes after the world has suffered its most deadly disease outbreak of the century, namely the COVID-19 pandemic. Africa as a whole, and more specifically Sub-Saharan Africa, has been relatively less affected by this pandemic. This (unusual) fact has raised many questions and inspired a number of hypotheses as to why the pandemic has been less severe in the so-called "developing" Africa while the so-called "developed" countries and continents of the world have suffered more than ten times Africa's disease burden. Among these questions is the vaccine paradox as Africa has the lowest COVID-19 vaccination rate in the world. It is natural, therefore, that this year's edition includes a roundtable discussion on the topic: "Understanding the different types of vaccination technologies".*

*Looking at the list of participants and the associated book of abstracts, the Conference confirms itself as a most valuable tool for intellectual networking as it covers a wide range of fields and topics in science including biology, medicine, chemistry, mathematics, physics, information technology, data sciences, engineering, and so on.*

*With hope that your stay in the city capital of Cameroon, Yaoundé, will be memorable, we thank you all for your kind participation and wish you a most productive and enjoyable Conference.*

**Nourridine Siewe, PhD**

**Chair of the Scientific Committee (9th Edition)**



PKFokam Conference on Science and Technology, 9th edition, 7 - 9 June 2022  
program

	<b>TUESDAY JUNE 7 2022: DAY- 1</b>
7:30 – 8:30	Conference Check-in and Registration open
<b>Opening session Amphitheater</b>	<b>Chair: Dr KAMDEM Nestor</b>
8:30 – 8:45	Welcome and opening remarks: <b>Prof. Dr. NJINE Thomas</b>
8:45 – 9:00	Introductory words of the chairperson of the scientific committee: <b>Dr. SIEWE Nourridine</b>
9:00 – 10:00	Opening topic: le questionnement comme fondement de l'innovation / <b>Dr. SIMO DJOM Maurice &amp; Mr. BANG Dimite Samuel</b>
10:00 – 11:00	Opening Keynote address: The advent of an innovative health system based on African medicine associated with science <b>Prof. Dr. NKENG-EFOUET-ALANGO Pépin</b>
11:00 – 11:30	<b>COFFEE &amp; TEA / B2B</b>

**PKFokam Conference on Science and Technology, 9th edition, 7 - 9 June 2022  
program**

TUESDAY JUNE 7 2022: DAY- 1									
	ROOM - 1			ROOM - 2			ROOM - 3		
Session 1	Chair: Dr. DZOKOU V. J	Agricultural sciences		Chair: Prof. Dr. NANA Paulin	Natural sciences		Chair: Dr. KAMDEM Nestor	Natural sciences	
		Poster Nr	Page		Poster Nr	Page		Poster Nr	Page
11:30 – 12:00	FOKA Ebénézer	53	54	BAPONWA Odile	1	1	NGWANGUONG Evangeline	34	34
12:00 – 12:30	ENYOE OLOUGOU M. N	47	48	Dr. NGOMO Orléans	2	3	TCHAKOUAMO MATEFO	27	27
12:30 – 13:00	Dr. MIANTSIA F. O	48	49	Prof. FOKUNANG C.	4	4	KAGHOU Mabel Mbifung	28	28
13:00 – 14 :00	<b>LUNCH BREAK / B2B</b>								
Session 2	Chair: Prof. FOKUNANG Charles	Natural sciences		Chair: Prof. NGOSONG Christopher	Natural sciences		Chair: Dr. NGOMO Orléans	Natural sciences	
		Poster Nr	Page		Poster Nr	Page		Poster Nr	Page
14:00 – 14:30	BODJU NYANDA S.	37	37	Prof. TEMBE Achick E.	5	6	KEPAWOU Guelle M.	9	9
14:30 – 15:00	Dr. MAPTOUOM Laure	38	38	Dr. NDARUSANZE J.	-	4	MENATCHÉ NJOPNU J.	30	30
15:00 – 15:30	FOBASSO T. R	39	39	SONFACK Gaiëlle	23	24	AMAHNDONG Mathilda	31	31
15:30 – 16:00	NONO N. Vanessa	40	40	Dr. NJABON Eric N	24	25	SAIDOU T. Sylvestre	32	32
16:00 – 16:30	MOMO Evariste J.	46	47	ATINDO Songwe T.	7	8	TABAKAM TCHANGOU G.	25	26

**PKFokam Conference on Science and Technology, 9th edition, 7 - 9 June 2022  
program**

WEDNESDAY JUNE 8 2022: DAY- 2									
	ROOM - 1			ROOM - 2			ROOM-3		
7:30 – 8:30	<b>COFFEE &amp; TEA / B2B</b>								
<b>Session 3</b>	<b>Chair: Dr. DJUIDJE KOUOMOU Peguy Flora</b>	<b>Agricultural sciences</b>		<b>Chair: Prof. TEMBE Achick Estella</b>	<b>Natural sciences</b>		<b>Chair: Dr. EYA BATE Hans</b>	<b>Mathematics , computer , physics &amp; other</b>	
		<b>Poster Nr</b>	<b>Page</b>		<b>Poster Nr</b>	<b>Page</b>		<b>Poster Nr</b>	<b>Page</b>
8:30 – 9:00	MAGNI PACHA Tatiana	52	53	MAFO Fokam M. A	11		ENOW TAKANG ACHUO Albert	41	
9:00 – 9:30	ZOA Florent Boris	45	46	SIPPING KEMEGNE Trésor	29		TCHAMBA KEUWE Gérard	81	
9:30 – 10:00	Dr. DZOKOU Victor Joly	54	55	Dr. Gebremariam Birhanu	6		Dr. PACIO Rochelle	72	
10:00 – 10:30	MBOUDOU BELIBI Marlyse Z.	55	56	TCHASEP WANDJI Nadège	12		LIGBWAH Victor Wotanie	26	
10:30 – 11:00	<b>COFFEE &amp; TEA / B2B</b>								
<b>Session 4</b>	<b>Chair: Dr. MIANTSIA FOKAM Olivier</b>	<b>Agricultural sciences</b>		<b>Chair: Dr. MAPTOUOM Laure</b>	<b>Natural sciences</b>			<b>Mathematics , computer , physics &amp; other</b>	
		<b>Poster Nr</b>	<b>Page</b>		<b>Poster Nr</b>	<b>Page</b>		<b>Poster Nr</b>	<b>Page</b>
11:00 – 11:30	NJIANDOH MBEBOH Maurice	49	50	IKOME Hermia N	13	13	TBA		
11:30 – 12:00	KENMOGNE NUEMSI Pierre	50	51	TONBOU Calixte	14	14	TBA		
12:30 – 13:00	Prof. Dr. NANA Paulin	51	52	MEKEMZEU FANKEM Patience	15	15	TBA		
13:00 – 14:00	<b>LUNCH BREAK / B2B</b>								
<b>Session 5</b>	<b>Chair: Dr. PACIO Rochelle</b>	<b>Agricultural sciences</b>		<b>Chair: Dr. DJOBO Noel</b>	<b>Natural sciences</b>		<b>Chair: Dr. FTATSI MBETMI</b>	<b>Mathematics , computer , physics &amp; other</b>	
		<b>Poster Nr</b>	<b>Page</b>		<b>Poster Nr</b>	<b>Page</b>		<b>Poster Nr</b>	<b>Page</b>
14:00 – 14:30	MVONGO DANG Victorp	43	44				KEMENI KEMMOE W.	65	67
14:30 – 15:00	Dr. FONKWA Georges	42	43	KACHE FOTSING Sorelle	17	17	KOUAM W. Guy	66	68
15:00 – 15:30	MOLO Thierry	44	45	DZEFFOUO K. Beauvarine	18	18	TAHTE Bertrand	67	69
15:30 – 16:00	LIMALA II Etienne Pacôme	56	57	NOUBOU TAKAM Daïna	8	59	Dr. SIEWE Nourridine	63	65
16:00 – 16:30	<b>COFFEE &amp; TEA / B2B</b>								
16:30 – 18:00 ROOM - 2	<b>Round table:</b> Understanding the different types of Vaccines technologies Prof. DJUIDJE NGOUNOUE Marcelline Epse NDZIE, Mr. ENOW TAKANG ACHUO Albert, Dr. SIEWE Nourridine								

**PKFokam Conference on Science and Technology, 9th edition, 7 - 9 June 2022  
program**

THURSDAY JUNE 9 2022: DAY- 3									
	ROOM - 1			ROOM - 2			ROOM - 3		
7:30 – 8:30	<b>COFFEE &amp; TEA / B2B</b>								
<b>Session 6</b>	<b>Chair: TBA</b>	<b>Environment</b>		<b>Chair: Dr. NJABON Eric</b>	<b>Natural sciences</b>		<b>Chair: Dr. SIMO Hervé</b>	<b>Mathematics , computer , physics &amp; other</b>	
		<b>Poster Nr</b>	<b>Page</b>		<b>Poster Nr</b>	<b>Page</b>		<b>Poster Nr</b>	<b>Page</b>
8:30 – 9:00	Dr. MBOG MBOG S.	58	60	KAMDEU Elodie	19	19	NDJEUMOU NGASSI Roger	64	66
9:00 – 9:30	NDJOUONDO Gildas P.	59	61	MALEU Thérèse C.	20	21	KAPAWA NOUNAMO	71	73
9:30 – 10:00	NGATA N. Laurence	61	63	MBARGA ETOGA Paul	21	22	Dr. TSEMO Aristide	62	74
10:00 – 10:30	NANDOU TENKEU Muller	60	62	METIEFENG TANKO Nathalie	22	23	TSAFACK TATSAGOUM Alex	73	75
10:30 – 11:00	<b>COFFEE &amp; TEA / B2B</b>								
<b>Session 7</b>	<b>Chair: Dr. Gebremariam Birhanu</b>	<b>Natural sciences</b>		<b>Chair: Dr. NEMATCHOUA Francis</b>	<b>Engineering</b>		<b>Chair: Dr. FONKWA Georges</b>	<b>Mathematics , computer , physics &amp; other</b>	
		<b>Poster Nr</b>	<b>Page</b>		<b>Poster Nr</b>	<b>Page</b>		<b>Poster Nr</b>	<b>Page</b>
11:00 – 11:30	NGUEGUIM Stéphanie	33	33	MELI TAMWA Jean Landry	79	82	Dr. DJOBO Noel	74	76
11:30 – 12:00	POSSI DJILA Franck Landry	35	35	Dr. SIMO Hervé	70	72	ESSIMI Marion Amandine	76	78
12:30 – 13:00	YOUNBI Tatiana Gwladys	36	36	Dr. FTATSI MBETMI Guy-de-patience	80	83	MAYO Jean Pierre Junior	77	79
13:00 – 14:00	<b>LUNCH / B2B</b>								
<b>Closing session Amphitheater</b>	<b>(Keynote address)</b>								
14:00 – 15:00	<b>NGUIMDO Emmanuel</b> ; Mechanical construction: Theory and practice								
15:00 – 16:00	<b>Prof. Dr. NGONKEU Eddy</b> ; Scientific research, driving force of innovation for economic development and sovereignty in Cameroon								
16:00 – 17:00	<b>Dr. MUNNYANGI Gérôme</b> , Malaria and Coronavirus (Closing Keynote address)								
17:00 – 18:00	Prizes and closing remarks								

**BAPONWA Odile**

**Antioxidant mechanism of renal and hepatic failure prevention related to paracetamol overdose by the aqueous extract of *Amblygonocarpus andongensis* stem bark**

**Poster P1**

**Baponwa, O.**<sup>1\*</sup>, Amang, A.P.<sup>1</sup>, Mezui, C.<sup>2</sup>, Koubala, B.B.<sup>3</sup>, Siwe, T.G.<sup>4</sup>, Vandi, L.V.<sup>1</sup> and Tan V. P.<sup>4</sup>

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**Background and methods:** Paracetamol is a commonly used analgesic/antipyretic whose long-term intake or overdose is associated with renal and hepatic injuries. The aim of this study was to determine the hepatonephroprotective mechanisms of aqueous extract of *Amblygonocarpus andongensis* stem bark (AEAASB) on renal and hepatic failure resulting from paracetamol overdose. Forty-five rats were divided into nine groups of five animals; these were treated once daily for 8 days with 5 ml/kg distilled water (normal, negative and satellite controls), 0.9 % normal saline and 140 mg/kg N-acetyl-cysteine (positive controls), 125, 250 and 500 mg/kg AEAASB (test groups) and 500 mg/kg AEAASB (satellite test). On day 8 after treatments, hepatonephrotoxicity was induced in all groups except normal group by oral administration of a single dose of paracetamol (1000 mg/kg). Urinary, hematological, serum and oxidative stress parameters were evaluated as well as *in vitro* antioxidant activity of AEAASB. Histological sections of liver and kidney were performed.

**Results:** AEAASB significantly decreased urea, creatinine, ALT, AST, alkaline phosphatase, bilirubins ( $p < 0.001$ ) at 500 mg/kg compared to negative control. Significant decreases in hepatic ( $p < 0.01$ ) and renal ( $p < 0.001$ ) MDA levels were associated with increases of SOD, CAT and GSH levels in the 500 mg/kg AEAASB group compared with the negative control. Histological analysis showed that AEAASB prevented paracetamol-induced renal and liver tissue damages. Furthermore, AEAASB was a very strong antioxidant ( $IC_{50} = 180 \mu\text{g/ml}$ ,  $AAI = 5.55$ ) with an ability to scavenge 63.03 % of DPPH• radical and reduce ferric iron by 52.68 mgEqVitC/100 g DM.

**Conclusion:** The hepatonephroprotective effect of AEAASB would result from the enhancement of the antioxidant status (related to its ability to scavenge free radicals), this due to the presence of some classes of bioactive compounds in significant amounts.

**Key words:** paracetamol, *Amblygonocarpus andongensis*, hepatonephroprotection, Antioxidant; Wistar rats.

**Prof. Dr. NKENG-EFOUET-ALANGO-Pépin (HDR)\***  
**THE ADVENT OF AN INNOVATIVE HEALTH SYSTEM BASED ON AFRICAN MEDICINE ASSOCIATED  
WITH SCIENCE**

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Traditional African medicine is not fully recognized, despite its successes in the treatment of many diseases, as well as the uses of many of its medicinal plants as sources of drugs in Western or conventional medicine. This non-recognition would be attributed to his dubious rationality. The problem of its rationality arises in the following terms: can traditional medicine be structured and functionalized in a rational way, following the example of Western medicine taken as a reference? The research hypothesis retained is then that the introduction of biomedical analyzes as a diagnostic aid tool could lead to the establishment of an exhaustive, and therefore rational, scientific diagnosis in the clinical practice of traditional African medicine. The main results obtained from this practice in the hospitals of the Alango Foundation are: the identification in scientific terms of the diseases treated, the association of traditional therapies with specific diseases, the exact knowledge of the intrinsic therapeutic properties of the medicinal plants used. These results lead to the organization of a health system based on African medicine, characterized by the four major components of any modern health system:

1. The academic and university training of young African doctors and pharmacists;
2. The expansion of a national network of reference hospitals in African medicine
3. The development of an industry of improved traditional medicines (MTA) and phytomedicines;
4. Scientific research focused on the production of standardized drugs.

Ultimately, the innovation of introducing biomedical analyzes as a scientific diagnostic tool in the clinic of traditional medicine, led to the innovation of the training of the African doctor at the university, then to the innovation of the creation of a modern health system of African medicine, the foundation of innovative public health policies, which make it possible to solve endemic health problems for all sections of the population with the help of endogenous expertise.

**Keywords:** Alango Foundation; innovative health system; biomedical analyses; traditional therapies; standardized drugs; reference hospitals in African medicine.



**Dr. NGOMO Orléans\***

**Optimization of adsorption parameters of carotenoids from palm oil on montmorillonite clays for using in mask face  
Poster P2**

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The adsorption of carotenoids from palm oil on montmorillonite clays from Maroua in the Far North region of Cameroon has been carried out by optimisation of some parameters. The physico chemical characterisation of carotenoids was performed by determination of absorbance using the UV-Visible Spectrophotometer and making High Performance Liquid Chromatography. The amount of carotenoids adsorbed is determined by making the difference in optical density before and after adsorption. In order to determine the magnitude of adsorption from a reduced number of experiments, the centered composite plane was adopted through three factors which can influence the adsorption: time (15-45 min), temperature (25 - 65 ° C) and the concentration (20 - 50 mg / L). Of these three independent variables, the concentration is the factor which has a greater influence on the response surface and the iso-response of the adsorption (about 84%), while temperature influences the least (i.e. around 0, 77%). The optimum amount of carotenoids adsorbed is 1.76 mg.g-1 for the contact time values of 30 minutes and the initial concentration of 35 mg / L. The coefficient of determination, the absolute analysis of the mean deviation, the bias factor and the accuracy factors made it possible to validate the model.

**Keywords:** Clays, carotenoids, adsorption, optimization.

**Dr. NDARUSANZE Jean Berchmans\***

**Quality of life among patients with schizophrenia at Kamenge Neuropsychiatric Center  
Poster P3**

*Dr. Jean Berchmans NDARUSANZE*

*Université du Burundi*

*Ph. D Neuroscience Student*

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Background: Schizophrenia affects many domains of the patient's life and results in poor quality of life (QoL). QoL assessment can help in improving schizophrenia patients' care.

Research prospect: This study assessed the QoL of schizophrenia patients to determine the level of their social cognition, and then use the QoL measure results to make possible future schizophrenia patients' assistance improvement through medical and social assistance.

Method and Materials: A cross-sectional study involved 30 patients with schizophrenia. Standard statistical methods as implemented in the IBM SPSS 25 were fitted. Central tendency variables (frequency, mean) and percentages analysis were fitted. The S- QoL 18: Quality of Life Scale in 18 Items phrasing in Kirundi translation was used [2].

Results: The mean ( $\pm$  Standard deviation) score of the QoL with schizophrenia  $57.4544 \pm 27.66297$ . When the mean ( $\pm$  Standard deviation) score of the WHO QoL-BREF scale is  $74.34 \pm 15.83$ . There is a significant association between symptomatic remission and QoL. We consider that the symptomatic remission level of the QoL subscales mean score measure is "As usual plus More than usual" which totalize 57.62%. The prior study such as the Quality of life assessment needs to be implemented to improve the social and medical schizophrenia patients' assistance;

Keywords: Assessment, Care, Scale, Social cognition, Cross-sectional study

**Prof. Dr. FOKUNANG Charles**  
**Global Novel Technologies and Genetic Engineering in the management of COVID-19 and future response to**  
**Pandemics.**  
**Poster P4**

**Charles FOKUNANG\***, *Estella Achick Tembe Fokunang*

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**Background and methods:** As the coronavirus (Covid-19) pandemic spreads, technological applications and new innovation initiatives are being developed in order to address the challenging filed situations, therapeutic intervention in a safe, effective and quality manner. This is done in order to facilitate the efforts of overworked healthcare workers, while developing new, effective vaccines. At a time when everyone needs better information, including epidemic disease modellers, state authorities, international organizations, social distancing, digital information and surveillance technologies are deployed in a global uncoordinated manner for collecting data and produced evidence to support public health decision-making. The new technologies- Artificial intelligence, robots and drones being deployed to help track the disease and enforce restrictive measures; while scientists are frantically applying gain of function research in gene editing, synthetic biology and nanotechnologies with the aim of preparing and test future vaccines, treatments and diagnostics. Blockchain applications can track contagion, manage insurance payments, and uphold medical supply chains. Furthermore, 3D printing and open-source technologies seem capable of sustaining the effort of governments and hospitals around the world to meet the increasing need for medical.

**Results:** This paper aims at presenting a non-exhaustive overview of the technologies currently in use, putting more highlights on their main features and significance in the fight against the coronavirus pandemic, focusing on the way they are being used to monitor and contain the rapid spread of the disease.

**Conclusion:** The new technologies ensure that public health institutions maintain their capacity to meet the ever-increasing needs caused by COVID 19.

**Key words:** COVID-19, New technologies, pandemic disease, Artificial intelligence, gain of function research.

**Prof. Dr. TEMBE Achick Estella**  
**Strengthening Public Health as the Foundation of the Health System and First Line of COVID -19 Defense**  
**Poster P5**

***Estella Achick TEMBE\*** ; Charles Ntungwen FOKUNAN*

*Department of Pharmacotoxicology and Pharmacokinetics, Faculty of Medicine and Biomedical Sciences, The University of Yaoundé I, Cameroon.*

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**Background and methods:** National public health systems are essential components of the first line of defense against the threat of pandemic diseases. Public health capabilities and infrastructure at a national level are the foundation of a global health risk framework management. The public health objectives can only be achieved within a highly-functioning and resilient health care system with effective primary care delivery. Public health and primary care are so interdependent and interlinked that talking about them as separate functions are counter-productive.

**Results:** We closely developed an insight into the Primary care, as part of the health care system, as a fundamentally patient-centered, as well as public health focused on population health. A primary health care system without the support of strong public health capabilities will lack the ability to monitor disease patterns and to plan and mobilize the scale of response required to contain an outbreak. This paper gives an overview of a public health system approach in building a strong primary care capability in order to pick up the initial cases of an outbreak and the delivery system to execute an effective response strategy. In the context of countering the threat of infectious diseases, public health and primary care serve the same ultimate objective—improving the health security of individuals.

**Conclusion:** Public health approaches is challenging from the macro level by looking at the health security of the population, cascading from the national level down to the community level.

**Key words:** Public health, capacity building, strong primary health care facility

Dr. Gebremariam Birhanu

**Evaluation of Quality and Antimicrobial Efficacy of Locally Manufactured Ethanol-Based Hand Sanitizers Marketed in Addis Ababa, Ethiopia in the Era of COVID-19**  
Poster P6

Muluken Nigatu Selam<sup>1</sup>, Bruck Messele Habte<sup>1</sup>, Tesfa Marew<sup>1</sup>, Motlalepula Matsabisa<sup>2</sup>, **Gebremariam Birhanu**\*<sup>1,2</sup>

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<sup>2</sup>Department of Pharmacology, Faculty of Health Sciences, University of the Free State, Bloemfontein, South Africa.

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**Background:** Coronavirus disease 2019 continues to spread worldwide. Hand hygiene, via either regular handwashing with soap and water or using hand sanitizers, is among the various measures that need to be followed to control the outbreak of the disease. Alcohol-based hand sanitizers are the “gold standard” for hand disinfection because of their broad antimicrobial spectrum of activity, easy availability, better safety profile, and general acceptability to users. This study aimed at evaluating the physicochemical quality and antimicrobial efficacy of the locally manufactured Ethanol-Based Hand Sanitizers (EBHS) marketed in Addis Ababa, Ethiopia.

**Methods:** A cross-sectional survey was used to collect EBHSs from Addis Ababa marketplaces. A total of 25 sample products were randomly selected from the different categories. The physicochemical evaluation of the products was carried out as per the USP and WHO standards. *E. coli*, *Klebsiella*, *P. aeruginosa*, *S. aureus*, *Salmonella*, and *Shigella* spp clinical isolates were used for the antimicrobial efficacy test.

**Results:** The FTIR result confirmed that all the test products met the identification test for ethanol. The majority (68%) of EBHSs complied with the test for ethanol content (75 – 85% v/v). However, only 3 products fulfilled the hydrogen peroxide content (0.112 - 0.137% v/v). LPC307 showed the maximum zone of inhibition of 12 mm against *E. coli*; whereas, MPC204 exhibited only 3 mm. LPC101 was found to be more sensitive to *Shigella* and *Klebsiella* Spp with MIC values of 20% and 10%, respectively. The sample LPC101 showed a minimum bactericidal concentration of 20% against *E. coli*, *P. aeruginosa*, and *Klebsiella* spp.

**Conclusion:** One-third of the tested EBHSs did not comply with the ethanol content limit and the majority of the products failed to meet the label claim for hydrogen peroxide content. Besides, nearly all products proved to have activity against all the tested pathogenic microorganisms; though, they did not show 99.9% bacteriostatic or bactericidal activities as claimed. The study findings suggested regular monitoring of the quality of marketed EBHSs considering the current wide use of these products

**Keywords:** Antimicrobial efficacy, COVID-19, Ethanol-based hand sanitizer, Quality evaluation.

ATINDO Songwe Thierry

Chemical characterization and insecticidal effect of *Moringa oleifera* L. seeds extracts on common bean weevil  
(*Acanthoscelides obtectus* Say)

Poster P7

\*Thierry Songwe Atindo<sup>1</sup>, William Norbert Tueguem Kuate<sup>2</sup>, Gokhan Zengin<sup>2</sup>

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**Background and Methods :** High losses of common bean during storage is caused by some insects; example *Acanthoscelides obtectus* Say. Chemical insecticides are commonly used to control insects, but their overuse has adverse effects on the environment and consumers' health. There is therefore, the need of an alternative control method. The objective of this study is to evaluate the chemical characterization and insecticidal effect of *Moringa oleifera* seed extracts on the developmental stages of *Acanthoscelides obtectus* in stored beans. Three types of *Moringa oleifera* seed extracts, namely methanol, ethanol and acetone extracts, were used at doses of 12.5, 25 and 50µl/ml each, with three repetitions per extract. HPLC-MS was used to characterize these extracts. The toxicity of extracts against the adults, the number of eggs and the viability rate of laid or emerged eggs of *A. obtectus* were evaluated.

**Results ;** As results, the study showed that *M. oleifera* seeds extract are rich in numerous compounds such as polyphenols and organic acid. The acetone extract, from day 2, showed a 100% mortality rate in all doses compared to about 14% in the control treatment. The number of eggs laid in the control (236.67) was very high compared to null (0) in acetone treatment at 50µl/ml.

**Conclusion :** *Moringa oleifera* seed extracts significantly reduced the damage caused by *A. obtectus* on stored *P. vulgaris* at dose of 50µl/ml.

**Key words:** *Acanthoscelides obtectus*, *Moringa oleifera*, *Phaseolus vulgaris*, chemical characterization, toxicity.

KEPAWOU GuaeUe Manuela

Phytochemical and antibacterial study of the leaves of *Coula edulis* (Olacaceae) a medicinal plant find in Cameroon  
Poster P9

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Various secondary metabolites contained in medicinal plants have revealed many therapeutic potentials for diseases. Several studies conducted all over the world on plants belonging to the Olacaceae family have shown that they are very rich in these metabolites. It is within this framework that we are interested in *Coula edulis* by its various uses in traditional medicine. The stem bark is used to treat the ulcers, and they are also applied in form of decoction for diarrhea and oral infections. In addition, minquartinoic acid,  $\beta$ -sitosterol 3-*O*- $\beta$ -*D*-glucoside, a mixture of  $\beta$ -sitosterol and stigmasterol, and *n*-hexadecanoic acid have been previously reported from the stem bark of *C. edulis*. This work is to isolate and characterize bioactive compounds present in the leaves of *Coula edulis*. The structure of compounds were elucidated on the basis of 1D and 2D NMR spectroscopic data and by comparison with those reported in the literature. The phytochemical investigation of the dichloromethane/methanol (1:1) extract of the leaves of *Coula edulis* a medicinal plant belonging to genus *Coula*, led to the isolation and characterization of fourteen compounds including taraxerol (**1**), 3 $\beta$ -*E*-coumaroyltaraxerol (**2**), 3 $\beta$ -*Z*-coumaroyltaraxerol (**3**) a mixture of  $\beta$ -sitosterol (**4**), and stigmasterol (**5**),  $\alpha$ -amyrin (**6**), betulin (**7**), stigmasterol 3-*O*- $\beta$ -*D*-glucoside (**8**),  $\beta$ -sitosterol 3-*O*- $\beta$ -*D*-glucoside (**9**), lupeol (**10**), lupenone (**11**), ursolic acid (**12**), *n*-hexadecanoic acid (**13**), *D*-mannitol (**14**). The structure of compounds **1-14** were elucidated on the basis of 1D and 2D NMR spectroscopic data and by comparison with those reported in the literature. Compounds (**1-3**; **7**; **10-12** and **14**), were reported for the first time from the genus *Coula*. Compounds (**2**; **3**; **6**; **8** and **14**), were reported for the first time from Olacaceae family. Crude extract, compounds (**2** and **3**) were evaluated for their antibacterial activity. Compounds (**2** and **3**) demonstrated moderate activity against *Shigella flexneri* 518 with MIC values of 100  $\mu$ g/mL. The present study shows *C. edulis* having potent antibacterial activities. These results also confirm its use in the treatment of diarrhea

**Keywords:** *Coula edulis*, leaves, ethnobotanical study, phytochemical, compound, antibacterial activity.

TENE Denis-Grégoire

Phytochemical study and evaluation of antibacterial activity of *Psorospermum aurantiacum* Engl. (Hypericaceae)  
Poster P10

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**Background and methods :** Even though traditional medicine is very successful in the fight against several diseases, accidents have occurred in some case. This is due to side effects of healing potions, the composition of which are badly know scientifically. In that case, a knowledge of chemical composition, biological properties of medicinal plants extracts and constituents will help introduce scientific bases and advice in the practice of traditional medicine. With this aim in view, we have undertaken phytochemical and biological studies of medicinal plant: stems of *Psorospermum aurantiacum*. It's go in potions destined to cure gastrointestinal, urinary, dermatological infections, venereal diseases, sterility and epilepsy. After collection the twigs, she was dried powdered and extracted by the maceration at room temperature with methanol. The crude extract obtained was subjected for their antibacterial activities against wide range of microorganisms using microdilution method.

**Results:** From the ethyl acetate fraction, we have some isolated compounds using chromatographic methods to afford six pure compounds including one new named xanthonolignoid (cadensin H) and five known among which, two xanthenes (1,5,6-trihydroxy-7-methoxyxanthone and 1,7-dihydroxyxanthone) and three lupane-type triterpenes skeleton (betulin, lupeol and betulinic acid). The methanolic extract and ethyl acetate fraction showed a moderate antibacterial activity against *Shigella flexneri*, *Staphylococcus aureus*, *Salmonella typhi*, *Escherichia coli* and *Klebsiella pneumonia* with an MIC value ranging of 250 to 1000  $\mu\text{g}/\text{mL}$ . Among all tested compounds, only one, 1,5,6-trihydroxy-7-methoxyxanthone displayed a significant antibacterial activity against some bacteria strains tested above with MIC value ranging of 12.5 to 50  $\mu\text{g}/\text{mL}$ .

**Conclusion:** Methanolic extract, ethyl acetate fraction and pure compounds from *Psorospermum aurantiacum* exhibited a broad-spectrum of antibacterial activity. These findings could be exploited to justify the use of this plant in the treatment of infectious diseases in traditional medicine.

**Keywords:** *Psorospermum aurantiacum*; stems; xanthonolignoid; antibacterial activity.



MAFO Fokam M. A  
Chemical constituents from the trunk bark of *Hypericum perforatum*  
Poster P11

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**Background and methods:** Plant of *Hypericum* genus are widely used in folk medicine for the treatment of inflammation, bacterial and viral infections [1]. These traditional uses led many scientists around the world to focus their research on the phytochemical and pharmacological investigations of the genus *Hypericum*. As results, several metabolites of diverse classes with interesting biological properties were isolated and characterized (benzophenones, naphthodianthrones)[2].As part of our continuing search, we carried out *using chromatographic techniques*; the chemical investigations on the trunk bark of *Hypericum perforatum*, a perennial herb with about 40 to 80 cm high widely dispersed in Central Africa.

**Results:** The chemical investigation on the trunk bark of *Hypericum perforatum* resulted in the isolation of two diterpenoid derivatives (1-2), and four known compounds (3-6). The structures of the compounds were elucidated by means of spectroscopic methods (MS, IR, 1D and 2D NMR) as Kaurenoic acid (1), 2-Oxokolavenic acid (2), 5-hydroxy-6,7,4'-triméthoxyflavone (3), 5-hydroxy-3,7,4'-triméthoxyflavone (4), formononetin (5), and 7,8,4'-triméthoxyisoflavone (6). Compounds 1 and 2 were isolated from the genus *Hypericum* for the first time.

**Conclusion:** This is the first report for isolation of diterpenoids (1-2) from genus of *hypericum*. Flavonoids (3-6) are commonly found in plants belonging to this genus, but diterpenoids (2) is rare in genus of Clusiaceae.

**Keywords:** Clusiaceae; *Hypericum perforatum*; diterpenoids.

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**TCHASEP WANDJI Nadège**  
**Diagnosis of a new disease in *Jatropha curcas* L. in Cameroon Poster**  
**P12**

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*Jatropha curcas* L. (commonly called physic nut in English) is a small tree that belongs to the *Euphorbiaceae* family. It is considered as an important source of energy and is also harvested for the production of oil that can be used as an important alternative energy resource. The overall objective of this study is to contribute to the development of *Jatropha* cultivation through a better understanding of its pathogens. The completion of this study required a morphological and molecular identification of microorganisms present on diseased organs of *J. curcas* in Cameroon. A morphological and molecular identification of causal agents was needed to carry out this study. The morphological identification was done by the culture of fungal isolates on water agar medium in the presence of double-sterilized pine needles, 24 fungi isolates from infected organs of the host plant were obtained and purified in a PDA medium. The BLAST algorithm was used to identify in the public database sequences having the highest similarity with the sequences obtained. *J. curcas* seeds were sown to produce artificial inoculations. It stands out from the analysis of results that all isolates sporulated. After the Blast, eight sequences were identified without ambiguity as *Lasiodiplodia parva* whereas, the sequences of six isolates not corresponding to any sequence present in the database, could be those of a new species of *Lasiodiplodia*. One-year old *J. curcas* plants grew well for the achievement of inoculations. After inoculation, they showed streaks along the cambium, presented lesions on the cambium after inoculations. The lengths of the lesions were 9.5; 6.7; 6.2 and 5.9 cm respectively for the isolates TS7, TS12, TS2 and TS9. The mycelium isolated from inoculated plants was similar in culture plates to the original one from infected samples. This suggests that, the causal agent *Lasiodiplodia parva* is responsible of *Jatropha* dieback.

**KEYWORDS:** *Jatropha curcas*, causal agent, dieback, *Lasiodiplodia parva*.

IKOME Hermia N.

Search for antiplasmodial compounds from two Cameroonian *Zanthoxylum* species: *Z. gilletii* and *Z. dinklagei*  
(Rutaceae)  
Poster P13

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**Background and methods** : Malaria caused by the parasite *Plasmodium falciparum* is recognized as one of the most threatening diseases worldwide. It is the leading cause of illness and death in many developing countries.

Current drugs used for treatment are either from plant sources or developed from compounds isolated from plants. Nonetheless, the parasite continuous to developed resistance to these drugs.

Several species of the genus *Zanthoxylum* (Rutaceae) including *Z. gilletii* are being used in Cameroon traditional medicine for the treatment of malaria.

In the current study, the antiplasmodial potential of the DCM/MeOH (1:1) stem bark extracts of *Z. gilletii* (ZM) and *Z. dinklagei* (ZD) obtained by cold percolation along with their constituents obtained by column chromatography were investigated.

**Results:** Eight compounds, lupeol (1), a coniferyl alcohol (2), fagaramide (3), nitidine (4), chelerythrine chloride (5), hesperidin (6), arnottianamide (7) and sucrose (8) were isolated from ZM and six compounds, lupeol (9), decarine (10), stigmasterol (11), hibalactone (12), sesamine (13) and rutaecarpine (14) from ZD respectively. The structures of the compounds were established using 1D and 2D NMR spectra and by comparison with published data. The crude extracts and compounds were tested for the antiplasmodial activity against the chloroquine resistant strain W2 of *P. falciparum*. Both stem bark extracts showed significant activities against W2 strain of the parasite with IC<sub>50</sub> values of 8.3µg/ml and 3.2µg/ml for ZM and ZD respectively. Nitidine (4), chelerythrine (5) chloride and decarine (10) all benzophenanthridine type alkaloids were the most active compounds with IC<sub>50</sub> values of 3.18µM/ml, 3.87µM/ml and 4.95µM/ml respectively.

**Conclusion:** To the best of our knowledge, this is the first report on the antiplasmodial activity of the DCM/MeOH (1:1) stem bark extract of *Z. dinklagei*. Furthermore, the two isolated compounds; corniferyl alcohol and sucrose are reported for the first time from the DCM/MeOH (1:1) stem bark extract of *Z. gilletii*. This study valorizes the use of *Z. gilletii* in traditional medicine for the treatment of malaria.

**Keywords:** *Z. gilletii*, *Z. dinklagei*, isolation, characterization, antiplasmodial activity.

TONBOU Calixte

Isolation and evaluation of the antiplasmodial activity against polyphenolic compounds of *Bersama engleriana* Gürke (Melianthaceae)  
Poster P14

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**Background and methods:** Plants are the reservoirs of secondary metabolites playing an important role in their protection and defense against insects and parasites. In fact, they are occupied the important place to human health because they are on the basis of must drugs. In Africa, malaria is leading cause of people death because access to modern health care is not easy, that is raison to use a plants for treatment. In this work, we set out to evaluate the antiplasmodial activity to the *Bersama engleriana* Gürke (Melianthaceae).

The air dried and powdered leaves of *B. engleriana* were extracted by maceration with acetone and methanol successively at the room temperature. Both extract were divided into three parts. The first parts of extracts were submitted to phytochemicals screening: The second parts were used in one hand, to antimicrobial test against Gram-positive bacteria strains: *Bacillus subtilis* (DSMZ 704), *Micrococcus luteus* (DMSZ 1605), *Staphylococcus warneri* (DSMZ 20036) and Gram-negative bacteria strains: *Pseudomonas agarici* (DSMZ 11810) and *Escherichia coli* (DSMZ 11810) by the inhibitor diameter method in agar medium. And the other hand to evaluate the antiplasmodial activity by SYBR green I-based fluorescence assay. The third parts were submitted to fractionation owing to the use of repeated silica gel column chromatography.

**Results:** The phytochemical screening of extracts revealed the presence of flavonoids, saponins, phenolic compounds, coumarins, tannins and triterpenes. The separation on chromatography column afforded nine compounds namely: 3- $\beta$ -hydroxylurs-12-en-28-oic acid (**1**), 3- $\beta$ -glycoside ursolic acid (**2**),  $\beta$ -stigmasterol (**3**), glycoside  $\beta$ -stigmasterol (**4**),  $\beta$ -sitosterol (**5**), glycoside  $\beta$ -sitosterol (**6**), mangiferin (**7**), Bersapigenin A (**8**), Bersapigenin (**9**). The antimicrobial activity showed low sensitivity against all strains and the antiplasmodial activity showed good and moderate activity respectively against Bersapigenin and Bersapigenin A.

**Conclusion:** This results suggest that *B. engleriana* could be justified for it antiplasmodial uses

**Keywords:** Melianthaceae, *Bersama engleriana*, antiplasmodial activity

MEKEMZEU FANKEM Patience

Contribution of four *Myrtaceae* species and cocoa butter in the fight against dermatophytosis caused by *Trichophyton rubrum* and *Trichophyton soudanense*: a formulation trial.  
Poster P15

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**Background and methods:** Dermatophytosis are infectious diseases caused by keratinophilic fungi called dermatophytes. They are increasing these recent years, especially in poor and developing countries. However, current chemical treatments have many drawbacks, including the recurrence of infections, side effects, high cost and long duration of treatments. It is therefore urgent to find new, more effective and less restrictive means of control. Our work aimed to evaluate the *in vitro* antidermatophytic activity of four essential oils from the leaves of *Myrtaceae* species against *Trichophyton rubrum* and *Trichophyton soudanense* and to test a cocoa butter-based formulation. For this purpose, essential oils of *Syzygium aromaticum*, *Syzygium guineense*, *Callistemon citrinus* and *Callistemon rigidus* leaves were extracted by hydrodistillation using a Clevenger apparatus and their constituents were identified by gas chromatography coupled with mass spectrometry. The antidermatophytic activity was evaluated by the agar incorporation method and the most active essential oil was used with cocoa butter to produce a formulation whose action was tested on the mycelial growth of both dermatophytes.

**Results:** The extraction yields were ranged from 0.1% to 0.9%. All essential oils were more active than griseofulvin (MIC>8000ppm) against the two dermatophytes studied. Indeed, the essential oil of *S. aromaticum* showed minimum inhibitory concentrations (MIC) of 1000 and 1100ppm against *T. rubrum* and *T. soudanense* respectively; the other essences had MICs higher than 8000 ppm with respective inhibition percentages of 67.79% and 63.42% for *S. guineense*, 47.07% and 71.06% for *C. citrinus*, 63.29% and 80.28% for *C. rigidus* against *T. rubrum* and *T. soudanense*. Finally, the tested formulation was also found to be more active on the mycelial growth of dermatophytes than griseofulvin with inhibition percentages above 80%.

**Conclusion:** These results showed that *Syzygium aromaticum* leaves essential oil, more active than the others, can be used for the formulation of phytodrugs against dermatophytosis.

**Keywords:** antidermatophytic, cocoa butter, essential oils, formulation, *Myrtaceae*,

TOKO GUIZOKO Einstein

Chemical constituents of one Cameroonian medicinal: *Maracanga monandra* (Euphorbiaceae)  
Poster P16

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**Background and methods:** *Maracanga* genus belonging to the Euphorbiaceae family, in Cameroon we have eleven species among which *Macaranga monandra*. This plant used in African traditional medicine for treatment of some disease among which, sterility, dyspnoea, intercostal neuralgia etc... The previous chemical study of *Maracanga* genus permit to isolate several classes of secondary metabolites including flavonoids, diterpenoids, steroids, stilbenoids and tanins. Some of these compounds exhibited a wide range of biological activities such as antibacterial, antifungal, antimalarial, cytotoxicity, anti-inflammatory, antiviral and antitumor. The fruit of *Maracanga monandra* was extracted by maceration with MeOH at room temperature. The methanolic extract of fruit obtained was subjected to Vacuum Liquid chromatography (VLC) using *n*-hexane-EtOAc gradient to afford four main fractions. After fractionated, *n*-Hex-EtOAc (3 :1) fraction was chromatographed over silica gel column and sephadex (LH-20) to yield pure compounds. Their structures were determined by means NMR 1D and 2D in conjunction with mass spectrum.

**Results:** From the *n*-Hex-EtOAc (3 :1) fraction of fruit from *Maracanga monandra* we were able to isolate eleven known pure compounds among which we can cite: two triterpenoids, three coumarins and six flavonoids. The structures of all isolated compounds were fully elucidated using spectroscopic techniques and by comparison of their spectral data with those of the literature.

**Conclusion:** The phytochemical investigation of *n*-Hex-EtOAc (3 :1) fraction of fruit from *Macaranga monandra* led to the isolation and identification of eleven pure compounds.

**Keywords :** *Maracanga monandra*, Euphorbiaceae.

**KACHE FOTSING Sorelle**

**Bio-guided investigation of a Cameroonian medicinal plant with anticandidal activity: *Monotes kerstingii*  
(Dipterocarpaceae)  
Poster P17**

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**Background and Methods:** Candidal vaginitis is the most frequent superficial manifestation of *Candida* infection which usually affect more than 75% of women. For that worries, health authorities and the WHO present medicinal plants as the best sources for obtaining drugs which could improve the health care of population. This work aim to perform a bio-guided study of *Monotes kerstingii*, a plant traditionally used for the treatment of fungal infections. *Monotes kerstingii* root bark crude extract (MKR) and leaf crude extract (MKL) were prepared and screened against five *Candida* strains using fluconazole as positive control. These extracts were then fractionated and the resulting fractions were submitted to anticandidal activity. Active fractions were further purified by the means of usual chromatographic methods to obtain pure compounds whose structures were elucidated using their spectrometric and spectroscopic data. In order to determine the active principles of these fractions, isolated compounds were assessed for their anticandidal activity as well.

**Results:** Both extracts displayed MICs ranging from 31.5 µg/mL to 2000 µg/mL. MKL was the most active with MIC values of 31.5, 62.5, 62.5, 500 and 2000 µg/mL respectively on *C. parapsilosis*, *C. albicans*, *C. krusei*, *C. tropicalis* and *C. glabrata*. The best activity was recorded with the ethyl acetate fraction showing MIC values of 125 µg/mL on *C. albicans*. From these fractions, twenty two pure compounds including: one triterpene, one ellagic acid, one chromene, three phytosterols, three stilbenes, three stilbene-coumarins, seven flavonoids and three mixtures of cis and trans stilbene-coumarin derivatives were isolated and screened. The stilbene 5-[(1E)-2-(4-hydroxyphenyl) ethenyl]-4-methoxyphenyl}-2-methyl-1-propanone showed the best activity against the five tested strains with MICs ranging from 7.81 to 15.56 µg/mL.

**Conclusion:** The Bio-guided investigation of *Monotes kerstingii* can lead to the formulation of an effective standardized phytomedicine that can be integrated into our health care system for sustainable development.

**Keywords:** *Candidiasis*, *Monotes kerstingii*, *stilbene*, anticandidal activity, phytomedicine

**DZEFFOUO KOUCHELE Beauvarine**

**Chemical investigation of *Cnestis ferruginea* vahlex dc (connaraceae) and evaluation of the anti-bacterial properties  
Poster P18**

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**Background and methods:** Antimicrobial resistance (AMR) which occurs when changes in bacteria cause the drugs used to treat infections to become less effective has emerged as one of the leading public health threats of the 21<sup>st</sup> century. In 2019, more than 1.27 million deaths were associated to AMR with *Escherichia coli* being responsible for most of the deaths followed by *Staphylococcus aureus*. Faced with this critical situation, the discovering of new antibacterial molecules or phyto-preparations is an urgent need. For this purpose, plants are generally sources of bioactive secondary metabolites. The aim of this work is to investigate, chemically and pharmacologically for its antibacterial potential of *Cnestis ferruginea*, a plant used in traditional medicine to treat some bacterial ailments. The different crude extracts obtained by maceration from *C. ferruginea* were submitted to antibacterial screening using the micro-dilution method. The CH<sub>2</sub>CL<sub>2</sub>/MeOH (1:1) crude extracts obtained from each part were subjected to flash chromatography or liquid-liquid partition to afford five fractions, of which each were submitted to antibacterial tests. The fractions obtained from the leaves and roots were further chromatographed over silica gel column chromatography eluted with solvents of increasing polarity.

**Results:** The CH<sub>2</sub>CL<sub>2</sub>/MeOH (1:1) crude extract of root showed a good and moderate activity against *S.aureus* CPC, *S. aureus* ATCC4330, *E.coli* ATCC 25923 and *S.aureus* MR3359 with a MIC value were 125, 62.5, 250, 500 μg/mL respectively. All the fractions obtained were subjected to the antibacterial test and the results are in progress. Fifteen and ten compounds were isolated from CH<sub>2</sub>CL<sub>2</sub>/MeOH (1:1) crude extract of the leaves and roots respectively. <sup>1</sup>H and <sup>13</sup>C NMR analysis of all these compounds are under process and three have already identified to mixture of β-sitosterol and stigmasterol glucoside, vitexin and robustaside B.

**Conclusion:** Preliminary results of this study show that, the roots of *Cnestis ferruginea*, can be used to treat some diseases due by *S.aureus* and *E.coli*.

**Keywords:** *Cnestis ferruginea*, Antimicrobial resistance, Sterol, Flavonoids, Antibiotics.



KAMDEU Elodie

Cytotoxic Steroidal saponins from roots of *Asparagus schweinfurtti* (Asparagaceae)  
Poster P19

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**Background and methods:** Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from plants, many based on their uses in traditional medicine. Saponins include a diverse group of compounds characterized by their structure containing a steroidal or triterpenoid aglycone and one or more sugar chains. Saponins have health benefits such as cholesterol lowering and anticancer properties. Saponins are the active components in many herbal medicines and contribute to the health benefits of foods such as soybeans and garlic. Pharmaceutical applications of saponins include as raw materials for production of hormones, immunological adjuvants, and drugs. The root of *Asparagus racemosus* is used in traditional Indian medicine as a galactagogue and for the treatment of diverse ailments including dysentery, tumors, inflammations, neuropathy, nervous disorders, bronchitis, hyperacidity, certain infectious diseases. It is in this perspective that our project is part of the phytochemical and pharmacological study of saponins from a Cameroonian medicinal plant *Asparagus schweinfurtti* and the evaluation of its anticancer and cytotoxic activities. This plant has been reported to have anticancer, antiabortion, anti-diarrheal, antiplasmodial and antioxidant activities.

**Results:** The methanol extract of roots tuber of *Asparagus schweinfurtti* was fractionated and purified using chromatographic methods, to afford sixteen compounds. The structures of these compounds were elucidated using modern spectroscopic methods such as 1D NMR (<sup>1</sup>H, DEPT and <sup>13</sup>C) and 2D NMR; Mass spectroscopy. Amongst these compounds, six are described here for the first time.

These are

5 $\beta$ -spirost-25(27)- $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 2)- $\beta$ -D-glucopyranosyl; (25R)spirost-5 $\beta$ -one-23-O- $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 6)- $\beta$ -D-glucopyranosyl; (25R)spirost-3-hydroxy-23-O- $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 6)- $\beta$ -D-glucopyranosyl;

(25R)spirost-5 $\beta$ -one-23-O- $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 6)- $\beta$ -D-glucopyranosyl;

17 $\beta$ -hydroxy-5 $\beta$ -spirost-25(27)- $\beta$ -D-glucopyranosyl-(1 $\rightarrow$ 2)- $\beta$ -D-glucopyranosyl;

(25S)-22-methoxyfurost-5 $\beta$ -triol 3-O-[[ $\alpha$ -L-rhamnopyranosyl-(1 $\rightarrow$ 2)]-[ $\alpha$ -L-rhamnopyranosyl-(1 $\rightarrow$ 4)]- $\beta$ -D-6-acetyl-glucopyranosyl-26-O- $\beta$ -D-glucopyranosyl}.

Fractions and pure isolated compounds were evaluated *in vitro* for their cytotoxic activities against OVC-5 (human ovary carcinoma *cell*) and HepG2 (human liver carcinoma *cells*). Some compounds and fractions have shown important inhibiting activities. the cytotoxicity activities is in progress on other cancer cells such as H-125 (lung cancer *cell*), PANC-1 (**human pancreatic cancer**) and U251N (**human glioblastoma**).

**Conclusion:** Six new saponins with unprecedented glycosylation at C-23 of the aglycon have been isolated from *Asparagus schweinfurtti*. Some compounds and fractions have shown important cytotoxic activities against two human cancer lines. This may account for the use of this plant in traditional medicine to treat cancers.

**Keywords:** Traditional medicine, *Asparagus schweifurthii*, chromatography, saponins, cytotoxicity.

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**Chemical constituents from fruits of *Cnestis ferruginea* Vahl ex. DC (Connaraceae) and evaluation of their anticholinesterase and antiradical activities**

Poster P20

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**Background and Methods:** Alzheimer's disease (AD) is the most common form of dementia mostly in old people, characterized by low acetylcholine levels and oxidative stress, involving progressive neurodegeneration with formation of amyloid- $\beta$  deposits in the brain. A proper strategy to overcome AD is through the inhibition of the cholinesterase enzymes, both acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) which helps to increase acetylcholine levels in the brain and this is necessary for neurotransmission, memory, reasoning, and other cognitive activities. *C. ferruginea* was subjected to phytochemical investigation, in search for bioactive secondary metabolites which were in turn evaluated for their anticholinesterase and DPPH radical scavenging activities. The methylene chloride/methanol extract of fruits of *C. ferruginea* was subjected to column chromatography over silica gel and eluted with a mixture of n-hexane-ethyl acetate and ethyl acetate-methanol gradients polarity. The structures of pure compounds were established using physical and spectroscopic data and were assessed for their anticholinesterase and DPPH radical scavenging activities.

**Results:** Purification of the different fractions led to one new quinic acid derivative: ferruginic acid, with six known compounds so  $\beta$ -sitosterol 3-O- $\beta$ -D-glucopyranoside, scopoletin, vitexin, 3-hydroxyvitexin, bergenin and 2-(1,3,4,5-tetrahydroxycyclohexyl)acetic acid. Ferruginic acid exhibited moderate anticholinesterase activity against AChE.

**Conclusion:** These results indicate that *C. ferruginea* and its constituents could be employed in the management of Alzheimer's disease.

**Keywords:** Ferruginic acid; *Cnestis ferruginea*; Connaraceae; anticholinesterase activity; DPPH scavenging.

**MBARGA ETOGA Paul**

**Chemical studies of two Cameroonian medicinal plants: *Macaranga hurifolia* (Euphorbiaceae), *Conyza aegyptiaca* (Asteraceae) and evaluation of their potential against *Staphylococcus Aureus*.  
Poster P21**

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**Background and methods:** *Staphylococcus aureus* is a bacterial pathogen that poses a serious public health threat and causes a wide range of infections such as soft tissue and skin infections, bacteremia, bloodstream, ear inflammation, digestive tract and lethal pneumonia. Methicillin-resistant *S. aureus* (MRSA) strains are associated to serious complications and poor clinical outcome. The increasing of infections cause by *S. aureus* is due to drugs resistance to the available treatment develop by the bacteria. Since 1944, *S. aureus* has developed successively penicillin, methicillin and vancomycin resistance. So there is an imperative need to develop research on new antibiotics agents with a reduced side effect. Our main goal is to obtain extracts or active fractions and determined their chemical composition in view to an attempt of formulation. To achieve that, we will extract and study the activity against *S. aureus* of extracts, fractions, combined fraction from both plant, isolate, purify, identify and characterize secondary metabolites from active fractions. Areal parts of *Macaranga hurifolia* and the whole plant of *Conyza aegyptiaca* were dried, powdered and extracted by maceration. The different crude extracts obtained were evaluated regarding their antibacterial potential against three strains of *S. aureus* using microdilution method. Extracts were fractionated, and purified through column chromatography. The structures of all isolated compounds were elucidated using spectroscopic techniques, particularly NMR 1D and 2D in conjunction with mass spectrometry (HR-ESIMS, LC-MS).

**Results:** Sixteen compounds were isolated and elucidated that including, three new compounds named conyflavone, conyditerpene A and conyditerpene B and thirteen known compounds. Tested extracts of both plants, displayed moderate antibacterial potential against *S. aureus* values ranging from 3.9 to 500 µg/mL.

**Conclusion:** The results of this study show that extracts of both plants can be used for the pre-formulation of a phyto-drug.

**Keywords:** *Macaranga hurifolia*, *Conyza aegyptiaca*, *Staphylococcus aureus*

**METIEFENG TANKO Nathalie**

**Isolation of some compounds from the methanol extract of *Graptophyllum pictum* (Asclepiadaceae)  
Poster P22**

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**Background and methods :** Plants have been used as medicinal remedies. According to the World Health Organization (WHO), about 80% of the world's population still relied on natural resources for health maintenance, especially in Africa, Asia, and Latin America. *Graptophyllum pictum* or popularly known as caricature-plant, is a medicinal shrub belong to the family of Acanthaceae. *Graptophyllum pictum* has been used widely to treat many diseases such as wound healing, antipyretic, analgetics, and menstrual problems. The leaves of *Graptophyllum pictum*, are traditionally used as anti-microbial, against inflammation, ulcers, abscesses, haemorrhoid, anaemia. Since few chemical studies have been reported characterizing the properties of *G. pictum* compounds, we have undertaken phytochemical studies of this medicinal plant. After the collection of the plant, it was dried, powdered and extracted by the maceration at room temperature with methanol. We have isolated seven pure compounds using chromatographic methods. On the basis of conventional one-dimensional spectroscopic analysis methods and by comparison with the literature, the structures of five of these compounds were identified to be a mixture of **stigmasterol** and **sitosterol**, **a mixture of their glycoside**, the **glycoside of stigmasterol**, the **glycoside of sitosterol**, and the **lupeol**. The others three compounds are still being analyzed.

**Conclusion:** Methanolic extract lead us to the isolation of seven compounds. These compounds could be exploited to justify the use of this plant in the in the traditional medicine.

**Keywords:** *graptophyllum pictum*; acanthaceae; compounds.

SONFACK Gaiëlle

**Antibacterial and antibiotic-modifying activities of fractions and compounds from *Albizia adianthifolia* (Schum.)  
against MDR Gram negative enteric bacteria  
Poster P23**

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**Background:** Resistance of bacteria to antibiotics is one of the biggest problem on the world. In this study, methanol roots extract was subjected to chromatography techniques and fractions sub fractions with isolated phytochemicals were assessed for their antimicrobial as well as their antibiotic-potentiating effects towards Gram-negative multidrug resistant (MDR) bacteria.

**Methods:** The methanol extract obtained by maceration was partitioned into ethylacetate and *n*-butanol fractions respectively. Column chromatography followed by purification of different fractions was applied to isolate phytochemicals from the two fractions and their chemical structures were determined using spectroscopic techniques. The antibacterial activities of the samples were determined by the modified rapid p-iodonitrotetrazoliumchloride colorimetric assay, as well as those of antibiotics in association with the compounds.

**Results:** The phytochemicals isolated were stearic acid (1), a mixture of stigmasterol and  $\beta$ -sitosterol (2a + 2b),  $\beta$ - sitosterol 3-O- $\beta$ -D-glucopyranoside (3), palmatin (4), homomangiferin (5) and mangiferin (6). adianthifolioside GS<sub>1</sub> (7) and 3-O- $\{\beta$ -D glucopyranosyl(1 $\rightarrow$ 2)- $[\alpha$ -L-arabinopyranosyl(1 $\rightarrow$ 6)]- $\beta$ -D-glucopyranosyl}oleanolic acid (8). The fractions and isolated compounds were tested against eleven Gram-negative bacteria including multidrug resistant strains. Ethylacetate fraction exhibited selective inhibitory effects whilst all tested bacteria were inhibited by *n*-butanol fraction in MIC ranges of 8 to 1024  $\mu$ g/mL. Compound 9, 4, 2a + 2b, inhibited the growth of 6/11 (54,5%) tested bacteria, with the MICs ranging from 32 to 128  $\mu$ g/mL. Compound (7) revealed considerable inhibition against all the studied bacteria with MIC values ranging from 16 to 128g/mL. When tested with an efflux pumps inhibitor, the inhibitory effects of compounds 6 and 4 increased towards all the tested bacteria. In association with erythromycin, streptomycin and tetracycline, compounds 3 and 4 had the most significant synergistic activity on the seven selected bacteria

**Conclusion:** The present study provides information on the possible use of *Albizia adianthifolia* and its constituents in the control of Gram-negative infections including MDR phenotypes.

**Keywords:** *Albizia adianthifolia*, Antibiotic modifying activity, Mimosaceae, Phytochemicals, Multi-drug resistance.

Dr. NJABON Eric N

**Molecular Docking Investigations of the Interaction between Antimalaria Drugs and Models of Receptors from Human and *Plasmodium* Parasites**  
**Poster P24**

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**Background and Method:** Even though there has been a drop in malaria infections in the last decade, significant deaths in sub-Saharan Africa still results from the plasmodium falciparum parasite. In the absence of a widely acceptable vaccine, research continues to explore human and plasmodium receptors in the folate acid cycle for antimalaria drug activities. Homology modeling was used to build models of plasmodium telomerase reverse-transcriptase (pf-TERT) based on the availability of the sequence in Uniprot database that were significantly comparable with homologues from human. The same technique was used to build models of plasmodium dihydropteroate (pf-DHPS). The human receptors were obtained from the protein data bank (pdb). The receptor models were subject to energy minimization to obtain stable structures for docking as implemented in the Chimera Molecular Visualization package and the Auto Dock Vina software.

**Results:** Six antimalaria drugs including: chloroquine, artemisinin, pyrimethamine, sulfadoxine and pentamidine were individually docked with pf-TERT and plasmodium dihydropteroate pf-DHPS and their mutants. The binding ranged from -0.60 to -10.0 kcal/mol with artemisinin showing strongest binding in the set. The bindings were stabilized by polar interactions mostly involving aspartate and glutamate and non-polar interactions with leucine, phenylalanine, alanine and valine. The interactions decreased with increasing mutation with the same trends obtained for human and plasmodium receptors.

**Conclusion:** All six antimalaria bound with both human and plasmodium receptors, and slightly varied affinity which dwindled with increasing mutation of the receptors. The binding depended on the size and type of amino acid residues found in the active sites of the receptors. Weaker interaction with mutants might further be explored to understand resistance towards certain anti-malaria drugs.

**Key words:** malaria, binding energy, dihydrofolate reductase, dihydropteroate synthetase, FreeEnergy, telomerase reverse-transcriptase, Plasmodium falciparum, antimalarial drugs

TABAKAM TCHANGOU Gaétan

Further constituents from *Eriosema glomeratum*, semi-synthesis of dihydrochalcone derivatives and their cytotoxicity  
Poster P25

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**Background and methods:** This work was designed to isolate further compounds from roots and the aerial part of *E. glomeratum* and to evaluate the cytotoxicity of extracts, isolated compounds and semi-synthetic derivatives. This plant is used in folk medicine to treat wounds, venereal diseases, helminths and skin diseases. Chromatographic and spectroscopic techniques were used to isolate and characterize compounds. The evaluation of the cytotoxicity was carried out against three human [lung (A549), breast (MCF7), and cervical (HeLa)] cancer cell lines by using the 3-(4,5-dimethylthiazolyl-2)-2,5-diphenyl-tetrazolium bromide reduction assay.

**Results:** Seventeen compounds including two new (**1** and **2**) and fifteen known (**3** - **17**) were isolated. The semi-synthesis mainly acetylation and cyclization reactions were done on two dihydrochalcones isolated (**14** and **15**) to afford seven new derivatives (**18** - **24**) and a known one (**25**). The methanolic leaf extract had a strong activity on all the tested three cell lines (IC<sub>50</sub>, 8.4 to 13.1 µg/mL) whereas the *n*-hexane leaf extract showed a strong cytotoxicity toward MCF-7 (IC<sub>50</sub> 11.2 µg/mL) and moderate activity against HeLa and A549 (IC<sub>50</sub>, 22.7 and 41.3 µg/mL), respectively. Isolated compound **14** had strong activity against MCF-7 (IC<sub>50</sub> 7.4 µM). The derivative **18** showed strong activity against HeLa (IC<sub>50</sub> 6.3 µM) while **15** and derivative **19** had moderate activities on all the tested three cell lines (IC<sub>50</sub>, 10.4 - 46.6 µg/mL). Precursor **14** and diacetylated derivative **18** had strong and specific activity on MCF-7 (7.4 µM) and HeLa (6.3 µM). Derivatives **18** (6.3 µM) and **19** (22.9 µM) against HeLa was most potent than their precursor **14** (32.7 µM).

**Conclusion:** Our results on the isolation of seventeen compounds from *E. glomeratum* and the preparation of eight dihydrochalcone derivatives as well as their cytotoxic activity have further strengthened the previous findings of the effectiveness of certain compounds of the same classes against cancer.

**Keywords:** *Eriosema glomeratum*, Fabaceae, Constituents, Semi-synthetic derivatives, Cytotoxicity.



TCHAKOUAMO MATEFO Ornella Ingrid

Chemical investigation of two cameroonian medicinal plants with antiplasmodial activity: *Dialium excelsum* (Fabaceae) and *Brenania brieyi* (Rubiaceae)  
Poster P27

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**Background and methods:** Malaria remains a life-threatening disease caused by *Plasmodium* parasites that affect approximately 229 million of people worldwide for 6.2 million cases in Cameroon. The upsurge of resistance of *P. falciparum* to the available antimalarials require an urgent need in the search for alternative treatment. History reveals that medicinal plants have always been considered as an important source of natural products against malaria. It is in this perspective that we undertook the bioguided investigation of the CH<sub>2</sub>Cl<sub>2</sub>/MeOH (1:1) extracts of the leaves and the stem barks of *D. excelsum* and *B. brieyi* towards malaria which are used in the treatment of malaria and which displayed potent antiplasmodial activity during the preliminary screening. The active fractions were purified using usual chromatographic methods. The structures of the isolated compounds were characterized by spectroscopic technics. The *in vitro* antiplasmodial activity of the extracts, fractions and compounds was performed using the SYBR green I-based fluorescent microdilution assay against the chloroquine sensitive Pf3D7 strain of *P. falciparum*.

**Results:** The stem bark of *D. excelsum* showed promising activity, the leaves and the stem bark of *B. brieyi* showed moderate activity with IC<sub>50</sub> of 6.17, 24.09 and 32.63 µg/mL respectively. The bioguided investigation of these extracts led to the isolation and characterization of 27 compounds including: 12 pentacyclic triterpenoids, 5 flavonoids, 5 saponins, 1 steroid, 1 quinone, 1 sugar derivative, 1 diacid and two new homoflavonoids. Their antiplasmodial assay is still in progress.

**Conclusion:** This research has provided insight on the chemical constituents and the antiplasmodial potential of *D. excelsum* and *B. brieyi* which deserve more attention in the perspective for the search for phytochemicals against malaria.

**Keywords:** *Dialium excelsum*, *Brenania brieyi*. bioguided investigation, antiplasmodial, homoflavonoids

KAGHOU Mabel Mbifung

**Protective effects of the aqueous extract of *Ganoderma boninense* (Ganodermataceae) against parastar-induced hepatotoxicity in male wistar rats (*rattus norvegicus*)**  
**Poster P28**

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**Introduction:** Pesticides largely used in many countries including Cameroon to boost crop production have been shown to negatively affect vital organs including the liver. Mushrooms thanks to their rich bioactive contents have been used for medicinal purposes. This study aimed at evaluating the protective effects of *Ganoderma boninense* aqueous extract (GBE) on liver parameters in Parastar-exposed male Wistar rats.

**Methods:** Six groups of eight rats ( $150 \pm 2$  g) each were given either distilled water (5 mL/kg), Parastar (6.23 mg/kg), GBE (50, 150 mg/kg), or Parastar (6.23 mg/kg) and GBE (50, 150 mg/kg) for 60 days. The animals' weights were recorded every two days. On day 60, the animals were sacrificed, livers excised, weights recorded and used for liver biochemical, oxidative stress biomarkers and the liver histopathological analysis.

**Results:** Parastar decreased ( $P < 0.05$ ) relative liver weights, serum albumin levels, increased ( $P < 0.05$ ) serum total cholesterol concentrations, serum aspartate amino transferase and alanine amino transferase activities. Furthermore, Parastar increased liver thiobarbituric acid reactive oxygen species levels, while it decreased ( $P < 0.05$ ) glutathione levels and the activities of superoxide dismutase and catalase when compared to the distilled water control group. Liver microphotographs results of Parastar treated group revealed dilated sinusoidal capillaries and leucocyte infiltration. Both doses of GBE and co-administration with Parastar autosonized the toxic effects induced by Parastar.

**Conclusion:** This study provides evidence that *Ganoderma boninense* is a promising mushroom in protecting the liver against Parastar-induced toxicity.

**Key words:** *G. boninense*, liver, male rat, oxidative stress, Parastar, toxicity

SIPPING KEMEGNE Trésor Marius

Comparative study of antioxidant and anti-inflammatory effects of polysaccharide extracts from *Ganoderma resinaceum* (Boud) fruiting bodies

Poster P29

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**Background and methods:** Mushroom-derived polysaccharides have particularly attracted much attention in the field of biochemistry and pharmacology due to their bioactivities and non-toxicity. One of most commonly exploited mushrooms in Asia and Africa to treat hypoglycaemia, cardiovascular and liver diseases is *Ganoderma resinaceum*, a lignicolous basidiomycete belonging to the *Ganodermataceae* family. Thus, this study aimed to compare the antioxidant and anti-inflammatory activities of polysaccharide extracts from *G. resinaceum* fruiting bodies. To achieve this goal, crude (GRT), mycelial (MYC), exopolysaccharide (EPS I, EPS II), and polysaccharide (GRP I and GRP II) extracts were obtained from *G. resinaceum* fruiting bodies. The six extracts were assessed for their free radical scavenging and metal chelating ions assays. The *in vitro* anti-inflammatory activity was evaluated by stabilization of erythrocytes' membranes and protein denaturation assays. For, *in vivo* study, paw oedema was induced by administration of  $\kappa$ -Carrageenan (0.1 mL; 1%) to male Wistar rats aged 4 to 6 weeks. Animals were pre-treated with *G. resinaceum* extracts (125 mg/kg) and diclofenac sodium (20 mg/kg). Inflammatory cytokines and chemokines levels were determined and histological analysis of paw tissue was done.

**Results:** *G. resinaceum* polysaccharide-rich extracts (GRP I and GRP II) have shown the best bioactivities. They have scavenged anti-radical, NO, chelated ferrous ions, stabilized murine erythrocytes membranes and inhibited the proteins' denaturation. At 125 mg/kg, GRP I and GRP II restored the microarchitecture with a weak infiltration of immune cells in the subcutaneous tissues. Moreover, they have declined the overproduction of proinflammatory cytokines (G-CSF, TNF  $\alpha$ ), chemokines (eotaxin, fractalkine) increased the levels of anti-inflammatory cytokines (IL 10, IL 12p70).

**Conclusion:** *G. resinaceum* polysaccharide extracts could be the potent anti-oxidant and anti-inflammatory agents.

**Keywords:** *Ganoderma resinaceum*, Antioxidant, Inflammation, cytokines, chemokines.

MENATCHÉ NJOPNU Joël

Chemical investigation and antiplasmodial activity of *Antrocaryon micraster* (anacardiaceae)  
Poster P30

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**Background and methods:** Malaria is a parasitic disease widespread in tropical and subtropical regions of the world. According to the latest WHO report, the number of case of malaria was estimated at 241 million with 627.000 deaths worldwide in 2020. Nearly 95% of these cases have been recorded in the WHO Africa region. Recent studies have reported that *Plasmodium falciparum* has developed resistance to many of the available antimalarials. This therefore calls for urgent need to search for new antimalarial drugs. In line with this, we undertook the bioguided investigation of the CH<sub>2</sub>Cl<sub>2</sub>/MeOH (1:1) extract of the different parts of *Antrocaryon micraster*. The extracts were fractionated by column chromatography and by liquid-liquid partition. The structures of isolated compounds were established based on their spectroscopic (1D and 2D NMR) data. The *in vitro* antiplasmodial assay was performed following the method using SYBR Green-I based with chloroquine as reference drug described by Smilkstein and collaborator in 2004.

**Results:** The different extracts of the stem bark and the fruits showed good antiplasmodial activity *in vitro* against the chloroquino-sensitive strain 3D7 of *P. falciparum* with IC<sub>50</sub> value of 4.36 µg/ml and 8.08 µg/ml, respectively. The chemical investigation of stem bark, fruits and leaves of this plant led to the isolation and identification of 22 compounds among which 7 flavonoids, 2 anthraquinones, 3 ellargic acid derivatives, 4 steroids, 3 triterpenoids, 1 lignans and 2 benzoid acid derivatives.

**Conclusion:** The good antiplasmodial activity of stem bark and fruits of *Antrocaryon micraster* can justified the used of this plant in traditional medicine to treat malaria.

**Keywords:** *Antrocaryon micraster*, antiplasmodial activity, bioguided investigation.

AMAHNDONG Mathilda Loinseboh

**Chemical investigation of two cameroonian medicinal plants with antisalmonella activity: *Pittosporum viridiflorum* (Pittosporaceae) and *Paullinia pinnata* ( Sapindaceaea)  
Poster P31**

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**Background/method** Typhoid fever is a life threatening disease mainly caused by the bacterium *Salmonella typhi*, spread through the ingestion of contaminated food or drink. WHO in 2019 reported around 11-20 million infected cases, 128,000-161,000 deaths globally with 7.2 million cases in Sub-Saharan Africa. Antibiotics such as azithromycin and fluoroquinolones are used to treat this disease but frequent resistance shown by micro-organisms has rendered these drugs less effective. So the main objective of this work is to search for extracts/fractions with potent antisalmonella activity, which could be used for the formulation of phytomedicines and to isolate secondary metabolites, which can be used as a lead for the development of new drugs against typhoid fever. In line with this, the stem bark of *P. viridiflorum* and the leaves of *P. pinnata* were extracted with CH<sub>2</sub>Cl<sub>2</sub>/MeOH (1:1) and ethanol/water (7:3), respectively to obtain crude extracts, which were submitted for antisalmonella test. The extracts were fractionated using liquid-liquid partition to obtain nine fractions which were sent for antisalmonella test. The fractions were purified using different chromatographic methods. All the structures reported were elucidated using different spectroscopy methods (1D and 2D NMR, MS). The antisalmonella activity was performed using the micro dilution method.

**Results:** The chemical investigation of these extracts led to isolation and characterization of 18 compounds including 06 flavonoids, 05 triterpenoids, 02 saponins, 02 benzoic acid derivatives, 01 quinone, 01 caffeic acid, 01 steroid. The extracts and fractions from these plants showed good to moderate activity on; *S. typhi*, *S. enterica* and *S. typhimurium* with MIC values between 31.3 and 500 µg/mL.

**Conclusion:** The investigation of the stem bark and leaves of *P. viridiflorum* and *P. pinnata*, respectively showed good to moderate antisalmonella activity so demonstrates their potential for the pre-formulation of a phytodrug.

**Keywords:** *P. viridiflorum*, *P. pinnata*, antisalmonella, flavonoids

SAIDOU TSILA Sylvestre

**Chemical study of one Cameroonian medicinal plant with antiplasmodial activity: *Balanites aegyptiaca*  
(Zygophyllaceae)  
Poster P32**

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**Background and Methods:** Malaria is a serious and sometimes fatal disease caused by a parasite that commonly infects a certain type of mosquito which feeds on humans. It remains a major public health problem affecting 216 million people worldwide, mainly in the tropical areas of sub-Saharan Africa. The need to develop alternative treatment has become critical due to the emergence of *Plasmodium falciparum* resistance to almost all existing antimalarial drugs. New bioactive agents are urgently needed. *Balanites aegyptiaca* are used in Cameroon to treat malaria and other infectious diseases. Antiplasmodial preliminary screening of dichloromethane-methanol (1:1) extracts of the stem bark of this plant, showed a good activity on the 3D7 strain of *P. falciparum* with IC<sub>50</sub> values of 15.55 µg/mL. The aim of this work is to search for non-toxic extracts, fractions with potent antiplasmodial activity that can be used in the preformulation of phytodrugs and active secondary metabolites for the development of new antiplasmodial agents. Liquid-liquid partition was performed with *n*-hexane, ethyl acetate and *n*-butanol and then screened to antiplasmodial activity against the same strain. The structures of some isolated compounds were established by NMR (1D and 2D) and by MS.

**Results:** The chemical investigation of the ethyl acetate fraction led to the isolation and the characterization of 11 compounds. Among the isolated compounds we have 02 phenolic compounds, 03 steroids, 02 saponins and 04 lignans. Concerning the antiplasmodial activity, the extract and fraction showed an IC<sub>50</sub> between 8.2-32.9 µg/mL against *P. falciparum* 3D7.

**Conclusion:** The investigation of the stem bark of *Balanites aegyptiaca* showed a good antiplasmodial activity which could justify the traditional uses of this plant to treat malaria. This plant could be a potential candidate for the preformulation of the phytodrug.

**Keywords:** *Balanites aegyptiaca*, chemical study, antiplasmodial activity.

NGUEGUIM Stéphanie

**Isolation and identification of polyphenolics compounds from *Allanblackia Floribunda* (Clusiaceae) and the evaluation of their antimicrobial activities**

Poster P33

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**Background and methods:** Traditional medicine has been and remains the main source for a large majority of people in Africa to solve health problems and also because of its much lower cost than modern medicine (OMS,2008). Natural products are used either directly after extraction or after a chemical transformation. However, for these plants to be used credibly, effectively and without any risk to populations, the study of their phytochemistry, the evaluation of their biological activities, as well as the evaluation of their chronic toxicities is necessary. This is why our choice was based on the study and antimicrobial evaluation of *Allanblackia floribunda*, a plant widely used by populations because of its many virtues. In this work, we undertook to evaluate the antimicrobial activities of *Allanblackia Floribunda*. Air-dried plant material was powdered and extracted with the mixture of CH<sub>2</sub>Cl<sub>2</sub> and MeOH (1:1) at room temperature for two days. The extracts from fruit seeds are divided into three parts. The first part was subjected to phytochemical screening: The second parts were used on the one hand, for the antimicrobial test: *Bacillus subtilis* (AMR 2384), *Micrococcus luteus* (AMR 2387), *Pseudomonas agarici* (AMR 2392) and *Escherichia coli* (AMR 2398) by the inhibitor diameter method in agar medium. The third parts is submitted to fractionation owing to the use of repeated silica gel column chromatography.

**Results:** Phytochemical screening of the extracts revealed the presence of flavonoids, saponins, phenolic compounds, coumarins, triterpenes... The separation on chromatography column gave seven compounds namely: betulinic acid (1), lupeol (2), the mixture of  $\beta$ -sistostery and stigmasterol (3), mixture of  $\beta$ -sistostery-3-O- $\beta$ -glycoside and stigmasteryl-3-O- $\beta$ -glycoside (4), morelloflavone (5), volkensiflavone (6), saturated fatty acid (7). Antimicrobial activity showed good and moderate against all strains.

**Conclusion:** This results suggest that *A. Floribunda* could be justified for its antimicrobial uses

**Keywords:** Clusiaceae, *Allanblackia Floribunda*, antimicrobial activity

NGWANGUONG Evangeline Tashie

Phytochemical determination, in-vitro and in-vivo antibacterial effects methanol and aqueous extracts of association of leaves of *Spidium guayava* and *Carica papaya*, against salmonella  
Poster P34

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Typhoid fever is a major public health problem especially in developing countries like in Cameroon where it's an endemic disease. In the search for new anti-typhic substances, medicinal plants are good sources for new anti-typhic molecules accessible by everyone. This study aimed at determining the phytochemical contents and anti-salmonella potentials of single and association effects of the leaf extracts of *Spidium guajava* (PG) and *Carica papaya* (CP) *in-vitro* and *in-vivo*. The plant materials were extracted using methanol and water and then concentrated. Phytochemical screening was done. The salmonella strains were screened using well micro-dilution test to obtain the MIC and MBC of methanol and aqueous extracts of PG and CP against *Salmonella typhi*. These extracts were associated using checkerboard method to find the best proportion (CP 5 mg/kg + PG 20 mg/kg) for *in-vivo* study of *Salmonella typhi* induced albino Wistar rats.

Phytochemical screening in the different leaf extracts revealed the presence of alkaloids, phenols, flavonoids and others. The MIC of the methanol extract was 64  $\mu\text{g/mL}$  for CP+PG and its MBC was 128  $\mu\text{g/mL}$ . Acute toxicity studies showed that, the 2 extracts at 5000 mg/kg of CP in isolation and association (CP 5 mg/kg + PG 20 mg/kg) are non-toxic. CP methanol extracts showed more bactericidal activity and CP + PG methanol extracts in combination showed more activity *in-vitro* and *in-vivo*. The internal organs, urine and blood samples collected for *in-vivo* study (histological, biochemical and haematological) indicated extracts were effective against *Salmonella typhi* (ATCC 6539).

This study demonstrated the presence of certain phytochemicals CP and PG which contributed to their activities inhibiting *S. typhi* both *in-vitro* and *in-vivo*. Based on activities and non-toxic effects of these plants we can develop phyto-medicine against *S. typhi* resistances.

**Keywords:** Salmonellosis, medicinal plants, *in-vitro* and *in-vivo*.



**POSSI DJILA Franck Landry**

**Chemical investigation of one Cameroonian medicinal plant with antiplasmodial activity: *Lovoa trichilioides* Harms (Meliaceae)  
Poster P35**

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**Background and methods:** Malaria is a life-threatening disease caused by *Plasmodium* parasites transmitted to people generally by *Anopheles* female mosquitoes. In sub-Saharan Africa, it affects approximately 200 to 400 million people each year, resulting about 400,000 annual deaths and children under 5 years are the mostly affected. Although progress made in modern medicine, malaria remains one of the most dangerous disease due to the resistance developed by *Plasmodium* parasites against the existing drugs. Therefore, the need to search for new antimalarial drug for eradication of this disease is imperative. Hence, we undertook to investigate the leaves of *Lovoa trichilioides*, used to treat malaria in folk medicine. The aim of this work is the search for extract, fractions or compounds with potent antiplasmodial activity which can led to the development of antimalarial drugs. The Liquid-liquid partition of ethanol leaves extract of *L. trichilioides* was performed with *n*-hexane, ethyl acetate and *n*-butanol and then screened to antiplasmodial activity against the same strains. Their structures were established based on their spectroscopic (1D and 2D NMR) data. Antiplasmodial assays were done using SYBR Green-I based with chloroquine as reference drug.

**Results:** After maceration of the leaves of *L. trichilioides* with ethanol, the antiplasmodial screening of the ethanol crude extract on *Plasmodium falciparum* 3D7 and Dd2 strains showed good activity with IC<sub>50</sub> values of 8.19 and 7.93µg/mL respectively on both strains. Successive column chromatography of *n*-hexane and ethyl acetate fractions afforded six compounds: one glycosylated flavonoid, two steroids, one triterpenoid, and one saponin.

**Conclusion:** This study confirmed partially the uses of this plant in traditional medicine to treat malaria.

**Keywords:** Meliaceae, *Lovoa trichilioides*, antiplasmodial activity

YOUMBI Tatiana Gwladys

Antiplasmodial activity of MeOH/CH<sub>2</sub>Cl<sub>2</sub> (1:1) extract of *Macaranga monandra* (Euphorbiaceae) leaves and some of their constituents

Poster P36

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**Background and methods:** Malaria is one of the world's most distressing and devastating diseases, especially in the tropical Africa, Asia and Latin America. The World Health Organization estimated 219 million cases of malaria distributed among 3.2 billion people at risk in 2021, causing at least 435 000 deaths. In fact the leaves of *M. monandra* is used in folk medicine to treat fever, so we focus our attention on it to evaluate antiplasmodial activity of extract, fractions and isolate compounds. To achieve this goal the crude of leaves of *M. monandra* were partitioned with *n*-hexane, dichloromethane, ethyl acetate and *n*-butanol. The extract and fractions were assessed for their antiplasmodial activities and compounds had obtained by repeated column chromatography on silica gel and sephadex using differents solvents. The structures of pure compounds were established using physical and spectroscopic data.

**Results:** Antiplasmodial bioassay on extract and fractions of *M. monandra* shown interesting antiplasmodial activity. In fact, extract exhibited promise antiplasmodial activity with IC<sub>50</sub> value of 5.27 µg/mL; when *n*-hexane, dichloromethane, ethyl acetate and *n*-butanol fraction exhibited also moderate and good activity with IC<sub>50</sub> values of 13.97 µg/mL; 12.95 µg/mL; 3.27 µg/mL; 2.57 µg/mL respectively.

Separation and purification of the different fractions afforded fourteen compounds including three steroids, four flavonoid, one diterpene, five pentacyclic triterpenes and one xanthone. Apigenin exhibited moderate activity against malaria with IC<sub>50</sub> value of 12,01 µg/mL.

**Conclusion:** Extract, ethyl acetate fraction and *n*-butanol of *M. monandra* is a potent antiplasmodial alternative which can be useful in the search for new antiplasmodial drugs.

**Keywords:** *Macaranga monandra*, Euphorbiaceae, antiplasmodial activity.

**BODJU NYANDA Sandra**

**Isolation of secondary metabolites from *Penianthus camerounensis* (Menispermaceae) and *Strombosia grandifolia* (Olacaceae)  
Poster P37**

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**Background:** Multidrug Resistance (MDR) has been identified as a major threat to the public health of human being by the World Health Organization. The new and promising approach to treat infectious disease is to develop molecules that can potentiate the activity of available antibiotics. The bark of *P. camerounensis* is used to treat malaria and the stem bark of *S. grandifolia* is used for the treatment of pulmonary, kidneys, diuretics diseases and tuberculosis.

**Purpose:** Isolation of antimicrobial compounds from *Penianthus camerounensis* and *Strombosia grandifolia*.

**Methods:** The crude extracts of the different parts of *P. camerounensis* and the stem bark of *S. grandifolia* were partitioned with *n*-hexane, methylene chloride and ethyl acetate (EtOAc). The structures of pure compounds were established using physical and NMR data.

**Results:** Separation and purification of the different fractions afforded different class of compounds. All compounds including phytosteroids, ecdysteroids, ceramides, flavonoid, alkaloids and pentacyclic triterpenes.

**Conclusion:** These results are in accordance with the folk use of *P. camerounensis* and chemotaxonomy of *Penianthus* genus.

**Keywords:** *Penianthus camerounensis*, *Strombosia grandifolia*. Menispermaceae, Olacaceae.

Dr. MAPTOUOM Laure

**Baobab (*Adansonia digitata* L.) fruit pulp juice exhibits antioxidants properties *in vitro* and antiestrogenic effects *in vivo***  
**Poster P38**

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The baobab's fruit is one of the local fruit found in Cameroon, its pulp is very rich in nutrients, bioactives compounds and medicinal properties. The metabolite profiling of baobab fruit pulp reveal some phenolic compounds, among of which are different classes of flavonoids (flavan-3-ols, flavonols, flavones) one of the principal class of phytoestrogen (kaempferol, apigenin). Phytoestrogens are plant metabolites with the chemical structure shaped as that of 17 $\beta$ -estradiol that may bind to estrogen receptors and mimic or inhibit estrogenic actions in mammals. Their antiestrogenic properties make them suitable for prevention or treatment against estrogendependent diseases (breast, ovarian, uterine and prostate cancers, fibroma, myoma...) and the management of postmenopausal disorder. The aim of this work was to evaluate the antioxidants properties *in vitro* and antiestrogenic effects *in vivo* of baobab fruit pulp juice. Baobab juice was prepare using an optimize processing. For antioxidants properties: phenolic compound content, DPPH antiradical activity, total Antioxidant Capacity (CAT) and ferric reducing antioxidant power (FRAP) were evaluated. Moreover, a classical 3 days uterotrophic test was carried out to evaluate antiestrogenic effects of baobab juice in ovariectomized *Wistar* adult female's rats using the coadministration of estradiol with baobab juice. Changes in the uterus and vagina were used as endpoints of estrogenicity. This juice was rich in phenolic compound ( $396.74 \pm 6.68$  Eq mg GA /100 mL), had high antioxidant activity (FRAP:  $1177.49 \pm 1.57$  mg FeSO<sub>4</sub>/ 100 mL; DPPH: 73.25% inhibition /100 mL; CAT:  $3.98 \pm 0.28$  Eq g AA /100 mL) *in vitro* and had anti-estrogenic effect (significant decrease in relative uterine weight at all dose and in the height of vagina epithelium) *in vivo* on *Wistar* female's rats. The consumption of this baobab juice would contribute to the prevention and management of chronic diseases related to oxidative stress and estrogeno-dependants diseases, and it is suitable for men and postmenopausal women.

**Keywords:** *Adansonia digitata* L, baobab juice, phenolic compound, antioxidant, anti-estrogens.

**FOBASSO TAGNIKEU Romeo**

**Use of bacterial crude lipase in the production of an ester: case of isoamyl acetate (banana flavor)  
Poster P39**

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Triacylglycerol acyl-hydrolases, or lipases, are atypical enzymes due to their mechanism of action and their substrate specificity. Depending on the microenvironment of the enzyme, they can act as hydrolases in aqueous media or as catalysts in organic synthesis. As hydrolases, they are responsible for the catabolism of triglycerides, their preferential substrates, into fatty acids and glycerol. In a solvent medium, they can catalyze a large number of reactions ranging from esterification to acidolysis or alcoholysis while exhibiting a certain enantio-, regio- and chemo-selectivity. The aim of this work was to isolate a lipase-producing bacterium, produce the crude lipase and use it to catalyze the synthesis of an aroma. Soil and effluent sampling were carried out in the lagoons of the palm oil production mills and plantations. The lipase-producing bacteria were isolated there on an agar medium containing rhodamine B and then the best isolate was selected on the basis of its ability to lower the pH in a short time with phenol red as a colored indicator. After the selection of the best isolate, the enzyme was produced followed by the study of the influence of temperature and pH on its activity. The synthesis of the aroma by enzymatic catalysis was carried out. It appears from the above that the lagoons are full of lipase-producing bacteria and the isolate called SE2B is the best lipase producer with an activity of 0.33 IU/ml. The study of the influence of temperature and pH on the raw enzyme has shown us that: the raw enzyme has an optimum temperature around 35°C, an optimum pH of 6. Macroscopic and microscopic analyzes reveal that the SE2B colony would be a gram-negative bacillus, catalase +, oxidase – and motility positive. The crude enzyme produced and was used for the synthesis of an ester: isoamyl acetate whose presence was justified by the smell of ripe banana and its purity was demonstrated by thin layer chromatography.

**Keywords:** Lipase, Isoamyl Acetate, Aroma, SE2B.

NONO NINKEH Vanessa

Molecular characterization of isoniazid-resistant strains of *Mycobacterium tuberculosis* clinical isolates in Cameroon  
Poster P40

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**Background:** Tuberculosis (TB) remains a global public health concern due to the emergence of drug-resistant strains. Surveillance of drug-resistant TB is central to combating the global TB epidemic and preventing the spread of antimicrobial resistance. Although gene mutations in specific loci of the *Mycobacterium tuberculosis* (MTB) genomes are reported as the primary basis for drug resistance, not all resistances to isoniazid (INH); one of the most potent antituberculosis drugs can be explained by this. Chromosomal mutations in *katG* and *inhA* genes have been considered to be the major cause of INH resistance. However, only 70% of INH-resistant isolates possess these mutations, implying that in the remaining 30%, the resistance mechanism is unknown. This study seeks to investigate other mechanisms responsible for isoniazid-drug resistance.

**Methodology:** Five hundred isoniazid-resistant MTB strains were identified from the Mycobacteriology repository of Centre Pasteur du Cameroun. Bacteria were cultured in BACTEC MGIT 960 system and identified for the presence of MTB. Genotypic drug susceptibility testing were performed on positive cultures and their phenotypic resistance reconfirmed using the Genotype MTBDRplus assay and BACTEC MGIT SIRE kits respectively.

**Results:** Of the 500 strains, 447 MTB isolates were identified and 53 excluded for absence of growth and contamination. Among the 447 MTB isolates that were resistant phenotypically, 55.5% had mutations in *katG*, 15.2% in *inhA* and 17.6% in both *katG* and *inhA* genes. Fifty-two isolates had no mutations.

**Conclusion:** The result revealed a prevalence of 11.6% isoniazid-resistant strains lacking mutations at *katG* and *inhA* genes. This serves as a baseline for investigation of the absence/presence of other mutants as well as potential genomic variants for further follow-up studies of gene expression through the use of sequencing techniques. Information obtained can lead to innovation of new drugs and an assay for rapid and accurate diagnosis of all isoniazid-resistant patients.

**Keywords:** Tuberculosis, isoniazid-resistance, mutations

**ENOW TAKANG ACHUO Albert\***

**Can machine learning effectively protect genetic genealogical databases from identical-by-state (IBS) probing attacks? Poster P41**

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**Background and methods:** Identical-by-state (IBS) probing is a way of attacking a public genealogy database in order to discover the identities of persons who share specific qualities that the 'attacker' is interested in. In order to be successful, the attacker must create an IBS-inert DNA sequence and combine it with a sequence containing the trait of interest. As a result, the final sequence would only match people who have genomic areas that are similar to the trait of interest.

In order to prevent these attacks, it was hypothesized that the very principle behind the design of IBS-inert DNA sequences makes these sequences susceptible to detection by skilled machine learning systems, because the attacker purposefully creates an IBS-inert DNA sequence and designs it to be structurally dissimilar to real DNA sequences. To test the hypothesis, a dataset that included both real DNA sequences (from the UCI Machine Learning Repository's splice junction gene sequences dataset) and computer-generated DNA sequences was organized. Next, 18 non-identical Random Forest (RF) classifier models were used to determine the best configurations for discriminating between real and computer-generated DNA sequences.

**Results:** The findings revealed that an optimized RF classifier combined with a k-mer value of 2 and an n-gram value of 2 resulted in the most performant RF classifier model, with accuracy, sensitivity, specificity, false positive rate, Matthews correlation coefficient, and area under the receiver operating characteristic curve values of 88.3%, 84.8%, 91.8%, 8.2%, 0.768, and 0.958, respectively. A decline in model performance was also linked to an increase in k-mer size.

**Conclusion:** Machine learning can be used to detect and block IBS-inert DNA sequences before their introduction into a genetic genealogical database, and also to depollute the latter from already-existing IBS-inert DNA sequences. The datasets and source code used in this research may be found at <https://github.com/Enowtakang/study-ml-0322>.

TCHAMBA KEUWE Gérard

***Crassocephalum crepidioides* aqueous extract prevents L-NAME induced hypertension in rats.**

**Poster P81**

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*Crassocephalum crepidioides* (CC) is a plant use as vegetable in West and central Africa. It is also use as medicinal plant to cure diabetes and cardiovascular disorder. To investigate the antihypertensive effect of this plant, we induce the hypertension with saline L-NAME (25mg/kg/day ip), the NO antagonist in male rat weighing 150 to 200g for 3 weeks. The groups of 5 rats each received daily respectively distilled water (1ml/100g p o), saline solution (0,5ml/100g ip), Captopril (20mg/kg po), aqueous extract of Cc at the doses of 150 and 300 mg/kg po. By non-invasive method, the systolic, the diastolic and mean blood pressure as well as body weight was taken weekly during the experiment. After the experiment period, some serum biochemical parameters such as oxidative stress markers, hepatic and renal function biomarkers and lipid profile were evaluated. The results coming out showed that the aqueous extract of Cc, captopril reduced significantly the increase of systolic, diastolic and mean blood pressure caused by L-NAME. The inhibitory percentage of 28,13% ;17,38% and 29,40% respectively with captopril, aqueous extract of Cc 150 mg/kg and aqueous extract of Cc 300 mg/kg was recorded in mean blood pressure after 21 days . This aqueous extract of Cc also reduced significantly the production of oxidative stress markers, renal and hepatic biomarkers as well as lipid profile. These results can afford the antihypertensive effect of this plant and can justify its use the treatment of cardiovascular disorders.

**Keys words:** *Crassocephalum crepidioides*, preventive; antihypertensive, L-NAME



**Dr. FONKWA Georges**

**Assessment and epidemiological profile of parasites of five fish species with breeding potential from the upper course of the Nkam river (Littoral-Cameroon)**

**Poster P42**

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**Background and methods:** Parasites are a major constraint to fish production. In Cameroon, there is a dearth of data on the diversity and the epidemiological profile of parasites of freshwater fishes. This study was conducted from May to September 2019 upstream of the Nkam river, in the “plaine des Mbô” in order to contribute to the knowledge of fish parasites biodiversity and ecology. So, a total of 130 fish specimens (13 *Clarias gariepinus*, 34 *Clarias jaensis*, 24 *Labeobarbus batesii*, 29 *Oreochromis niloticus* and 30 *Parachanna obscura*) randomly collected from the fishermen were parasitologically examined so as to determine the prevalence and mean intensity (I) of infestation.

**Results:** All fish species were polyinfested by six taxa of parasites namely monogeneans, myxosporeans, nematodes, cestodes, copepods and trematodes. The overall prevalence (48%) was low. Irrespective of the host species, the prevalence was low with monogeneans (49.23%), trematodes (28.46%) and myxosporeans (24.62%) while cestodes (1.53%), copepods (5.38%) and nematodes (6.92%) recorded a very low prevalence. Fish species, sex, size classes and weights did not significantly influence the prevalence and intensity of infestation. In addition, the prevalence of monogeneans was maximum (100%) in *Oreochromis niloticus* followed by *Clarias gariepinus* (76.92%). On the other hand, 75% of the fish *Labeobarbus batesii* was infested by trematodes. The overall intensity varied from very low ( $I < 10.00$ ) to low ( $10.00 \leq I \leq 50.00$ ).

**Conclusions:** Fishes were polyparasitized by a parasitic fauna composed of six groups of parasites among which monogeneans were the most represented. Overall, the prevalence and the intensity of infestation was affected by the species, sex, sizes and weight classes of fishes from the Nkam river with no significant difference. The infestation of fishes may be detrimental to their health and that of consumers. So, it is recommended to quarantine fishes from the Nkam river and rid them of parasites before any farming purpose. Moreover, they should be sufficiently cooked before consumption.

**Keywords:** polyparasitism, prevalence; intensity; biodiversity, ecology

MVONGO DANG Victor

**Application of Water Service Sustainability Index to water services in Sub-Saharan Africa: The cases studies of eight councils in Southern Region of Cameroon (Central Africa)  
Poster P43**

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**Background and methods:** The aim of this article is to assess the sustainability of rural water service in Mvila Division (Southern region of Cameroon) in order to constructively feed the debate on the most effective ways to improve access to rural water service in Sub-Saharan Africa. The methodological approach was based on the application of the Water Service Sustainability Index (WSSI) and was implemented through technical inspection of Rural Drinking Water Supply System (RDWSS), semi-structured interview, and survey of 103 service providers.

**Results:** Results show that sustainability performance of rural water service in Mvila Division is Poor-Medium. The highest aggregate value of WSSI was obtain in Mvangan council (59.54%) followed by Ngoulemakong council (47.99%), Biwong Bulu (38.53%), Efoulan (33.99%), Biwong Bane (31.51%), and Ebolowa I (28.96%), Ebolowa II (28.19%) and Mengong (26.57%). Results also shows that rural water service is influencing by factors such as the low pricing of rural water service, climate risk, the poor structuring of the maintenance chain and the weak commitment of the municipal authorities.

**Conclusion:** This study represent only a current snapshot of rural water service delivery condition and should be conducted at regular interval to track changes in overall and local condition.

**Keywords:** index, rural water service, Sub-Saharan Africa, sustainability.

MOLO Thierry

**Potential for gene flow between *Gossypium hirsutum* and *Abelmoschus esculentus* by interspecific hybridization  
Poster P44**

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**Context and methods:** The trial of the cultivation of transgenic cotton in Cameroon posed the problem of genetic contamination of related species such as okra widely cultivated and consumed by the populations. The present study aims to assess the potential risk of gene flow between these two species by studying interspecific hybridization.

The periods of receptivity of the stigma and the viability of pollen grains were identified, the fruit set rates of intra- and interspecific crosses were evaluated.

**Results:** The results show that the blooming of the flowers constitutes the best period of receptivity of the stigma. Similarly, pollen viability is maximal in both species at this same stage of floral development. Interspecific crosses yielded three fruits for a fruit set percentage of 1.99% when *A. esculentus* was used as the female parent and zero results in the reciprocal direction of the cross. However, the formation of the latter could be attributed to phenomena of aneuploidy.

**Conclusion:** Receptivity and viability are greatest when flowers open. The percentage of fruit set is 1.99% when *A. esculentus* is the female parent.

**Key words:** *G. hirsutum*, *A. esculentus*, gene flow, hybridization

**ZOA Florent Boris**

***Agro-morphological performance of potato (*Solanum tuberosum* L.) varieties in Agroecological Zone V of Cameroon***  
**Poster 45**

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This study aimed to identify potato varieties that are likely to produce in Cameroon's Agroecological Zone V. The trial was conducted in a completely randomized block design with seven varieties and three replications. In each block, there were seven elementary plots in which there were six one-plant pits separated by 20 cm from each other. The experimental set-up was spread over an area of about 150 m<sup>2</sup>. Data on growth and yield parameters were subjected to an analysis of variance (ANOVA). The results obtained show that the viability rate of the varieties varied from 77.78 to 96.55% respectively for the varieties Maffo and Désirée, while the greatest number of tubers per plant varied from 04 to 18 respectively for Synergie and Désirée. The average weight of these tubers ranged from 0.2 to 0.5 kg for Bansa and Doza respectively. *Alternaria* was not identified in Doza, Maffo and Désirée unlike the other varieties. All other varieties were subject to white mold and bacterial wilt with indices ranging from 1.72 to 21.05% and 2.22 to 11.36% respectively. The yield per hectare of the varieties varied from 1.14 to 9.3 t/h respectively for Maffo and Doza. In terms of vegetative development, the Désirée variety expressed the highest performance. In view of these growth and yield results, the cultivation of the Doza variety seems to be the most recommended in the study area.

**Keywords:** *Solanum tuberosum* , genetic resources, adaptability, productivity, agroecological zone

MOMO Evariste Josué

**Formulation and Characterization of the Nanoemulsions of the essential oils from *Mondia whitei* and *Zingiber officinale*.**  
**Poster P46**

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**Background and methods:** Essential oils (EOs) are rich in bioactive compounds. However, their volatile and insoluble characteristics in water make their uses problematic. However, their nanoformulations are likely to stabilize and protect the active molecules they contain. The cold method of Prinderre and coll. (1998) was used for the formulation of nanoemulsions (NEs) of EOs from *Mondia whitei* and *Zingiber officinale*. The proportions 5/5/90 respectively for EO, surfactant and water were used with tween 80 as surfactant. The characterization of the NEs formulated was carried out by laser granulometry.

**Results:** It appears that the nanoemulsion of the essential oil of *Mondia whitei* (NEMW) is white, milky while that of *Zingiber officinale* (NEZO) is white, milky with a translucent tendency leaving a bluish reflection on the walls of a glass bottle transparent. Furthermore, the particle size distribution curves obtained show that NEZO has a single peak indicating a single population of particles, therefore the average size is 192 nm. On the other hand, that of the NEMW presents 3 peaks indicating three populations of droplets therefore the average size is 30.329µm.

**Conclusion:** Due to its stability and the best characteristics it exhibits, the EO nanoemulsion of *Z. officinale* is more suitable than that of *M. whitei*. Its use can thus be optimized in various fields, in particular that of the preservation of foodstuffs.

**Keywords:** Formulation; nanoemulsion; essential oils.

ENYOE OLOUGOU Marie Noela

**Re-engineering the soil microbiome using microbial inoculant products to improve soybean yield and grain biofortification to mitigate hidden hunger  
Poster P47**

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**Background and methods:** Soybean (*Glycine max* L.) is an important food crop with high oil (18-22%) and protein (40-42%) contents, but its production is constrained by poor and declining soil fertility leading to reduced performance in smallholder farming systems. Chemical fertilisers are often used to mitigate these constraints however, their continuous use increases production cost and exert deleterious effects on the environment and humans. Consequently, there is need for sustainable alternative such as bio-fertiliser products emanating from plant growth promoting bacteria and endophytic fungi. We conducted a field study in Yaoundé, Cameroon to investigate the grain yield and nutritional benefits of co-inoculating plant growth-promoting bacteria (PGPB) and *Arbuscular mycorrhiza* fungi (AMF) with addition of nitrogen (N), phosphorus (P), and potassium (K) fertilisers. Ten microbial and NPK treatment combinations were evaluated (Control–no input, PGPB, AMF, PGPB+AMF, PGPB+N, PGPB+PK, PGPB+N+PK, PGPB+AMF+N, PGPB+AMF+PK, and PGPB+N+P+K). The microbial inoculant products used in this study were produced at the Rhizobiology laboratory of the University of Buea.

**Results:** The soybean grain yield doubled following co-inoculation of PGPB and AMF with or without NPK fertiliser compared to the no-input control treatment. Also, soybean grain biofortification was observed with a significant increase in the nutritional contents of zinc, iron, protein, and carbohydrate.

**Conclusion:** Integrating the bio-products in soybean farming systems ensures a sustainable system that is resource-conserving, socio-culturally supportive, commercially competitive, and environmentally friendly. Hence, it is imperative to adapt microbial biotechnology to the specific needs of farmers and effectively disseminate it to foster sustainable development.

**Keywords:** Bio-fertiliser, biofortification, soybean yield, plant growth-promoting bacteria, *Arbuscular mycorrhiza* fungi.

Dr. MIANTSIA FOKAM Olivier

Multivariate analysis of cranial measurements of Cameroon's Blue Duiker (*Cephalophus monticola* Thunberg, 1789)  
Poster P48

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The blue duiker (*Cephalophus monticola*) is exclusively an African wild bovidae. It is a principal source of protein in the African forest zones and contributes in the nutrition of local populations. Fifteen cranial measurements on 60 skulls using the opportunist's method as from January 2018 to December 2018. Descriptive statistic and multivariate analysis were done using SPSS version 21.0 software and XLSTAT-Pro version 7.5.2 software. It reveals that, there exist a significant difference between males and females skull ( $p > 0.05$ ): total length of skull  $114.32 \pm .81$  and  $121.71 \pm 1.77$ ; Palate maximal width  $35.24 \pm .75$  and  $44.96 \pm 14.80$ ; postorbital apophyses width  $23.34 \pm 1.11$  and  $36.26 \pm 1.79$ ; Palatine length  $55.31 \pm 1.16$  and  $66.52 \pm 1.86$ ; condyle basal length  $96.53 \pm 1.26$  and  $105.43 \pm 3.05$  for the males and females respectively. We have a high positive correlation between the jugal teeth line length and the total skull length (0.973); between palatine length and the total skull length (0.990) and, between condyle basal length and the total skull length (0.993). The principal component analysis (PCA) enable us to see the level of genetics variability of blue duiker through skull measurements. These variables measurement are close together from one to another where there is a high similarity between species. Despite these similarities, the population structure of blue duiker shows three sub-species of blue duiker C1, C2 and C3 found respectively in the agro ecological zones of the Western highlands, Mono-modal humid forest and Bimodal humid forest. These three sub-species varies genetically but could correspond to the metapopulation of blue duiker caused by the fragmentation of their habitat.

**Keys words:** Characterization, measurement, blue duikers, skull, agro ecological zone

NJIANDOH MBEBOH Maurice

**Improving the productivity of soybean using locally formulated botanical products for the benefit of farmers in Cameroon**  
**Poster P49**

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**Background and methods:** Soybean is the most economically important bean in the world with high protein content (40-42%) that plays vital roles in food and nutritional security while generating income for many farmers. Nevertheless, production is constrained by poor and declining soil fertility coupled with field pests. Agrochemicals are commonly used to mitigate these constraints, but they are not readily affordable for many smallholder farmers, while their indiscriminate use may cause deleterious effects on the environment and human health.

Botanical products have demonstrated efficacy as sustainable alternatives that can be used by smallholder farmers to sustainably improve soil fertility and crop yields, but they are not fully explored partly due to the lack of commercial products. This study was conducted in Buea, Cameroon to investigate the productivity of soybean using botanical products. Five treatments were evaluated in this study comprising Control (no input), NPK + Lamida gold (Synthetic products), Mucuna + Piper (botanical products), Mucuna + Fungi endophytes, Mucuna + Rhizobium + Fungi endophytes + Piper.

**Results:** A significant increase was observed in the soil microbial biomass, enzyme activity, in all the treatments with botanical products as compared to treatments with synthetic products and the no input control. Correspondingly, all the treatments with botanical products demonstrated a significant increase in soybean grain yield as compared to the no input control treatment.

**Conclusion:** This result highlights the importance of botanical products as a sustainable alternative to synthetic products. Integrating botanical products in soybean farming systems ensures a holistic approach that is economically viable, resource-conserving, socio-culturally adaptable, and environmentally friendly. Therefore, it is necessary to promote entrepreneurship on the production of commercial botanical products that are adapted to the specific needs of farmers in Cameroon to foster sustainable community development.

**Keywords:** Botanicals, soybean, Mucuna, Piper, yield, sustainability.



**KENMOGNE NUEMSI Pierre Popice**  
**Sustainable Production of Upland Rice by Direct-Seeding with Living Vegetation Cover Relative to Pedoclimatic Variations**  
**Poster P50**

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**Background and methods:** Rice chart production in Cameroon is low and keep decreasing although the rich diversity of soils and climate. Sustainable production of rainfed rice to ensure stable food security while reducing the impact of environmental degradation can be improved through no-till soil management practices in an intercropping system. This study was envisaged to evaluate the influence of tillage and no-tillage on the growth and yield of an ameliorated (NERICA 8) and a local (RTM) rainfed upland rice varieties under two pedoclimatic conditions. The experimental trial was a comparative study conducted in Mendong (Haplic Ferrasols) and Goufan (Dystric Nitisols) in the Central region of Cameroon (Africa) from April to August 2018. A split-split plot experiment was conducted using cropping system (ploughing and direct sowing with living plant cover) as primary factors and cultivation techniques (monoculture and polyculture) as secondary factors.

**Results:** The rice sprouting rate was significantly higher on Haplic Ferralsol from Mendong (65.79% - 100%) (P <0.01) than on Dystric Nitisol from Goufan (34.69% - 79.59%). The growth of rice is highly influenced (P <0.001) by Haplic ferralsols compared to Dystric Nitisol with associated cultural techniques (P <0.1). Independent of the cropping system used, crop yield was high on Haplic ferralsols with major arithmetic differences in the cultural association. Intercropping indices show that the association NERICA 8 and Bean NITU is very performant and highly profitable.

**Conclusion:** Upland rice production in Cameroon cover a lot of potential that need to be master urgently to respond to need of population and open a strategic market structure around the world. The polyculture of rice with dwarf and non-voluble legumes (beans and cowpeas) is interesting compared to monoculture in terms of yield and economy in chemical input for long-term soil preservation.

**Keywords:** Cultural Systems, Direct Seeding, Pedoclimatic Variations, Upland Rice, Yield.

Prof. Dr. NANA Paulin

Virulence of wild and transformed strains of *Metarhizium anisopliae* ICIP30 against cattle ticks  
Poster P51

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Entomopathogenic fungi are being perceived as an attractive and promising alternative to chemical acaricides. Despite intensive efforts, biological control agents have not met expectation because they are slow in acting and their inability to compete with cheaper chemical pesticides. Recent research has been to increase the speed of kill and so improve commercial efficacy of the biocontrol agent. The objective of this study was to assess the virulence wild and transformed strains of *Metarhizium anisopliae* ICIP30 against *Rhipicephalus appendiculatus* and *Amblyomma variegatum* ticks. Pathogenicity of *Metarhizium anisopliae* ICIP30 was improved by engineering it to express *Androctonus australis* neurotoxin AaF1CA7. All the stages (larvae, nymphs and adults) were used to bioassay the effect of the toxin expression on virulence. Relative to the Wild Type (WT), the transformed strain was more virulent against larvae and nymphs of both tick species of ticks at most of the concentrations tested. For instance, the WT required a LC<sub>50</sub> of 2.6 x 10<sup>7</sup> conidia ml<sup>-1</sup> to achieve 50% mortality in *R. appendiculatus* larvae compared to only 1.9 x 10<sup>5</sup> conidia ml<sup>-1</sup> for the transformed strain. It thus takes 13 fold fewer conidia of transformed strain to provide the same level of mortality. In *R. appendiculatus* larvae, LT<sub>50</sub> for the WT was significantly high and ranged between 7.6±0.7 to 21.2±9.8 days as compared with transformed strain which ranged between 3.9±0.3 to 10.0±1.2 days. Similar trends followed with larvae and nymphs of *A. variegatum*. Adults of both species were less susceptible to fungal infection, except at the highest concentration (1x10<sup>9</sup> conidia ml<sup>-1</sup>) where the transformed strain outperformed achieving 63.3 and 50.0% mortality in *R. appendiculatus* and *A. variegatum* respectively. Contrary to the results from *Anopheles arabienses* where no increase in virulence by the transformed isolate was observed the present study has demonstrated an increase of virulence of transformed isolate against larvae and nymphs of both *R. appendiculatus* and *A. variegatum* at lower concentrations.

**Keywords:** *Metarhizium anisopliae*, toxin, biological control, virulence, cattle ticks

MAGNI PACHA Tatiana Flore

**Formulation of biofungicides from *Cymbopogon citratus* and *Tithonia diversifolia*: evaluation its antimicrobial activities against *Pythium myriotylum*, the causal agent of root rot of *Xanthosoma sagittifolium*(L) Schott  
Poster P52**

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**Background and method :** Each year, fungal infections are responsible for the destruction of more than 125 million plants. The increase of fungal resistance, the pollution of soils and water ways and the poisoning of the population due to the use of fungicides justify the search for new strategies to control these fungal infections. To this end, the antifungal potential of two popular medicinal plants (*Cymbopogon citratus* and *Tithonia diversifolia*) collected and the fungicidal activity of sodium bicarbonate were used to prepare a biofungicide formulation. The latter was used to eradicate root rot, a disease caused by *Pythium myriotylum* which is the fungus responsible for nearly 90% of crop losses of *Xanthosoma sagittifolium* locally known as « Cocoyam » in Cameroon.

Three formulations were prepared from sodium bicarbonate, essential oil citronella and slurry sunflowers. The stability of these formulations was determined base on pH, temperature, order of incorporation of the inputs and storage time. The most stable formulations were used for antifungal tests and The minimum inhibitory concentration (MIC) was used for the greenhouse tests. Finally, the mode of action of these formulations was determined *in vitro*.

**Results:** At the end of this work, the correct order of administration of the inputs is EO-T80-B-S (Essential Oil - Tween 80- Bicarbonate-Slurry), the formulations M1 and M2 are the most stable because they are thermostable at temperatures of 4°, 25°, 37°, and 40°C and have a pH of 7 and 8 respectively. Their MIC is 1% for *Pythium myriotylum*. These formulations act on fungi by inhibiting protein synthesis and proton pumps and by membrane lysis.

**Conclusion :** A biofungicide formulation based on sodium bicarbonate, *Cymbopogon citratus* and *Tithonia diversifolia* will be an asset for eradication of *Pythium myriotylum* and improve the quality and quantity of agricultural production of *Xanthosoma sagittifolium* in Cameroon.

**Keywords:** formulation, biofungicide, *Xanthosoma sagittifolium*, *Pythium myriotylum*

FOKA Ebénézer

Potential of a biopesticide formulation based on Calcium, Neem, Sida weeds and Citronella on *Theobroma cacao*  
Poster 53

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**Background and methods:** Cocoa produced by eco-friendly method increases faster than consumer supply is getting, and organic cocoa label represents about 3.5 % of global cocoa production. Cameroon cocoa culture is confronted by numerous constraints among which, black pods disease causes by *Phytophthora megakarya* is the most important. However, the use of chemical pesticides which is efficient had harmful effects on environment and human health. The use of biocontrol agents as well as elicitors are some promising alternatives to synthetic pesticides. The aim of this study was therefore to put forth a biopesticide based on neem (*Azadirachta Indica* A. Juss.) oil and aqueous extract, Sida weeds (*Sida acuta*) hydroalcoholic extract, Citronella (*Cymbopogon citratus*) essential oil and calcium extract; its action mechanism on *Phytophthora megakarya* and its effect on the growth and resistance of *T. cacao* against this pathogen. Thermodynamic stability and activity (insecticide, fungicidal) of the formulation were determined. The effect of the formulation on the growth and resistance of cocoa against *P.megakarya* was also evaluated. The potential defense partway induce by it was also determinate.

**Results:** The formulation has 100% of stability after more than 3 months and has an inhibition effect on ATPase/H<sup>+</sup> pumps of the pathogen. Once prepared at 0.1% (V / V), it retains its insecticidal and inhibitory properties against fungus (55% of inhibition on *P.megakarya* when use at 0.1%), promotes the growth of plants by increasing foliar surface by 17% and reduce the disease severity by induces the defense markers flavonoids and  $\beta$ -1,3-glucanase activity by 30% to 200%. Our formulation also increases AOC4, AOS and BI genes.

**Conclusion:** These results suggest that our biopesticide is useful for biofortification by enhancing the quality of cocoa seedling, reduce disease severity using jasmonic acid defense pathways and avoid necrosis. Therefore, our formulation maybe useful for a sustainable agriculture.

**Key words:** Bioformulation, Biofungicidal, action mode, *Phytophthora megakarya*, cocoa defense.

Dr. DZOKOU Victor Joly

Effects of neem oil and phyto-extract of *Lantana camara* on *Spodoptera frugiperda* (Lepidoptera-Noctuidae), corn pest in Bankim, Adamawa-Cameroon

Poster 54

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**Background and methods:** In sub-Saharan Africa, million people depend on maize for food. But the losses caused by *Spodoptera frugiperda* on maize amount to millions of dollars, and the chemical control costly and not eco-friendly. The purpose of this study was to evaluate the effectiveness of ethanolic extract of *Lantana camara* and neem oil (*Azadirachta indica*) in reducing crop damage in maize cultivation in Bankim. This was carried in a field experiment using a randomized complete blocks design with the following treatments; 0.5L.ha<sup>-1</sup> and 1L.ha<sup>-1</sup> of neem and 10% and 20% ethanolic extracts of *L. camara* replicated three times.

**Results:** Neem oil treatments significantly reduced ( $p < 0.05$ ) crop damage by *S. frugiperda* on the leaves of maize from 49<sup>th</sup> to 63<sup>rd</sup> day after sowing (DAS) compared to the control treatment. Neem oil at 1L.ha<sup>-1</sup> had a significant effect on the incidence of *S. frugiperda* at the 35<sup>th</sup> and 49<sup>th</sup> DAS relative to the control treatment. Consequently, neem oil treatment produced yield (4137.33 kg.ha<sup>-1</sup>) higher than the control treatment (2812.66 kg.ha<sup>-1</sup>). Neem at 0.5L.ha<sup>-1</sup> and 1L.ha<sup>-1</sup> showed significant differences in the number of damaged ears compared to control. Ethanolic extracts of *L. camara* significantly ( $p < 0.05$ ) reduced crop damage relative to the control, from the 49<sup>th</sup> to the 63<sup>rd</sup> DAS. On the incidence of damage and the percentage of damaged cobs, *L. camara* showed a significant difference on the 35<sup>th</sup> and 49<sup>th</sup> DAS. Consequently, the number of insects collected in the control plots during the experiment was higher relative to the treated plots.

**Conclusion:** Neem oil at 1L.ha<sup>-1</sup> showed reduced crop damage and the number of larvae of Fall Armyworm (FAW), thus increased the yield of maize.

**Keywords:** *Spodoptera frugiperda*, Neem oil, *Lantana camara*, *Zea mays*, bio control, Cameroon.

MBOUDOU BELIBI Marlyse Zita

Use of the aqueous extract of *Thevetia peruviana* ( PERS.) K. schum seeds for the control of corn (*zea mays* L.)stalk borers in the field  
Poster P55

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**Background and methods:** Stem-boring insects are a major constraint to maize production, causing more than 50 % of yield losses. In order to find an alternative to chemical control which constitutes the most used means of control against these pests, the insecticidal potential of the aqueous extract of the seeds of *Thevetia peruviana* was tested in field on the species of corn stalk borers encountered on the study site. Two maize varieties (V1: CMS 8704; V2: local) and three treatments (T1: control; T2: aqueous extract of *Thevetia peruviana* seeds; T3: cypercal 12 EC) were used in a split-plot design with four replicates. Growth parameters, density and grain yield were evaluated. In lab, the contact toxicity test of extract of *T. peruviana* seeds at 25 % was made on a population of stems borers.

**Results:** The results show that the plant height is best in aqueous treatment T2 ( $9,12 \pm 2,45$  cm). The density of stem borers was significantly reduced (3 stem borers) in the plots treated with aqueous extracts compared to the control plot (10 stem borers). Higher grain yield (2,05 t/ha) was recorded in plot treated with aqueous extract of the improved variety than the control (1,41 t/ha) of local variety. The toxicity test of extract of *T. peruviana* seeds at 25 % was as effective as the synthetic insecticide with 100 % mortality after 4 days exposition of stems borers.

**Conclusion:** The aqueous extract of *T. peruviana* seeds having shown a strong protective potential against stalk borers of maize in the field, as well as a strong insecticidal potential in laboratory on the latter, can therefore be integrated within the framework of integrated pest management strategies.

**Keywords:** *Thevetia peruviana*, Aqueous extract, Insecticide potential, Stem borers, Maize.

LIMALA II Etienne Pacôme

**Smallholders perceptions and socio-economic importance of leaves of *Megaphrynium macrostachyum* (Benth.)  
Milne-Redh. (Marantaceae) in the Central and Coastal regions of Cameroon  
Poster P56**

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This study, which aims to determine the perceptions of the actors and the socio-economic uses of *Megaphrynium macrostachyum* leaves, was conducted in the Central and Coastal regions of Cameroon, in fourteen markets distributed in four cities, namely: Douala, Edea, Boumnyebel and Yaounde. Data collection carried out from April to June 2021 from 102 merchants involving men and women was done through an ethnobotanical survey with individual and semi-structured interviews and direct observations in the field. The result of the evaluation of the knowledge of the smallholders on the socio-economic uses revealed that *Megaphrynium macrostachyum* leaves are mainly used in the food (UA = 99%) and medicinal (UM = 61,85%) domains and its marketing proved to be a profitable activity according to 99% of respondents, with an average gain of 211.1 FCFA per average package of 57 leaves whose average purchase price is 147 F CFA and that of sale being 246 F CFA. The major difficulties encountered by the sector are the transport (48,23%) and the rotting of the leaves (27,06%). The actors involved in the sector are mostly single (48%) and married (34%), their education level being mainly secondary (47%) and primary (46%). Young women being the main providers (84,15%) and the Bassa community the main source of supply for the product (55,31%). So, *Megaphrynium macrostachyum* is not only of social but also economic interest, because it is used as a medicinal plant and also as a traditional vegetable sold and consumed by several households. In order to improve the well-being of the populations who benefit from it daily, this species must be taken into account in programs for the conservation and sustainable development of NWFPs in Cameroon.

Keywords: perceptions, smallholders, Socio-economic importance, *Megaphrynium macrostachyum* Cameroon.

**Dr. DJUIDJE KOUOMOU Peguy Flora**

**Physicochemical and microbiological assessment of the drinking water sources from Manoka Island, Cameroon  
Poster P57**

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**Background and methods:** Water is a natural resource essential to life, but its quality is jeopardized by pollution from several sources, hence the need to contribute to improving its quality. The present work was conducted to assess health risks related to sources of drinking water used by inhabitants of Nyangadou village in Manoka Island, Cameroon. A descriptive and analytical study of 41 randomly selected households was carried out in order to get an idea of the health risks associated with drinking water. Water samples were collected from functional wells and boreholes and analyzed in the laboratory in order to determine physico-chemical parameters and microbiological contaminants, using the standard methods described by APHA and AWWA.

**Results:** The results showed that 51.22% of surveyed households use water from boreholes as a source of supply and 48.78% use well water. Among the 41 surveyed households, 31.72% treat water before consumption while 68.28% do not treat it and no household had latrines. The physico-chemical analysis showed that water samples analyzed are contaminated to varying degrees by organic and inorganic matter boreholes. The average nitrite (NO<sup>2-</sup>) concentration in well water is 19.1 ± 0.7 mg/L while ammonium (NH<sub>4</sub><sup>+</sup>) contents are 27.15 ± 0.02 and 0.49 ± 0.07 mg/L in well and borehole water samples respectively. The biochemical oxygen demand (BOD) and chemical oxygen demand (COD) are very high in well water (938.33 ± 0.6 mg/L) and borehole water (1114 ± 0.06 mg/L). The microbiological analysis showed that the value of total germs is 184 CFU/100 mL and 14 CFU/100 mL in well and borehole water samples respectively. These different values of the chemical and bacteriological parameters found in well water samples greatly exceed the WHO standard values.

**Conclusion:** These results indicate that well water is unhealthy for direct consumption.

**Keywords:** well water, borehole water, physico-chemical parameters, households, water quality, Manoka.



NOUBOU TAKAM Daïna

**Levuriform endogenous flora of *Garcinia mangostana* and opportunity for biotechnological exploitation**  
**Poster P8**

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As the world's population grows, several biotechnological processes are used for food preservation and processing to meet the nutritional needs of the population. One of these processes is alcoholic fermentation, used for a wide range of foods in particular cereals, dairy products, vegetables and fruit. Indeed, the fruit are face with various problems including post-harvest losses and their increased perishability with regard to the metabolism of their microbial flora. The aim of this study was to characterize endogenous yeasts from *Garcinia mangostana* for industrial exploitation. For this, fresh mangosteen fruits were harvested in the Littoral region of Cameroon. Spontaneous fermentation was carried out after disinfecting the fruit. The isolation of yeasts was then carried out on the SDA medium in the presence of chloramphenicol and the selected isolates was characterizing.

A total of 30 yeasts were isolated of which 23 were capable of fermenting. Of these isolates 09 produced an alcohol content of 5° after five days of fermentation at 29°C. Three (03), including L<sub>1</sub>H<sub>1</sub>, L<sub>1</sub>G and L<sub>1</sub>I<sub>2</sub> showed strong growth in a medium containing up to 16% ethanol (v/v). Characterization of these isolates by Api 20 C AUX Gallery revealed that L<sub>1</sub>H<sub>1</sub> was *Saccharomyces cerevisiae* 2, L<sub>1</sub>G was *Saccharomyces cerevisiae* 1 and L<sub>1</sub>I<sub>2</sub> was *Cryptococcus luteinis*.

These isolates could well be optimized for industrial use in the production of fermented beverages.

**Keywords:** Yeast, fermentation, mangosteen, alcohol

Dr. MBOG MBOG Séverin

Evaluation of Effluent Management at the Gynco Obstetric and Pediatric Hospital of DOUALA  
Poster P58

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The study on the evaluation of the effluent management of HGOPED was carried out between March and July 2021, with the aim of proposing an appropriate management method.

**Methodology:** To complete this evaluation, we made an inventory of the source's pollutants associated with wastewater mapping, to highlight the non-compliance of the mode management, we carried out a diagnosis through a checklist, Ishikawa and Pareto. Then the determination of the pollutant removal rate in the laboratory followed by a questionnaire with residents.

**Results:** The results on the management of HGOPED effluents enabled us to highlight the non-compliance of the wastewater treatment steps and the most important causes (methods to 33.33%, material at 33.33% and financial resources at 16%). Residents also complain foul odors and the sensitivity of the receiving environment has shown us that diseases the most recurrent water problems are malaria at 37.6%; 24.8% typhoid; 12.8% of amoeba and scabies. All this is due to the lack of potable water. The result of laboratory analyzes revealed apart from SS (intermediate 23 mg/l, downstream 30mg/l) and intermediate COD (368 mg/l) i.e., 20 mg/l, 250 mg/l respectively. which were high due to the excessive presence of chemicals in the water. The slaughter rate of all physical and chemical parameters met MINEPDED discharge standards. The initial environmental analysis enabled us to highlight the significant environmental aspects that arise, among other things, from the activities carried out in the anatomy-pathology department.

Keywords: Impact; Pollutant; Management; Environment; Hgoped

**NDJOUONDO Gildas Parfait**

**Comparative analysis of phytoplankton diversity of the Miana and Tongo'o bassa rivers (Littoral, Cameroon)  
Poster 59**

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**Background and methods:** Anarchic and galloping anthropization is degrading the hydrosystems of coastal towns in Cameroon. Phytoplankton plays an important role in these ecosystems. The aim of the study was to make a comparative analysis of phytoplankton diversity of the Tongo'o Bassa and Miana rivers with a view to propose measures to monitor these rivers for diversity conservation. Sampling took place monthly from March, 2020 to February, 2021. Phytoplankton was sampled in the pelagic zone of each watercourse.

**Results:** Total species richness of Miana river amounts to 10 classes divided into 41 genera and 46 species. Tongo'o Bassa river has 9 classes divided into 20 genera and 22 species. Shannon-Weaver Diversity Index is high to 3.21 bits to Miana river (station M3) and low to Tongo'o Bassa river of 1.35 bit (station T2). Class of Bacillariophyceae records the highest density at Miana river of 2400 ind/L obtained respectively to M1 and M3 stations. To the Tongo'o Bassa river, the densest class is Cyanophyceae with a maximum density of 4400 ind/L to station 2. Correspondence Factor Analysis (CFA) identifies 2 groups of species. Group 1 consists of 42 species, exclusive to Miana river. Group 2 consists of 15 species, exclusive to Tongo'o Bassa river.

**Conclusion:** This analysis was used to highlight a biotypology of phytoplankton population of these rivers from which management resources could be set up for a restoration of quality of Tongo'o Bassa river and a rational use of these resources rivers for sustainable development.

**Keywords:** Anthropization, Biodiversity conservation, Phytoplankton, River.

NANDOU TENKEU Muller

**Contribution to the fight against unsanitary conditions and deforestation of mangroves through the production of ecofriendly coal in Douala  
Poster P60**

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To fight the insalubrity and deforestation of the mangrove of the Cameroon estuary, a study was conducted in two sites of Youpwe and monkey wood between 2017 and 2022. A social-economical study and environmental survey related 98 operators of the cutting of woody trees of the genera *Rhizophora* and *Avicennia*. An ethnobotanical inventory on 04 transects of 50 × 10 m was also carried out. It shows that three different nationalities showed up, which was Cameroonian at 91%, Nigerian 6% and Central African 3% leading this area. The apparent exploitability diameter of the genera *Rhizophora* and *Avicennia* varies between 0.5 ±0.01 cm, 0.6±0.01 cm, 1.00±0.01 cm, 1.15±0.01 cm. The diameter class [0-5[ has undergone extinction at these sites. The area of the territory decreased from 4.24 ±0.01 m<sup>2</sup> in 2017 to 1.58 ±0.01 m<sup>2</sup> in 2022. The volumes exploited also experienced a decline from 239.85 ±0.001 m<sup>3</sup> in 2017 to 100.1 ±0.001 m<sup>3</sup> in 2022. The average densities per site are 805 N/Ha in 2017 and 454,445 N/Ha in 2022. Fisher's test showed a significant difference between these two sites. Its value obtained 60.50 is higher than the theoretical value 2.04 at the degree of freedom 3.25 × 10<sup>-50</sup>. These results show that the mangroves of the Wouri estuary are on the verge of extinction. The eco-friendly coal was produced from six biomass. Calorific values range from 16 MJ/Kg, 25 MJ/Kg, to 32 MJ/Kg. The result shows that 80% of these 98 operators have agreed to substitute this charcoal for species of the genera *Rhizophora* and *Avicennia* for cooking meals and for wood energy. These results contribute to the fight against unhealthy and deforestation of mangroves and are in line with the sustainable development goal, in particular number 7 and 13.

**Keywords:** *Avicennia*, *Rhizophora*, mangrove deforestation, ecological charcoal, sustainable development goal, unsanitary conditions

NGATA N. Laurence

**Socio-economic and environmental impacts of the rehabilitation of the pedestrian road in Ekoudou 1 (Yaounde)  
performed by HILT techniques  
Poster P61**

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The Ekoudou 1 district is one of the spontaneous settlement districts of the city of Yaoundé. Several actions in favor of the improvement of the living conditions of the populations have been initiated in this district and in this case the project of rehabilitation of the pedestrian way which was launched in November 2008. The objective of this study is to evaluate the socio-economic and environmental impacts of this work, carried out using High-Intensity Labor Techniques (HILT).

To achieve this objective, a diagnosis of the state of sanitation of the study area was carried out before the construction of the work, followed by socio-economic and health surveys which were carried out before and after the construction of the project. Book using a semistructured questionnaire. This survey was completed by a physico-chemical analysis of the waters of some underground water points used by the populations.

The epidemiological survey revealed a prevalence rate of 47% for parasitic infections and a rate of 7% for waterborne diseases compared to the 194 diagnoses made in patients of all ages residing in this district.

The realization of this work suffers from insufficiencies related to the environmental impact study (EIS) relating essentially to the absence of a compensation plan, the impacts actually occurring on the ground and the shortcomings in the implementation of the Environmental Management Plan (EMP).

This work shows in the final analysis that the health and economic situation of the populations of this district could improve after the completion of the work, but there is still much to be done in terms of wastewater and sewage.

**Keywords:** Footpath, socio-economic impact, environmental management, HILT technique, Ekoudou 1 district.

**Dr. TSEMO Aristide**  
**Closed models on the category of directed graphs and applications**  
**Poster P62**

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Graphs play an important role in computer science, in particular in data mining where subgraph patterns are identified for clustering data. This leads to different classifications of graphs. On this purpose, it is possible to adapt in the context of graphs ideas used in topology like homotopy theory, which has been extended to category theory by Quillen. With my coauthor Terrence Bisson, we have defined a closed Quillen model structure on the category of directed graphs relevant to Zeta series. The weak equivalences of this model are morphisms which preserve cycles. We have also determined its homotopy category, which is equivalent to the category of periodic Z-sets. In practice, this model can be applied to identify networks which can retain similar information.

**Keywords:** Graph theory, Closed model, data mining.

**Dr. SIEWE Nourridine\***

***TGF- $\beta$  inhibition can overcome cancer primary resistance to PD-1 blockade: a mathematical model***  
**Poster P63**

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**Background and methods.** Immune checkpoint inhibitors have demonstrated, over the recent years, impressive clinical response in cancer patients, but some patients do not respond at all to checkpoint blockade, exhibiting primary resistance. Primary resistance to PD-1 blockade is reported to occur under conditions of immunosuppressive tumor environment, a condition caused by myeloid derived suppressor cells (MDSCs), and by T cells exclusion, due to increased level of T regulatory cells (Tregs). Since TGF- $\beta$  activates Tregs, TGF- $\beta$  inhibitor may overcome primary resistance to anti-PD-1. Indeed, recent mice experiments show that combining anti-PD-1 with anti-TGF- $\beta$  yields significant therapeutic improvements compared to anti-TGF- $\beta$  alone.

**Results.** The present paper introduces two cancer-specific parameters and, correspondingly, develops a mathematical model which explains how primary resistance to PD-1 blockade occurs, in terms of the two cancer-specific parameters, and how, in combination with anti-TGF- $\beta$ , anti-PD-1 provides significant benefits. The model is represented by a system of partial differential equations and the simulations are in agreement with the recent mice experiments. In some cancer patients, treatment with anti-PD-1 results in rapid progression of the disease, known as hyperprogression disease (HPD). The mathematical model can also explain how this situation arises, and it predicts that HPD may be reversed by combining anti-TGF- $\beta$  to anti-PD-1.

**Conclusion.** The model is used to demonstrate how the two cancer-specific parameters may serve as biomarkers in predicting the efficacy of combination therapy with PD-1 and TGF- $\beta$  inhibitors.

Keywords. Checkpoint inhibitors, TGF-beta inhibition, cancer therapy, drug resistance

**NDJEUMOU NGASSI Roger Corneille**  
**Campus Portal with Graphic Reporting**  
**Poster P64**

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**Background and methods:** Knowledge management in learning institutions is the process of making use of shared lessons, practices, activities, procedures and materials related to the stakeholders' interest or students' affairs efficiently. Resource constraints and accreditation requirements oblige educational institutions to set their prime technological concern and select the most appropriate systems. The immense availability of mobile devices among students offers opportunities to integrate them into academic context. This research proposes SEKÛD, an intuitive, easy to use campus portal with personalized contents tailored to user roles and which can be used anytime, anywhere and on any smartphone. At this stage, SEKÛD portal has been implemented as a stand-alone desktop application following the V-shape development approach due to its simplicity and early test planning. The development team conducted a functional requirements analysis, identified the components that would be necessary to meet user needs, reviewed existing solutions, and came out with the detailed architectural design of the system.

**Results:** SEKÛD Campus Portal is currently in the coding phase. Once developed, we will use PKFokam Institute of Excellence as pilot-test institute to validate functionalities of the system including viewing and downloading lecture notes, course syllabi, required books, latest assessments and timetables. Features such as assiduity rate and academic records shall be in the form of line, bar and pie charts.

**Conclusion:** There is an abundance of information that the college passes on based on the student's particular situation. Upon completion, the SEKÛD system will be available for use by any academy helping their students to get the privileges of the portal.

**Keywords:** SEKÛD, Campus Portal, Graphical Reporting, Knowledge Management, Learning institution, innovation.



**KEMENI KEMMOE Wilfried Pierre & NGASSI NDJEUMOU Corneille**  
**Library Management System**  
**Poster P65**

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**Background and methods:** In most developing countries, library services are essentially human-oriented with most library content being hard copies. Services like exploring the library's booklist, borrowing and returning books, are rendered on-site and managed manually. This research proposes KAD, a software that is designed to manage all the primary functions of a library. KAD is developed in Python using database and object-oriented programming. KAD permits easy management of users and documents whether books or digital content. Borrowing and returning of books is handled properly with time saving both for the user and for the librarian. All the information about the library which was done manually by the librarian is done on the computer using KAD, this enhances productivity.

**Results:** KAD is currently in the coding phase. Once done, African libraries in general, and particularly Cameroonian libraries, will use KAD and validate all the functionalities and advantages of the system.

**Conclusion:** KAD will improve the delivery of library services, reduce the workload of the librarian and enhance user satisfaction. We believe the Library management system we develop is highly needed in the different libraries of our country and outside.

**Keywords:** KAD, Library Management, Python, Database

**KOUAM W. Guy\***

**New Information and Communication Technologies: An Opportunity for Africa's Development (?)  
Poster P66**

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Developing countries and modern information and communication technologies: how does this fit together?

Digital transformation is both a challenge and an opportunity for African countries.

Current situation. What are the opportunities for young entrepreneurs? What difficulties do they encounter, particularly in the field of e-commerce?

**Keywords:** information and communication technologies, education, economy, e-commerce

**TAHTE Bertrand**

**A neural network based license plate recognition in complex environment**

**Poster 67**

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**Background and methods:** Vehicle and vehicle license detection obtained incredible achievements during recent years that are also popularly used in real traffic scenarios, such as intelligent traffic monitoring systems, auto parking systems, and vehicle services. Computer vision attracted much attention in vehicle and vehicle license detection, benefit from image processing and machine learning technologies. However, the existing methods still have some issues with vehicle and vehicle license plate recognition, especially in a complex environment. In this paper, we propose a multivehicle detection and license plate recognition system based on convolutional neural network (CNN) in a complex environment. Our dataset is composed of images taken from even and uneven illumination environment and images with different shooting angles. Firstly, a higher level of CNN is employed to extract vehicles from the original images. Secondly, the regions of the detected vehicles are input to a lower level (smaller) CNN to detect the license plate. Thirdly, the detected license plate is split into single numbers. Finally, the individual numbers are recognized by an even smaller CNN.

**Results:** The experiments on the real traffic database of Camerounens license plates validated the proposed method. Compared with the commonly used all-in-one deep learning structure, the proposed method deals with the license plate recognition task in multiple levels for sub-tasks, which enables the modification of network size and structure according to the complexity of sub-tasks. Therefore, the computation load is reduced.

**Keywords:** Deep learning, convolution neural network, Vehicle detection, Characters recognition.

**KENMOGNE Fabien**

**Stability of modulated signals in the damped mechanical network of discontinuous coupled system oscillators with irrational nonlinearities**  
**Poster P68**

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The behavior of mechanical network consisting of discontinuous damped system oscillators elastically coupled with strong irrational nonlinearities, excited at one of its end by the modulated signal is investigated. By using the Newton second law, the set of discrete damped equations governing the dynamics of this network are established. These set of equations have strong irrational nonlinearities, with smooth or discontinuous characteristics depending just to the inclination angles of strings. By using next the perturbation method, these set of discrete equations are reduced to the nonlinear cubic Guinzburg-Landau (CGL) equation governing the small dissipative amplitude modulated signal. As this CGL equation is not integrable, the dissipative modulated pulse and dark solitons as solutions are approximated via perturbation method, which is confirmed by using the conserved quantities as well as numerical investigations. Finally the conditions for modulational instability are found and proved to be sensitive both to inclination angle and dissipative coefficient.

**Keywords:** *Irrational nonlinearity; Mechanical network; Discontinuous dynamics; Damped soliton; Modulational instability.*

WOKWENMENDAM Limi Martine & Dr KENMOGNE Fabien

Effects of time delay on the dynamics of nonlinear beam on elastic foundation under harmonic moving load  
Poster P69

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The effects of the time-delay on the dynamics of the nonlinear beam on elastic foundation under vibrating moving external load are analyzed. The moving load carries out both a horizontal motion with speed  $v$  and transverse harmonic oscillations, with angular frequency  $\omega$ . By using the formulation of Lagrange as well as geometric analysis, the nonlinear equation of the system with time-delay is established. In this case the Winkler-type model of elastic foundation soil that acts on its bottom interface (soil-beam) is used. The equilibrium points are next found, their stability studied and the condition of Hopf bifurcation established as function of time delay. Next by using the Melnikov process, the analytical constraints necessary to have chaos or not as behaviors of the system are sought, which are confirmed by numerical investigations, with plotting of the time series, Lyapunov exponent and the bifurcation diagram, which are used to study the effects of time-delay ( $\tau$ ), which is chosen as control parameter. The results show that when the value of  $\tau$  is small, the ergodic tori and resonance cycles with different rotation numbers on the torus can appear in the system. When the value of  $\tau$  increases the chaos behaviors take place in the system.

**Keywords:** Nonlinear beam; Time delay; Moving load; Melnikov theory of chaos.

**Dr. SIMO Hervé**

**Dynamical behaviors of pendulum arm under electric bursting oscillation  
Poster P70**

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We investigate numerically the responses of the single pendulum and double pendulum arms coupled to a nonlinear RLC-circuit shaker through a magnetic field. These systems can be used to build a robotic device or an automat. The nonlinear RLC circuit is a Duffing oscillator that generates electric bursting oscillations. We first examine the dynamical behavior of the single pendulum arm. Time series shows that the pendulum arm exhibits

bursting oscillation. When the natural frequency  $\omega_2 < 1$ , the shape of the bursting in the electrical part is different from that observed in the pendulum arm and if  $\omega_2 > 1$ , the shape is the same. We then explore the behavior of a double pendulum arm powered by electric bursting oscillations. Time series are also used to explore the behavior of each pendulum arm. The results show that the displacement of each pendulum arm undergoes bursting oscillations

resulting from the transfer of the electronic signal. The shape of bursting of the first pendulum is different from that of the second pendulum for some values of  $\omega_1$ . The shape, period and amplitude of the bursting oscillations depend on various control parameters.

**Keywords.** Single pendulum arm; double pendulum arms; bursting oscillations; nonlinear RLC circuit, a robotic device

**KAPAWA NOUNAMO & Dr. PACIO Rochelle**  
*Dynamic and Responsive Alumni System*  
Poster P71

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**Background and Methods:** To maintain data to be efficient and innovate processes, systems must be automated, accessible and accurate. Dynamic and responsive alumni system, is one thing that institutions must have and maintain. It allows alumni and undergraduate students to communicate each other. Alumni will give details on their current status, including employment details and job opportunities in the company they're working, and this will be an opportunity for undergraduate students, it will also help companies to seek applicants on a specific program. To gather data, the team used methods such as questionnaire and interviews to the members of alumni, also to some institutions and companies. The software methodology used was Rapid Application Development (RAD) put less emphasis on planning and more emphasis on adaptive process. Prototype are used in this research, based on the gathered user interface requirements.

**Results:** The main objective of the study is to design and develop a dynamic and responsive alumni system, it provides information to the specific objectives; the processes in the existing system, the problems encountered, the features and functions needed to be dynamic and responsive, the security and control measures, and also the benefits to be acquired by the alumni, undergraduate, institutions, and employers.

**Conclusion:** The implementation of this dynamic and responsive alumni system will innovate the processes of tracing alumni, their current employment status, job posting by employers, job opportunities by the undergraduates, in more accessible, accurate and efficient way. Companies and institutions will be connected, and this study will be a big help to the undergraduates in their internship and job opportunities.

**Keywords:** responsive web design, dynamic system, alumni system, job opportunities

**Dr. PACIO Rochelle**  
*Online Examination System*  
**Poster P72**

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**Background and Methods:** Many transactions in the education sectors are already done online, static data like viewing programs, courses and other information of the institutions, also data that are dynamic like accessing a database to view active students, grades online, alumni among others. Online examination, particularly entrance examination is one of the preliminary process that a student must perform before registering to a university, the team's objective is to design and develop this application to be more accessible, accurate and efficient way to deliver and get examination results faster. To gather data, the manual-based questionnaires were confidentially used, interview with the administrators or invigilators were also conducted for follow up and get other necessary information.

**Results:** Designing and developing an online examination specifically discussed the pen and paper based systems, and the problems encountered, the features and functions need to be online, the control measure and security by the end users and the administrator, and finally the benefits to be acquired.

**Conclusion:** The implementation of this online examination system is an innovative development by the education sectors, showing that they are competent and adapting technological trends. This will enhance the processes and deliver an excellent results for the end-users especially those who are at a distance with more accessible, accurate and speedy results.

**Keywords:** online examination, e-exam, educational innovation, education sectors, database



**TSAFACK TATSAGOUM Alex J.**

**Impact of nonlocality and quintic nonlinearity on the dynamics of a soliton in weakly nonlocal media  
Poster P73**

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The present work investigates the impact of nonlocality and quintic nonlinearity on the dynamical parameters of spatial solitons. For this fact, we have established the equation governing this dynamics which is a quintic cubic nonlinear Schrodinger equation. We approximated the solution of this equation by a hyperbolic secant ansatz type. By means of the variational method, we have highlighted the influence of the propagation parameters on the pulse. Thereafter, numerical analysis is made and allows us to conclude on the role of the quintic nonlinearity and the nonlocality on the dynamics of the solitons in these media. It turns out that the quintic nonlinearity contributes to the compression of the pulse, while the nonlinearity participates in its broadening. Taking into account the two effects helps stabilize the soliton during its propagation by generating a new dynamic state depending on whether the quintic nonlinearity and the nonlocality add up, compensate each other, or that one of the two effects is more important than the other.

**Keys words:** Nonlocal media, quintic nonlinearity, soliton, variational method.

**DJOBNO Noel\***

**Alternative cement and potential to meet infrastructural needs of Africa  
Poster P74**

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The increasing demand for housing induced by a growing of urban population between 4% and 6.5% annually is driving up the need for construction materials and viable infrastructures (housings, roads, bridges, etc.) in Africa. Concrete is the most consumed material in the world after water and also a major contributor to the carbon footprint of the built environment. Indeed It is a composite material with Portland cement as the key component, yet Portland cement production is responsible for 8-10% of the anthropogenic CO<sub>2</sub> in the world. In addition to the environmental concern of cement production, the cost of cement remains higher in sub-Saharan Africa than it is in industrialised countries. This is because of the shortage of cement plants and poor road infrastructure for transportation. Moreover, some of the raw materials required for making traditional cement can be unavailable, inaccessible and/or of insufficient quality. The development of low carbon-emitting, cement-based materials and construction technology from local materials contributes to resilient infrastructure, promotes inclusive and sustainable industrialisation, and fosters innovation. This paper addresses the innovative solutions developed to help achieve sustainability in Africa's built environment by promoting the use of locally available raw materials. The potential of clays, lateritic soils, and natural pozzolan to be used as raw materials for developing alternative cement has been investigated. Further, their use in manufacturing various construction materials involving concrete block and stabilized compressed earth block reported. The results demonstrated that the construction materials obtained have interesting properties (setting time, compressive strength, rheology etc.) and sometimes performed well than their relative made of conventional ordinary portland cement. The work also highlight the benefit of those construction materials to meet infrastructure demand in Africa at a lower cost with limited impact on the environment.

**Keywords:** low carbon cement; built environment; local materials; building materials

**ABDULMALIKI TATAH Suiseka**

**Study and Realization of an Improved Bio-digester for The Production of Biogas Used in Generating Electrical Energy in Buea Town  
Poster P75**

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Cameroon urban centers and Buea in particular is suffering from the problem of waste management and insufficient electrical energy supply. The application of this project will help in solving the problem of waste management and energy crises in the country.

The conversion of bio-waste was recycled to biogas in a 0.04m<sup>3</sup> polyethylene plastic design as biogas plant with feed input, biogas output and slurry output fabricated of which 80% and 20% of the plant was designed for feed and biogas holder respectively. The digester was fed with 10 liters of cow dung and 4 liters of pretreated plantain peels all diluted in 10 liters of well water to occupy 25.6 liters of total biogas plant volume in a continuous feeding mode of 10 days for 35 days. The plant was installed in a room out of sunlight made permanently dark and insulated with the achievement of maximum temperature of 27.5°C. Flammability of produced biogas was tested on the 35<sup>th</sup> day of incubation and blue flame was achieved with maximum gas pressure of 0.17Kpa with energy equivalent of 0.048KWh. Thermal power station devices were studied and Rankine Cycle was designed and simulated in Matlab Simulink with biogas combusted at the furnace and the furnace temperature was set. The output of the cycle is a rotating mechanical power that is coupled with the generator for the production of electrical energy. Maximum furnace temperature of 1500°C was set and the maximum and minimum mechanical output power of respectively 1.2MW and 1.1MW were achieved with maximum and minimum overall efficiency of 24.5% and 22.75% respectively. Electrical power generated from cycle is calculated by multiplying the output mechanical power and generator's overall efficiency.

**Key words:** Biogas, digester, biomass, boiler, steam turbine, Rankine Cycle

**ESSIMI Marion Amandine & Dr. PACIO Rochelle**  
*Hardware & Software: The Little Man Computer Model*  
Poster 76

**Dr. Rochelle Pacio**<sup>\*</sup>, Essimi Marion Amandine , Fadila Yamfam Houmie , Junior Ekoko Ben Duala

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**Background and Methods:** Dr. Stuart Madnick created an instructional model of computer called “The Little Man Computer” (LMC); the concept is very important to computer users and young technologists especially those students under computing discipline to understand deeply how processors and operating system functions. To gather data, the team used document review and video simulations. Also Familiarising, performing teardown and assembly with the main components of the system unit, a bit technical but the team use an analogy to human body parts to fully grasp its functions. Also the importance and deep understanding of the Operating System (OS), to make these hardwares to work with the software.

**Results:** The main objective of the study is to present a better understanding on the technical parts of hardware and software, specifically, it discussed the LMC, the system unit components and its functions, and a deep understanding on how the OS works.

**Conclusion:** Proper presentation, documentation and review of these topics, will provide knowledge and deep understanding for computer users, young technologists, and students under computing disciplines.

**Keywords:** The Little Man Computer, processor, system unit, central processing unit, operating system

MAYO Jean Pierre Junior & Dr. PACIO Rochelle  
*Online Grading System*  
Poster P77

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**Background and Methods:** One of the online student information system that is very important to students and parents is the grading system, the ability to access grades online anytime, anywhere with accurate data is one way to represent that institutions are responding to innovative trends in technologies. Aside from it lessen paper and transportation costs to get student's grades, it is very convenient, efficient and secure way to keep grades information. The team used methods such as questionnaire and interviews to gather data. Moreover, benchmarking and data mining was also observed.

The software methodology used was Agile; it is the process by which a team can manage a project by breaking it up into several stages and involving constant collaboration with stakeholders and continuous improvement and iteration at every stage.

**Results:** The main objective of the study is to design and develop a online grading system, it sought answer to the following objectives 1) The information gathered in the existing system, 2) The problems encountered in the existing system, 3)The functions needed to be automated 4) The security and control measures and 5) the perceived benefits by the institutions, employees, students, and parents.

**Conclusion:** The implementation of this research will make institutions known to their technological innovations in disseminating grades to end-users - students and parents, in more accessible and accurate online grading system.

**Keywords:** online grading system, online students information system, agile methodology

LIGBWAH Victor Wotanie

**Inorganic Geochemistry of sandstones, shales and claystones strata in W Douala sub-basin, Cameroon: Implications for tectonic settings, provenance and paleoweathering conditions**  
**Poster P26**

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Inorganic geochemistry of sandstones, shales and claystones strata in part of the western Douala Basin has been studied through major and trace element, including rare earth elements (REEs) in order to determine and understand their provenance, tectonic settings and paleoweathering conditions. Different geochemical discriminants and elemental ratios such as  $K_2O/Na_2O$  vs  $SiO_2$  and  $Th-Sc-Zr/10$ ,  $Eu/Eu^*$ ,  $La/Sc$ ,  $Th/Co$  and  $Th/Cr$ ,  $Th/Sc$  vs.  $Zr/Sc$  and  $Eu/Eu^*$  vs  $(Gd/Yb) N$  indicate that the rocks were derivative from mafic igneous source with minor association of intermediate igneous source with substantial sediment recycling (F1 vs F2 plot after Bhatia, 1983). Geochemical signatures from plots of  $K_2O/Na_2O$  against  $SiO_2$ , discriminant functions F3 against F4 after Roser and Korsch (1988) using raw oxides for provenance signatures and  $Th-Sc-Zr/10$  all validate deposition of sandstone, shales and claystones in a passive continental margin setting. An A-CN-K ( $Al_2O_3-CaO-K_2O$ ) diagram (ternary plot) and chemical index of alteration (CIA) values suggest that the studied rock experienced moderate to intensive degree of chemical weathering under moderate weathering conditions for an extended period of time, or under humid weathering for shorter periods of time.

**Keywords:** *Mafic Igneous Source, Provenance, Tectonic Settings, Sandstones and Shales*

**NGUIMDO**  
*Theory and practice*  
**Poster P78**

*FISTEC Sarl*

It is about putting a good link between theory and practice or emphasizing practice for visible development.

the choice of technology also enters into these strategies.

we will analyze the financing of technology and its value chain in order to detect the factors of truth.

industrial development

transformation machines being all the operational parts of a transformation process, we will quickly approach the methodology for defining a production line or a factory.

the unitary parts being compositions of the sets of physical operations, the contractor and the designer will define the composition of the factory.

the different operating modes lead to modeling the manual or automatic system and in some cases the semi-automatic.

these modes calling on the skills of the most or least qualified engineer in the field.

dear sir and ladies. the time has come when we will no longer fail to trust our engineers. it is this hour when the financiers will also choose to finance technology like the merchants who make the engineers of others more competent. through their industrial and commercial creativity.

it is then that for the realization of this equipment, we integrate the welding of its steels and the boilermaking. general mechanics call mechanics. automation, electricians and other more specialized technicians and to have a competitive result.

it is time for us to invest in local technology in order to put our engineers to work and thus limit imports. buying an imported finished product is putting the manufacturer's engineers to work. why not do it with us. now is the time to raise funds to make this idea a reality within 6 months. we will have biscuit factories, soap factories, fruit juices, washing machines, building materials built by us.

long live technology and long live pkfokam

**Application of Cloud, IoT and Artificial Intelligence technologies for energy sector innovation in Cameroon: Smart Grids.  
Poster 79**

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**Background and methods:** The energy infrastructure faces several challenges. Among these challenges, operators must mainly: maintain a constant balance between supply and demand of electrical energy; quickly identify and correct failures in the network; adapt to climate issues; optimize energy production and make consumption flexible for industries, businesses and households. The smart grid presented here will address these many issues through the integration of IoT sensors/actuators (for real-time measurement of electrical variables and execution of automatic actions on network nodes), mobile networks (for information transmission), the Cloud (for centralized storage of electrical measurements, their processing and advanced analytical interpretation thanks to artificial intelligence), and finally a multi-platform user interface to allow users to interact with the electrical network and observe the result of the electrical data analysis.

**Results:** A simulation of the proposed architecture allowed us to evaluate the behavior (automatisms, energy variations, ...) of an electrical network with a 90% certainty rate. Let's also add a design file of the smart meter to be installed at the energy consumers. The publication of two recent articles (1), (2) on IoT and Artificial Intelligence resulting from the designed and realized operational prototypes.

**Conclusion:** The inclusion of artificial intelligence here is a key factor as it will revolutionize the predictions possible on the power grid, optimize energy management, magnify profits and improve green energy integration.

**Keywords:** Smart Grid, Smart electrical networks, Artificial Intelligence, Cloud, IoT.

**Published articles:**

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**Background and methods:** Part of the African population gets its water from wells. Locally manufactured rope-pump are increasingly used because they are cheaper and easier to maintain, even if water is always collected in a bucket before being used. Thus, we deploy the design and manufacturing tools to overcome this problem.

**Results:** We have designed our water supply system on a 3D CAD software while dimensioning elements with respect to water well diameter and depth, and also the output pressure and flow rate. The system consists of a two floors frame made with angles of 50mm. The first floor at human height has a crank connected to the rope-pump installed in the second floor at a higher level by a special belt-pulley system. The outlet pipe of the rope pump pours water in a 250l plastic recycled container resting on the upper floor. The system has been realized with local materials and adequate maintenance capacity. It has been connected to the water network of a domestic home through an isolation valve. It is operated manually by a human, but it can be easily motorized if needed. The storage capacity of the system can be upgraded to 1000l. The sanitation water flow rate and pressure were good. The system can also serve as a charged water storage for a home connected to the town water system. The cost of construction and installation of our prototype was around 300 000 cfa f.

**Conclusion:** The home rope-pump based water supply system designed, built, installed and tested, has succeeded in supplying water to a medium size domestic home. It has an average flow rate of 36,7l/min in the upper container. Later, we will both reduce the construction cost and increase the performance of our water supply system.

**Keywords:** Design and construction, water supply system, rope-pump, local materials

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