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CONTENTS

Rural Development Technology

This research focuses on effect of hydrogen sulphide treatment (control, 0.5, 1.0, 1.5 mM) during ambient storage on sugar spot, decay loss and postharvest quality of banana fruit. Hydrogen sulphide (H_2S) treated fruit were stored at ambient conditions ($25\pm2°C$ and 60–65% of relative humidity) up to 9 days. In general, H_2S treatment maintained higher values of lightness, peel firmness, reduce the respiration rate and ethylene evolution rate and extended shelf life of stored fruit by delaying progression of ripening. Moreover, H2S (1.0 mM) was found significantly better over other treatments in reducing sugar spot or peel browning spot and maintaining the desirable overall postharvest traits of the fruit. The findings indicated that H_2S has a great potential for pre-storage application to preserve quality, reduce sugar spot and postharvest decay loss, possibly through the delayed onset of senescence, without any adverse effects on fruit quality.

Myat Su-Mon[1], Ram Asrey[2]*, Uma Prajapati[2]
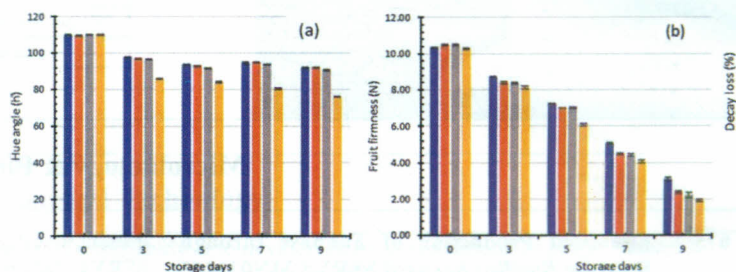
The present research was done for the selected minor millets viz. barnyard (*Echinola esculenta*), Kodo (*Paspalum scrobiculatum*), and little millets (*Panicum sumatrense*). The physical and engineering properties were evaluated at a moisture content of 10–11%, (dry basis) for whole and hulled millets. Significant improvement in the physical properties of the millets was observed for the hulled millets. The hulled millets showed higher sphericity (0.68–0.86) and exhibited a decrease in whole grains' spatial dimensions. The analysis (Gravimetric properties, frictional properties, Aerodynamic properties) was conducted for both whole and hulled millets. In frictional properties, mild steel surface showed the highest angle of static friction (9.78–17.96°) with smooth-rolling. The hulling has shown an improvement in all the physical and engineering properties of millets. In the color values, the whiteness index was improved for hulled millets. In the mechanical property of grains, resistance to crushing was expressed in terms of hardness.

**Abhishek Gaurav, Rama Chandra Pradhan and Sabyasachi Mishra**

CONTENTS
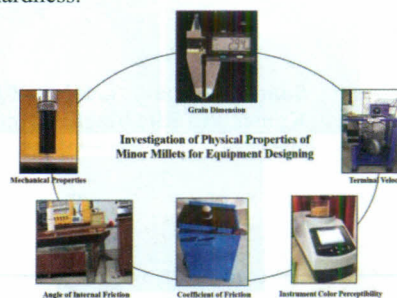
Electrical Engineering

This article proposes Adaptive Neuro Fuzzy Inference System (ANFIS) based control scheme for dual use of the grid-connected solar photovoltaic (PV) system as the active power source when irradiance is high and as static compensator (STATCOM) for reactive power compensation to the grid when the irradiance level is inadequate. This way the strategy results in optimal utilization of the converter circuit of the solar PV. Thus, the dual use of solar PV system brings in additional advantages in terms of enhanced power transmission capability of the grid. To examine the efficacy of the proposed control strategy, the system is modeled and analysed in using MATLAB/Simulink tool and also validated over real-time simulator (OPAL-RT-OP5700).
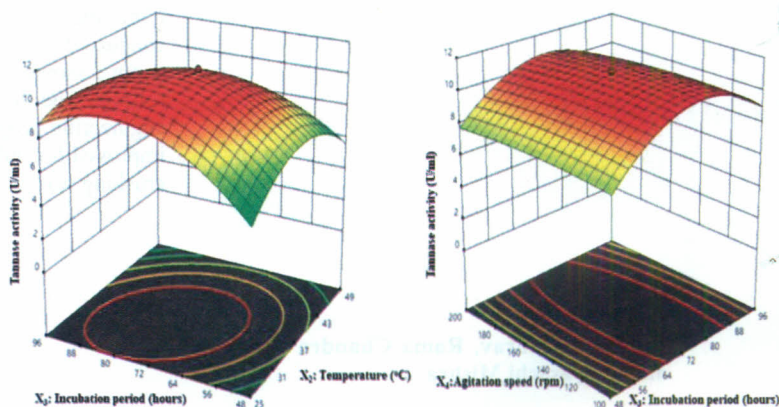
Naveen Gira and Anil Kumar Dahiya
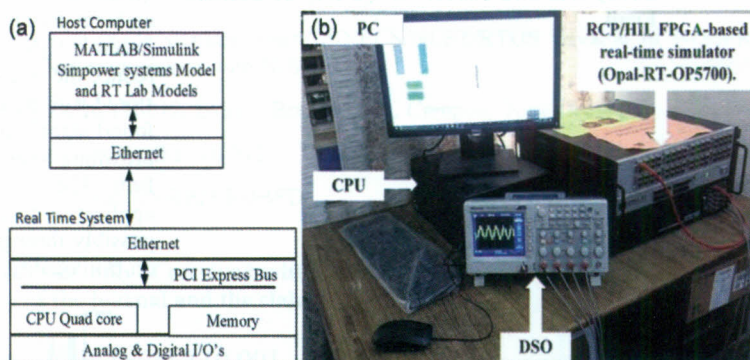
Microbiology & Biotechnology

Present investigation reports enhanced production of tannase by *Bacillus haynesii* SSRY4 MN031245 through application of Response Surface Methodology (RSM). Central Composite Design (CCD) of RSM was employed to determine the most important factors contributing to enzyme production and their interactions were analysed through graph models. Optimum production of enzyme (11.19 U/mL) was achieved at pH 5.5, temperature 37°C, incubation period 72 hours and agitation speed of 150.0 rpm. The statistically optimized values of variables enhanced the tannase production by 2.49 folds.

**Sunny Dhiman, Gunjan Mukherjee, Anu Kumar and Rita Singh Majumdar**

CONTENTS

Nanotechnology

The study is the first report on Molybdenum nanoparticles synthesis using wood apple shell extract. Molybdenum nanoparticles or nanopowder are black high surface area particles. The Molybdenum nanoparticle was synthesised using *Wood Apple* shell extract through calcination process. The characterization of synthesized Molybdenum nanoparticles was done using UV Visible spectroscopy, Fourier Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscopy (SEM). The UV-Visible spectroscopic analysis showed maximum absorption peak at 260 nm. The observed spectrum of FTIR analysis shows distinct bands at 2735.29 cm^{-1}, 2396.44 cm^{-1}, 1763.99 cm^{-1}, 1383.79 cm^{-1}, 875.15 cm^{-1} and 825.74 cm^{-1}. In SEM study the shape of Molybdenum nanoparticles was found to be spherical. The antibacterial activity of Molybdenum nanoparticles is studied against Gram positive and Gram negative broth cultures and highest inhibitory effect was observed for Gram negative bacteria *Proteus mirabilis* and *Klebsiella pneumonia*. These findings confirm that the Molybdenum nanoparticle has complimentary potential to treat various bacterial infections like Urinary tract infection, Blood stream infections and Meningitis.
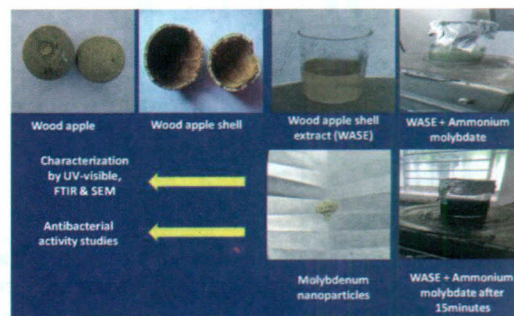
Chemical Technology

The aim of this study is to develop stable formulations of ginger oleoresin using microencapsulation and emulsification technology. The advantage of encapsulation is that the formulations are water soluble unlike the oleoresin; which helps in reducing the use of solvents and promotes the use of natural product and widens its application range. The wall materials like polyvinylpyrrolidone (PVP) and maltodextrin (MD) showed the maximum encapsulation efficiency of 81.043%. The flow properties of microencapsulated powder were studied by analyzing the compressibility index and Hausner ratio for different combination of wall materials. The optimization of microemulsion was studied using pseudo-ternary phase diagram and the microemulsion with the maximum area was found in 3:1 (Surfactant: Co-Surfactant) ratio of Tween80-Propylene Glycol with caprylic-capric triglycerides as the oil phase and rest is the water phase. The ginger oleoresin diffusion study was carried out using Franz diffusion cell to study the active permeability, and stability of the formulations.
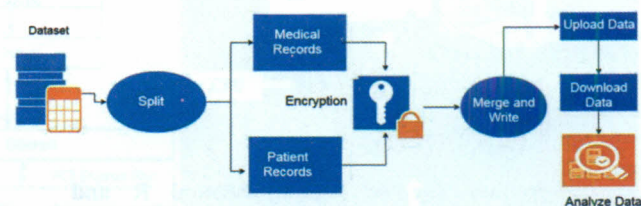

Staphylococcus aures   *Escherichia coli*

Aspergillus niger

CONTENTS
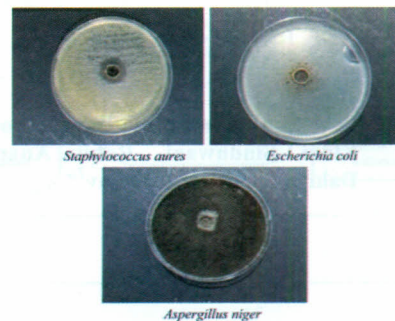
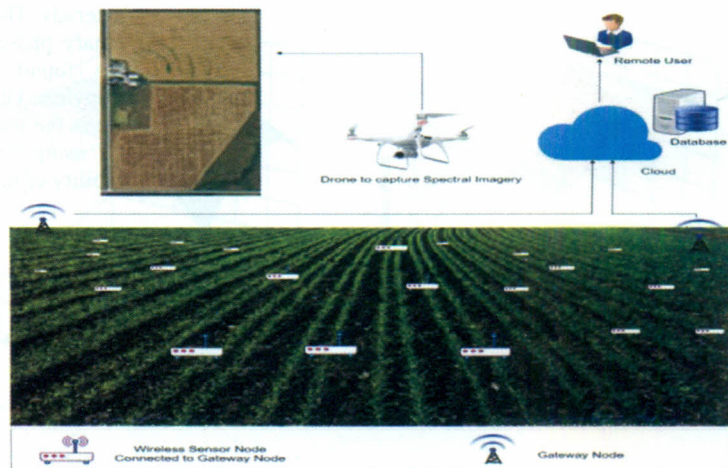## Computer Science & Information Technology

Cloud computing has emerged as a vibrant part of today's modern world, providing computer services such as data storage, managing and processing via the internet. For the most part, cloud applications emphasize a multi-tenant structure to provide support for several customers in a single instance. A multi-tenancy situation involving the allocation of resources in cloud storage and the risks associated with it, in which confidentiality or integrity may be compromised. Homomorphic encryption is one such technique which guarantees to franchise in safeguarding information under cryptographic domain. The proposed modified Algebra Homomorphic Encryption scheme based on updated ElGamal (AHEE) encryption scheme is designed in such a way that the cloud administrators do not obtain any information about the medical data. This scheme is quantitatively evaluated using metrics such as encryption time and decryption time. The experimental results using UCI Machine Learning Repository ECG data set show that the proposed scheme achieved shorter encryption time of 6.61 ms and decryption time of 5.94 ms and also analyze this secured datum using big data analytics.

Naresh Sammeta and Latha Parthiban

The crop diseases can't detected accurately by only analysing separate disease basis. Only with the help of making comprehensive analysis framework, users can get the predictions of most expected diseases. In this research, IOT and machine learning based technique capable of processing acquisition, analysis and detection of crop health information in the same platform is introduced. The proposed system supports distinguished services by monitoring crop and also managed its data, devices and models. This system also supports data sharing and communication with the help of IOT using unmanned aerial vehicle (UAV) and maintains high communication standards even in bad communication environment. Therefore, IOT and machine learning ensures the high accuracy of disease prediction in crop. The proposed integrated system is capable of detecting health of crop through analysis of multi-spectral images captured through the IOT associated UAV. The various machine learning is also applied to test the performance of our system and compared with the existing disease detection methods.

Rati Shukla, Gaurav Dubey, Pooja Malik, Nidhi Sindhwani, Rohit Anand, Aman Dahiya and Vikash Yadav[2]*

CONTENTS

By using the Type III Pearsonian system of distributions the image segmentation process was carried out in the current article which is a novel technique. With the help of K-component combination of Pearsonian Type III distribution, it is considered that the whole input images are characterized. The performance parameters PRI (Probabilistic Rand Index), GCE (Global Consistency Error) and VOI (Volume of Interest) for the currently considered model are estimated with the help of EM (Expectation Maximization) algorithm. For analyzing the proposed model's performance, four random images are selected as input for the current model from Berkeley image database. The performance metric parameters PRI, GCE and VOI values given the results as the currently proposed method is providing more précise results for the input images where the regions of the input images selected are with tiles having long upper model and the left skewed images. By the help of image quality measures, the proposed method is performing well for the purpose of retrieving the images with respect to the picture segmenting process which is based on GMM (Gaussian Mixture Model). The current model performance was compared with the other existing models like the k-means hierarchical clustering model and the 3-paprameter regression models.

P Chandra Sekhar, N Thirupathi Rao, Debnath Bhattacharyya and Tai-hoon Kim
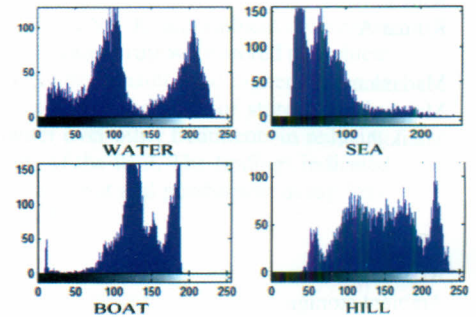
The present work compares three GIS-based machine learning techniques to predict the changes in landslide susceptibility patterns classified as low, moderate, and high from observed records. The state-of-the-art methods include Random Forest (RF), Support Vector Machine (SVM), and Multinomial Logistic Regression (MLR). The landslide inventory contains a total of 1239 locations, which are divided into three subsets for training, testing, and validation purposes. A total of seven influencing factors were selected to understand the relationship between selected factors and observed landslides. The models were compared using the Receiver Operating Characteristics (ROC) curve and other statistical measures, including accuracy, precision, recall, sensitivity, and specificity. The RF model outperformed with the highest training ($RF_{Accuracy}$=91%), testing ($RF_{Accuracy}$=88%), and validation ($RF_{Accuracy}$=86%) accuracy. The ROC values computed for the validation dataset for three models are 0.749, 0.734, and 0.874 for the MLR, SVM, and RF models respectively. The outcome of the present study could be instrumental for policy and decision-makers concerning risk planning and mitigation.

Poonam Kainthura and Neelam Sharma
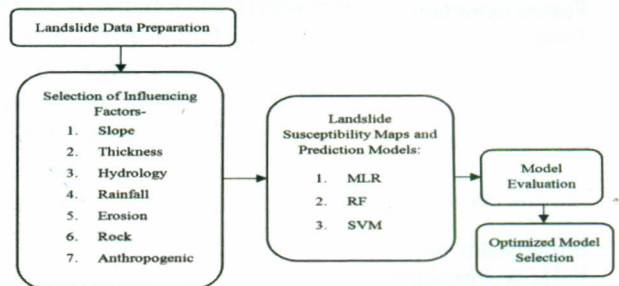
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