Book of Abstract of the 1st KyU international Conference 2017

KIRINYAGA UNIVERSITY

FIRST INTERNATIONAL CONFERENCE

THEME: INNOVATIVE TECHNOLOGY FOR SUSTAINABLE DEVELOPMEMENT

JUNE 29-30, 2017

DAY 1 June 29, 2017

- **Preliminaries**
- **Arrival and registration**
- **Familiarization and visit to conference Venue**
- **Distribution of name tags and conference material**
- **Welcoming guests on campus**
- **Corrections on the program**
- **Announcements of changes**
- **PowerPoint presentations given to ICT staff for presentation**

Keynote Speakers

Prof. Mary Ndung'u, Vice Chancellor, (KyU)

8:00am- 8.50 am	Registration
8:50am-9:00am	Opening Prayers
9:00am-9:20am	Welcoming Remarks/ Chair of Conference: Deputy Vice Chancellor (ASA)
9:20am – 10.00am	Opening Remarks& Keynote Address: Vice Chancellor
10.00am—10.30 am	Group Photo
10.30 am—1.00pm	Parallel Session
1.00pm– 2pm	Health Break
2.00pm –4.30Pm	Parallel Session
4.30 pm	Tea/ Guests Leave at their own Pleasure

Data was analysed using descriptive statistics. From the initial survey it was evident that all of the respondents had social media accounts, but very few used them for educational purposes. Results showed that majority of the learners were comfortable interacting with the prototype and that they require minimal training on how to use it. Learners were consistently positive in their assessment regarding functionality of the prototype. From the finding it was evident that web 2.0 tools in particular social media have enormous potential in education and that learners are comfortable using these tools.

E-LEADERSHIP BY PRINCIPALS ON MANAGEMENT OF PEDAGOGICAL INFORMATION IN SECONDARY SCHOOLS IN KIRINYAGA COUNTY, KENYA

Sub-Theme: The Role of Technology and Innovation for Sustainable Development.

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Abstract

Policy framework for education 2012 has stressed on technological innovation to improve the quality of teaching and learning for proper management of secondary schools in Kenya. Management of pedagogical information requires effective interaction and flow of communication between administrators, teachers, students, parents and stakeholders. E-leadership by principals plays a critical role in transforming secondary schools to have competitive power to promote develop. This study assessed the influence of e-leadership by principals on management of pedagogical information in secondary schools in Kirinyaga County, Kenya. Structures put in place by principals for e-leadership implementation, how the principals promote e-leadership among teachers and challenges faced by principals in implementation of e-leadership in secondary schools in 12 secondary schools in Kirinyaga County. The study adopted a descriptive survey research design. Stratified random sampling was used to sample p12 principals of secondary schools in Kirinyaga County. Data was collected using questionnaires. Quantitative data was analysed using both descriptive and inferential statistics which included percentages, means, standard deviation and Pearson correlation coefficient while qualitative data was analysed descriptively using content analysis and presented using narration, frequency tables, bar graphs and pie charts. Results showed that most of school principals rely on offline approach which was inadequate for monitoring curriculum performance and student activities in secondary schools. The study provided theoretical knowledge on how e-leadership can enhance management of pedagogical information in secondary schools Establishment of pedagogical information management system to enable the school principals monitor and make data-driven decisions on teaching and learning processes is suggested..

Key Words: E-leadership, School Principals, Pedagogical Information

University students spend considerable time on social and mainstream media where they observe, like and share the images portrayed by the media as 'ideal image'. Previous studies have shown that the unrealistic body images portrayed as 'ideal' by the media causes individuals to develop negative body images which eventually results into depression, low self-esteem and eating disorders. The study was conducted at Kirinyaga University College where a total of 251 students were randomly sampled to participate in the cross-sectional survey. A self-administered questionnaire and structured interview questions were used to collect data concerning media influence, body image perception and its influence on the individual body dis/satisfaction and impact on self-esteem. Data was coded and analyzed by Statistical package for social science (SPSS Version 21). 83% of the respondents observed that media portray a thin slender body image as attractive. 25% considered themselves very thin (American size portrayed by the media as beautiful and attractive), 52% considered themselves thin while 22% considered themselves curvy (size 8 figure). Only 1% of the respondents observed that they are fat and 0% obese. 75% were satisfied with their body image at while 25% were not happy with how they looked. Respondents that are not satisfied with their body appearance tend to develop negative body image which eventually affects their self-esteem and promotes eating disorders. The study highlights the need to develop measures to promote holistic healthy food choices and physical exercise to encourage individuals to appreciate their body image and adopt a healthy lifestyle. The study recommends that models of all body shapes and size be used by the media and other advertising companies to promote positive body image amongst their consumers.

SOCIAL MEDIA AS A TOOL FOR COLLABORATIVE LEARNING: A CASE OF TWITTER

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ABSTRACT

New frameworks for developing interactions between the actors of learning processes require new ways of gaining an understanding of such processes. Today, these frameworks are of a technological kind, and their prime expression is found in social networking sites, which have already been called 'social operating systems'. Students have gone ahead and taken advantage of these platforms by creating virtual learning environments, which are quickly becoming repositories of collective knowledge and teaching resources. Unfortunately, we are not able to fully utilize this collective knowledge being generated through group member's interaction. The focus of this study, was to ensure that the knowledge being generated through social media is not lost. This was achieved by developing a framework that was able to extract, classify and store the classified comments from a social media account to support collaborative leering. The prototype was then evaluated at the Kenya Institute of Curriculum development using a staff induction course that had four modules. Data was collected through interviews and questionnaires the interviews

Sub-Theme	**Health and Biotechnology**
Venue	**Academic Boardroom I**
Chair	**Mr Dennis Butto**
Rapporteurs	**Mr. Mark Webale & Mr. Lenny Chimbevo**

Lenny Chimbevo (Technical University of Mombasa). **Isolation and identification of heavy metal resistant bacteria producing enzymes from industrial, laboratory and dumping sites wastes in Mombasa County**

Irene Mutuku et al, (Kirinyaga University). **Antimicrobial resistance and molecular characterization of avian pathogenic *Escherichia coli***

Nancy Maingi, (Dedan Kimathi University). **Determinants of uptake of dual family planning methods among HIV positive women aged 18 to 49 years in Kirwara Sub-county, Murang'a County**

Mary Njeri chege, (JKUAT). **Phenotypic and genotypic characterization of *Xanthomonas axonopodis pv manihotis causing cbb in Kenya***

Jacob Mwangi et al (Pwani University). **Secondary infection in tungiasis**

Ezekiel Mecha et al, (Justus-Liebig University). **Giessen, Germany The tgf-beta and tgf-β receptor interactions in human endometrial and endometriotic cells**

Ezekiel Mecha, UoN**. Transforming Growth Factor-Betas (Tgf-Bs) In Human Endometrial And Endometriotic Cells *In Vitro***

Sub-Theme	**Engineering and Technology**
Venue	**Academic Boardroom II**
Chair	**Dr. Aaron Mogeni**
Rapporteurs	**Dr. Agnes Ndinda and Ms. Irene Mwangi**

Samuel Macharia etal, (Dedan Kimathi University). **Real-time remote wind data acquisition and processing system for wind turbines using internet of things technology**

S

amuel Macharia et al (Dedan Kimathi University). **Investigating Factors that Mostly affect the 3D Print Physical Appearance**

Kinyanjui Jeremiah Ndung'u, (KyU).**Characterization of norm-attainable operators on no separable Hilbert spaces**

Sub-Theme	**E-Entrepreneurship**
Venue	**Academic Boardroom III**
Chair	**Dr. Dennis Muchangi**
Rapporteurs	**Mr. Jeremiah Kinyanjui and Ms Florence Maweu**

Adel Kanyiri Karwanda**, (Kenya Methodist University). Influence of innovativeness on entrepreneurial orientation of social enterprises in Meru county Kenya**

Mary Maina et al, **(KyU). Bank ownership structure and interest rate spread among Kenyan commercial banks**

Dr. Robert Gitau Muigai, (KyU). **The moderating effect of firm size on the relationship between capital structure and financial distress of non-financial**

areas for economic transformation. Deepening the integration of key value chains of the economy is specifically mentioned. After a comprehensive analysis of Rwanda's global competitiveness, tourism was identified as one of the key sectors that would spur economic development in the country. Important as it is, however, the linkage of this sector to the rest of the economy was found to be weak and hence compromises on its ability to deliver on certain targets as expected. The objective of the study was to establish the effect of Value Chain Enhancement on Sustainable Tourism Linkages in Rwanda. The study was anchored on Michael Porter's value chain theory. Data was collected using structured questionnaires and focus group discussions whose reliability and validity were tested at an index of 0.70. The Cronbach's Alpha coefficient was used to measure the reliability on a 5-point Likert Scale for multiple items obtained from a pilot survey while content validation index of the questionnaire was done by value chain and tourism experts to determine its validity. Descriptive statistics like frequency tables, means, charts, and percentages were used besides content analysis to establish the effect of Value Chain Enhancement on Sustainable Tourism Linkages in Rwanda. The findings indicated that the revenue generated creates domestic and external linkages in the economy and prompts value chain formations and upgrading. Generally, most visitors were satisfied with Rwanda's tourism products except for its value for money. The impact of tourism on the economy can be enhanced by strengthening the indirect and induced components besides increasing domestic and foreign visitors' expenditure levels (i.e. direct impact). The most significant component of the indirect contribution is the supply chains created in the economy as a result of visitor expenditure. These supply chains should be identified, strengthened and enhanced by involving the local communities and enterprises so as to reduce on leakages in terms of input imports. Refurbishing and expansion of Kigali Serena hotel served to illustrate the effect of upgrading processes and products on the entire economy. The study recommends upgrading of tourism processes and products besides enhancing of returns by increasing length of stay and daily expenditure per visitor. The study further recommends that immediate steps to be taken are value addition to existing tourism product, reduction of barriers to entry into the sector by local entrepreneurs, encouraging innovation of new products, enhancing local and regional linkages and review of regulatory and institutional arrangements.
KEY WORDS: *Value Chain Enhancement and Sustainable Tourism Linkages*

STUDENTS' PERCEPTION ON THE INFLUENCE OF THE 'IDEAL' MEDIA BODY IMAGE ON THEIR SELF-ESTEEM AND SUBSEQUENT CHOICE OF CLOTHING: THE CASE OF KIRINYAGA UNIVERSITY

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ABSTRACT

This study examined the perception of university students on their body appearance in relation to what the media portrays as 'ideal body image'.

FIRM CHARACTERISTICS AND E-COMMERCE USAGE IN THE KENYAN BANKING INDUSTRY

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ABSTRACT

The aim of this study was to investigate the firm characteristic drivers that influence e-commerce usage in the Kenyan banking industry. Despite clear evidence showing that e-commerce usage is moderated by local environment, drivers influencing e-commerce usage remains under-researched particularly in Kenya. This objective of the study was to determine the influence of market share, number of employees, Top management support, organization learning ability and bank ownership on e-commerce usage in the Kenya banking industry. Grounded on the Technological, Organizational and Environmental model (TOE), five hypotheses were tested in the study to determine the drivers of e-commerce usage.

A descriptive cross- sectional survey was carried out and the population of the study was all the 43 commercial banks operating in Kenya as at December 2013. A sample of 32 banks was selected using stratified random sampling, while purposive sampling was used to select 96 respondents who participated in this study. Primary data was collected using a questionnaire that was administered to the heads of ICT, Operation and Finance departments of the selected banks. Data analysis was carried out using Statistical Package for Social Sciences (SPSS) and coefficient of determination and regression analyses was undertaken to test the hypothesis.

Results showed that Top management support, organization learning ability were significant factors determining use of e-commerce while firm size, bank ownership and number of employees were not. The study adds to existing innovation literature suggesting that firm characteristics influence usage of e-commerce applications in Kenyan banking industry and confirms effectiveness of TOE framework for conducting studies on actual technology usage at the firm level.

EFFECT OF VALUE CHAIN ENHANCEMENT ON SUSTAINABLE TOURISM LINKAGES AND ENTERPRISE IN RWANDA
A CASE STUDY OF KIGALI SERENA HOTEL

Odunga P. O[1], Manyara G[2], Abuya J O[3]

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ABSTRACT

The Rwandan government launched the Economic Development and Poverty Reduction Strategy II (EDPRS 2, 2013-2018) that highlights enhancement of connectivity and linkages within the country's economy as one of the priority

Sub-Theme	**Agriculture**
Venue	**Academic Boardroom IV**
Chair	**Dr. Grace Kairu**
Rapporteurs	**Mr. Kosphat Karani and Ms Sherry Odari**

Fredrick M. Njoka, (Embu University). **Assessment of Soya Beam growing in selected regions of East Africa**

Agnes Wamuyu Kinyua, (Dedan Kimathi University of Technology). **Effects of different fermentation methods on physicochemical composition and sensory quality of coffee (coffea Arabica)**

Kibet Peter, (Kenyatta University). **Effects of agricultural lime types on soil properties and maize (zea mays l) performance in acidic soils of Tharaka Nithi County, Kenya**

Winnie Kimiti, (Kenyatta University). **Effects of liming on soil chemical properties and maize performance in farmer managed trials of Tharaka Nithi County, Kenya**

Ndung'u M et al., (Kenyatta University). **Effects of tied-ridging and integrated soil fertility management technologies on maize-soybean yields in Tharaka-Nithi County, Kenya.**

Parallel Session 2:00pm – 4:00pm

Sub-Theme	**Health and Biotechnology**
Venue	**Academic Boardroom I**
Chair	**Dr. Godwil Munyekenye**
Rapporteurs	**Mr. Mark Webale & Mr.Lenny Chimbevo**

Agwata Ototo, (Pwani University). **The effect of dietary vitamin E on the growth and survival of the Nile tilapia in a semi-intensive system**

Nancy Nguchara, (KyU). **Influence of media 'ideal body image' on body image dis/satisfaction amongst University women**

Gichui William, Evaluation **of antinociceptive activity of croton megalocarpus (hutch)**

Mburu Samuel**, (KyU). Early HIV infection, cancer pathophysiology: similarities, differences and implications**

Hellen Nyambura Kariuki, (UON). **Pain management and palliative care in Kenya**

Hellen Nyambura Kariuki, (UON). **Traditional medicines used in pain management in Kenya**

Thairu E. N, (KyU). **Improving the lives of breast cancer survivors through clothes**

Sub-Theme	**Engineering and Technology**
Venue	**Academic Boardroom II**
Chair	**Ms Irene Okello**
Rapporteurs	**Ms Agnes Dinda and Miss Irene Mwangi**

Stephen Maina, (KyU). A study on the safety and ergonomics for building construction works in Kirinyaga University

Zachary Karori, (KyU). A **conservative framework for effective deployment of cloud services in higher education**

Benard Okelo, (JOOUST). Characterizations of normal operators in banach algebras

The degree of financial distress was measured using the Altman's Z-score index as reviewed for the emerging markets. A quantitative research design was adopted for the study. Secondary data from audited and published financial statements was collected on the 40 listed non-financial firms between year 2006 and 2015. The study estimated the specified panel regression model for fixed effects as supported by the Hausman test results. Feasible Generalized Least Squares (FGLS) regression results revealed that firm size has a significant moderating effect on the relationship between capital structure and financial distress of non-financial firms. Specifically, results showed that although generally debt has a negative and significant effect on financial distress of the studied companies, this effect becomes positive and significant as the size of the firm increases. The study further revealed that use of long term debt has a positive and significant effect among large-scale firms while short term debt is significantly detrimental. On the basis of these empirical findings, the study recommended that managers of listed non-financial companies should always consider the size of the firm in making leverage choice decisions for their entities.

Key words: Capital Structure, Financial Distress, Firm Size

INFLUENCE OF INNOVATIVENESS ON ENTREPRENEURIAL ORIENTATION OF SOCIAL ENTERPRISES IN MERU COUNTY IN KENYA

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[2]School of Business Studies, Karatina University, P.O. Box 1957 - 10101, Karatina, KENYA.

ABSTRACT

Social entrepreneurship has been quite a challenging area which considers the practice in which an entrepreneur sets out to solve some social problems by way of combining business management skills with social sector acumen to yield sustainable financial and social returns. This analysed influence of innovativeness on entrepreneurial orientation among managers of SACCOs in North Imenti, Meru County. The study was anchored on existing theories in Entrepreneurship namely Psychological Entrepreneurship Theories, Sociological Entrepreneurship Theory and Schumpeter's' Innovation Theory based on which the priory relationship between innovativeness and entrepreneurial orientation was derived. A descriptive research design methodology was adopted and primary data collected from 35 respondents comprising managers in charge of SACCOS in IMENTY North County using closed - ended questionnaires. Logistic Regression analysis was used to analyse data and show the relationship between Innovativeness and Entrepreneurial Orientation aided by SPSS. Wald test was used to test the significance of the relationship between the two variables at 5% significance level. Results showed that Innovativeness significantly influenced entrepreneurial orientation of the managers; thus predictor of survival of firms in the competitive business and economic environments..

Key words: Social entrepreneurship Entrepreneurial orientation, Innovativeness

BANK OWNERSHIP STRUCTURE AND INTEREST RATE SPREAD AMONG KENYAN COMMERCIAL BANKS

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ABSTRACT
Interest rate spread is a measure of profitability between the cost of short term borrowing and returns on long term lending. This study aimed at establishing the effect of ownership structure on interest rate spread of commercial banks in Kenya. It is anchored on a study "determinant of interest rate spread of commercial banks in Kenya". Though several variables were studied, this paper concentrates on the effects of ownership structure on interest rate spread of commercial banks in Kenya. Correlation research approach was used. Questionnaires were used to collect data which was analyzed using SPSS Version 19. After running different tests: reliability tests, factor analysis, descriptive tests, Pearson correlation, model of fitness and regression, results showed that ownership structure has an influence on the interest rate spread of commercial banks in Kenya. We recommend participation of all stakeholders on review of existing policies on stability and soundness of the banking industry. Banks should also explore internally and industry driven strategies that mitigate against some of the bank-specific factors associated with higher spreads. Based on the research findings, it can be concluded that ownership structure played significant role in explaining interest rate spread. It is therefore recommended to the government and policy makers to implement sustainable political and macroeconomic environments to boost investors' confidence in the banking sector and reduce interest rate spread.
Key Words: Interest rate spread, ownership structure, interest rate, commercial banks

THE MODERATING EFFECT OF FIRM SIZE ON THE RELATIONSHIP BETWEEN CAPITAL STRUCTURE AND FINANCIAL DISTRESS OF NON-FINANCIAL COMPANIES LISTED IN KENYA

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Abstract

This paper sought to establish the moderating effect of firm size on the relationship between capital structure and financial distress of listed non-financial firms in Kenya. Firm size was measured using the natural logarithm of total assets while capital structure was operationalized through the various components of financial leverage: total debt, long-term debt and short term debt financing.

Sub-Theme	**Entrepreneurship**
Venue	**Academic Boardroom III**
Chair	**Dr. Hannah Wambugu**
Rapporteurs	**Mr. Jeremiah Kinyanjui and Ms Florence Maweu**

Murage Lucy Muthoni, (Karatina University). E-leadership by principals on management of pedagogical information in secondary schools in Kirinyaga County, Kenya

Dr .Kabata Githinji, (KyU). Firm characteristics and e-commerce usage in the Kenyan banking industry

Prof. Odunga Pius Ongoro, (KyU). Effect of value chain enhancement on sustainable tourism linkages and enterprise in Rwanda a case study of Kigali Serena Hotel.

Sub-Theme	**Agriculture**
Venue	**Academic Boardroom IV**
Chair	**Dr. Jotham Wasike**
Rapporteurs	**Mr. Josephat Karani and Ms Sherry Odari**

David M. Mushimiyimana, (Kenya Methodist University). **Evaluation of the effect of regulated deficit irrigation and soil moisture conservation practices on maize (zea mays l.) performance**

Leah Masakhwe Munyendo, (Dedan Kimathi University). **Moulds and ochratoxin associated with green coffee beans (coffee Arabica l.) processed by dry and wet methods in Nyeri County**

David M. Njeru, (Dedan Kimathi University). **Process analysis for emission control within the small scale coffee roasting industries in Kenya**

Rutto, D.K.L, (University of Eldoret). **Farming practices and its effect on seed quality of jute mallow (corchorus olitorius) in Kenya**

Kahiro Shadrack Kimenju et al, (JKUAT). **Proteolytic activity of bromelain from pineapples obtained from different agro-ecological zones, Thika Region, Kenya**

DAY TWO: JUNE 30, 2017

- Preliminaries
- Arrival and registration
- Announcements
- PowerPoint presentations given to ICT staff for presentation

10.00am—10.30 am	Group Photo
10.30 am—1.00pm	Parallel Session
1.00pm– 2pm	Health Break
2.00pm –4.30Pm	Parallel Session
4.30 pm	Tea/ Guests Leave at their own Pleasure

Sub-Theme	**Health and Biotechnology**
Venue	**Academic Boardroom I**
Chair	**Ms Mary Murigi**
Rapporteurs	**Mr. Mark Webale & Mr.Lenny Chimbevo**

operators and they include normal, positive, paranormal, hyponormal and norm-attainable operators. On norm-attainability operators, characterization has been done especially on separable complex Hilbert spaces but not on non-separable infinite dimensional complex Hilbert spaces operators. In this paper norm-attainability in an infinite dimensional complex non separable Hilbert space is presented.

Results showed that an operator is norm attainable if it is unitary, norm-attainable if it is isometry, normaloid and even paranormal. The study also showed that inner derivation and generalized derivation are norm-attainable if the inner derivation and generalized derivation are normally represented respectively. Methodology involves use of inner products and mathematical inequality; Cauchy-Schwartz inequality and triangle inequality. Results obtained are useful in applications in operator theory particularly operator algebras.
Keywords: Nonseparable, Normaloid, Paranormal, Norm-attainable.
Sub-THEME: Engineering Science and Technology for Development

THE DAVIS-WIELANDT SHELL AND THE ESSENTIAL NUMERICAL RANGE OF HILBERT SPACE OPERATORS

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ABSTRACT

The study of the numerical ranges, essential numerical ranges and in extension the Davis-Wielandt shells of Hilbert operators is vital in mathematical analysis and applications in engineering and quantum computing. However, replacement of the numerical range by essential numerical range without altering the Davis-Wielandt shell has not been exhausted. The underlying question is, "When can the essential numerical range replace the numerical range in the Davis-Wielandt shell without altering the shell?" Let H be a complex Hilbert space and B(H) be the algebra of bounded linear operators acting on H. In this paper, we discuss the numerical ranges and essential numerical ranges of operators to ascertain which operators strike an equality. The methodology involves use of inner products and some known mathematical inequalities like the triangle inequality and the Cauchy-Schwarz inequality. The results obtained show that the essential numerical range can replace the numerical range in the Davis-Wielandt shell if and only if the operator $T = \lambda I$. In conclusion, the results obtained are useful in engineering and quantum computing.

Keywords: Numerical range, Essential numerical range, Davis-Wielandt shell

CHARACTERIZATIONS OF NORMAL OPERATORS IN BANACH ALGEBRAS

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Abstract

The study of norms of Hilbert space operators forms an important aspect in functional analysis, operator theory and its applications to economics, quantum chemistry and quantum computing amongst other disciplines. However, characterizations of these operators via norm-attainable operators have not been exhausted. Let H be a complex Hilbert space and $B(H)$ the Banach algebra of all bounded linear operators on H. In this paper, numerical radius-attainability of normal operators in Hilbert spaces is presented. We outline the theory of normal, self-adjoint and norm-attainable operators and relate them to normal operators in a general setup. Methodology involved use of inner products, tensor products and some known mathematical inequalities like Cauchy-Schwarz inequality and the triangle inequality. Results showed that normal operators are hyponormal operators if they are self-adjoint. Hyponormal operators are also norm-attainable if there exist a unit vector x in the Hilbert space which is unique such that for any operator T, $\|Tx\| = \|T\|$. Moreover, the study results show that there is norm equivalence for hyponormal operators and normal self-adjoint operators. These results concur with other results which verify normality for compact operators when the Hilbert space is taken to be infinite dimensional and complex. Results obtained in this study are useful in quantum computing in generating quantum bit and applications in quantum engineering.

Keywords: Norm, Banach algebra, Hyponormality, Norm-attainability, Self-adjoint operators.

CHARACHERIZATION OF NORM-ATTAINABLE OPERATORS ON NON-SEPARABLE HILBERT SPACES

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[1]*School of Pure and Applied Science, Kirinyaga University*

ABSTRACTS.

A number of mathematicians have studied Hilbert space over decades and various results have been obtained. There are several classes of Hilbert space

Hellen Nyambura Kariuki, (UON). **Antinociceptive activities of toddalia asiatica root extracts using the formalin test on mice**

Felix Odhiambo, Collins. O, (UON). Exploring the strengths of mobile health (m health) in Kenya

Mwanasiti Bendera, (JKUAT). Identification of potential sex pheromone components from Kenyan population of the legume Pod borer, maruca vitrata (fabricius) (lepidoptera: crambidae

Collins Owino et al, (UON). Role of human ubiquitin ligases in enterovirus 71 human host-cell interactions

M. Orwe1 et al, (Kenya veterinary vaccines production institute). **Identification, characterization and purification of msc_0265, a potential vaccine antigen homologue of mycoplasma mycoides subsp. mycoides in mycoplasma capricolum subsp. Capripneumoniae**

Ndeto K. John et al, (Kenyatta University). **Utilization of an individual birth plan during pregnancy among pregnant women in rural Kenya (A case study of Makueni County, Kenya)**

Kimemia Millicent Wamuyu et al, (KyU). **Factors influencing use of protective clothing and safety in technical institutions in central Kenya**

Sub-Theme	**Engineering and Technology**
Venue	**Academic Boardroom II**
Chair	**Mr. Zachary Kirori**
Rapporteurs	**Mr. Boniface Kamau and Mr. Mark Waita**

Muchui P. Kirikua, (KyU). **Development of a biomass steam powered generator unit for Kenyan rural**

Kibetu D. K, Chuja University**. Integrated Remote sensing and GIS Analysis of Spatial Expansion of Kagochi Campus of Karatina University and its Driving Forces**

Owego Duncan, (TUK). **The Davis-Wiel and T-Shell and The Essential Numerical Range of Hilbert Space Operator**

Omulindi M**. In Silico Characterization of Dermacentor Andersoni P 36 Immunosuppressive protein**

Kwamboka A.O, Kimemia M. W. (KyU**). Assessment of Tutor Qualification and Training Needs in Technical and Vocational educational and Training Institutions Offering textile Technology Courses**

Sub-Theme	**Agriculture**
Venue	**Academic Boardroom III**
Chair	**Mr. Abel Nyakundi**
Rapporteurs	**Ms. Grace Kiiru and Dr. Kabata**

Chepkemoi Janeth et al, (UON). **Effects of tillage practices, cropping systems and organic inputs on soil nutrient content in Yatta Sub- County**.

Pauline Wairimu Ikumi, (KyU). **Effect of soaking coffee cherries on biochemical composition and cup quality of coffee brew**

Laurine Kithi, (Coast Development Authority). **Impacts of farmer field schools on food security and environmental conservation in Western Kenya**

Unfortunately, we are not able to fully utilize this collective knowledge being generated through group member's interaction. The focus of this study, was to ensure that the knowledge being generated through social media is not lost. This was achieved by developing a framework that was able to extract, classify and store the classified comments from a social media account to support collaborative leering. The prototype was then evaluated at the Kenya Institute of Curriculum development using a staff induction course that had four modules. Fifteen newly recruited staff at Kenya Institute of curriculum development, Nairobi were included in the study. Data was collected through interviews and questionnaires. Data was analysed and presented using descriptive statistics. From the initial survey it was evident that all of the fifteen respondents had social media accounts, but only 25% used these accounts for educational purposes. 95% of the respondents were comfortable interacting with the prototype and required minimal training on how to use it. Thirteen of fifteen (86%), strongly agreed that the comments on the prototype were better organized than on Twitter. From the finding it was evident that web 2.0 tools in particular social media have enormous potential in education and that learners are comfortable using these tools. One limitations of the study was the small sample size used, the researcher therefore recommends further testing of the framework against a larger population.

TECHNOLOGY: INTEGRATED REMOTE SENSING AND GIS ANALYSIS OF SPATIAL EXPANSION OF KAGOCHI CAMPUS OF KARATINA UNIVERSITY AND ITS DRIVING FORCES

Kibetu Dickson Kinoti
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ABSTRACT
Studies carried out on Land Use and Land Cover(LULC) Changes have focused majorly on urban ecosystems. Locally, there are no exclusive studies done on university land use dynamics and cause factors. Such studies are important for monitoring universities development and environmental quality. Using a case study of Kagochi Campus of Karatina University, this study sought to analyse how land use and land cover changes have contributed to spatial expansion of this campus. In this study, university transition phases were comparatively evaluated with the administration regimes at the university and national levels. GIS and remote sensing techniques were used to assess the complex interactions of processes leading to observed land use and cover outcomes. The LULC changes mapped between 2011 and 2015 were linked to both prevalent presidential and university administrative policies in place then. The study shows how land policy adoption and implementation strategies influence universities land use and spatial expansion of campus facilities.

Keywords: LULC, Spatial expansion, GIS, Remote Sensing, Campus

ASSESSMENT OF TUTOR QUALIFICATION AND TRAINING NEEDS IN TECHNICAL AND VOCATIONAL EDUCATIONAL AND TRAINING INSTITUTIONS OFFERING TEXTILE TECHNOLOGY COURSES.

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ABSTRACT
Technical training Institutes and institutes of technology were upgraded to Technical and Vacational Education Training Institutes, TVET in 2007 but continued to use tutors that previously served in the former institutes. This presents a qualification gap given that not all tutors were having advanced competencies and skills requisite to managing programmes in TVET Institutions. This study assessed Tutor qualification and training needs in TVET Institutions offering textile technology courses. A descriptive survey was undertaken in 8 technical institutes and 10 institutes of technology, offering textile technology courses and examined by the Kenya National Examinations Council. A total of 452 respondents' comprising principals, deputy principals, lecturers, technicians were included in the study. Data was collected using Questionnaires and Interviews, analysed by Statistical Package for Social Sciences (SPSS) and presented in form of frequency tables, bar graphs, and pie charts. Results showed that tutors were academically qualified for the jobs they were undertaking; with 8% holding masters degrees in fashion design and textile technology, 14% Bachelor degrees, 58% Diploma in Technical Education, 10% Diploma in Education, and 10% Diploma in textile technology respectively. Those with Masters degrees and Technical diplomas were teaching Diploma and certificate courses and those with Diploma in Education were teaching artisan courses.
Because of the recent changes in technology and the fact that TVET Institutions are currently preparing students for progression to bachelor degree levels and higher, there is need for institution of tutor training at advanced levels particularly to Masters degree levels to prepare them better for their teaching duties.
Key words: Qualification, Training needs and Training methods

ICT TECHNOLOGY: SOCIAL MEDIA AS A TOOL FOR COLLABORATIVE LEARNING: A CASE OF TWITTER

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New frameworks for developing interactions between the actors of learning processes require new ways of gaining an understanding of such processes. Today, these frameworks are of a technological kind, and their prime expression is found in social networking sites, which have already been called 'social operating systems'. Students have taken advantage of these platforms and created virtual learning environments, which are quickly becoming repositories of collective knowledge and teaching resources.

Mary W. Mutonga et al, (University of Eldoret). **Assessment of the effects of zero and conventional tillage practices on soil moisture and wheat crop yield in an arid and semi-arid land of Laikipia County, Kenya**

Nkari Isaac Micheni, (Chuka University). **Branding practices for fresh fruits and vegetables, farmer characteristics, operating environment and performance of commercial farmers**

Parallel Sessions: 2:00pm – 4:00pm

Sub-Theme	**Health and Biotechnology**
Venue	**Academic Boardroom I**
Chair	**Mr. Samuel Kagoiyo**
Rapporteurs	**Mr. Mark Webale & Mr.Lenny Chimbevo**

Peterson M. Njeru et al, (Kerugoya county hospital). **Management of diarrheal diseases among children under five years: A case study of mothers at Kakamega County, Kenya**

Mark Kilongosi, (KyU). Escherichia **coli pathotypes and shigella sero-groups in diarrheic children in Nairobi City, Kenya**

Munyekenye G.O et al, (KyU). **Distribution of malaria vectors along altitudinal gradient in western Kenya.**

Nyaboga E. N and Nguu E. K**. Overexpression Of *Arabidopsis* Dehydroascorbate Reductase (Dhar) Gene Confers Enhanced Tolerance to Post-Harvest Physiological Deterioration and Drought in Cassava**

Dennis Butto, (KyU). **Tuberculosis and its associated factors in Mwea West Sub-county, Kirinyaga County, Kenya**

Muiga Molly, (KyU). **Psychoneurial Immunology: Importance of Bio psychosocial approach in patient management**

Wanjiku Njoroge, KyU. **Establishment Of A Robust Biomimetic Blood Vessel Model For Stem Cell And Drug Therapies**

Sub-Theme	**Engineering and Technology**
Venue	**Academic Boardroom II**
Chair	**Mr. Jeremiah Kinyanjui**
Rapporteurs	**Mr. Boniface Kamau and Mr. Mark Waita**

Abel Nyakundi Ogari, (KyU). **Modeling of kerosene cooking stove to utilize vegetable oil and optimize performance- a review**

Mwai Josphat karani, (KyU). **Social media as a tool for collaborative learning: a case of twitter.**

Lucy Wamuyu et al, (KyU). **Effects of ninhydrin based physical processing of latent prints for crime investigations**

There was 17% increase in the amount of light emitted by the retrofitted lamp. The retrofitted pressure lamp is therefore a better alternative to kerosene lamps as it provides a cheaper and cleaner source of energy for rural areas that are not connected to national electricity grids.

Key words: kerosene, straight vegetable oil, green- house gas emissions, blends, health, renewable energy, pressure lamp, modifications

A STUDY ON THE SAFETY AND ERGONOMICS FOR BUILDING CONSTRUCTION WORKS IN KIRINYAGA UNIVERSITY

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Abstract
A large number of construction works continue everyday in Kirinyaga University as an emerging young university where labor is plentiful. Ergonomics for construction works in Kirinyaga University was carried out during February 2017 to April 2017 to observe the present status of practicing safety regulations and ergonomics principles by constructions workers. This study sought to establish relationship between construction and work related injuries, examine safety equipment used by workers and recommend solutions to any ergonomics related safety challenges that may affect construction works in Kirinyaga University. A survey involving the use of questionnaire, observation and interviews were used as tools for investigation. Data collected was subjected to descriptive statistics. Those responding to the questionnaire had an average age of 33 years, 30% workers fall in the age range 25-30 years, worked an average of 40 hours in a week, and had an average of 3 years work experience in construction industry. Results showed that back pain back injuries constitutes 20% of total work related musculoskeletal symptom due to manual lifting of heavy materials followed by body injuries representing 10%.The study revealed that, 5% of workers visited the hospital for their musculoskeletal injuries and 2% reported visiting Hospitals for body injuriesa. Long hours standing and working in the same position was identified as the leading causes of work-related musculoskeletal symptoms. A majority of workers did not wear protective/ safety equipment hence exposing them to construction related injuries. We recommended, among others, establishment of policies to govern ergonomics and safety issues in construction and provision of safety equipment to workers to minimize work related injuries.

Key words— Constructions, Ergonomics, Injuries, Equipment, Safety

immunogenic region within the groove is potential binding site of major histo-compatibility complex class II, leading to recognition of tick p36 proteins by T-cell receptors. These results collectively expand our knowledge of p36 as an important protein family from tick saliva, laying ground for future investigation targeting these proteins in developing improved tick control approaches.

EXPLORING THE STRENGTHS OF MOBILE HEALTH (M HEALTH) IN KENYA

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ABSTRACT
Use of mobile phone to support delivery of health care services has recently been shown to be effective in many parts of the world and its rising even locally. In Kenya, use of mobile phone to leverage health service delivery is a new frontier gaining prominence within the private and public sector and has revolutionized the health care delivery. The objective of the study is to assess the successes of Mobile health in Kenya. In this study, five published refereed articles were reviewed together with two website information for organizations that deal with mobile health research services. There was reasonable success in the use of mobile phone in Kenyan health sector with majority of successes having been made in clinical management of patient data and quick access to medical care and caregivers, delivery of clinical care information and improved adherence to ARVs , treatment of uncomplicated malaria and improved adherence of caregivers to treatment guidelines.

Effects of Using Straight Vegetable Oil/Kerosene Blends on Modified Pressure Lamp

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Abstract
A vast majority of rural people in developing countries use fossil kerosene for illumination and cooking predisposing users to health hazards. This kerosene use in lamps pose health hazards to users in addition to being subjected to price fluctuation. These challenges have called for the search of alternative fuel sources for illumination. Effect of straight vegetable oil (SVO) use in pressure lamps to reduce in-door air pollution was investigated in this research. Chinese Anchor brand pressure lamp was retrofitted to handle the SVO and emissions measured from a simulated room. The lamp was modified to handle up to a 90 % SVO/kerosene blend. Results showed that SVO use in the retrofitted pressure lamps reduced the fuel consumption by 6 %, emissions of carbon monoxide by 17 % and particulate matter by 18%. Carbon dioxide emission increased by 5%.

Closing Ceremony: June 30, 2017
Venue: Main Hall

4:00pm-4:10pm	Remarks from the Chair, Conference Organizing Committee: Way Forward - **Prof. Charles O. Omwadho**
4:10pm- 4:15pm	Closing Remarks: Vice Chancellor, **Prof. Mary W. Ndungu**
4:15pm-4:30pm	Certificates
4:30pm-4:35pm	Vote of Thanks by Representative of Visitors
4.35 pm – 4.40	Vote of Thanks from KyU
4.40pm	Tea & guests leave at their own

EFFECTS OF LIMING, ANIMAL MANURE AND INORGANIC FERTILIZER ON SOIL PH AND MAIZE PERFORMANCE IN ACIDIC SOILS OF THARAKA NITHI COUNTY, KENYA.

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ABSTRACT

Soil acidity is a major problem globally covering approximately 30% of the total area of land worldwide. In Sub-Saharan Africa (SSA), acidic soils occupy 29% of the total area while approximately 13% of Kenyan land area has acidic soils, widely distributed in croplands of the central Kenyan regions. High soil acidity, soil nutrient depletion and limited use of lime in combination with manure and mineral fertilizers lead to aluminium decline in crop yields. Thus to increase crop yields, there is need for enhanced application of lime, mineral fertilizers and manure. The objective of this study was to evaluate the effects of agricultural lime, goat manure, and inorganic fertilizers on soil pH and maize performance in acidic soils of Tharaka-Nithi County. On-farm trials were set up in randomized complete block design with eight treatments in ten replicate farms. Treatments were; control (no lime, no manure and no fertilizer), lime ($CaCo_3$), manure, fertilizer, lime + manure, lime + fertilizer, fertilizer + manure, lime + manure + fertilizer. Maize (H516) variety was used as the test crop. Data generated was subjected to Analysis of Variance (ANOVA) and means were separated using least significant difference at 95% significance level ($p<0.05$). Results showed that lime alone (2 ton ha-1) significantly increased soil pH (19.6%), manure (12.1%), lime + manure (19.8%), lime + fertilizer (17.0%), fertilizer + manure (15.3%) and lime + manure + fertilizer (21.1%). Lime + Fertilizer had chlorophyll content of 41.744 while Lime alone had lowest chlorophyll content at 31.944. Application of lime in combination with animal manure and inorganic fertilizer treatment had the highest plant height 168.20cm at the 8th week. Integrated application of manure with lime and P fertilizer contributed to improved soil pH. Thus, manure can substitute or supplement inorganic fertilizers and could be recommended for smallholder farmers of Tharaka Nithi County.

Keywords: Acidic soils, manure, calcium carbonate and Stover yield.

The objective of this research was to come up with a way of effectively acquiring and processing wind data in real-time from a remote location. An instrument is made using a 3-D printer with electronic sensors to collect data. Data is sent wireless to a mini computer that does basic processing and uploads data to the cloud for further processing. This system provides wind data that is comparable to those generated by conventional systems and meets industrial standards. The system enables understanding of wind energy trends through the day and would be useful to scientists and wind farmers manage wind energy and discover wind behavior trends over the years

IN-SILICO CHARACTERIZATION OF *Dermacentor andersoni* p36 IMMUNOSUPPRESSIVE PROTEIN

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ABSTRACT

Ticks cause approximately $17-19 billion losses to the livestock industry worldwide hence the need for anti-tick vaccines as a vector control strategy. Identification and characterization of new protective antigens conserved across vector species, provides an opportunity to develop a universal and commercially viable vaccine. Putative immunosuppressive proteins have been described in ticks, including p36 identified in *Dermacentor andersoni*. Recombinant p36 protein suppresses T- cell proliferation *in vitro* in a dose dependent manner, suggesting a role in facilitating tick feeding. Genes related to *D. andersoni* p36 protein, have been isolated from *Rhipicephalus appendiculatus, Amblyomma variegatum* and *Haemophysalis longicornis*. This study applied bioinformatics tools to investigate conservation of p36 proteins in additional tick species, map antigenic regions and model the 3-D structure of *D. andersoni* p36 protein, as a step towards elucidating the functional role of this protein family. Homology searches identified p36 related genes in 3 more tick species; *Rhipicephalus haemaphysaloides haemaphysaloides*, *Amblyoma sculptum* and *Amblyoma aureolatum*. Majority of p36 homologues were predicted as antigens with a homologue from *R. appendiculatus*, a major tick pest in sub-Saharan Africa including Kenya, showing antigenicity score of 0.7701 superseding Bm86, a known anti-tick vaccine antigen that scored 0.7681. A conserved antigenic region which may have a role in immunosuppressive function of tick p36 proteins was found in all homologues. The 3-D structure of *D. andersoni* p36, showed it is globular with a main folding region and major groove passing in-between the fold where the antigenic region is located. Ligands binds in the largest cleft in over 83% of proteins thus due to p36 known function as a T-cell immunosuppressors, the conserved

INTEGRATED REMOTE SENSING AND GIS ANALYSIS OF SPATIAL EXPANSION OF KAGOCHI CAMPUS OF KARATINA UNIVERSITY AND ITS DRIVING FORCES

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ABSTRACT

Studies carried out on Land Use and Land Cover(LULC) Changes have focused majorly on urban ecosystems. Locally, there are no exclusive studies done on university land use dynamics and cause factors. Such studies are important for monitoring universities development and environmental quality. Using a case study of Kagochi Campus of Karatina University, this study sought to analyse how land use and land cover changes have contributed to spatial expansion of this campus. In this study, university transition phases were comparatively evaluated with the administration regimes at the university and national levels. GIS and remote sensing techniques were used to assess the complex interactions of processes leading to observed land use and cover outcomes. The LULC changes mapped between 2011 and 2015 were linked to both prevalent presidential and university administrative policies in place then. The study shows how land policy adoption and implementation strategies influence universities land use and spatial expansion of campus facilities.

Keywords: LULC, Spatial expansion, GIS, Remote Sensing, Campus

INVESTIGATING FACTORS AFFECTING THE 3D PRINT PHYSICAL APPEARANCE

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Many factors affect the 3D Print physical appearance.
This paper attempts to rank parameters that affect physical appearance of a 3D Print.
A model is designed in Autodesk Inventor Software and printed several times under varying 3D Printer conditions using Maker. The finished products are then viewed under a microscope (×500) and categorized as Very Good, Good, Bad and Very Bad. Changes in the printing parameters are noted and recorded in fuzzy logic program.

EFFECTS OF AGRICULTURAL LIME TYPES ON SOIL PROPERTIES AND MAIZE (*Zea mays L*) PERFORMANCE IN ACIDIC SOILS OF THARAKA NITHI COUNTY, KENYA.

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ABSTRACT

Liming is one of the options used to ameliorate acidic soils but widespread use of lime by farmers is limited by inadequate awareness on its use, lack of appropriate recommended rates and unknown quality of the available agricultural limes. The objective of this study was to evaluate the effects of three agricultural lime types (calcium oxide, calcium carbonate and CaO.MgO lime) on soil properties and maize performance in Tharaka Nithi County. A field experiment was set up in a randomized complete block design with eight treatments in four replicates. Treatments were Control (no lime, no fertilizer), $CaCO_3$, CaO, $CaCO_3$ + fertilizer, CaO + fertilizer, fertilizer (no lime), CaO.MgO, CaO.MgO + fertilizer. Maize (variety H516) was used as the test crop. Variables measured were; soil pH, plant growth parameters; chlorophyll content and grain yield. Data was subjected to analysis of variance (ANOVA) using SAS software. Results showed that use of lime significantly affects plant height, soil pH and total grain weight. CaO.MgO treatment led to highest pH value of 5.81(increase of 21.27%) after 6 weeks, $CaCO_3$ treatment resulted in the highest soil pH increase (16%) in the 12 week, while CaO + fertilizer and $CaCO_3$ + fertilizer had highest chlorophyll content in the 6th (43.04) and 12th week (46.23) respectively. A CaO.MgO + fertilizer combination led to highest plant height (219.8) while application of $CaCO_3$ + fertilizer combination led to highest grain and biomass yields in both Kirege (grain 5.34 and biomass 15.38tha^{-1}) and Kangutu (3.71 and biomass 8.75tha^{-1}) sites. Application of $CaCO_3$ and inorganic fertilizers was most effective resulting in improved soil conditions through increase in pH plant growth characteristics and maize grain yield.

Keywords: Acidic soils, calcium oxide, calcium carbonate and CaO.MgO lime

EFFECT OF DIFFERENT FERMENTATION METHODS ON PHYSICO-CHEMICAL COMPOSITION AND SENSORY QUALITY OF COFFEE (*Coffea arabica*).

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ABSTRACT
Fermentation of coffee beans is primarily done to remove mucilage and can be done using two methods; dry and wet fermentation methods. Processors undertake fermentation using different ways such as use of different containers creating varying conditions that may consequently affect composition and quality characteristics of coffee. This research aimed at determining the effect of different fermentation methods on physicochemical composition and the sensory quality of coffee. Coffee cherries were pulped and subjected to natural fermentation methods using different containers; plastic bucket, sack and cement tank. Wet fermentation was done in a plastic bucket. After fermentation, parchments were washed and dried. Green coffee beans were evaluated for physicochemical composition and analyzed for sensory attributes by a panel of professional cuppers. Results showed that different fermentation methods did not have significant variations in most of the physico-chemical parameters analyzed. However, significant variations were observed in the levels of pH with the wet fermented coffee samples showing lower levels as compared to dry fermented samples. There were no significant differences in the body, acidity, color, flavor and overall class among the coffee samples fermented using different containers. Sensory evaluation showed that wet fermented coffee samples had better color of green beans, least silver skin discoloration and overall quality compared to dry fermented coffee samples. Thus use of different containers during fermentation does not affect coffee quality thus processors can adopt materials to reduce coffee processing costs.

ASSESSMENT OF SOY BEAN GROWING IN SELECTED REGIONS OF EAST AFRICAN

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ABSTRACT
This study reports findings of a survey conducted in Uganda, Kenya and Tanzania. as part of a larger project assessing ability and production of soybean in

REAL-TIME REMOTE WIND DATA ACQUISITION AND PROCESSING SYSTEM FOR WIND TURBINES USING INTERNET OF THINGS TECHNOLOGY

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ABSTRACT

This paper presents a harmonized method of acquiring and processing wind data1 in real-time from a remote area. The Internet of Things (IoT) and Machine Learning (ML) technologies used in this research make it easy for researchers to study wind energy trends. This is a great resource for start-ups into wind energy farming and can also be applied in other fields to acquire and process scientific data on wind speed, Wind direction, Temperature, Humidity and Height above sea level. The industrial method used to acquire wind data is by use of Supervisory Control and Data Acquisition (SCADA) and Programmable and Logic Controller (PLC) systems. Instrumentation is then done by separate companies to ensure that data is acquired by way of saving it in hard drives. Currently, it is difficult to explicitly study wind energy trends using the wind data from the existing wind farms. This is because most wind farms do not provide wind data in real-time; thus there is a one month waiting period and the data is kept for about 3 months and discarded hence real-time analysis of data is not feasible. In addition, it is not economical for a startup small scale wind farmers to use the SCADA system and PLC systems to ensure optimum wind energy harvesting. This study sought to come up with a way to acquiring and processing wind data in real-time from a remote locations. An instrument is made using a 3D Printer, electronic sensors installed and the system deployed to collect data. Data is then sent wirelessy to a mini computer which does the basic processing and uploads the data to the cloud for further processing. This system provides wind data of comparable standards to industrials data. Processing makes the wind data to be useful in real-time making it easy to appreciate data as it comes in enabling easy discovery of interesting wind energy trends through the day. This system would potentially help scientists and wind farmers to manage wind energy, discover new wind behavior and trends over the years and the data comparable to those obtained using industrial standard instruments such as Ammonite Instruments

Of the participant who had high blood sugars there was a reduction of 3mmol/l in the first visit and more than 5mmol/L total reduction of in subsequent visit.
Of the known diabetic participant, participant who lived with HIV and cancer participant, there was improvement of their adherence to treatment. Psychological Stressors contribute to high incidence of diseases and interfere with disease prognosis. Result of this study demonstrated positive effect of psychotherapy to patient management.

Bio psychosocial approach is suggested for effective patient management.

A CONSERVATIVE FRAMEWORK FOR EFFECTIVE DEPLOYMENT OF CLOUD SERVICES IN HIGHER EDUCATION

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Abstract – Cloud computing is irrefutably one of the greatest computing technologies in modern times. It is a utility-based platform that promises to open up new opportunities in innovations to a wide range of computing domains such as research, entrepreneurship, green computing, high performance computing, and pervasive intelligence among others. The basic tenet of this on-demand utility-based paradigm is to remove the burden where organizations would have to establish elaborate Information and Communication Technology (ICT) data centers and instead offload part or all the information technology Infrastructure to a third party for access across the internet by hiring software, application platform as well as the ICT infrastructure. Uptake of this technology holds promise to driving down costs while fostering innovation and promoting agility. There is need for continuous storage, , update and management of onsite ICT infrastructure in academic institutions particularly those of higher learning. Consequently migration to cloud services continues to be a corporate agenda for these institutions. However, higher education is yet to realize the full potential of this technology due to challenges associated with deployment of these services to the cloud. This paper reviews the benefits and explores challenges faced by these institutions in deploying cloud services and suggests a conservative model for cloud computing uptake.

Keywords: *Cloud Services, Deployment Model, Higher Education, E-Learning*

the Lake Victoria Region. Baseline data was collected using questionnaires, Focus Group Discussions and in-depth interviews with key informants. Most respondents were engaged in subsistence farming with Maize being the dominant crop and very few were involved in soybean production. Generally, there was high male participation in farming activities including soybean growing tasks. A number of soybean varieties were grown by the studied communities, mainly as an intercrop. Some farmers had knowledge of the processing and consumption of soybean. Those who had consumed did so in the form of roasted snacks and porridge. Most farmers found soybean palatable. There were some cultural beliefs and practices favouring, and others hindering soybean production and utilisation in Kenya and Uganda but not in Tanzania. The demand for and prices of soybean affected its prioritisation by farmers. The above issues were found to be equally important in influencing soybean production and utilisation. However, there is need for more information about the physiological, edaphic, climatic and nutritional factors affecting soybean growing in the areas studied.

IMPACTS OF FARMER FIELD SCHOOLS ON FOOD SECURITY AND ENVIRONMENTAL CONSERVATION IN WESTERN KENYA

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ABSTRACT
Sustainable food production is a challenge facing many developing countries. In Kenya, land degradation has led to a decrease in production of staple foods such as maize leading to widespread hunger in recent years Consequently, development agencies have invested in Farmer Field Schools to enhance farmers' knowledge through agricultural research and extension to sustainably increase food security. This study assessed the impacts of Farmer Field Schools (FFS) on household food security and environmental conservation in the Western Province of Kenya. The outcome variables awere; maize yield per acre, income per acre, household food insecurity score and environmental conservation score. Principal component analysis and propensity score matching techniques were used for analyses and regression method to test robustness of matching results. We report significant differences in yields and income per acre between FFS

households and non-FFS households; FFS households have higher yields and income per acre than their counterparts. The study also showed that FFS program reduces severity of food insecurity but has no significant effect on environmental conservation. This implies that FFS plays a critical role in enhancing household food security in Kenya.

PHENOTYPIC AND GENOTYPIC CHARACTERIZATION OF XANTHOMONAS AXONOPODIS PV MANIHOTIS CAUSING CBB IN KENYA

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Cassava bacterial blight (CBB), caused by Xanthomonas axonopodis pv. manihotis (Xam), is an important bacterial disease of cassava. There is inadequate information on the morphological and genetic variability of Xam isolates from Kenya. This study determined the diversity of Xam isolates from different cassava growing regions of Kenya using phenotypic characteristics and repetitive DNA polymerase chain reaction-based fingerprinting (rep-PCR). Thirty three isolates were recovered from infected cassava leaf samples collected from farmers' fields in cassava growing regions. The dendrogram generated from analysis of phenotypic characteristics of the isolates produced two major clusters at 75% similarity level. Analysis of 19 isolates with repetitive extragenic palindromic (rep) primers yielded characteristic fingerprint pattern with bands ranging between 400 and 2000 bp in size and their numbers ranged from 1 to 6 bands per isolate. Cluster analysis using unweighted pair group method with arithmetic averages (UPGMA) did not reveal any significant differences in clustering and relationship to the geographical origin, with exception of a single isolate that had unique fingerprints. These findings indicate that Xam population in Kenya evolved from the same origin and is a uniform population, and this may prove useful in future breeding programmes.

This study evaluated the effects of vitamin E on the growth and survival of Nile tilapia. Four feeds of varying vitamin E concentrations were formulated, four hundred and eighty fingerlings weighing 5.0−8.0 g under four treatments in cage culture for a period of ten weeks. The data obtained from this trial were subjected to one –way ANOVA to test for effects of dietary treatments. Results indicated that performance improved as vitamin E concentration in the diet increased ($P < 0.05$). Growth factors and survival improved reaching a maximum at 500mg/Kg of feed. Further examination of growth factors and feed utilization efficiency showed that the highest specific growth rate, survival, and the lowest feed conversion ratio were at 500 mg /Kg concentration. The positive influence of growth and survival in the fish most likely resulted from the inclusion of vitamin E into Oreochromis niloticus feed.

Key words: Oreochromis niloticus; Vitamin E; Growth; Survival.

PSYCHONEURAL IMUNOLOGY: IMPORTANCE OF BIOPSYCHOSOCIAL APPROACH IN PATIENT MANAGEMENT. CASE STUDY OF KIRINYAGA UNIVERSITY CLINIC

Molly Muiga, KyU

ABSTRACT

Psychoneuroimmunology (PNI) is a discipline that attempts to unearth the interaction between, psychology, neurosciences and immunology (psyche, nervous and immune systems). Onset and progression of diseases is attributed to several factors namely biological, psychological and sociological factors. The study was to evaluated effect of psychotherapy on the progression of chronic diseases among staff of Kirinyaga University diagnosed with a chronic illness using a descriptive survey. Purposeful sampling of all staff attending the Kirinyaga university clinic between the months of January to June 2016 with a diagnosis of chronic illness namely Diabetes, hypertension, HIV/AIDs, Cardiac disease, cancer (New and known cases).Data was collected through the review of medical records and administration of a researcher filled questionnaire. The variables assessed were stress, blood pressure, blood sugar, adherence to treatment. Data was analysed using SPPS. A total of 18 Participants mean age 46.8 (56 % males, 44 females) were recruited to the study. 89 % of participant had high blood pressure of which only 5% had a known condition, 84% were newly diagnosed. High blood sugars were recorded in 22% of the participants were 50% were known diabetic cases, 5% had cancer and HIV respectively.

Co-morbidity of high blood sugar had hypertension was reported in 25% of the participant.

Stress was reported by 97%, 80% attributed stress to work and personal growth (career Development) needs at 1st visit after intervention, 100% of the respondents indicated that they felt positive change compared to previous health status. 89% had a reduction in blood pressure (**Bp)** by more than 10mmHg systolic and 5mmHg of diastolic. Over the next two visits the total reduction of an average 17mmHg systolic and 8mmHg diastolic.

Cells were treated with or without TGF-β1 or TGF-β2, respectively, and the cell numbers counted. Secretion of TGF-betas and plasminogen-activator inhibitor-1 (PAI-1) was determined using ELISA. Cell adhesion was analyzed after treating the cells with recombinant human PAI-1. Tissue obtained from patients (peritoneal and ovarian endometriosis) undergoing laparoscopic surgery was fixed with Bouin`s solution and paraffin-embedded. After deparaffination immunohistochemistry was performed with the Envision system. Results showed that TGF-β1 as well as TGF-β2 significantly decreased cell numbers of all cell lines. The decrease in cell numbers of endometrial cells was higher (T-HESC=61%, HES=29%, primary cells=56%) compared to endometriotic cells (22B=24%, 12ZVK=21%). Although we found that both endometrial and endometriotic cells secrete TGF-β1, secretion by stromal and especially endometriotic stromal cells was highest. In contrast, secretion of TGF-β2 was only evident for endometriotic stromal and to a lesser extent for endometriotic epithelial cells. Secretion of TGF-β3 was very modest. Treatment of endometrial and endometriotic stromal and epithelial cells with TGF-β1, TGF-β2 or TGF-β3 increased secretion of PAI-1 dramatically in all four cell lines and also in the primary stromal cells. Whereas a TGF-β receptor type I (TBR1) kinase inhibitor completely blocked the TGF-β1 or TGF-β2-induced PAI-1 secretion, an ERK1/2 inhibitor only partially reduced PAI-1 secretion. Treatment of endometrial and endometriotic cell lines with recombinant PAI-1 showed reduced cell adhesion, especially of the stromal and epithelial endometrial cells. Finally, TGF-β3 was identified in the endometrial glands and vessels, but remarkably also in most endometriotic glands of the ovary as well as of the peritoneum.

These results suggest that the TGF-βs exert a strong influence on PAI-1, which is not only important in the control of the blood coagulation cascade but according to our results also for cell adhesion of endometrial and endometriotic cells. These results suggest the importance of the TGF-betas in the pathogenesis of endometriosis.

THE EFFECT OF DIETARY VITAMIN E ON THE GROWTH AND SURVIVAL OF THE NILE TILAPIA IN A SEMI-INTENSIVE SYSTEM.

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Abstract
Growth and survival of fish are important factors that determine performance of aquaculture and are influenced by quality and quantity of feed given. However, supply of food containing necessary nutrients for optimum growth is not readily available to fish farmers in Kenya. Formulation of fish feed from locally available materials can be an important alternative to boost aquaculture and enhance production. Vitamin E, one of the important nutrients, has been shown to improve feed quality and promote health, growth and survivalin cultured fish. However, there is scanty information on the contribution of vitamin E on feed quality improvement, growth and survival of fish in Kenya.

EFFECTS OF TIED-RIDGING AND INTEGRATED SOIL FERTILITY MANAGEMENT TECHNOLOGIES ON MAIZE-SOYBEAN YIELDS IN THARAKA-NITHI COUNTY, KENYA

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ABSTRACT
Deficits in soil moisture, low soil fertility and lack of water conservation technologies have been a major constraint to smallholder farming systems leading to declined crop yields in Sub-Saharan Africa. This study assessed effects of tied ridging and integrated soil fertility management (ISFM) technologies on maize-soybean performance in Tharaka Nithi County, Kenya. A field experiment was set up in a randomized complete block design with eight treatments replicated four times on 6 m × 4.5 m plots. Treatments were; with tied ridging (tithonia + Mineral Fertilizer, Manure + Mineral Fertilizer, Mineral Fertilizer, Control), without tied ridging (Tithonia + Mineral Fertilizer, Manure + Mineral Fertilizer, Mineral Fertilizer, Control). Key variables measured were grain yield and biomass. Data was subjected to analysis of variance (ANOVA) using SAS 9.2 and means separated using Duncun's multiple range tests at P≤0.05. Integrated soil fertility management technologies under tied ridging significantly increased both maize and soybean grain yields during short rains in 2016 (p≤0.037 and p≤0.039 respectively) and only maize grain yields during long rains in 2016 (p≤0.005). Further, tithonia+fertilizer and manure+fertilizer treatments under tied ridging significantly increased maize and soybean grain yields by 34.8% and 43.5% respectively compared to the control in long rains of 2016. Only tithonia+fertilizer under tied ridging increased significantly soybean grain yields by 57.1% over control in short rains in 2016. Maize grain yield also increased under maize-soybean rotation by 35.5% over sole maize. This study recommends use of combination of either tithonia biomass or manure with inorganic fertilizer under conventional tillage to enhance soil fertility and maize-soybean yields in Tharaka nithi county.
Keywords: Integrated soil fertility management, Tied ridging, Grain yields

EFFECT OF FARMING PRACTICES ON SEED QUALITY OF JUTE MALLOW (*CORCHORUS OLITORIUS*) IN KENYA

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ABSTRACT
Use of high quality seeds help to increase crop yields. Currently in Kenya, there is no high quality seed of jute mallow (*Corchorus Olitorius*) from breeders to farmers. This has forced farmers to use re-cycled planting seed of crop whose potential is not assured leading to low poor quality seeds and yields as low as 2 -4 tons/ha/annum compared to expected yield of 5-8 tons/ha/annum. At planting farmers use 7kg/ha instead of 5kg/ha of seed required for a density of 250 000 plants/ha. This is 40% extra seed. The objective of study was to look into the jute mallow farming practices and its effect on quality of seed used by farmers. A seed survey and collection from local markets and farms was carried out and taken to University of Eldoret seed laboratory for seed quality tests for analytical purity, germination and vigor as per ISTA 2004 protocol. Some seeds were planted in a green house, phenotypic characteristics recorded and analyzed using descriptive statistics and SPSS. 80% of farmers were middle and old age with 92% of them being female, with 86% not having attended any formal training on seed production or agronomy and 54% not schooled at all. Seeds were of superior quality (over 98 %), but germination and emergence was low (56 %). Phenotypic characterization showed diversity in seeds with four varietal characters coming out based on color, maturity and height as: Green Early Maturing Short, Brown Early Maturing Short, Green Late Maturing Tall and Brown Late Maturing Tall. It was concluded that seeds grown by farmers are diverse and of poor physiological quality hence there is need for a purification program to improve seed quality.

Key words: Indigenous, Vegetable, Jute mallow, Quality, Seed.

EFFECTS OF ZERO AND CONVENTIONAL TILLAGE PRACTICES ON SOIL MOISTURE AND WHEAT CROP YIELD IN AN ARID AND SEMI-ARID LAND OF LAIKIPIA COUNTY, KENYA

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ABSTRACT
Soil water conservation through tillage is one appropriate way of addressing soil moisture deficit in rain-fed . A study was carried out to assess the effects of zero and conventional tillage practices on soil moisture and wheat crop grain yield in the semi-arid land of Laikipia in Kenya, during the short rain season of 2015/2016 (September to February).

ESTABLISHMENT OF A ROBUST BIOMIMETIC BLOOD VESSEL MODEL FOR STEM CELL AND DRUG THERAPIES

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Vascular disease results from inflammation, injury and the accumulation of fatty deposits in the blood vessels. Blood vessels are composed of three distinct layers; intima, media and adventitia. Development of a three dimensional (3D) blood vessel construct (TEBV), comprised of human cardiac artery smooth muscle cells (HCASMCs) within a collagen gel and a layer of human umbilical vein epithelial cells (HUVECs), and a perfusion system would allow visualisation of vascular disease pathophysiology and new treatment studies. The objective of this study was to produce a blood vessel construct (TEBV), establish a perfusion system, evaluate the therapeutic effect of endothelial progenitor cells (EPCs) and the effect of statins on homing capabilities of EPCs to areas of vascular injury. To assemble TEBV, smooth muscle cells were seeded into a collagen gel and the epithelial cells seeded on top of the gel over an aligned nanofiber mesh. Rat MSCs were perfused by generating laminar flow at physiological shear stresses then evaluating the attachment to/interaction with an intact TEBV. The MSCs were labelled with a fluorescent marker (CFSE). We successfully assembled a multilayer TEBV. Rat MSCs were perfused over an intact construct and some attachment to the construct has been observed. Perfused stem cells showed minimal attachment on intact intimal layer. Future efforts will include creating a lesion on the intimal layer of the TEBV and the investigation of EPC homing to the lesion site with and without statins at various concentrations.

TRANSFORMING GROWTH FACTOR-BETAS (TGF-BS) IN HUMAN ENDOMETRIAL AND ENDOMETRIOTIC CELLS *IN VITRO*

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ABSTRACT
Transforming growth factor-betas (TGF-βs) are elevated during menstruation and are suspected to be involved in the pathophysiology of endometriosis. TGF-β superfamily members are multi-functional regulators of cell viability. They are highly expressed in the peritoneal fluid of patients with endometriosis, as well as in endometriotic sites. Thus, TGF-βs might be involved in biological processes leading to endometriosis. This study characterized the TGF-βs in endometrial and endometriotic cells *in vitro*
Immortalized human endometrial stromal (T-HESC), epithelial (HES), endometriotic stromal (22B) and epithelial (12ZVK) cell lines were used besides primary endometrial stromal cells.

Fifty five percent of respondents used dual protection, Sixty four percent confesed to religious influence on use of dual protection. 68% acknowledged spousal influence, 59% acknowledge access to family planning commodities whenever they need, while 44% of reported that health workers negative attitude towards the clients influenced uptake of dual method. Spousal communication regarding FP is one of the factors associated with the approval of and thus couples who discuss FP are more likely to use a contraceptive

Keywords: Dual fp, Uptake, HIV Positive Women 18-49years

OVEREXPRESSION OF *ARABIDOPSIS* DEHYDROASCORBATE REDUCTASE (DHAR) GENE CONFERS ENHANCED TOLERANCE TO POST-HARVEST PHYSIOLOGICAL DETERIORATION AND DROUGHT IN CASSAVA

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Abstract

Ascorbate (AsA, vitamin C) provides the first line of defense against damaging reactive oxygen species (ROS), and helps protect plant cells from many factors that induce oxidative stress. Dehydroascorbate reductase (DHAR) is an important enzyme functioning in the regeneration of ascorbate and maintenance of a pool of the reduced form. To increase AsA content of cassava, transgenic cassava plants overexpressing cytosolic *At*DHAR1 gene were generated using *Agrobacterium*-mediated transformation of friable embryogenic calli (FEC). Genomic integration of the *At*DHAR1 gene was confirmed by PCR and Southern blot analysis. Expression of the *At*DHAR1 transgene was confirmed by RT-PCR analysis. The DHAR activities and the levels of AsA were markedly increased in transgenic lines compared to non-transgenic (NT) plants.

The transgenic plants were tested for osmotic and methyl viologen-mediated oxidative stress. Selected lines of transgenic plants were established in the greenhouse, roots harvested after 6 months and tested for post-harvest physiological deterioration (PPD). Transgenic plants showed higher tolerance to mannitol-induced osmotic stress as demonstrated by longer root length, lower level of hydrogen peroxide (H_2O_2) and malondialdehyde (MDA) compared to NT plants. Following treatment with methyl viologen (10 mM), leaf discs from transgenic plants showed lower levels of H_2O_2 and chlorophyll degradation in comparison to NT plants. Roots of transgenic lines showed delayed PPD as compared to non-transgenic plants. These results indicate that increasing the plant AsA content through enhanced ascorbate recycling has potential for utilization in transgenic breeding to improve abiotic stress tolerance in crops.

Key words: cassava, post-harvest physiological deterioration, promoters

Evaluation was based on two tillage treatments; zero tillage (ZT) and conventional tillage (CT), with four varying sowing onset dates namely the early sowing date (SD1), normal sowing date (SD2), late sowing date (SD3), and a control treatment with supplemental irrigation under normal sowing dates (WTSD2). The experiment was laid-out in a randomized complete block design in split-plot arrangement with three replicates. Tillage treatment constituted the main blocks, while sowing dates formed the subplots which were then planted with a rust resistant and high yielding wheat variety (Kenya Korongo) attaining maturity at 130 days. Undisturbed soil samples for gravimetric soil moisture determination were taken every ten days from 10 cm, 25 cm, 45 cm and 60 cm representative of the 0-20 cm, 20-30 cm, 30-60 cm and 60cm depth intervals respectively in a 60 cm soil profile considered during the entire growing season from each subplot. Results indicate that, irrespective of the sowing date, soil water content at the root zone between the two tillage practices was significantly different at $p<0.05$. Similarly the crop yields were significantly higher ($p<0.05$) in zero tillage treatments as compared to conventional tillage with mean yield of 5.70±1.08 ton/ha (CT) and 8.69±0.54 ton/ha (ZT) in rain-fed trials. It was concluded that zero tillage conserved moisture better leading to higher grain yield than conventional tillage.

Key words: zero tillage, conventional tillage, rain-fed, soil water content.

IMPACTS OF FARMER FIELD SCHOOLS ON FOOD SECURITY AND ENVIRONMENTAL CONSERVATION IN WESTERN KENYA

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ABSTRACT

Sustainable food production is a challenge facing many developing countries. In Kenya, land degradation has led to a decrease in the production of staple foods such as maize leading to widespread hunger in recent years. Consequently, development agencies have invested in Farmer Field Schools to enhance farmers' knowledge through agricultural research and extension to sustainably increase food security. This study assesses the impacts of Farmer Field Schools (FFS) on household food security and environmental conservation in the Western Province of Kenya. The outcome variables are: maize yield per acre, income per acre, household food insecurity score and environmental conservation score. Principal component analysis and propensity score matching techniques are used for analyses and regression method to test the robustness of matching results. We find significant differences in yields and income per acre between FFS households and non-FFS households; FFS households have higher yields and income per acre than their counterparts. The study also shows that FFS program reduces severity of food insecurity but has no significant effect on environmental conservation. This implies that FFS plays a critical role in enhancing household food security in Kenya.

EFFECT OF REGULATED DEFICIT IRRIGATION AND SOIL MOISTURE CONSERVATION PRACTICES ON MAIZE (*Zea mays* L.) PERFORMANCE

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ABSTRACT
Arid areas and dry years should not lead to low harvest because has many options for the mitigation of rainfall inadequacy, irrigation being one of such options. However, it requires some adjustments when water is limited. This study investigated performance of maize in dry areas under regulated deficit irrigation (RDI) in combination with soil water conservation measures at Kithoka in Meru, Marimanti in Tharaka Nithi and Isiolo in Isiolo counties in Kenya. Deficit irrigation except during the exponential growth stage (DI_E) and deficit irrigation except during the reproductive (DI_R) stage were compared to full irrigation (FI) and deficit irrigation throughout (DI). Other treatments were ridging (R) compared to flatbed (F); superabsorbent polymer (SAP) compared to a control without SAP applied on two maize varieties (DUMA 43 and KDV 2). Experimental design was RCBD replicated three times. Growth parameters were plant height and plant diameter while yield indicators were stand count, productive plants per plot, ear size, above ground biomass, grain yield, and harvest index. Data was summarized using MS ACCESS and subjected to F-test at 5% level of significance and post-hoc tests were used to compare the means. FI gave the highest diameter (2.206 cm) and plant height (148.02 cm to the flag leaf) and the highest grain yields (3019 kg/ha) but DI_R gave the highest harvest index (0.4665) while DI_E had the highest water productivity (0.5082 kg/m^3). Ridging and SAP and their interaction with RDI had a significant effect on various yield indicators and on water productivity. DUMA 43, gave higher yields and water productivity than KDV 2. The study concluded that RDI increases water productivity when combined with SAP and/or ridging and DI_E was recommended as a viable practice when water for irrigation is limited.

EFFECT OF FARMING PRACTICES ON SEED QUALITY OF JUTE MALLOW (*CORCHORUS OLITORIUS*) IN KENYA

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ABSTRACT
Use of high quality seeds help to increase crop yield. Currently in Kenya, there is no high quality seed of jute mallow (*Corchorus Olitorius*) from breeders to farmers. This has forced farmers to use re-cycled planting seed of crop whose potential is not assured leading to low poor quality seeds and lyields as low as , 2-4 tons/ha/annum compared to expected yield of 5-8 tons/ha/annum. At planting farmers use 7kg/ha instead of 5kg/ha of seed required for a density of 250 000 plants/ha. This is 40% extra seed. The objective of study was to look into the jute mallow farming practices and its effect on quality of seed used by farmers.

management hospitals in Nairobi (KNH, MP Shah, Nairobi and Aga Khan Hospitals), at least three months before this study. The study adopted a descriptive survey design, and used purposive sampling to select four cancer treatment hospitals in Kenya. A total of 272 respondents were captured from their respective hospitals as they returned for checkup, and at the hospices where cancer survivors go for support. Questionnaire was the main data collection tool. Data of all categories was tabulated and descriptive statistics used to analyse quantitative data using Statistical Package for Social Sciences (SPSS) version 21.0. One of the main challenges was that breast cancer survivors experienced swelling of arms and hands, a condition that could be controlled by the use of lymphedema sleeve. This can be concealed by designing a long sleeved garment that covers the swollen areas, with an extra scarf prepared from the same material that the breast cancer survivor would use as the sleeve instead of using a sleeve of a different material. Since mastectomy changes the woman's body configuration, leaving several scars therein, it is important that these scars be concealed with the right garment design that provides both comfort and concealment. Further studies should be considered to address the challenges facing breast cancer patients before treatment and move further to their clothing requirements after treatment.

TITLE: FACTORS AFFECTING UPTAKE OF DUAL FAMILY PLANNING METHODS AMONG HIV POSITIVE WOMEN AGED 18 TO 49 YEARS IN KIRWARA SUB-COUNTY, MURANG'A COUNTY.

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Dual protection is a simultaneous prevention of sexually transmitted infection and unwanted pregnancies. It is achieved by consistent use of condoms alone or by simultaneous use of condoms with another method, or other risk reduction behaviors such as non-penetrative sex or abstinence. About half of the 34 million people living with HIV globally are women. In sub-Saharan Africa, nearly 60% of all new HIV infections occur in women .The level of unmet family planning needs among the 1.18 billion women aged 15–49 worldwide is estimated to be 11%. Of the 128 million women (married or in a union) aged 15–49 in sub-Saharan Africa, the estimated unmet need for family planning is at 25%.It is therefore recommended sexually active people be granted access to information, contraceptives and counseling services to make informed choices about their sexual and reproductive health needs. This study determined sociodemographic, client related and healthcare related factors influencing uptake of dual family planning methods using descriptive cross-section study design. Systematic random sampling was used in selection of respondents. 77% the respondents were between 21-30 years. 16% between 31-40 years, 6% less than 20 years while 1% above 41 years. 47% of the respondents were farmers, 41% employed while 12% were involved in business. 74% of the women were married, 19% single, 4% divorced and 3% widowed. 53% had secondary education, 25% had primary education while 22% tertiary education. Ninety seven percent of the respondents were Christians.

TUBERCULOSIS AND ITS ASSOCIATED FACTORS IN MWEA WEST, KIRINYAGA COUNTY, KENYA

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ABSTRACT
Tuberculosis (TB) is one of the oldest diseases known to affect humans and a major cause of mortalitiy worldwide. It is a global public health concern with majority of cases occurring in the world's poorest nations. In the year 2012, 89,568 cases of Tuberculosis (TB) were reported in Kenya. Using this figure, World health Organization ranked the country 15th out of 22 countries with high TB burden Objective of this study was to establish prevalence and risk factors associated with this disease in Mwea West of Kirinyaga County, Kenya. Data was obtained from patients seen at eight heath facilities in Mwea Sub County. Using a descriptive cross-sectional study applying quantitative methods. Result showed that approximately 80% of the respondents had ever suffered from TB with 17% and 3% reporting that they had contracted the disease twice and more than twice respectively. Additionally, 40% of the respondents reported that at least one of their family members had contracted TB. HIV/ AIDS infection was conspicuously present in over 70% of respondents with TB. Risk factors identified included smoking 50%, alcohol abuse 62% and low knowledge on TB transmission. Health promotion interventions aimed at behavior modification should be scaled up and an analytical study to determine the relationships between social demographics and prevalence should be carried out.

IMPROVING THE LIVES OF BREAST CANCER SURVIVORS THROUGH CLOTHES.

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ABSTRACT
Breast cancer is the second most common cancer found among women, second only to skin cancer. It is the leading type of cancer affecting women in Kenya. The most common surgical treatments for the disease are mastectomy and lumpectomy. These can cause changes to breast size, shape of the chest wall and overall torso symmetry. These changes imply that the breast cancer survivors (BCSs) may require entirely new attire. This study therefore aimed at determining the correct clothes designs for the breast cancer survivors. The objectives of the study were to determine the physical challenges faced by breast cancer survivors with respect to their clothing needs, and to assess the correct clothes design suitable for the breast cancer survivors' changed body posture. The target population constituted breast cancer survivors discharged from the four cancer

A seed survey and collection from local markets and farms was carried out and taken to University of Eldoret seed laboratory for seed quality tests for analytical purity, germination and vigor as per ISTA 2004 protocol. Some seeds were planted in a green house, phenotypic characteristics recorded and analyzed using descriptive statistics and SPSS. 80% of farmers were middle and old age with 92% of them being female, with 86% not having attended any formal training on seed production or agronomy and 54% not schooled at all. Seeds were of superior quality (over 98 %), but germination and emergence was low (56 %). Phenotypic characterization showed diversity in seeds with four varietal characters coming out based on color, maturity and height as: Green Early Maturing Short, Brown Early Maturing Short, Green Late Maturing Tall and Brown Late Maturing Tall. It was concluded that seeds grown by farmers are diverse and of poor physiological quality hence there is need for a purification program to improve seed quality.
Key words: Indigenous, Vegetable, Jute mallow, Quality, Seed.

MOULDS AND OCHRATOXIN A ASSOCIATED WITH GREEN COFFEE BEANS (*Coffea Arabica L.*) PROCESSED BY DRY AND WET METHODS IN NYERI COUNTY.

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ABSTRACT
Poor processing and storage of cofee can lead to contamination with moulds especially *Aspergillus* and *Penicillium* species which produce mycotoxins such as Ochratoxin A (OTA) which are hazardous to consumers. The aim of this study was to determine the levels of moisture content, biochemical composition, mould contamination and OTA in coffee processed by dry and wet methods in Nyeri County, Kenya. Moisture content was determined by dry oven method, chemical composition and OTA levels by use of HPLC and moulds enumeration by serial dilution technique. Results showed no significant difference in moisture content of coffee samples from estates and factories. Significant ($p < 0.05$) variations were observed in sucrose, caffeine and chlorogenic acid contents of the coffee beans from different factories and estates. Wet processed coffee from Jungle estate, Kihuyo factory and Nyeri hill farm recorded the highest levels of caffeine, chlorogenic acid and sucrose respectively. Mould counts of coffee samples from factories and estates were between 1×10^3CFU/ml to 6.0×10^1 CFU/ml. The highest mould contamination was observed in dry processed coffee s compared to wet processed coffee. This could be related to sun drying of the whole cherries taking long period of time to dry encouraging growth of moulds . Ochratoxin A was not detected in samples from estates and factories. Coffee samples collected from estates and factories were not contaminated with OTA even though they showed some levels of mould contamination.
Key words: Processing methods, Factories and estates, chemical composition, Ochratoxin A.

EFFECT OF SOAKING COFFEE CHERRIES ON BIOCHEMICAL COMPOSITION AND CUP QUALITY OF COFFEE BREW

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ABSTRACT

During the peak harvest season, most coffee processing factories may lack sufficient capacity to process coffee cherries. Such processing delays lead to undesirable fermentation affecting the quality of the coffee. Soaking of coffee cherries may be adopted in an attempt to preserve the cherries but information on the effects of this practice on chemical composition and sensory quality of coffee is limited. This study aimed at determining the chemical composition and cup quality of soaked coffee cherries, for a period of seven and ten days with daily change of soaking water and without change of soaking water with the control being freshly processed coffee cherries. Levels of caffeine, chlorogenic acids, sugars and trigonelline were determined by HPLC methods. Cup quality was determined using 3 trained coffee cuppers. Results showed that soaking coffee cherries did not lead to significant variations in the level of trigonelline, chlorogenic acids, caffeine and sucrose.Levels of trigonelline ranged between 0.88-1.15 %, chlorogenic acid 6.71-8.13%, caffeine 1.04-1.13% and finally sucrose 5.67-6.60%. Sensory analysis revealed significant variations ($p \leq 0.05$) in raw bean color, flavor and class of the coffee brew. In terms of quality, coffee samples obtained from freshly processed coffee cherries scored the highest at 4.78 (fair to good quality). Discrimination function analysis placed freshly processed coffee cherries further distinctively from other treatments thus yielding the best quality.

PROCESS ANALYSIS FOR EMISSION CONTROL WITHIN THE SMALL SCALE COFFEE ROASTING INDUSTRIES IN KENYA.

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ABSTRACT

Roasting of coffee has been practiced for decades since the beginning of the 20th Century. It is a vital stage in the coffee value chain in which the green coffee beans undergo chemical changes to acquire characteristic coffee flavor. In the beginning, much of the roasting was home based in small batches for personal consumption but later faded with the rise of commercial coffee roasting companies. Continuous increase in global consumption of coffee products including beverage, fresheners and coffee flavor additives have seen the industry attract small, medium and large scale coffee roasting firms. This study categorized coffee roasting firms in Kenya. Chemical compound like proteins, fats, caffeine and organic acids contained in green coffee beans decompose or oxidize during roasting while others volatize to become pollutants.

This study determined composition and abundance of malaria vectors along altitudinal gradient (1000m-1600m) in western Kenya.

Larval and indoor resting anophelines were sampled in Kisian (1000-1200m), Emutete (1453-1632m) and Iguhu (1450-1580m) using standard sampling procedures. ANOVA was used for data analysis.

Results: Five anopheline species were identified from larval habitats, four species showed no variation (Person $\chi 2 = 13.6$; $P = 0.09$) in abundance while one species was found only in one highland site. Only two species of four were found resting indoor and there was no variation in indoor resting density of An. gambiae s.l. ($F= 2.46$; $df = 2, 297$; $P = 0.08$) and An. funestus ($F = 0.94$; $df = 2, 297$; $P = 0.38$) along the gradient. PCR analysis of An. gmabiae s.l. showed significant variation in abundance of An. gambiae s.s and An. arabiensis along the altitudinal gradient in both larval (Pearson $\chi 2 = 133.4$; $df = 2$; $P < 0.001$) and adult (Pearson $\chi 2 = 8.6$; $df = 2$; $P = 0.013$) samples. An. gambiae s.s was abundant in higland but An. arabiensis was also observed at altitude > 1300m.

Diversity in distribution of anopheline larvae correlated with the diversity in larval habitat in study areas. An. arabiensis was observed above 1300 m phenomenon not reported before in same sites, suggesting an ecological expansion by this important vector. There is need for constant monitoring of vector populations is necessary to understand changes in malaria transmission dynamics as vector species expand ecological zones.

Key words: Anopheles, Diversity, Altitude, Ecological Expansion.

EFFECTS OF NINHYDRIN BASED PHYSICAL PROCESSING OF LATENT PRINTS FOR CRIME INVESTIGATIONS

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Abstract

Detection of fingerprints at a crime scene is of prime interest to forensic investigators for identification purposes. Fingerprints are usually left at the scene of crime unintentionally after which they are detected and lifted using various methods. Ninhydrin is commonly used to reveal fingerprints on porous surfaces. It reacts with the amino group of amino acids and other components of palmar sweat to develop a purple color that is visible on most paper backgrounds. This technique was used to determine the effectiveness of Ninhydrin in developing latent prints. Once developed, latent prints should be photographed, because they fade with time. To prevent this they can be stored in airtight plastic bag after drying and only if they have reached optimum development. This empirical study confirmed the effectiveness of the Ninhydrin method for extracting fingerprints from documents like forged cheques, anonymous letters, and extortion notes. Further, this detection method can also be used to formulate a cost effective, easily understood procedure that can be adopted as a training tool for forensic, security training and law enforcement personnel.

Key words: Finger prints, Forensic Science, Ninhydrin, Security, Investigation, Analysis, Latent prints, Palmar sweat.

Although diarrheagenic *E. coli* pathotypes and *Shigella* sero-groups are leading causes of diarrhea in children under five years in developing countries, their distribution and antimicrobial resistance vary from place to place and over time in a given region. Using a cross-sectional study, diarrheic children (n=354) under five years seeking treatment at Mbagathi Hospital, Nairobi city, Kenya, were enrolled. Stool samples were collected from all children and cultured for bacterial analysis. Bacterial isolation and identification was performed by conventional microbiological methods. Polymerase chain amplification was used to detect *aspU, aggR, and pcvd432* for EAEC, *est* and *elt* for ETEC, *eae* for EPEC, *stx* for EHEC, and *ipaH for* EIEC and *Shigella species*. Antimicrobial profile was determined by disk diffusion method.
Prevalence of EAEC, ETEC, EPEC (*eae*), EIEC (*ipaH*) was 21.2%, 10.5%, 4.5%, and 0.6%, respectively, while that of mixed infection was 0.6% for ETEC/EAEC and 0.3% for EAEC/EPEC/ETEC. No EHEC strain was isolated. Pathogenetic analysis for EAEC showed that 5.9% carried *aspU*, 8.2% possessed both *aspU* and *aggR* and 7.1% had a combination of *aspU, aggR* and *pcvd432* while that of ETEC was 2.3% for *elt*, 6.5% for both *elt* and *est* and 1.7% for *est*. The combination of *aspU* with *aggR, elt* and *est,* and *pcvd432* with *aggR, aspU* and *est* was 0.3% in each case of ETEC/EAEC mixed infection. The *aspU* gene co-existed with *aggR, pcvd432, eae* and *elt* in the EAEC/EPEC/ETEC mixed infection. Prevalence of *S. boydii, S. dysenteriae*, *S. flexneri* and *S. sonnei* was 0.8%, 0.6%, 1.7%, and 0.8%, respectively. No *E. coli* pathotype and *shigella* co-infection was detected. In addition, *both E. coli pathotypes and Shigella species were resistant to ampicillin, trimethoprim/sulfamethoxazole, streptomycin, chloramphenicol and tetracycline while gentamycin and kanamycin resistance occurred in diarrheagenic E. coli. Results of this study confirm that*
E. coli pathotypes and Shigella sero-groups harboring virulent genes are an important cause of diarrhea in children in Kenya. Increasing spectrum of antibiotic resistance in diarrheagenic E. coli and Shigella species necessitates development of antimicrobial stewardship education-programs to influence prescribing behavior as well as optimizing the use of effective antimicrobials in Kenya.
Key Words: *E. coli* pathotypes; *Shigella* sero-groups; Antimicrobial profile.

DISTRIBUTION OF MALARIA VECTORS ALONG ALTITUDINAL GRADIENT IN WESTERN KENYA.

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Backround: Malaria is a challenge in sub-Saharan Africa where over 80% of estimated 2 million deaths occur annually. Partly, malaria control relies on measures targeting the vector. To correctly implement evidence based vector control measures understanding vector composition is paramount.

Since the emissions associated with coffee roasting process are inevitable, SME firms in the industry continue to face emission control challenges inhibiting their growth and profitability. The purpose of this research was to develop an emission management plan for treatment, control and disposal of air pollutants for a small scale batch –type coffee roasting firm. Case study methodology was used to study the emission problem and data collection. Pareto analysis was used to rate the emissions risk indeces. Process improvement techniques towards a clean coffee roasting process are presented for cleaning chaffs, smoke and dust. Adopting the proposed designs for cyclones and smoke extract hood for a standard 60kg small batch-type coffee roaster would clean and control unwanted emissions.
Key words: Processing methods, Factories and Estates, chemical composition, Ochratoxin A

ISOLATION AND IDENTIFICATION OF HEAVY METAL RESISTANT BACTERIA PRODUCING ENZYMES FROM INDUSTRIAL, LABORATORY AND DUMPING SITES WASTES IN MOMBASA COUNTY

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ABSTRACT
Industrial, laboratory and dumping sites wastes are sources of heavy metal introducing health risks to humans. However, bacterial strains with wider industrial applications, particularly production of enzymes for detergent industry emerge. The focus of this study was to screen and isolate enzyme producing heavy metal-resistant bacteria. Wastewaters were collected from industrial discharge points at Tudor creek (TD) and laboratory effluent (TUL) at Technical University of Mombasa, Kenya. Soil samples were collected from damping sites in Kongowea 1 (KG1), Kongowea 2 (KG2), Tudor ground (TG) and Tudor district hospital (TH) in Mombasa County. Bacteria strains were isolated using nutrient agar media further sub-cultured to obtain pure colonies. Pure strains were screened for production of protease and amylase using lytic activity. Heavy metal tolerance test was used to screen for copper and mercury resistance to isolated bacteria. Microscopic and biochemical characteristics were used to identify bacteria expressing ability to grow in heavy metals and actively produce viable enzymes. Positive growth was realized in all sample collected from the six sites in varying concentration with copper plates recording the highest plate count. Activity of microbial protease and amylase ranged from 0.1080±0.0025 in KG1 to 0.3703±0.0014 in TUL and 0.200±0.0745 in TUL 0.3613±0.0014 in TH to respectively at a concentration of 2.5 mg/L of copper. At a concentration of 2.5 mg/L of mercury, activity of microbial protease and amylase ranged from 0.0113±0.0014 in TD to 0.2047±0.0014 in TH. There was no significant difference ($p < 0.05$) in microbial community and enzyme activity from the six sampling points.

In all the sampling points, *S. aureus*, *N. Veillonella*, *B. licheniformis*, *B. azotoformans*, *Streptococcus*, *Peptostreptococcus*, *Enterococcus* and Acinetobacter/ Moraxella were identified. The sites studied contain bacteria adapted to heavy metal pollution that can be natured to produce enzymes in situations demanding resistant enzymes such as detergent industries.

Key Wards: **Heavy Metal Resistance; Enzymes; Industrial wastes; Dumping sites**

EVALUATION OF ANTINOCICEPTIVE ACTIVITY OF *CROTON MEGALOCARPUS* (HUTCH)

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ABSTRACT

Use of plant parts for therapeutic purposes has been widely practiced in Africa. One of the trees used for fever and analgesia is *Croton megalocarpus*. However, animal studies have not been done to evaluate antinociceptive activity.

This study investigated investigate antinociceptive activity of *Croton megalocarpus* using formalin induced paw licking test on swiss albino mice.

Mice were injected with the 50 mg / Kg, 100 mg / Kg and 200 mg / Kg of the Extract, 100 mg / Kg Aspirin (positive control), 5 mg / Kg Morphine (positive control) and the Vehicle (10% Dimethyl Sulfoxide in Normal Saline). An hour later, they were injected with 0.1 ml of 5% formalin in the sub plantar region of the hind paw. The amount of time (in seconds) spent licking and or lifting the injected paw an indicator of pain, was recorded using a stop watch in 5 minute blocks for a period of 30 minutes in two phases, the early (0-10 min) and late (15 -30 min) phases. 50 mg / Kg dose of the extract did not exhibit significant antinociceptive effect whereas the 100 mg / Kg and 200 mg / Kg doses exhibited highly significant effects ($p < 0.01$) in the early phase compared to the vehicle. All the doses of the extract exhibited highly significant ($p < 0.01$) antinociceptive effects in late phase compared to the vehicle confirming that the extract exhibits both phasic and tonic antinociceptive effects in the Swiss albino mice compared to the negative controls.

EARLY HIV INFECTION, CANCER PATHOPHYSIOLOGY: SIMILARITIES, DIFFERENCES AND IMPLICATIONS

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Abstract

Cancer and Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) are associated with chronic oxidative stress, inflammation and immune activation. Although similarities in pathophysiology of these diseases are well established, the knowledge has not been applied in understanding carcinogenesis.

ANTINOCICEPTIVE ACTIVITIES OF TODDALIA ASIATICA ROOT EXTRACT USING THE FORMALIN TEST ON MICE

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ABSTRACT

Approximately 80% of the world population and 70% of sub-saharan Africa have been reported to rely on traditional healers who use herbal remedies for management of various medical conditions. Anecdotal evidence, suggest that herbal remedies used in most communities are claimed to be effective hence the need to evaluate their effectiveness for the benefits to the general population. Analgesic substances have been purified from plants and novel structures with known mechanism of actions identified. Roots and bark of *Toddalia asiatica* have been traditionally used in the treatment of pain. The aim of this study was to investigate the antinociceptive activities of *T. asiatica* root extract using the formalin test in mice. Roots of *Toddalia asiatica* were sourced, air-dried, powdered and extraction done using dichloromethane and methanol in the ratio of 1:1. Extracts were concentrated and reconstituted in 5% dimethylsulfoxide (DMSO) and 95% normal saline to achieve working concentrations of 50,100 and 200 mg / kg body weight. The experimental and control animals (8 each) were injected intraperitoneally 1 hour prior to the experiment. and sensorimotor test performed on each animal prior to the formalin test. None of the animals showed sensorimotor defect. The 50mg /kg dose showed no significant antinociceptive effect in the early or the late phase of formalin test. The 100mg / kg dose showed highly significant antinociceptive ($p < 0.001$) effect in the late phase (15-30 mins) of formalin test while the 200mg / kg dose showed significant antinociceptive effect ($p < 0.01$) in the early phase (0-5mins) of formalin test compared to the vehicle treated animals. The 200 mg / kg dose showed no significant effect in the late phase.

ESCHERICHIA COLI PATHOTYPES AND *SHIGELLA* SERO-GROUPS IN DIARRHEIC CHILDREN IN NAIROBI CITY, KENYA

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Abstract

Microbial infections are a major public health concern. We investigated prevalence of *E. coli* pathotypes and *Shigella* sero-groups and their antimicrobial profiles among diarrheic children in Nairobi city, Kenya.

Approximately 37% and 12% of Kenyas population suffer from high blood pressure, and heart diseases respectively while 10% of the population has diabetes. More than 28,000 new cases of cancer are diagnosed yearly in Kenyan hospitals while 22,100 die of cancer each year. NDCs thus cause over 55% of all deaths recorded in the hospitals and contribute to 50% of all hospital admissions in the public hospitals. Majority of cancer cases present late or at end stage of disease. Consequently patients and their families have identified pain relief as a means to improving quality of life among patients. This study recommends pain relief and palliative care encompassing physical, spiritual, emotional and social care as the only realistic treatment options to management of late ort end stage diseases.

TRADITIONAL MEDICINES USED IN PAIN MANAGEMENT IN KENYA

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Introduction

WHO estimates that approximately 80% of the world population relies on traditional healers for their day to day health care needs and approximately 70 % of the people in sub Saharan Africa are reported to be using herbal medicine for treatment of various medical conditions.

Analgesics and local anaesthetics were developed from compounds isolated from plants, Opioids, the most potent analgesics in clinical use today and Morphine were isolated from *papaver somniferum*. The willow bark and salicin (the base for aspirin (ASA) have been used in traditional medicine for relief of mild pain and fever for years.

The cost of conventional medicines is very high and there are always inadequate supplies. Available analgesics have adverse effects and some are either too potent or too weak. Thus since Opiods cause sedation, respiratory depression and NSAIDs cause gastric irritation and platelet depression, there is need for identification and development of of new analgesic compounds.

Thus, traditional /alternative medicines have thus been used for pharmacotherapy to millions worldwide and are a viable option for future drug development. Traditional medicines thus provide viable option for modern drug development.

Parent extracts have been "clinically" tested in their traditional milieu and in some cases over millennia and have been used for treatment of painful conditions despite the fact that no conclusive scientific research has been done on antinoceptive activities of most of these plants. Thus, a number of plants have been assayed for active nociceptive compounds and results showed significant nociception compared to the controls validating the anecdotal evidence for their use in management of HIV/AISDS, cancer, other chronic illnesses and in palliative care.

Understanding the basis of similarities in pathophysiology of the two diseases could be crucial in understanding carcinogenesis. This study reviewed existing knowledge, research gaps in oxidative stress, inflammation and immune activation in carcinogenesis and early HIV infection, to stimulate new research interests to accelerate development of future management strategies. Medline, PubMed, Scopus and Science direct databases were searched using the keywords: oxidative stress, carcinogesis, acute HIV infection, chronic inflammation and immune activation reactive oxygen species (ROS). The identified studies were critically appraised for relevance, methodology, , results compared. Chronic oxidative stress, inflammation and immune activation were common in the two diseases and might possibly be the common drivers of pathophysiology Competition for limited nutrients and oxygen by rapidly dividing cells, changes in microenvironment and bone marrow could also account for the characteristic differences. More accurate understanding of these processes might provide new insights into carcinogenesis, facilitate accelerated development of future therapeutic targets, inform policy on cancer prevention, screening and early diagnosis. *Keywords: Oxidative stress, Carcinogesis, HIV infection, Chronic Inflammation and Immune activation*

PROTEOLYTIC ACTIVITY OF BROMELAIN FROM PINEAPPLES OBTAINED FRO FERENT AGRO-ECOLOGICAL ZONES, THIKA REGION, KENYA.

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ABSTRACT

In Kenya, large quantities of pineapple by-products are not well utilized although they can be a potential source of bromelain. The latter is widely used in the pharmaceutical, food, and cosmetics industries. The objectives of this study was to determine the levels of bromelain in crude extract of different parts of pineapples from different agro-ecological zones (AEZ) of Thika Region, Kenya. Following extraction, protein concentration and bromelain activity was estimated using standard methods. Bromelain activity of bromelain for the crown from the upper (UAEZ), mid (MAEZ) and lower (LAEZ) was 45.52, 50.91, 50.50 U/ml and the activity was significantly ($p<0.05$) lower in pineapples from UAEZ compared to those from other two zones. For peels, the bromelain activity (U/ml) of pineapple from UAEZ (47.01U/ml) was significantly ($p<0.05$) lower than that from MAEZ (50.76U/ml) and LAEZ (50.22U/ml). Bromelain activity in the stems of pineapple from LAEZ (47.37U/ml) was significantly higher ($p<0.05$) compared to those from MAEZ (39.30U/ml) and UAEZ (38.37U/ml). The study shows that pineapple by-products in Kenya can be a good source of bromelain, with higher levels of activity being observed in pineapples from the lower and mid-AEZ.

Key words: Bromelain, Pineapple, Agro-ecological zones, Kenya.

IDENTIFICATION OF POTENTIAL SEX PHEROMONE COMPONENTS FROM KENYAN POPULATION OF THE LEGUME POD BORER, *Maruca vitrata* (FABRICIUS) (LEPIDOPTERA: CRAMBIDAE)

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Abstract

Previously, a sex pheromone blend has been developed for field monitoring of population density of *Maruca vitrata*, a severe pest of leguminous crops in the tropics. However, its effectiveness has been shown to vary depending on the population of the moth suggesting possible involvement of additional pheromone components. In this study we investigated the composition of the sex pheromone in a Kenyan population of *M. vitrata*. GC/EAD analysis of pheromone gland extracts of calling females using male antenna isolated three EAD-active components. Apart from the major sex pheromone component previously identified, (*E,E*)-10,12-hexadecadienal, we identified two additional components, the isomers (*Z,E*)- and (*E,E*)-9,11-tetradecadienyl acetate in the gland extract which were confirmed with authentic standards by GC/MS. In laboratory bioassays, attraction of male *M. vitrata* moths to individual sex pheromone component and different blends of these components varied, with the strongest response elicited by a 1:1:1 blend of the three components (*E,E*)-10,12-hexadecadienal, (*Z,E*)- and (*E,E*)-9,11-tetradecadienyl acetate, which compared favourably with the responses elicited by virgin females. Our results suggest that this 3-component blend holds promise in the monitoring of *M. vitrata* populations in Kenya.

SECONDARY INFECTION IN TUNGIASIS:

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Tungiasis is a parasitic disease caused by jigger flea *Tunga penetrans*. The disease is mainly endemic in low-income communities in Africa and Latin America.

MANAGEMENT OF DIARRHEAL DISEASES AMONG CHILDREN UNDER FIVE YEARS (A CASE STUDY OF MOTHERS AT KAKAMEGA COUNTY, KENYA)

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ABSTRACT

Despite the efforts and successes in management of diarrhoea, the disease has remained among the top five causes of mortality and morbidity in Kenya, particularly among infants and children below five years. Advent of HIV/AIDS and the harsh economic situation is Kenya have led to increase in diarrhoea diseases. This study sought to determine mother's knowledge, attitude and practices in management of diarrheal diseases among children under five years of age.

A cross-sectional study was conducted at Shieywe sub-County, Kakamega County of Kenya. Systematic sampling technique was used to select the study population. Data was collected through observational checklists, in-depth interviews, self-administered semi-structured questionnaires and focused group discussions. Quantitative data analysed using SPSS and involved univariate and bivariate analysis. Qualitative data was analyzed by thematic content analysis.

384 mothers each with at least one child under five years were included in the study. 84% of respondents had knowledge of the causes of diarrhoea; but only 31% knew methods of diarrhoea prevention. 41% of respondents managed diarrhea cases with non-recommended home remedies such as salt and sugar solutions. The study also established that 37% of the health workers were not trained on diarrhoea management despite them being directly involved in case management presenting a gap between knowledge and practice.-*. There is need for improvement of home based case management and implementation of a community strategy for diarrhoeal management in Kenya.

Key words: Knowledge, Attitude, Practice, Diarrhoea

PAIN MANAGEMENT AND PALLIATIVE CARE IN KENYA

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HIV/AIDS, cancer and other non communicable diseases are a major life threatening illnesses in sub-Saharan Africa. thus, whereas **1.4** million Kenyans are living with HIV/AIDS and with prevalence rates estimated at 7.4 % among the 15 to 49 years age group, mortality due to Non Communicable Diseases (NCDs) is approximately 32%.

UTILIZATION OF AN INDIVIDUAL BIRTH PLAN DURING PREGNANCY AMONG PREGNANT WOMEN IN RURAL KENYA (A CASE STUDY OF MAKUENI COUNTY, KENYA)

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ABSTRACT

Ninety nine percent of global pregnancy and birth related maternal deaths occur mostly in poor rural communities in developing countries. There is evidence that individual birth planning and appreciation of the likelihood to experience complications increases the likelihood of seeking a skilled birth attendants. However, there is scarcity of literature on utilization of individual birth plan (IBP) in rural Kenya. This study assessed prevalence of utilization of IBP and socio-demographic factors associated with utilization of IBP during antenatal period in Makueni, Kenya through a community based cross-sectional study at Makueni County. Data was collected using self-administered semi-structured questionnaires and Focused Group Discussion. Quantitative data was analysed using SPSS and involved univariate and bivariate analysis. Chi- square values were used to test the significance of the association between dependent and independent variables ($p<0.05$). Qualitative data was analyzed by thematic content analysis.

326 women aged 18-49 years in late pregnancy or those who had delivered within 9 months preceding the survey were interviewed. IBP utilization was low at 48.2% despite the high antenatal care clinic attendance. Identifying a blood donor was the least utilized component (25%). Being middle aged (28-37) years, having higher level of education, having attended ANC clinic 4 times and being married were significantly associated with utilization of an IBP.

Utilization of IBP was low despite high ANC attendance. The low utilization contributes to three delays namely; delays in seeking medical care; reaching a health care facility and receiving health care at the facility. There is therefore need to develop strategies to keep improving the quality of antenatal care especially among those mothers least likely to be prepared in order to achieve the SDGs.

Key Words:
Individual Birth Plan, Focused Antenatal Care, Birth preparedness

Irritation associated with jigger entry makes patients to scratch lesions in turn favouring entry of bacteria through existing openings of the epidermis

Although a number of studies have been done to elucidate the pathogenesis of tungiasis, there are no reports on bacterial super-infection associated with tungiasis infection. Thus, we suspect that secondary bacterial pathogens associated with tungiasis infection might be involved in pathobiology of tungiasis and associated immunological complications.

The bacteria enters the body through the permanent sore of 250–500 µm size, through which jiggers breathe, release eggs and eject faeces

This study aimed at isolating and identifying the bacterial pathogens associated with tungiasis infection.

A cross- sectional study was carried out in Tezo village in Kilifi County and a total of 30 patients sampled. Swabs were collected from the cavities left after surgical removal of jigger. And transported in a cool box to laboratory in a Cary-brair media and cultured aerobically and anaerobically within four hours after collection. For aerobic culture, blood agar, and Macconkey agar were used while for anaerobic culture Chocolate blood agar was used. Various biochemical analyses were carried out to identify the isolated organisms. The most common bacterial species isolated were aerobic namely *Staphyloccous aureus* (42%), *Escherichia coli* (27%), *Enterococcus fecalis* (14%) and *Streptococcus pyogens* (5%). Interestingly, no anaerobic species were found. These results show that secondary infection is common in tungiasis and may contribute to pathophysiology of the infection. *T. Penetrans* may act as an antigen facilitating biofilm formation within the epidermis which provides a favourable environment and prevents bacterial pathogens from spreading to surrounding tissue leading to the spread of pathogens systemically and inducing inflammatory responses at the sites of infection.

THE TGF-BETA AND TGF-B RECEPTOR INTERACTIONS IN HUMAN ENDOMETRIAL AND ENDOMETRIOTIC CELLS

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TGF-βs are a member of a large superfamily including activins, inhibins, nodals, bone morphogenetic proteins (BMP), lefty A and B, growth and differentiation factors (GDFs) and anti-Mullerian hormones. Once activated, they bind and activate their high affinity receptors namely TGF-β receptor type I (TβRI), TβRII and TβRIII. TGF-βs and their receptors are highly expressed in the peritoneal fluid of patients with endometriosis and may thus be involved pathophysiology of endometriosis.

This study sought to characterise the TGF-β / TβR interaction in endometrial and endometriotic cells *in vitro*. Immortalized human endometrial stromal (T-HESC), epithelial (HES), endometriotic stromal (22B) and epithelial (12ZVK) cell lines were used. Cells were treated with or without TGF-β1 or TGF-β2, respectively, and cells counted. TβRII/TβRIII and TβRI/TβRII interaction was analysed and quantified by *in situ* Proximity Ligation Assay (PLA). Results showed that TGF-β1 or TGF-β2 significantly decreased cell numbers of all cell lines. Treatment of endometrial and endometriotic stromal and epithelial cells with TGF-β1 or TGF-β2 increased TβRII/TβRIII interaction. This interaction was notably stronger in TGF-β2-treated compared to TGF-β1-treated cells. Endometrial cells showed a stronger interaction compared to endometriotic cells. A moderate TβRI/TβRII interaction was observed in both TGF-β1-treated as well as in TGF-β2-treated endometrial cells. Results of this study demonstrate that TGF-βs exert a stronger influence in endometrial cells compared to endometriotic cells. We remarkably demonstrate a stronger interaction of TβRII/TβRIII upon treatment with TGF-β2 compared to TGF-β1 which underlines the importance of the TβRIII as a high-affinity receptor for TGF-β2. Differences in composition of the TGF-beta signalosome in endometrial cells compared to endometriotic cells suggest involvement in pathogenesis of endometriosis.

Key words: ***TGF betas, endometriosis, pathogenesis, high affinity receptors***

ROLE OF HUMAN UBIQUITIN LIGASES IN ENTEROVIRUS 71 HUMAN HOST-CELL INTERACTIONS

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ABSTRACT
The RNA virus-host cell co-evolution has led to both the pathogens and the hosts adapting to control each other. The mechanisms by which host cells resist RNA viral infection is not fully understood. ENTEROVIRUS 71(EV71), an emerging RNA virus associated with human health problems such as hand-foot-and-mouth disease as well as neurological complications. It is believed that host factors play a role in the EV71 pathogenesis but little is known about their identity or underlying mechanisms. Ubiquitin ligases are a family of human proteins involved in regulation of cellular signaling and functioning of proteins. Given their importance in cell physiology, it is likely that ubiquitin ligases may have a prominent role in either supporting or restricting viral infection. Although ubiquitination is critical for regulating key cellular processes and immune responses, the "global role of ubiquitination processes" in EV71infection of human host cells has not been determined to date. To address this, we over-expressed >90% of E3 Ubiquitin ligases [UBL] and their adaptors in HEK 293T cells, assessed their ability to modulate EV71 infection by immunofluorescence staining coupled with high-content microscopy and statistical data analysis. We identified 54 pro-viral and 65 antiviral UBLs.

Counter screen of these hit UBLs with dengue virus revealed both panviral and virus-specific effect of UBLS on infection. Our study identified several UBLs impacting on EV71 infection, revealing novel aspects of EV71-host cell interactions.

IDENTIFICATION, CHARACTERIZATION AND PURIFICATION OF MSC_0265, A POTENTIAL VACCINE ANTIGEN HOMOLOGUE OF *MYCOPLASMA MYCOIDES* SUBSP. *MYCOIDES* IN *MYCOPLASMA CAPRICOLUM* SUBSP. *CAPRIPNEUMONIAE*

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ABSTRACT
In silico identification and characterization of vaccine antigens has opened up new frontiers in the field of reverse vaccinology to mitigate the effects of livestock diseases by development of new subunit vaccines. This study characterized, expressed and purified MSC_0265 for use in immunoassays and inoculation in goats. *Mycoplasma mycoides subs. Mycoides (Mmm)* and *Mycoplasma capricolum capripneumonia* (*Mccp)* are similar pathogens at the genomic level and are the causative agents of Contagious Bovine Pleuropneumonia (CBPP) in cattle and Contagious Caprine Pleuropneumonia (CCPP) in goats respectively. In this study, BLAST was used to identify homology of MSC_0265 in *Mycoplasma capricolum capripneumonia* genome and the protein it is similar to. Characterization of MSC_0265 was also done using I-TASSER to predict secondary structure, solvent accessibility, normalised B-factor, 3D models and function. With cut off points of 0.0 for E-value, 100% for Query coverage and 90% for Identity, MSC_0265 a pyruvate dehydrogenase enzyme gave a high homology score on tBLASTn and BLASTp. It had earlier been cloned in pGS21a vector before proceeding with expression and purification of the His-tagged protein by Ni-NTA affinity chromatography. This study identified the homologue of MSC_0265 as protein WP_029333261.1 in the *Mycoplasma capricolum capripneumonia* genome (Accession NZ_LN515398.1) using tBLASTn and BLASTp. Additionally, MSC_0265 was characterized and its optimal expression profile and estimated molecular weight verified.

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