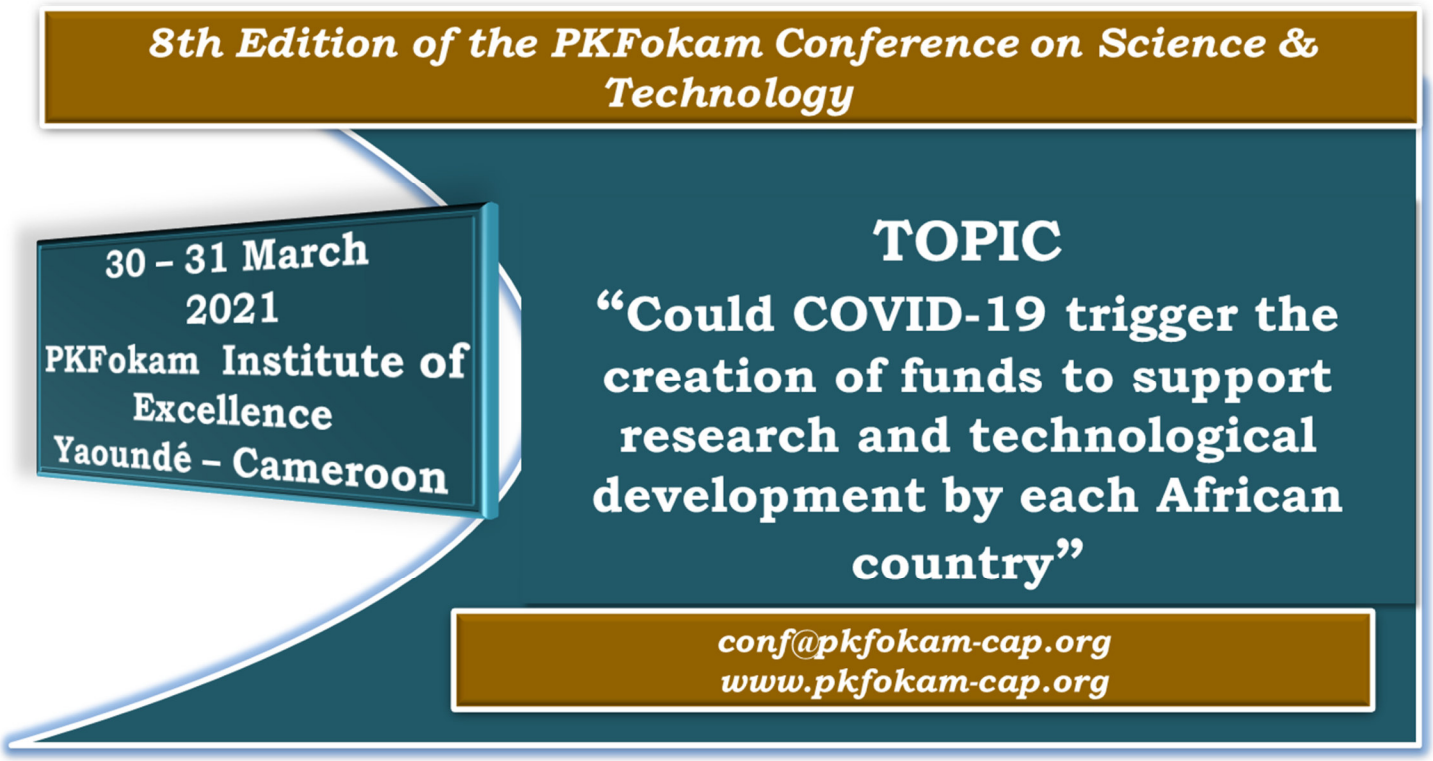

Topic: Could COVID-19 *trigger the creation of funds to support research and technological development by each African country?*

The COVID-19 pandemic has revealed the real face of governments. The results of scientific research as well as those of technological innovation, available to each country, can be used to fight this pandemic. African countries which have not deemed it necessary to invest in the sector of technological development and scientific research are stuck. Indeed, the so- called industries in several African countries are quite simply trading service counters and not development engines.

Have we learnt the lesson? *The attitudes of African governments and that of African industrialists will allow us to find a good answer to this question this year. However, African researchers themselves should also ask and answer good questions, not only on development issues, but on how to tackle and handle emergency situations in Africa.*

Scientific Committee

The PKFokam Conference on Science & Technology (http://www.pkfokam-cap.org/conference-on-science-technology/) main goal is to bridge the gap between theory and practice by stimulating a new motivation within the african «Sci-Tech» community. Our 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.

*A crucial question has been raised during previous editions of our conference: "**Research for Publication or Research for Development?**"*

It has been emphasized to focus on wealth-creating research activities to boost our economy. In this regard, the PKFokam Journal of Applied Sciences & Technology (https://pkfokam-jast.org/) , which is especially dedicated to the exploitation of results of applied research has been created. The PKFokam-Jast seeks to:

- *Promote and disseminate results of applied research.*
- *Disseminate the knowledge and findings that researchers have developed.*
- *Create connection between society and researchers, link that enables their results to attract more attention.*
- *Serve as information carrier for industrialists, companies or business actors who are willing to transfer the results of applied research out of laboratories into practical application.*

We welcome your submissions to the PKFokam-Jast

Thank you for your participation to the 8th edition of the PKFokam Conference on Science & technology.

Dr. Nestor KAMDEM
The PKFokam Conference Coordinator

*Dear Colleagues, Dear Friends, It is with great pleasure that we welcome you to our beautiful city of Yaounde for the 8th edition of the PKFokam conference on science & technology. The main aim is to provide a forum for discussion, to facilitate integration in several fields, and to bring together researchers, scholars, and students from all areas of science & technology from all around the word. The conference topic this year is: **Could COVID-19 trigger the creation of funds to support research and technological development by each African country?** will inspire African countries to invest in the sector of technological development and scientific research. Diverse research topics including Agricultural Sciences, Environmental Sciences, Water Treatment Technology, Natural Products in Drug Discovery, Mathematical Sciences, Physical Sciences, Information and Communication Technology and Mechanical Engineering are developed. Thanks to your participation, we do hope that you enjoy your attendance at this Conference!*

Pr.Dr. TOGUE KAMGA Fulbert
Chairman of the scientific committee (8th edition)

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8:55 – 9:05	**Prof. Dr. Fulbert KAMGA TOGUE** University of Douala	*Scientific coordinator of the 8th edition of the PKFokam conference*	
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TEGUIA Alexis

Problematics of Research Funding in Cameroon

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In addition to independent actors whose impact on national issues is not completely insignificant, research activities are conducted by above 5000 professionals either from the Ministry of Scientific Research and Innovation (above 1500) or mainly from the State Universities hosting above 3500 researchers. With such a number of experts from various scientific background, usually graduates of the best universities in the world, the development of the country as a whole and the day-to-day life of citizens in particular should benefit from research findings. However, while individual researchers get promoted for the quality of their publications, usually in first class scientific journals, the impact of the published research results on development is yet to be seen. Among other factors affecting the effectiveness of research in promoting development in Cameroon, the lack of local funding seems instrumental as most funds originate from abroad, usually for problematics imposed on researchers by the funders. Beside training qualified personnel, Cameroon authorities did not deploy a real funding policy to withstand research activities as development tool and consequently, with her meagre resources, the country has been paying salaries to her experts to work for the development of already more developed and richer countries. One would therefore like to question the philosophy of research in Cameroon and the reason why funding research activities is yet to become a priority for the power that be. While COVID-19 pandemics brought to light the importance of local scientific expertise in each country to control the disease and reinvent economic development, Cameroon may continue to depend exclusively on external assistance unless a real revolution of mentalities occurs.

NGONKEU M. Eddy L.

Production of Artemisia annuaL based herb tea and capsules by the multiplication of seeds (grains and leaves) as a preventive and curative means against COVID-19 in Cameroon.

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Background and methods: There is a simple cure which is not a myth and that everybody may cultivate in their garden or have in their homes, and which heals the worst pandemic in the world today, COVID-19. It is *Artemisia*.

In fact, malaria patients who have recovered thanks to that herb seem to display natural protection against COVID19. Artemisinine is a concentrate of natural Chloroquine, powerful antimalarial drug possessing a very strong antiviral effect without any known or proven after-effects on humans. The hypothesis would be that artemisinine played a preventive and curative role against COVID 19. The objective is to broaden this prospect by making available an *Artemisia* based simple product with easy access so that anybody could easily obtain grains and leaves as seeds for a large scale extension in Cameroon.

To put it more concretely, it is a question of multiplying seeds (grains and leaves), producing herbs and transforming them into *Atemisia Annua* L based infusion as preventive and curative means against COVID-19.

Results: The biochemical and phenological characterization of collected data has permitted the selection of the richest data in active substances such as artemisinine against pandemics. The production and free distribution of more than 25,000 plants and 50 kg of Artemisia seeds (that is more than 10,000 grains per gram) have been achieved with the populations of Cameroon. Then the setting up of seed farms in the 5 agro-ecological zones of Cameroon made it possible to start the extension of these technological packages. The drafting of technical user cards for the transformation and extension of *Artemisia annua* infusions is ongoing, and at present, together with IMPM (Institute of Medicinal Plants), work has been undertaken to produce artemisinine capsules. At the end of the process, herb tea infusions will be put at the disposal of hospitals, schools, markets, distributed to weak populations, and put at the disposal of the army and the police.

Conclusion: The effectiveness of such a large scale project would yield a cure for a greater number of patients in Cameroon where malaria and COVID-19 are rampant; this would permit the Cameroonian government to wage the battle at a lower cost. Furthermore, this solution would also be an important source of income for the populations producing and selling the herbs. To reach every Cameroonian and achieve the expected results, the search for funding is still ongoing.

Keywords: COVID19, Malaria, *Artemisia annua*, production of herb tea, cures, preventive, curative.

KENGNE TENKEU Janvier

Impact of environmental pollution on water quality and phytoplankton biodiversity of some ponds in the city of Bertoua (East-Cameroon)

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Introduction: A study carried out in five ponds (Mokolo, Mopa, Cote d'azur, Ngaikada and Kpokolota) of the city of Bertoua allowed to appreciate the spatial and seasonal dynamics of phytoplankton populations in relation to anthropization.

Methodology: This study was carried out from March 2016 to April 2017 on a monthly frequency with direct sampling at the surface and deep sampling using a Van Dorn bottle. The physicochemical analyses were carried out according to standard methods and phytoplankton analysis by the Utermôhl method.

Results: The abiotic variables show strong anthropization with high temperatures (> 23°C), low transparency (< 70 cm) despite the shallow depth (< 170 cm) of ponds, average oxygenation, high levels of nutrients and chlorophyll pigments. Nitrogen is the limiting factor of eutrophication and the ponds studied are all hypereutrophic. The biologic variables show that the pond "Cote d'azur" has 159 species, "Mopa" (147 species), "Ngaikada" (143 species), "Mokolo" (138 species) and "Kpokolota" (136 species). Diatoms dominate in Mopa (53%) and Ngaikada (43%) ponds. Euglenophyceae (32%) in Cote d'Azur and Kpokolota ponds and Chlorophyceae (46%) in Mokolo Pond. The high phytoplankton biomasses reflect high photosynthetic activity and high primary productivity due to nutrient uptake. These organisms are diverse, but not in equilibrium because of the dominance of a small group of saprophilic and polluotolerant species consisting of the taxa: Azpeitia africana, Stauroneis Phoenicenteron, Eresmophaera gigas, Microcystis aeruginosa and Aphanocapsa incerta.

Conclusion: Restoration should focus on the control of the flow of nitrogen compounds for a proactive management of the phytoplankton blooms responsible for eutrophication.

Impact of the study: Propose measures for the restoration of ponds for a resumption of aquaculture activities.

Keywords: Bertoua, ponds, anthropization, phytoplankton, restoration.

NANA PAUL-Alain

Lakes Monoun and Nyos in Cameroon: When Nature, Science, Scientific Culture and African Thoughts Confront Each Other!

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Abstract

Based on the sad murderous events of lakes Monoun and Nyos, killing 37 and 1746 people respectively, due to gaseous fumes, we present in this study the gap that exists between science and African societies still rooted in indigenous beliefs. It has been clearly demonstrated that these two lakes store large quantities of toxic gas. Also, the extremely varied microbial community that colonizes these lakes is also capable of producing and storing gas. These particularities have led to these lakes being classified as "killer lakes". In spite of these relevant results that preceded the installation of the degassing device, and in the absence of any real promotion of the scientific results, 9.4% of the survivors and residents claimed that it was a nuclear test. Also, 78.13% defended the thesis of a mystical-religious phenomenon. Clearly, the gap between science, scientists and societies is quite noticeable. For a solid and sustainable construction of Black Africa in general, a new dynamic and a synergy of all societal components in the face of science is needed.

Keywords: disaster, scientific culture, sustainable development, lakes Nyos and Monoun.

LIKENG LI NGUE Benoît-Constant

Effect of Genotypes and biological treatments using agro-mophological and germinative traits in tomato *(Solanum Lycopersicum L.)*

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Abstract

The purpose of the study was to evaluate the agro morphological and germinative traits under biological-products of three varieties with different genotypes purchased at the Mfoundi market namely: Nadira F, Rio grande and Roma savanna, from August to November 2017 at CERES center in Yaoundé, in comparison to the chemical treatments (phytosanitary treatment and fertilization) usually used by farmers in Cameroon. For all germinative parameters (germination time, seedling emergence and first leaf outline) the results obtained showed no significant genotypic variation under both biological and chemical treatments. However, the results obtained showed significant genotypic variation of all agro morphological studied traits. For instance, the number of roots ranged from 14.15 ± 2.8 to 22.46 ± 3.53 for Roma, from 10.38 ± 1.89 to 24.71 ± 3.69 for Nadira F1 and from 14.62 ± 2.99 to 24.38 ± 3.47 for Rio grande, for chemical and organic treatment respectively. The stem diameter of the plants ranged from 5.15±1.14 mm to 9 ± 0.46 mm for Nadira F1 and Rio Temoin, with no significant difference between the treatments. The number of branches per plant with no significant difference between treatments ranged from 11.50±3.83 to 17.95± 2.98 for Nadira F1 and Rio grande. Our study gained insight into the positive effect of organic or biological products in tomato productivity. Thus, to obtain good tomato yield, it is recommended to choose a good variety on the biological treatment.

Keywords: Genotype, Agro-morphological parameters, biological treatment, Solanum lycopersicum L.

ESSOME Sale C.

Antifungal potential of acetone and ethyl acetate extracts of Thevetia peruviana on Phytophthora colocasiae growth, causal agent of late blight of taro *(Colocasia esculenta (L.) Schott)* from three Agro-ecological zons of Cameroon

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Abstract

Objective: Taro leaf blight caused by *Phytophthora colocasiae* is the most devastating disease in taro production in Cameroon since one decade now. This study was conducted to evaluate the antifungal activities of acetone and ethyl acetate extracts of *Thevetia peruviana* seeds on the *in vitro* growth of the fungus.

Methodology and Results: acetone and ethyl acetate extracts of *T. peruviana* were prepared and used at concentrations of 12.5, 25 and 50 µ/ml. *P. colocasiae* was isolated from infected taro leaf cultivars "Macumba or Ibo coco" located in three different regions: west, Littoral and Centre. The different explants were put in V8 agar medium and maintained in pure culture. Mycelial fragments of *P. colocasiae* of about 0.8 cm in diameter were cut and placed in sterile Petri dishes containing Potato Dextrose Agar (PDA) medium supplemented with different concentrations of plant extracts and incubated at 23±1°C for seven days for the evaluation of the radial growth. The results obtained showed that the acetone and ethyl acetate extracts have completely inhibited the growth of the strains of West and Littoral at 25 µ/ml while total inhibition of the pathogen was not obtained with strain of Centre region. The lowest inhibition was obtained with the strain of Centre region: 93,88 % for acetone extract and 90.78 % for ethyl acetate extract compare to 100 % for west and littoral region at highest concentration. **Conclusion and potential application**: The acetone extract at the concentration of 25 µ/ml totally inhibited the *in vitro* radial growth of some strains of *P. colocasiae*. This extract, active *against P. colocasiae* could be used as alternative to fungicides for the control of taro leaf blight. In other hand, the strain of West region was most sensible to extracts than the others. This strain could be used to provide a genetic resource for future trials in natural conditions in greenhouse and in the field.

Keywords: Extracts of *Thevetia peruviana*, antifungal potential, *Phytophthora colocasiae*, taro.

MBOG MBOG Séverin.
Contribution to the continuity of academic activities in the context of a health crisis: Case of COVID-19 at the National Higher Polytechnic school of Douala

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Abstract

The objective of this study is to develop a strategy for the continuity of university activities in the ENSPD in order to guarantee the achievement of academic and pedagogical obligations in times of disruption

To achieve this general objective, three specific objectives were set and these constituted the main stages of this study. The first step consisted in making an inventory of the management of academic activities within the ENSPD for this, observations, interviews and surveys were carried out with the various actors who participate directly or indirectly in the management of academic activities.The second step was devoted to the identification and analysis of the causes of non-conformities. This consisted in identifying non-conformities through checklists based on the requirements of standards, prioritizing non-conformities through the 5M method, then proposing measures to improve these. The last step was to structure the non-conformities in an action plan using the 3P method

The results on the management of academic activities before and during COVID-19 show a delay of 0-90 days on the delivery of face-to-face courses, 0-75 days for tutorials, 0-59 days for CC, exams (normal and catch-up) 7-29 days and 7-15 days, publication of CC grades 13-80 days late and publication of exam grades (normal and retake) 23-83 days and 27-17 late days. Regarding the level of application of response measures before and during the coronavirus by the ENSPD, it varies from 5% - 40% for online courses, from 15% -30% for the implementation of the online platform, from 0% - 35% for remote assessments and for teacher training for online pedagogy from 5% - 10%. The analysis of the causes of non-conformities made it possible to propose certain measures to be able to remedy these non-conformities. The implementation of an action plan led to the development of a tool for managing academic activities within the ENSPD.

Keywords: academic activities, business continuity, disruption, non-compliance

TEMEGNE N. Carine.
Fertilizer Recommendation for Sorghum Cultivation in the North Region of Cameroon

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Abstract

Background and methods: The main sources of food energy in Cameroon are starchy roots and cereals. Most of the soils on which these cereals are grown are degraded in Cameroon. Fertilizer application has excellent potential to improve the nutrient content of deteriorated lands and raise the nutrient level of the plant. The aim of this study was to investigate appropriate fertilization schemes to enhance the production of sorghum in the North Region of Cameroon. The plant material consisted of the Zouaye variety of sorghum produced by IRAD (Institute of Agricultural Research for Development) of Garoua. The experiment was carried out in 2018 at IRAD Kismatari experimental field. The experimental setup was a complete randomized block design in four replicates and four treatments: T1 (No input), T2 (50 kg NPK + 50 kg Urea.ha-1), T3 (100 kg NPK + 100 kg Urea.ha-1), and T4 (150 kg NPK + 150 kg Urea.ha-1). Fertilizer treatments NPK and urea were applied at 3 and 5 weeks after sowing.

Results: Nine weeks after sowing, the plant height was highest at T3, following by T2 and T4. The treatment T1 exhibited the lowest grain yield while T2 and T3 showed intermediate grain yield. The treatment T4 produced the highest biomass, number of ears per plant, and grain yield (2.9 t.ha-1).

Conclusion: The treatment T4 appears to be the most appropriate fertilizer recommendation for sorghum production in the North Region. However, costs-benefits studies for the use of fertilizer NPK and urea are warranted to facilitate adoption by farmers in the Region.

Keywords: Fertilizer recommendation; grain yield; NPK; Sorghum bicolor; urea.

DZOKOU J. Victor

Sustainable management of edible insects of Yaounde rural area: biodiversity, host plants and socio-economic interests

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Abstract

Background and methods: The objective of this work is to contribute to the safeguarding of the forest ecosystem of six villages in Yaounde through the mastery of edible insects/host plants relationships and the sustainable exploitation of feeding trees larvae and caterpillars consumed and marketed. The insects were captured manually and with the use of a net on their host plants thus preserved in 70% ethanol and in curlpapers. The collection of dendometric parameters, the inventorying of products and services and a socio-economic investigation were carried out. Shannon and Simpson diversities indices and the equitability of Pielou were used to highlight the specific diversity of the ligneous hosts of edible insects.

Results: The insects consumed in Yaounde belong to 4 orders of 6 families of 10 species associated with the host plants belonging to 8 families of 10 genera and 10 species: The Lepidoptera-Saturniidae with *Imbrasia* genus of 7 species living on 5 host plants families (Lecythidaceae, Euphorbiaceae, Meliaceae, Fabaceae, Anacardiaceae) of 7 species. The polyphagous Orthoptera-Acrididae (*Acrida* sp.) and Orthoptera-Pyrgomorphidae (*Zonocerus variegatus*). The Isoptera-Termitidae (*Macrotermes falciger*) associated to termite mound. The Coleoptera-Curculionidae (*Rhynchophorus phoenicis*) associated on Palmaceae. Two thousand two hundred and ten host plants are listed and are used locally as medicinal plants, food, coal trees, firewood and saw log. Among the causes blocking the durability and the productivity of these edible insects are slash-and-burn farming (37.78 %), saw down of the host plants during harvests (30%), the firewood (11.11%) and the coal industry (3.33%). These insects represent a running ingredient in the local preparation of dishes. They are mainly eaten as additional food by all the surveyed populations (100%).

Conclusion: This work showed that the biotope of the edible insects is threatened by the human action on the ecosystem and proposed durable management means.

Keywords: Biodiversity, edible insects, host plants, durable management, livelihoods, Cameroon

SIEWE Nourridine

SARS-CoV-2 and self-medication in Cameroon: a mathematical model

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Abstract

Background and methods: Self-medication is an important initial response to illness in Africa. This mode of medication is often done with the help of African traditional medicines. Because of the misconception that African traditional medicines can cure/prevent all diseases, some Africans may opt for COVID-19 prevention and management by self-medicating. Thus to efficiently predict the dynamics of COVID-19 in Africa, the role of the self-medicated population needs to be taken into account. In this paper, we formulate and analyze a mathematical model for the dynamics of COVID-19 in Cameroon. The model is represented by a system of compartmental age-structured ODEs that takes into account the self-medicated population and subdivides the human population into two age classes relative to their current immune system strength.

Results: We use our model to propose policy measures that could be implemented in the course of an epidemic in order to better handle cases of self-medication.

Conclusion: Self-medication in the course of a pandemic may have a detrimental role at community level.

Keywords: Self-medication; COVID-19; SARS-CoV-2; basic reproduction number; sensitivity analysis

KAMDEM

Successful in vitro regeneration using zygotic embryogenesis in Picralima nitida Stapf Th. & H. Dur.: an over-exploited species in Cameroon

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Abstract

Background: The Cameroonian flora is full of significant diversity of medicinal plants, many of them like *Picralima nitida* are overexploited and have difficulty to regenerate naturally. The aim of this study was to improve the method of *in vitro* propagation and acclimatization of the species.

Methods: Four treatments were applied for the disinfection of mature zygotic embryos extracted from seeds of ripe fruits. Nine culture media containing different concentrations of phytohormones were tested, and the *vitro-plants* obtained were acclimatized on different substrates constituted of soil, sand, soil:sand (1:1 ratio).

Results: Different chemicals showed significant responses ($P<0.05$) on successful disinfection of the explants. Treatment combining triton X-100 (20 µl) and sodium hypochlorite (30 %) resulted in the highest disinfection rate and reaction (80 ± 4 %). MS medium without phytohormones (MS0.0) showed the maximum percentage of bud burst, germination and rooting (100 ± 0 %). The highest number of roots per shoot (2 ± 1) was observed on culture media MS0.0 and MS+BAP (0.2 $mg.L^{-1}$). Culture medium enriched with 2,4-D (0.5 $mg.L^{-1}$) showed the longest roots (1.5± 0.5 cm). Acclimatization on soil resulted in the highest number of leaves per shoot (4 ± 2) and favoured the growth of *vitro-plants* (2±1 cm after 60 days of acclimatization).

Conclusion: Ours is the first study to demonstrate that rhizogenesis is the only step of zygotic embryogenesis in *P. nitida in vitro* regeneration that need 2,4-D as exogenous phytohormone.

Keywords: 2,4-D, acclimatization, disinfection, *Picralima nitida*, regeneration, zygotic embryogenesis.

FANYA NKUIKA Arnaud

Design of the feed touch pad and concentrated touch pad

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Abstract

Context and methods: The breeders to manufacture a feed and concentrate n% of good quality with local ingredients while respecting international standards encounter many difficulties related to the calculations to have the right formula to produce less expensive. The difficulties are due to a lack of good math skills to solve complex systems of equations. This is a real challenge to overcome. Faced with the lack of level of the breeder, I conducted research which allowed me to set up first mathematical algorithms published in Germany ISBN: 9786202348454. ISBN: 9786202349833. the translation of these two algorithms into computer science give tablets called Fanprosoft and Fancmavsoft which will allow farmers (breeders) to produce very good quality feed and concentrate with local ingredients.

Results: Fanprosoft (touchscreen feed tablet) and fancmavsoft (touchscreen concentrates tablet) work with memories where the bromatological data from research centers, the types of farms and the different prices of ingredients are stored, according to the different geographic regions of the world and the strains of the subjects. Each requested ingredient enters automatically into the calculation system and the results are displayed within one second, the calculator offering 60 operations per second.

Conclusion: The operations (calculations) which are done by hand (trial and error, etc.) are now carried out thanks to artificial intelligence associated with Information and Communication Technologies (ICT) and what requires winning in time in decision making, to produce at low cost.

Keywords: Breeders, inventor, author, touch pad, OAPI, artificial intelligence

DONGMO NANFACK Albert

Effect of essential oil and powders of Tithonia diversifolia on the growth parameters and yield of rice in the field

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Abstract

The high costs of agricultural inputs push to look for alternatives to increase the production of rice. For this, the objective would be to evaluate in the field, the effect of seed treatment using the essential oil and the improvement of plants using Tithonia diversifolia powders on rice growth. The experiment was carried out in the Department of Moungo, in the locality of Lelem and Kompina. Before the field experiment, the biochemical parameters of the powders and the soil physicochemical were determined. The experimental design is a completely randomized factorial split-plot consisting of three treatments and two varieties (NERICA 3 and NERICA 8) with four replicates. The present study was carried out during two successive seasons of 2018 and 2019. All data are the meaning of these seasons. It appears that the soil of Kompina is an acid (pH between 5.0 and 5.3) and sandy clay that of Lelem is silty-clay-sandy and slightly basic (pH between 6.8 and 7.9). The yield increase is greater in the treated plots than control. Yield is high in the locality of Lelem than in the locality of Kompina. The 1000 seeds weights are very large in the amended plots (33 g) than the control plots (29 g). It is observed a good emergence rate (96%) in the two localities and some symptoms of the disease transmitted by seeds were observed only in the area of Kompina. From this study, we can retain that the NERICA varieties adapt very well to the rainy conditions of up-land and deserve to be popularized. The positive results of the amendment to the powder and treatment of seeds with essential oil on the growth of rice deserve a renewed interest in the exploitation of this plant resource as biofertilizer and biopesticide to improve rice production.

Keywords: Amendment, biofertilizer, biopesticide, rain-fed rice, Tithonia diversifolia

MADEUNOU NKOUEKEU Olga Laure

Potential for the lost of the Phytogenetics resources of Chilli pepper (*Capsicum annun*) in Cameroon: the case of Mfoundi Department

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Abstract

Varieties of chilli pepper (Capsicum annun) exist in Cameroon as well as in the rest of the world. However, their visibility remains unclear in Mfoundi Department markets to characterize the plant genetic resources available. In order to understand the reasons for this situation, a survey was conducted among traders of chilli pepper, seeds and producers. The results of this study carried out over a period of three (03) months made it possible to understand that pepper varieties are not mastered by traders who identify them at 12.91% by their production areas, at 19.35% by their colors, and have no idea for 65.59% of traders. Most of the production sold on the markets comes from the Western region. Peppers leave their production areas without any varietal identity, due to the negligence of producers who buy 30% of the plants from the market or extract 42.5% of their seeds themselves without prior varietal identification, which leads to the loss of genetic resources, despite the presence of several marketing structures with several well characterized varieties on their shelves.

Keywords: Capsicum annuun, varieties, phyotogenetic resource, conservation, Mfoundi

FOKAM Paul Ernest

Agromorphological performance of five varieties of watermelons (*Citrullus lanatus*) grown and marketed in Cameroon

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Abstract

Watermelon (*Citrullus lanatus* (Thunb.) Matsum. & Nakai) is a herbaceous plant of the Cucurbitaceae family with multiple uses and little knowledge on varietal improvement. This study aimed at evaluating the agromorphological performance of five watermelon varieties (Sugar baby, Kaolack, Crimson sweet, Charleston gray and Koloss) selected from the Cameroonian market on the basis of seventeen plant, fruit and seed characteristics selected from cucurbit descriptors. Based on the result on seed shape, all five varieties have elongated seeds (ratio length/height (L/H<1)). The Kaolack variety was early with a delay of 80 days after sowing (JAS) in contrast to the Sugar baby variety which had a delay of 110 JAS. The Kaolack and Crimson sweet varieties are considered elite varieties with regard to their best agromorphological performances (average number of fruits per plant 3.55 and 3.32 higher than the others). A positive and highly significant correlation at the 1% threshold (r = 0.957**) was noted between the length and weight of the mature fruit, flowering time and ripening time, respectively (r = 0.960**). The characterization of these varieties carried out in the field shows that the fruit length, the diameter, the weight of the mature fruit and the weight of 100 seeds allow to completely distinguish the five varieties contrary to the others, which will be used as a basis for future works of prospecting and collection, genetic characterization and improvement of the production of this plant.

Key words. *Citrullus lanatus*, agromorphological performance, varietal improvement,

DEFO Celestin

Designing and sizing a mini-potable water conveyance system equipped with solar panels in the locality of Nkozoa, council of Soa (Cameroon): A technological solution approach for improving rural water supply in the tropical environments.

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Abstract

Background and Methods: The situation of rural water supply in Cameroon is still alarming. Rural drinking water supply system that are still insufficient and existing structures are regularly broken down and abandoned over a short period of time. The present study was conducted in the locality of Nkozoa, Centre region of Cameroon, with the aim of improving access to potable water through the designing and sizing of a mini potable water supply system. Therefore, data were collected using direct observation and survey. Data processing were peformed using Epanet software.

Results: The water supply system of Nkozoa was designed to satisfy water needs of 91.245 m^3 per day in the horizon 2040. The available resources to satisfy this water demand is comprised of two boreholes with solar pumps of LORENTZ manufacturing brand capable of pumping 6.5 m^3/h of water each electrically supplied by 16 solar panels of 200 W power supply each. The storage tank is a cylinder metallic structure of 40 m^3 storage capacity. Water distribution will be by gravity through a ramified distribution network with HDPE canals with diameters varying from 25 to 90 mm supplying eight (8) public taps. The network simulation showed that the pressure in the system is above 10 m. The economic analysis of the project reveals that the project cost amounts to 79 527 105 (seventy nine millions, five hundreds and twenty-seven thousand one hundred and five) francs CFA all taxes included. The price of 1 m^3 of water is estimated at 270 (two hundred and seventy) francs CFA.

Conclusion: The construction of this mini-water conveyance system and the expansion of this technology will contribute to significantly improving the livelihood of rural population in Cameroon.

Keywords: Potable drinking water**,** water supply, water needs, water point, water distribution, water resources.

KAMTOH KAMEGNE L. Auguste

Presentation of an technological approach for treating a brewery industrial water in the Republic of Cameroon (Central Africa)

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Abstract

Background and Methods: This article aim to design a wastewater treatment plant (WWTP) for brewery industry located in Douala-Cameroon (Central Africa) that can be applicable in Sub-Saharan Africa in similar affinity pattern. Specifically, the aim is to characterize wastewater, operate a technical choice for wastewater treatment and to design infrastructure of WWTP. Data were obtained through measurements of the flow of wastewater by the volumetric method and water quality data were collected at the outlet point of the brewery company by sampling and laboratory analysis.

Results: The main results show that the Chemical Oxygen Demand-COD (1 082 $mg.L^{-1}$), the Biochemical Oxygen Demand –BOD_5 (466 $mg.L^{-1}$), the amount of faecal coliforms and of total coliforms (respectively 0.99 and 6.77 million UFC/100 mL) values in wastewater are above the Cameroonians and World Health Organisation (WHO) standards for waste disposal. The treatment technology "bacterial bed" was considered the most suitable to treat the brewery wastewater. It has a rate of flow estimated at 2 700 m^3 per day. The WWTP has seven components including a sieve (meshes 0.5 centimeters), a deoiler (ventilation power : 3 400 Watts), a lamellate decanter (volume 1 165 m^3), a bacterial bed (cloisonyl, height 2.5 m and surface 676 m^2), a second lamellate decanter with processing of calco-carbonic balance (Consumption CO_2: 81.07 Nm^3, diameter 25 m), a bio-digester, a basin of disinfection (surface 338 m^2, rate of processing 0.65 g/m^3, flow of injection 12 liters/h).

Conclusion: The construction of this WWTP will enable the improvement of environmental protection around the company and hence, the city of Douala.

Keys words: Wastewater treatment plant**,** bacterial bed, water quality, environmental protection.

MVONGO DANG Victor

Developing a novel software for assessing water service sustainability in rural areas of sub-Saharan Africa

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Abstract

Background and methods: Rural water services in Sub-Saharan Africa have failures that threaten their sustainability. The present study aimed to develop a software for assessing water service sustainability in rural areas of sub-Saharan Africa. Specifically, the aim is to develop a sustainability index for water service in Mvila Division (Southern region of Cameroon) that is applicable in other localities/countries of affinity pattern, and to develop a software for implementing this index. The methodological approach used for the development of the index was based on Multi-Criteria Analysis and the Analytical Hierarchy Process and was implemented through semi-structured interviews with 19 water service experts, surveys of 80 water service managers, and a summary meeting with experts aimed at making pairwise comparisons. The development of was done using Microsoft Excel and Power Apps.

Results: The developed index consists of 21 indicators grouped into six dimensions, the most important of which are the economic (34.01%) and the technical (19.96%) dimensions followed by environmental (14.65%) dimension, sustainable governance (13.10%), social (12.65%), and institutional (5.64%) dimension respectively. In addition, self-financing capacity (17.84%), financial autonomy (11.35%) and water quality (7.18%) are the most important indicators in determining the sustainability of water services. Based on these results, a software called "Water Service Assessment Tool" (WSAT) was developed in order to implement this index.

Conclusion: This software provides a solid baseline on the sustainability of water services at the village level and identifies priority actions to be taken to move services towards sustainability.

Keywords: index, rural water service, sustainability, analytical hierarchical process, Sub-Saharan Africa

ZANGO NKEUTIA Sylvain

Extreme multistability in fractional-order thin magnetostrictive actuator and applications

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Abstract

This works introduces and investigates the dynamics of a fractional-order thin magnetostrictive actuator with quintic nonlinearity in order to design more stable prototypes. The energy balance method is used to carry out the motion equation of the system. The numerical solutions of the system are exanimated using the well know Caputo method and Adams Bashforth Moulton scheme. The dynamical behavior of the system is explored with the help of common nonlinear tools such as, bifurcation diagrams with lyapunov exponents, two parameters bifurcation diagrams, time series plots, phase portraits and stability analysis. The bifurcation diagrams reveal that the system exhibits the extreme multistability. The applications of magnetostrictive actuator are given

DJOGANG Lucie Karelle

Computational study of the interactions between antimalarial chemotherapies with folate pathway receptors and telomerase reverse transcriptase

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Abstract

Background and methods: Malaria is a life-threatening disease responsible for half a million death annually, and with nearly half of the world's population at risk. The rapid drop in observed cases of malaria in the last two decades has been due to a combination of preventive and therapeutic remedies. The aim of this work is to determine whether pf-DHPS and pf-TERT can also serve as potential target receptors for antimalarial activity. In addition we explored the difference in affinity between DHFR mutants and antimalarial drugs. The affinity and interaction patterns for multiple target enzyme receptors in different pathways can help explain the wide range of action of many antimalarial medications. Homology modeling is used to build the three dimensional models of the enzymes *Plasmodium* telomerase reverse-transcriptase *(pf-TERT) and* Plasmodium dihydropteroate synthetase (*pf-DHPS*) to determine their affinity with antimalarial drugs. Autodock Vina is used to rapidly access the stability and rank the drug receptor complexes, with goal to determine and explain any observed specificity and or selectivity of current antimalarial drugs like pyrimethamine.

Results: The interactions of 6 antimalarial drugs with *pf-TERT*, *pf-DHPS* models and DHFR enzymes was screened using molecular docking with AutoDock Vina. The docking calculations show that all the ligands involved formed stable complexes with the receptors. DHFR receptors however, seem to have a high affinity compared to *pf-TERT* and *pf-DHPS*. There simulations show that the benchmark drug artemisinin shows the strongest affinity with all the receptors and this can be attributed to the size, shape and bipolar nature of the ligand. This bipolar nature ensures one side is mostly hydrophobic and the other polar. We observe that the stable complexes are formed when the ligands successfully bind using both favorable polar and non-polar contacts.

Conclusion: The performed study provides off with a pharmacophore that can be used for the development of new antimalarial chemotherapies.

Keywords: malaria, binding energy, dihydrofolate reductase, dihydropteroate synthetase, Free Energy, telomerase reverse-transcriptase, *Plasmodium* falciparum, antimalarial drugs

MIANTSIA FOKAM Olivier

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

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Abstract

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 21.0software 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 ± .81 and 121.71 ± 1.77; Palate maximal width 35.24 ± .75 and 44.96 ± 14.80; postorbital apophyses width 23.34 ± 1.11and 36.26 ± 1.79; Palatine length 55.31 ± 1.16 and 66.52 ± 1.86; condyle basal length 96.53 ± 1.26 and 105.43 ± 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 variabilities 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.

Keywords: Blue duiker, cranial, measurements, skull, Cameroon

NDAKI M. Claude

Understanding Cameroon's Pharmaceutical Innovation System Through Covid-19 Lenses : Catch-Up and Leapfrogging Innovation Strategies.

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Abstract

Number of works on issues concerning technology and innovation and Covid-19 in Africa , have focused on the usage of existing IT technologies for Covid 19 prevention in Africa (Adyasha Maharana et al, 2020). Very few have questionned the effect of African Countries national innovation systems to generate science, technology and innovation. The aim of this paper is to characterize Cameroon pharmaceutical innovation systems and production, and to analyze the effect of financing to bring novel drugs innovation and blockbusters. We will be using catcth-up, leapfrogging and co-evoluationnry theoretical framework (Malerba et al,2005 ;2009 ;2016 ;2019), The empirical framework and context will focus on Bishop Kleda curing drug for Covid 19. Recommendation will be made both at the macroeconomic level and microeconomic levels

CHITACK FOKAM Richard

Synthesis and assessment of the biopesticides from excerpts of tobacco, for the reduction of the agricultural pollution

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Abstract

Agriculture uses big quantities of chemical pesticides nowadays. In the same way to their beneficial effects for the cultures, the pesticides express their ominous effects quietly on health and environmental. This work appears in a perspective of alternative research of treatments phytosanitary respectful of the environment in the control of the cultures. The general objective of this work is to propose some measures to reduce the use of the chemical inputs by the production and the assessment of the biopesticides from tobacco. They are produced by steepings, decoction and brewing. And their efficiency reveals that the excerpts possess the insecticide weeding effects and fungicides according to their concentration at the time of the application.

Keywords: biopesticide, tobacco, steeping, decoction

TABAKAM TCHANGOU Gaétan

Chemical constituents of Indigofera costata (*Fabaceae*) and their radical scavenging properties

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Abstract

Background: This work was designed to evaluate the radical scavenging properties of the EtOH extract, fractions and constituents of Indigofera costata Gill. & Perr., a member of the Fabaceae family used in folk medicine for the treatment of cough and snake bite. Methods: Repeated silica gel column chromatography followed by Sephadex LH-20 were used to isolate nine compounds and the structures of five of these compounds were identified by spectroscopic analyses (NMR and MS), and comparison with published data. The free-radical scavenging was carried out by using the bioautographic method with the stable radical 2,2-diphenyl-1-picryhydrazyl (DPPH). Results: The phytochemical study led to the isolation of seven known compounds including β-sitosterol (1), β-sitosterol-3-O-β-D-glycopyranoside (2), hexacosanoïc acid (3), maackiain (4), 4-hydroxy-3-methoxy-8,9-methylenedioxypterocarpan (5), 1,2,6-tri-O-(3-nitropro¬¬panoyl)-β-D-glucopyranose (6), and 2',4',3,4,α-pentahydroxychalcone (7). The crude extract, fraction B, as well as two isolated compounds maakiain (4) and 4-hydroxy-3-methoxy-8,9-methylenedioxypterocarpan (5) had strong radical scavenging activity as shown on the TLC plate by the coloration intensity of their spots and by comparison to that of quercetin used in the same concentration as the reference standard. Conclusion: Our results reveled that the crude extract, fraction B and some isolated compounds from I. costata possessed significant radical scavenging properties and further investigation could be done in view to quantify the antioxidant activity of samples from this plant species.

Keywords: Indigofera costata; Constituents; Radical Scavenging; DPPH

DJOUMBISSIE DZATIE A. Raymonde

Chemical constituents of Desmodium ramosissimum G. Don (*Fabaceae*) and their radical scavenging properties

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Abstract

Background: This work was designed to carry out the phytochemical study and the radical scavenging screening of the MeOH extract from the whole plant of *Desmodium ramosissimum* (Fabaceae) used in traditional medicine for the treatment of malaria, fever, diarrhea, lung disorders and venereal diseases. **Methods:** Repeated silica gel column chromatography followed by Sephadex LH-20 were used to isolate twelve compounds and the structures of nine of these compounds were elucidated using spectroscopic analysis (NMR and MS), and comparison with published data. The free radical scavenging was carried out by using the bioautographic method with the stable radical 2,2-diphenyl-1-picryhydrazyl (DPPH). **Results:** The phytochemical study led to the isolation of nine known compounds that were identified as D-pinitol (**1**), mixture of *β*-sitosterol (**2**) and stigmasterol (**3**), *β*-sitosterol-3-*O*-*β*-D-glucopyranoside (**4**), glyceryl-1-tetracosanoate (**5**), lutein (**6**), kaempferol (**7**), catechin (**8**) and vitexin (**9**). Among them, vitexin (**9**), and catechin (**8**) had the highest radical scavenging activity and could be appreciated by the intensity of their spots on TLC after spraying with DPPH. Moreover, the crude extract, fractions III, IV and V displayed spots indicating the presence of constituents with good radical scavenging activity. **Conclusion:** Our work was carried out to identify nine secondary metabolites and revealed that the crude extract, fractions III, IV, V and two among isolated compounds from *D. ramosissimum* possessed significant radical scavenging properties. further study as cytotoxicity should be conducted in view to associate such plant in food supplement development.

Keywords: *Desmodium ramosissimum*; Fabaceae; constituents; Radical scavenging

DJOUMESSI TOBOU France Gina

Effects of graded levels of Curcuma longa Powder on in vivo digestibility in Guinea pigs (*Cavia porcellus*)

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Abstract

The effect of the use of *Curcuma longa* powder as phytobiotic on feed intake and *in vivo* digestibility of nutrients was studied in 40 guinea pigs of English breed. This study was designed to evaluate the effects of incorporating graded levels of *Curcuma longa* powder on feed intake and in vivo digestibility in Guinea pigs. Forty (40) Guinea pigs (20 males and 20 females) of English breed, mean weight 452 ± 75 g were allocated to four experimental treatments in a completely randomized design. Each treatment contains 10 Guinea pigs (5 males and 5 females). Three experimental rations were formulated from the basal diet (0%) by adding 0.25, 0.5 and 1% C. *longa* powder corresponding to $R_{0\%}$, $R_{0.25\%}$, $R_{0.5\%}$ and $R_{1\%}$ respectively. Digestibility test was carried out for a period of 17-days (10 days for adaptation and 7 days for data collection). The inclusion of *Curcuma longa* powder significantly improved ($p < 0.05$) feed intake regardless of the level of inclusion in the diets. Dry matter (DM) digestibility of the ration containing 0.25% *Curcuma longa* was comparable to that of the rations with 0 and 1% *C. longa*. The digestibility of crude fiber (CF) of Guinea pigs fed with 0.25% *C. longa* was comparable to those fed with 0.5 and 1% *C. longa*, but significantly higher than control ration without *C. longa*. In conclusion the inclusion of *Curcuma longa* powder at 0.25% improved feed intake and digestibility in Guinea pigs.

Keywords: *Curcuma longa*, *Cavia porcellus*, digestibility, feed intake**.**

ZOUNKIFIL NJI Nasser

Piezometric variation, groundwater quality assessment of aquifers and health risks associated in Lembe-Yezoum council, Cameroon, Central Africa

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Abstract

The management of water resources in the world knows many problems both on the quality and on the distribution of the resource according to the country. In Cameroon, as in most developing countries, water is one of the most threatened environments. Indeed, 80% to 90% of wastewater discharged into rivers is raw effluents. Pollution linked to demographic and structural change poses a threat to the degradation of the resource. Groundwater, the main source of drinking water for Third World populations, is the most affected due to the pollution and overuse that created the scarcity of drinking water. Various studies are therefore carried out with a view to improving drinking water supply services for the populations by exploiting groundwater. This work specifically aims to evaluate the hydrodynamic parameters and piezometric modeling, the hydro-chemical analysis of water and the assessment of the health risks associated with the pollution parameters. Thus, the positioning and hydraulic data were collected on a sample of five (05) boreholes processed on Excel for hydrodynamic evaluation and modeled on Modflow for the piezometric extension of aquifers. Laboratory analyzes were performed on sixteen parameters. The estimate shows a high productivity of the water table which provides the operating flows in the structures with an average of 4.013 m^3/h. The health risk assessment shows that exposure following the consumption of this water has no significant side effects in populations, both on children and on adults (QD <1). Likewise, the Water Quality Index (WQI) varies between 0 and 25 depending on the experimental classification indicates that the good quality of the water table intended for human consumption and in need of protection.

Keywords : Groundwater, health risk, pollution.

TCHINDA SIKALI Arnole Brisse

Improving the quality of service of the HTA distribution network in the city of Douala: Case of the BASSA and KOUMASSI Source Posts

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Abstract

The distribution of electrical energy is the last part of an electrical network. Thus any incident on the power grid induces an interruption or poor quality of service of the HTA distribution network. The main mission assigned to the distribution of electricity is to ensure the continuity of the supply of electricity so as to minimize the frequency and duration of interruptions seen by the customer, recipient of the product. Our study was conducted with the aim of proposing solutions to improve the quality of service of the HTA distribution network in the city of Douala, particularly the BASSA and KOUMASSI source stations. To achieve this, we conducted a root cause analysis of the incidents using the interrupt log from December 28, 2017 to January 26, 2019. This shows that the Douala distribution network has accumulated 2993 kWh NDT, which is approximately comparable to 2.244.750 FCFA of costs that the ENEO Cameroun S.A company buy to the ARSEL regulator. The BASSA source station has accumulated a total of 824 kWh while KOUMASSI has accumulated 345 kWh. After presenting the incidents generating all these END, we proposed as a solution the development of the SCADA distribution which will allow the control and the control of the network cut-off devices, coupled with the acquisition of the information necessary for the exploitation of the distribution network in real time. In addition, the overload of the backbone network allowed us to propose the creation of a new start named BAS_D14_BK1 of 7.58 MW to help the architecture of the current network of these source stations. Finally, the technological choices in line with our realities enabled us to show the added value of the implementation of the proposed solutions.

Keywords: HTA Distribution Network, Substation, Quality of service, Improvement.

NANA N. Hermann

Construction and Evaluation of a Statistical Model of Seasonal Forecast in Cameroon

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Abstract

Background and methods: The objective of this study is to build and then evaluate a statistical model of seasonal forecasts in Cameroon. This study was carried out four agroecological zones of Cameroon with the test stations of Kaélé, Meiganga, Nkongsamba, Yaoundé and Kribi. This study consisted of developing in each of these stations statistical forecast models which were then first checked over their calibration period (1958-1987), then were evaluated over a previous period (1989-1993).

Results: It emerges from this evaluation that the sea surface temperatures so far used during the PRESACs explain "roughly" the rainfall in Cameroon and especially in the cities of Yaoundé and Kribi where the multiple correlations between the sea surface temperature and rainfall indices are 0.70 and 0.71 respectively. It also follows that the Hit Skill Score and the rate of coincidence between forecast and observed rainfall indices vary from 65 % to 85 % and 76.66 % to 90 % respectively. No model has false alarms.

Conclusion: Strong connections have been established between rainfall in Cameroon and temperatures on the Atlantic coast of Africa. These results argue in favor of exploring other predictors to improve predictions.

Keywords: Cameroon, seasonal forecasts, precipitation.

TOGUE KAMGA Fulbert
Simulation of iron/sand water filters: Effect of two temporal dependent dispersion coefficients

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Abstract

The consumption of poor quality water is a serious health problem in many societies. Generalized unsanitary conditions; the abundance of polluting structures; and the lack of sanitation are some sources of the proliferation of diseases linked to this consumption. Several previous works have established filter systems made on the basis of iron as a suitable solution to water treatment. Numerous mathematical models have been developed by the scientific community to optimize filter systems made with iron. In this study, the advection dispersion equation was solved numerically, taking into account the loss of porosity in the device and two temporal dependent dispersion coefficients (asymptotic and linear). An analysis of the concentration profiles at the exit of the system was carried out. The results were established by taking a tolerable pollutant concentration threshold lower than 0.0% of the initial value. It was retained that for an asymptotic dispersion coefficient, the residual concentrations at the outlet of the system increase slightly with the values of the constant k (corresponding respectively to 50, 100, and 1000) compared to those of the constant dispersion coefficient. On the other hand, for a linear dispersion, these residual concentrations decrease with the values of k (fixed at 0.03, 0.1, 0.5, 20, 50). By retaining k estimated to 0.03 in the latter case, the simulations led to a reduction in concentrations to nearly 90% of the initial value. This result shows a significant increase in the mass of solute adsorbed in the system. It could be used to construct low cost filter for safe drinking water provision.

Keywords: water, metallic iron, sand, filters systems, advection, dispersion, drinking water

GBAPORO GBAPORO F. C.

Screening of soybean varieties (*Glycine max L.*) for their susceptibility to Asian rust caused by Phakopsora pachyrhizi in Cameroon.

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Abstract

Background and methods Soybean (Glycine max L.) is an annual plant belonging to the Fabaceae family, cultivated for its seeds which are very rich in proteins. In Cameroon, soybean production is compromise by Asian rust disease caused by Phakopsora pachirhizi, which is a major constraint causing 90% yield losses in field. The objective of this work is to evaluate the susceptibility of soybean varieties to Asian rust disease under natural conditions. Forty-three soybean varieties were screened using a fully randomized three-repeat Fisher block device. Epidemiological parameters (disease incidence and severity) at 6; 8 and 10 weeks after planting (SAS) and yields were evaluated.

Results: Results show that disease incidence was significantly higher in the local variety R3 in the proportions 16.67%; 29.63%; 75.93% at 6; 8 and 10 SAS respectively. In terms of Asian rust severity at 6 and 8 SAS, the local variety R3 recorded the highest rates of 21.17% and 24.14% respectively. In contrast, at 10 SAS, the variety TGX-2002-14DM had the highest severity of 59.26%. The variety TGX-2010-12F has the highest yield (1.17 t/ha) compared to the local variety R3 (0.17 t/ha). The dendrogram realized from incidence, severity and yield parameters shows that 7 varieties are highly susceptible to Asian rust, 17 varieties are susceptible, and 19 varieties are partially resistant.

Conclusion: This study shows that Asian soybean rust attacks all soybean varieties in the field. Varieties that were partially resistant despite the high incidence and severity were able to achieve higher yields, which can be recommended to growers as an alternative for Asian rust disease control.

Keywords: Asian rust, Glycine max, varieties, yield, screening

TEMGOUA NGOUADJIO E. Vanessa

Contribution to the chemical study and the radical scavenging properties of the leaves extract of *Lannea schimperi* (*Anacardiaceae*)

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Abstract

Background: This work was designed to evaluate the radical scavenging properties of the AcOEt extract, fractions and constituents of Lannea schimperi (Hochst. ex A.Rich.) Engl.a member of the Anacardiaceae family used in folk medicine for the treatment of dysentery and diarrhea. Methods: Repeated silica gel column chromatography followed by Sephadex LH-20 were used to isolate ten compounds and the structures of five of these compounds were identified by spectroscopic analyses (NMR and MS), and comparison with published data. The free-radical scavenging was carried out by using the bioautographic method with the stable radical 2,2-diphenyl-1-picrylhydrazyl (DPPH). Results: The phytochemical study led to the isolation of six known compounds including, β-sitosterol-3-O-β-D-glycopyranoside (1), the mixture of β-sitosterol (2) and stigmasterol (3), quercetin (4), α-tocopherol (5), and lupeol (6). The crude extract, fractions FA, FD and FE, compounds 4 and 5 exhibited a high radical scavenging activity as it was shown on the TLC plate by the coloration intensity of their spots. Conclusion: Our results revealed that the crude extract, FA, FD and FE some isolated compounds from the leaves of Lannea schimperi possessed significant radical scavenging properties and further investigation could be done in view to quantify the antioxidant activity of samples from this plant species.

Keywords: Lannea schimperi; Constituents; Radical Scavenging; DPPH

SIMO K. Ingrid

Cytotoxycity and antiplasmodial activity of phenolic derivatives from *Albizia zygia* (DC.) J.F. Macbr. (*Mimosaceae*)

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Abstract

Background and Methods: The proliferation and resistance of microorganisms are a serious threat against humankind and the search for new therapeutics is needed. The present report describes the antiplasmodial and anticancer activities of samples isolated from the methanol extract of *Albizia zygia* (*Mimosaseae*). Standard chromatographic, HPLC and spectroscopic methods were used to isolate and identify six compounds: phaseoloidin, quercetin 3-O-α-L-rhamnopyranoside, kaempferol 3-O-α-L-rhamnopyranoside, quercetin 3,4′-di-O-α-L-rhamnopyranoside, kaempferol 3,4′-di-O-α-L-rhamnopyranoside and quercetin. The acetylated derivatives were prepared by modifying two of these compounds, previously isolated from *A. zygia*. A two-fold serial micro-dilution method was used to determine the IC50s against five tumor cell lines and *Plasmodium falciparum.*

Results: Two semi-synthetic derivatives exhibited significant activity against P. falciparum with IC50 of 7.47 ± 0.25 µM and 6.77 ± 0.25 µM, higher than that of their natural precursor (IC50 25.1 ± 0.25 µM).

Conclusion: The results of this study clearly suggest that, the appropriate introduction of acetyl groups into some flavonoids could lead to more useful derivatives for the development of antiplasmodial agents.

Keywords: *Albizia zygia*, Phenolic compounds, Anticancer, *Plasmodium falciparum*

DJUIDJE KOUOMOU Peguy Flora

Phytosanitary practice in market gardening in Nkolbissson area (Centre region of Cameroon): potential risk for health and the environment

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Abstract

This study aims to assess the environmental and health risks associated with the use of phytosanitary products in market gardening in the area of Nkolbisson (Centre region of Cameroon). A survey was conducted among 40 market gardeners and 9 samples (rivers, wells and boreholes) water were analyzed to measure the residues of pesticides using the Gas Chromatography technique (GC). The results showed that insecticides and fungicides were the most phytosanitary products used by growers. In addition, the market gardeners do their activities without any suitable Personal Protective Equipment (PPE) such as respiratory masks, gloves and special clothes. Recurrent health problems affecting producers include itching (82.5%), headache (75%), frequent sneezing (52.5%), dizziness (22.5%) and vomiting (17.5%). Empty phytosanitary packages were usually abandoned in farms (67.5%) and incineration (25%) was the preferred method of discarding these empty packages. After water analyze, metalaxyl which is an antifungal active substance is detected in river water with a concentration 13.74 g/l. This concentration greatly exceeds the WHO guidance value, consequently this water is qualifying as unsuitable for direct source of drinking water. These results show that the inadequate phytosanitary practices in market gardening are the main factors for health risks for producers and consumers. These practices also contribute to the degradation of the environment including water component. Promoting best agricultural practices could contribute to sustainable market gardening. In addition, the use of plants pesticides by the producers could be an alternative to the use of synthetic pesticides and contribute to protect the environment and health of producers and consumers.

Keywords: Risk, Health, Environment, Phytosanitary products, Market gardening, Nkolbisson.

MOUSSANGO Davy

Demonstration of the biochemical weapons used by phytopathogenic fungi pests of fruit papayas (*Carica papaya L.*).

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Abstract

Background and methods: Fungal agents are classified among the most devastating microorganisms in foodstuffs. One of their prime targets is fruits and particularly papaya due to its high-water content. Papaya is an important source of vitamins and minerals. Papain extracted from latex is used to treat digestive disorders. Despite this importance, the production and marketing of papaya are still hampered by deterioration mainly due to fungi. These lead to yield reductions of more than 70% to 98%, loss of organoleptic properties and induce food poisoning. The control of these phytopathogens requires knowledge of their pathogenicity and a study of the hydrolytic enzymes they secrete. The proteolytic activity was carried out by inoculating the fungal explants on milk medium with 2% coomassie blue. The lipase activity is achieved by incorporation into phenol red supplemented with olive oil + Tween 80. The cellulase activity is based on the ability of the isolated strains to assimilate cellulose on solid carboxyl methyl cellulase medium.

Results: Five fungi were isolated from the tissues of papaya fruit showing symptoms of rot. Three of these were recognized as responsible for rots after pathogenicity testing. Morphological characterization identified these agents as belonging to the genera *Colletotrichum, Fusarium* and *Botryodiplodia*. 48 hours after incubation at 25 ± 2 ° C, the appearance of translucent, yellowish and transparent aureoles around the mycelial growths testifies to the synthesis of proteases, lipase and cellulase respectively.

Conclusion: The phytopathogenic fungal agents of papayas use hydrolytic enzymes as biochemical weapons to reach their host. The inhibition of the sites of synthesis of these enzymes would limit the impact of these microorganisms on the shelf life of papayas.

Keywords: Papayes, Enzymes hydrolytiques, Champignons phytopathogènes, conservation.

FUNAYE KOUAM Sorel
Elaboration and characterization of panneaux of raphia vinifiera particle panels

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Abstract

The environmental problem arises in terms of the depletion of non-renewable natural resources and the discharge of pollutants. The idea of using natural plant fibers as a reinforcement in a material is not entirely new, but in a context where the use of renewable resources tends to become a priority, it is now seen as a promising avenue and must continue to contribute to the objectives of sustainable development while continuing to respond to environmental concerns. The objective of this work is to valorize the bamboo of *Raphia vinifiera* by the manufacture of particle panels and to determine their physical characteristics to help reduce the demand on non-renewable natural resources. The method used is experimental. Four types of panels (P1, P2, P3 and P4) were produced in the respective proportions 70% to 40% of bamboo particles with 30% to 60% of the binder. Six tests pieces for each type of panel were subjected to tensile, compressive and experimental tests to determine density and absorption rate. The average bulk density of these panels varies between 0.297 and 0.329 g / cm3. The tensile strength of the test pieces varies from 0.371 to 0.450 MPa, and the value of the compressive strength varies from 17.05 to 20.66 MPa which reflects good mechanical properties of these panels and better cohesion between the resin and the fiber plant comparable to values found by other authors. This work shows that the panels obtained by reinforcing particles of *Raffia vinifiera* have very interesting mechanical strengths. Thus their uses will undoubtedly contribute to reducing the pressure on other natural resources.

Keywords: Environment, panels, particles, Raphia vinifiera, characterization.

TAJEUKAM Vice Clotèxe

The Use of NTFPs in the Baka and Kounabembe Traditional Pharmacopoeia in the Southeastern Cameroon and the possible process towards the low cost of drugs in Africa

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Abstract

Background and methods: Forest conservation around protected areas includes among others sustainable management of natural resources. This study was conducted in the area of the northern outskirts of the Boumba-Bek National Park in order to evaluate the potential use of plants in traditional medicine. Ethnobotanical surveys were conducted with local people using AFLORA survey forms. The surveys make it possible to determine the plants used, the part of the plant used, the method of preparation, the method of consumption.

Results: A total of 132 plant species used in traditional medicine for primary health care were identified. These plants belong to 109 genera and 45 families. 224 treatments for 101 disease symptoms were collected. These diseases include the nervous system, excretory system and nutritional function. The most recurrent diseases are cough, sexual weakness, back pain, abscess, general tiredness, malaria. Some plants such as Baillonella toxisperma, Alstonia boonei, Annonidium mannii, Ricinidendron heudelotii, Klainedoxa gabonensis, Scorodophloeus zenkeri, Swartzia sp. treat several diseases at once. The plant parts mostly used are stem bark, leaves, seeds, sap, the marrow of the bark, the pith of the stem. The main method of preparation of these recipes is decoction while the most common method of administration is oral administration. The plant resources of this village have a high potential in traditional medicine for primary healthcare.

Conclusion: The pharmacological study of these drugs would make it possible to set up a processing industry which would help the populations of Cameroon and sister countries to cope with the cost of drugs which are not always within the reach of the average citizen. It is therefore urgent, through the Covid-19 pandemic, that African governments become aware of the need to develop their country in order to deal with the isolation imposed by this pandemic.

Keywords: NTFPs, Processing, medicinal plants, pharmacology, primary healthcare

MAGWELL Pierre Fils Rodrigue

Potential of poultry feather waste as a growth medium in mass production of *Spirulina platensis*

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Abstract

INTRODUCTION: *Spirulina platensis* is a cyanobacterium with high nutritional and therapeutic properties especially known to improve immune response and hematopoiesis. Jourdan medium (JM) is the most expensive and not readily available medium commonly used for spirulina culture in Cameroon. Thus, for mass production there is a need to find an effective, cheaper and readily available alternative medium. Nutrients (nitrogen and phosphorus) present in agro-industrial effluents can be used to increase production of spirulina. Therefore, this study was carried out to evaluate growth performance and nutritional status of *Spirulina platensis* in different concentrations of poultry feather waste extract (PFWE).

METHODOLOGY: Poultry feather waste (PFW) was dried, powdered and sieved. For preparation of different concentration 0, 0.2, 0.4 and 0.6 g of PFW powder was added per liter of distilled water. Commercial fertilizers (g/L): 5 $NaHCO_3$, 5 NaCl and 3 Kanwan were added. Then the media were thoroughly mixed and sterilized.

RESULTS: The highest optical density (1.05 ± 0.07), biomass (0.81 ± 0.057 µg/) and specific growth rate (0.61 ± 0.021 div/day) ($p < 0.05$) were recorded on 0.6 g/L of PFW than the control (JM) and other treatments. Similar trend was observed with protein (1857.97 ± 28.19 µg/mL FW) and phycocyanin (351.82 ± 16.86 µg/mL FW) content of S. platensis in the same medium. However, decreasing trend of sugar content was observed from 1st to 10th day of culture in the different treatments.

CONCLUSION: Therefore, 0.6 g/L of PFWE was shown to be an appropriate concentration medium for the cultivation of *S. platensis* which guarantees better growth performance and nutritional status.

IMPACT OF THE STUDY: In this research, we have demonstrated that an agricultural waste such poultry feather waste extract can be used as a nitrogen source for alternative substrate for an economically viable mass culture of *S. platensis*.

KEYWORDS: *Spirulina platensis*, poultry feather waste extract, growth performance, nutritional status

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Abstract

Background and methods: Since the outbreak of the corona virus, some western countries are struggling to maintain the same level of educational standards as before. This situation shows how many educational authorities in the world were neither equipped nor prepared to face this crisis. In the process of learning and teaching, ICT can be a major tool to be more innovative and effective. There is no doubt that they have became a challenge for policymakers. ICTs have brought a massive change in the field of education and way of life. ICTs are also changing the way of life of many people around the world. ICT is a school subject in which people learn to use computer and other electronic equipment to store and send information. ICTs include tools such as landline, mobile phone, computer, network, television, radio, etc. If those technologies are used for educational purposes, in order to support and enhance student learning and to develop learning and teaching environments, they could go a long way in bringing significant added value to these fields and contribute to the creation of wealth and growth in African countries. Africa is the continent with the youngest population of the world, it means the biggest consumption market of tomorrow. How can the continent benefits of this big potential? The population in Africa uses mostly mobile communication devices for their daily interactions, for example financial transaction. We will discuss the role and effect of ICTs, and how the acquisition of digital literacy can empower African youth and develop the continent.

Keywords: ICT, Africa, Education, Digital, Mobile.

YONTI MADIE Calvia

Analysis of the importance of the adsorption coefficient (K) depending on the distance for the transport of solute in porous media: Coastal aquifers are subject to the influence of several meteorological, climatic and hydrodynamic factors

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Abstract

Aquifers are subject to the intrusion of pollutants which may be of natural or anthropogenic origin. This can therefore affect human health through the consumption of borehole water, and also the development of vegetation. However, the nature of the dispersion and absorption coefficients of the medium significantly influence the retention of pollutants in the underground environment. In this study, the advection dispersion equation whose dispersion and adsorption coefficient depend on distance was solved numerically to determine the spatio-temporal evolution of salinity in aquifers. Analysis of the results shows that the concentration profiles remain very sensitive to the distance-dependent adsorption coefficient. The Results obtained show that by considering 0.1g / L of salinity as a guide value in the aquifer and by considering an initial source of pollutant sinusoidally and exponentially variable as a function of time, the service time of a water point Drinking water is prolonged when the dispersion coefficient is dependent on distance and the adsorption coefficient constant. These results show the importance of measuring these parameters before using them in models.

Keywords: advection, dispersal, drilling, human health

PACIO Rochelle
Centralised Cybersante of Cameroon

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Abstract

One of the most critical information that individuals should take care of is their health. It must be gathered, processed and stored in a secured, accurate and efficient way. To gather data, the team used methods such as questionnaire, surveys, and interviews. 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 centralised cybersante system for Cameroon hospitals and clinics, specifically, 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 features needed to be automated 4) The security and control measures and 5) the perceived benefits by the government, hospital, doctors, patients and researchers.

Conclusion: The implementation of this research will make the Cameroon government known for their technological innovations and for the end-users to experience secured, accurate and efficient cybersante system.

Keywords: cybersante cameroon, e-health system, automation, centralised, security

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Optimisation of Data Research Management in African Universities
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Abstract

Objectives:

1. To build an integrated innovative experimental platform common to most experiments carried out by faculties and other research institutions

2. To build several MathLab Add ons that will be implemented to comply with the demands of most laboratory experiments and workshop practice

3. To propose a secure and developed way for data collections , environments, storage in ever field of research and engineering as a whole

4. To protect the research experimental result and long lasting archives

5. Enhance data integrity, quality and avoid data theft

DONFACK NANFACK Arno Rusel

Cytotoxicity and the anti-inflammatory activity of the constituents from the roots of *Pentas schimperi*

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Abstract

Backgrounds and Methods: Chromatographic and spectroscopic techniques were used to isolate and identify ten compounds as 3-hydroxy-1-methoxy-2-methylanthraquinone (1), 2-hydroxymethyl anthraquinone (2), schimperiquinone B (3), cleomiscosin A (4), damnacanthal (5), 1,2-dihydroxy anthraquinone (6), damnacanthol (7), 3-hydroxy-2-hydroxymethyl anthraquinone (8) for the isolated compounds and as 1-hydroxy-2-methoxyanthraquinone (9) and 2-hydroxymethyl-3-*O*-prenylanthraquinone (10) for the semisynthetic derivatives. The resazurin reduction assay was used to evaluate the cytotoxicity of 3, 5, 7 and 8 whilst caspase-Glo assay was used to detect the activation of caspases enzymes by 3 and 5. The anti-15-lipoxygenase activity and on NO production in (LPS)-activated macrophages RAW 264.7 cells were determined as indicators of anti-inflammatory activity.

Results: Compounds 5 and 7 displayed cytotoxic effects with IC_{50} values below 81 µM on all the tested cancer cell lines whilst 3 and 8 displayed selective activities. The recorded IC_{50} values for 5 and 7 ranged from 3.12 µM and 12.18 µM and from 30.32 µM and 80.11 µM respectively and from 0.20 µM to 195.12 µM for doxorubicin. Compounds 5 and 7 induced apoptosis in CCRF-CEM leukemia cells. Compounds 8 and 10 were the more potent inhibitor both in NOx production with respective IC_{50} values of 1.56 µM and 6.80 µM. Compounds 2, 7 and 8 had good anti-15-lipoxygenase activity with respective IC_{50} values of 13.80 µM, 14.80 µM and 15.80 µM compared to quercetin, which was used as a standard LOX inhibitor (IC_{50} of 16.80 µM).

Conclusion: Anthraquinones and mostly 5 and 7 are potential cytotoxic natural products that deserve more investigations to develop novel antineoplastic drugs against multifactorial drug resistant cancers. Our study revealed also derivatives 7 and 8 as potent inhibitor of both anti-15- lipoxygenase activity and NO production.

Keywords: *Pentas schimperi,* Rubiaceae, Anthraquinones, anti-inflammatory, cytotoxicity

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Prediction of Biological Activity of some Organic Compounds using 3D-QSAR/QSPR Computer Chemie Centrum, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
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Abstract

On the health front, the world today is subject to new pandemics or diseases, for example the covid-19, that are a real obstacle for human development. To deal with this problem, it becomes imperative and a major challenge to conduct an active search for the discovery of new medications. In computational chemistry, two fields of research, Quantitative Structure-Activity Relationships (QSAR) and the Quantitative Structure-Property Relationship (QSPR) have been developed to meet this urgent need. Some new QSPR models were used for calculating the physical properties, in order, to generate some QSAR models necessary in predicting the biological activity of some organic compounds. The octanol/water partition coefficient ($logP_{ow}$) is an important parameter for the identification of "drug likeness ".

The smile strings of all compounds were converted from 2D to 3D with CORINA. Geometries were optimized in the Gas phase with VAMP. Molecular descriptors were calculated with ParaSurf, using the isodensity surface (iso) or the Solvent-Excluded-Surface (SES).

The logP models (QSPR) were generated using a bagging version of the stepwise multiple linear regression, based on the binning of the local surface properties and their cross-products, over the surface divided into bins, called binned SIM.

With the AM1 Hamiltonian and the SES, I obtained the model, represented statistically: N = 10,813 R^2 = 0.89, RMSE = 0.58, MUE = 0.43

As an application, we use the newly developed binned-SIM model to calculate the logP values of some phospholipidosis-inducing compounds (PPL), which is the biological activity of drugs. These calculated $logP_{ow}$ values were used as additional descriptors. The QSAR models were generated using the Naive Bayes (NB) and the Random Forest (RF) algorithms, implemented in WEKA.

With the AM1 Hamiltonian and the SES, we obtained these results; for the test set: The overall accuracies are 78% and 75% for NB and RF, respectively.

Conclusion : Most of the compounds correctly predicted as actives by both NB and RF classifiers are respecting Lipinski's condition. Thus, we can state that, this scientific work can also be of considerable contribution to the prediction of the biological activity of some synthesized organic compounds as well as compounds extracted from some medicinal plants.

Keywords: QSPR, LogP, QSAR, PPL

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