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Discovery

About the Cover

ABOUT THE COVER

The paper seeks to examine the spatial and the temporal variations of surface winds over Northeastern Nigeria and their potential for energy generation. Wind data for six (6) synoptic stations located in northeastern Nigeria were obtained from the Nigerian Meteorological Agency (NIMET). The stations; Nguru, Maiduguri, Potiskum, Gombe, Bauchi and Yola are well distributed across the region. Descriptive statistics - mean, standard deviation and coefficient of variation - were used in analyzing the data. In addition, inferential statistics - time series analysis and regression were also used to provide further insight into the temporal and spatial characteristics of surface wind over the study area. The study found surface wind to vary over time and space. It was also observed that the North-east trade wind plays a key role in influencing the variations of Harmattan season climatic elements especially surface wind flow; because it is the driver of the season and is controlled by the movements of the Inter Tropical Discontinuity (ITD). Latitude has also demonstrated a great deal of influence on the variations of climatic parameters in the region. Accurate documentation of surface wind characteristics over the study area help in the determining the specification of suitable wind turbines for various locations (Ref: Luka Fitto Buba, Nura Umar Kura, Dantata Danlami, John Bathrobas Dakagan. Harmattan wind and its potential for electricity generation in Northeastern Nigeria. *Discovery*, 2018, 54(275), 432-441).

SOCIAL SCIENCE

Perceived organizational culture and perceived organizational support on work engagement

Iliyasu Shiyanbade Najeemdeen, Bello Taofik Abidemi, Farah Diana Rahmat, Bannah Daniel Bulus

The study examines the effectiveness of perceived organizational support, perceived organizational culture on work engagement among academic staff universities. The study adopts quantitative technique and utilized the use of questionnaire in collecting data from respondents. The data was analysed using Statistical Package for Social Science (SPSS). The regression results indicate that all independent variables which are perceived organizational culture, perceived organizational support are positively correlated with the dependent variable which is work engagement. Finally, the study offers recommendation and conclusion.

Discovery, 2018, 54(275), 411-418

ENGINEERING

Effect of Calcium content on the mechanical properties of Magnesium alloy

Mudashiru LO, Azeez TM, Olafimihan EO, Adio TA

Magnesium alloys of the type magnesium-aluminum have been widely used in various engineering application and continue to attract interest due their light weight and economic advantage. However, the correlations between microstructures, grains fractal dimensions and sphericities, and relation with performance during service have also been established for many commonly used Mg-Al alloys. This study therefore examined the effect of calcium extracted from animal bone on the microstructure and mechanical properties of Magnesium alloy. It was found that at 0.4 (wt.%) Calcium content structures with regular and random grain boundaries resulted to strengthening of the alloys. An optimal hardness and tensile strength of 50.1 BHN and 280.15 MPa was respectively obtained.

Discovery, 2018, 54(275), 419-422

FOOD SCIENCE

Characterizing and evaluating the potential of turmeric to attenuate hypercholesterolemia through animal modeling

Aniza Ishaque, Moazzam Rafiq, Ashfa Ghani, Anum Sabir, Eman Manzoor, Sara Arshad, Hafiz Saad Bin Mustafa

Hypercholesterolemia is the chief risk aspect for causing coronary heart ailments. Food has significant potential in managing this life threatening condition. Turmeric and its bioactive component, curcumin have therapeutic effect against hypercholesterolemia. In this study turmeric and its extract were evaluated for its hypocholesterolemic effect in high cholesterol induced rats for thirty days. For this purpose, extract of turmeric powder were assessed for total phenolic, total flavonoid and its antioxidant potential via screening tests like DPPH and FRAP assay. At the end of the study turmeric extract(conventional solvent extraction) and turmeric extract (supercritical fluid extraction) administered rats were kept fasted overnight and then they were analyzed for their serum lipid profile including HDL, LDL and triglycerides and total cholesterol and obtained data was subjected to statistical analysis. According to the analysis TPC (743.10 ± 8.19mg GAE/100g), TFC (75.14± 4.12 mg/g), DPPH (65.10± 1.03%) and FRAP (191.61 ± 4.1 uMFe^{2+}/g) showed their maximum values at 90% methanolic extract in conventional solvent extraction and Supercritical Fluid Extraction showed its maximum value at 4000psi regarding pressure factor. HDL(36.733 ± 2.195 mg/dL), LDL (74.825 ± 3.905 mg/dL), TG(74.825 ± 3.905 mg/dL) and TC (218.94 ± 13.345 mg/dL) showed decreased values at thirtieth day of study period as compared to start of study, showing positive effects in supercritical extract fed rats. Showing turmeric extract has beneficial effects in reducing cholesterol values.

Discovery, 2018, 54(275), 423-431

ENVIRONMENTAL SCIENCE

Harmattan wind and its potential for electricity generation in Northeastern Nigeria

Luka Fitto Buba, Nura Umar Kura, Dantata Danlami, John Bathrobas Dakagan

The paper seeks to examine the spatial and the temporal variations of surface winds over Northeastern Nigeria and their potential for energy generation. Wind data for six (6) synoptic stations located in northeastern Nigeria were obtained from the Nigerian Meteorological Agency (NIMET). The stations; Nguru, Maiduguri, Potiskum, Gombe, Bauchi and Yola are well distributed across the region. Descriptive statistics - mean, standard deviation and coefficient of variation - were used in analyzing the data. In addition, inferential statistics - time series analysis and regression were also used to provide further insight into the temporal and spatial characteristics of surface wind over the study area. The study found surface wind to vary over time and space. It was also observed that the North-east trade wind plays a key role in influencing the variations of Harmattan season climatic elements especially surface wind flow; because it is the driver of the season and is controlled by the movements of the Inter Tropical Discontinuity (ITD). Latitude has also demonstrated a great deal of influence on the variations of climatic parameters in the region. Accurate documentation of surface wind characteristics over the study area help in the determining the specification of suitable wind turbines for various locations.

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Impairment of cardiovascular function indices in male rats induced by aluminium-tainted water: Atherogenic indices and predictor ratio assessment

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Cardiovascular disease (CVD) is globally increasingly becoming public health concern. There is increasingly growing evidence that exposure to metal pollutants are risk factors that disturbs lipid metabolism with increase risk for CVD. The present work aimed to undertake to evaluate the toxicity of aluminium chloride - tainted drinking water ($AlCl_3$) on lipid profile in male wistar rats in assessing cardiovascular risk by using atherogenic indices and prediction ratio. Fifty male wistar rats were randomly assigned to five groups of 10 rats each. Control group was given normal drinking water whilst $AlCl_3$ treated groups received 200-800mg/kg $AlCl_3$ orally once daily for 28 days. Thereafter, blood samples were collected for lipid profile analysis. Atherogenic indices like Castelli's Risk Index (CRI), Atherogenic Index of Plasma (AIP), and Atherogenic Coefficient (AC), lipid ratios and predictor ratios were calculated. Overall, the estimated atherogenic indices- CR1-11, AC and CRI-1, the ratios TG/HDL-c, TC-HDL-c/HDL-c, TC/HDL-c and low HDL-c/LDL-c, rose strongly dose-dependently approximately and significantly different determine cardiovascular risk in rats by $AlCl_3$. Predictor ratio however, revealed that AIP did not significantly impact the risk of cardiovascular disease in rats. In conclusion, exposure to $AlCl_3$ elicited concurrently dose-response proliferation of both dyslipidaemia and atherogenic indices differentially with resultant deleterious effect in cardiovascular cells and tissues in rats. AIP may not be an independent factor in $AlCl_3$ impacting the risk of CVD in rats. These might be the various possible mechanisms of aluminium toxicity in male rat cardiovascular risk.

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