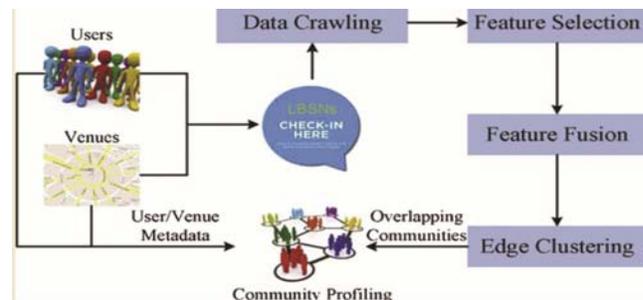


## CONTENTS

### Management & Information Technology

- 461 Efficiency Analysis of Carbon Emission Quotas** This paper analyzes the efficiency of carbon emissions under unexpected output conditions, using the epsilon-based measure of efficiency–data envelopment analysis model with integrated radial and non-radial characteristics, to calculate accurate efficiency values. By assessing China as a case study, taking gross domestic product and population as factors, the study calculates the carbon emission efficiency of all provinces and municipalities simultaneously to achieve fairness in resource allocation. Moreover, the Zero-Sum Gains Data Envelopment Analysis model is applied to optimize carbon emission quotas and establish a reasonable distribution plan. The results provide valuable guidance to policy makers toward formulating suitable energy saving and CO2 emission reduction policies.
- Lili Chen & Feng He**
- 465 Essential Implications of the Digital Transformation in Industry 4.0** Industry 4.0 represents the coming fourth industrial revolution, which will lead the way to the Internet of Things, Data and Services. To help industrial companies successfully become true digital enterprises in the Industry 4.0 era, this study aims to survey the essential implications of the digital transformation by conducting focus group discussions. Seven major implications for industrial companies are explored, and six critical issues are identified by experts. For anyone involved in digital transformation research and those seeking strategies to enter the global Industry 4.0 ecosystem, this study should offer some necessary fundamentals in terms of theoretical analysis and problem resolution.
- Ming-Xuan Lee, Yen-Chun Lee & C J Chou**
- 468 Relative Dimensionality of Feature Selection Based on Collective Behavior in Cluster Databases** Problem of clustering categorical data in social streams via link based cluster ensemble is being competitive with conventional algorithms. By observing these procedures conventional algorithms produce last information divided based on partial information. It is observed that individual behavior of each feature present in categorical data then cluster ensemble approach may fail due to insufficient analysis of feature selection in public web sites. Big amount of information producing day by day in public networks like Face book, Twitter, and YouTube present possibilities, difficulties peruse aggregate activities on a broad. Available goal is to grasp to estimate combined actions in public networking. In this system it is proposed to use an edge-centric grouping plan to get rare public measurements. With these rare public measurements, the proposed way can effectively manage systems of an incredible number of stars during indicating a similar forecast representation to other techniques of non-scalable. Our experimental results show efficient dimensionality selection in categorical data.

D Veeraiah & D Vasumathi



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**473 A Model for Accurate Prediction in GeoRSS Data Using Naive Bayes Classifier**

With new technologies emerging in collecting real-time data especially in earth sciences, the amount of data in terms of capacity and volume is growing rapidly. However, extracting relevant and useful knowledge from that data is vital. In addition, predicting an event depending on the set of features is equally important. One such method for predicting outcome from data is Naïve Bayes Classifier. In this paper, Naïve Bayes Classifier is applied on earthquake data which is available as RSS feed otherwise called as GeoRSS data. The GeoRSS can be mapped onto any GIS software for determining the area of interest. However, if the data is dense identifying a particular area of interest could be very cumbersome. Hence, there is a need for an efficient classifier to identify specific areas of interest from GeoRSS data. This paper proposes an efficient model using Naive Bayes Classifier to predict the outcome in GeoRSS data. It is proved that applying Naïve Bayes Classifier on a data set like GeoRSS, gave better accuracy for identifying an exact location of the earthquake with specific magnitude



**K Netti & Y Radhika**

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**S & T and Industrial Research**
**477 Kinetics of Cell Growth and Invertase Production by the Biotherapeutic Yeast, *Saccharomyces boulardii***

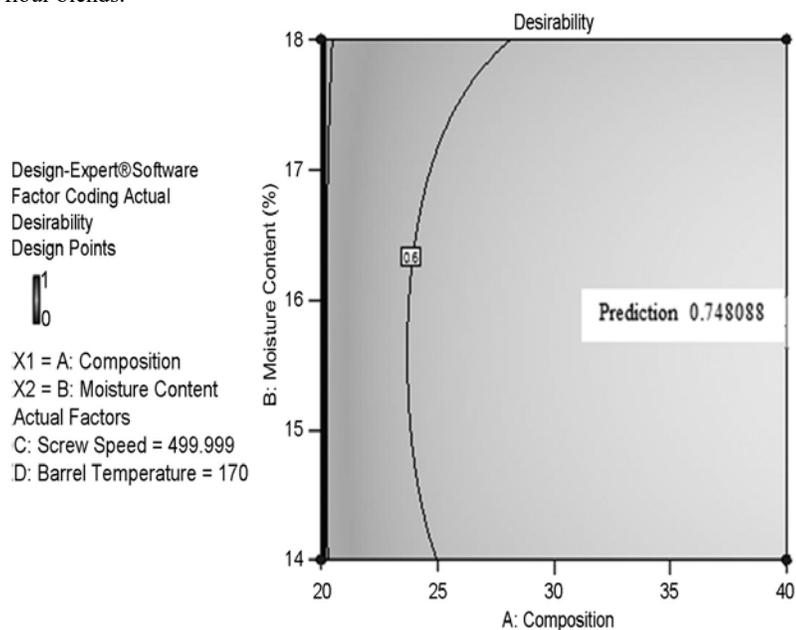
Invertase ( $\beta$ -D-fructofuranoside fructohydrolase; EC 3.2.1.26) is a highly glycosylated enzyme which hydrolyzes sucrose to glucose and fructose. Therefore, it finds many applications in food and feed industries. In addition, this enzyme become more attractive for its potential application in pharmaceutical industries based on its antimicrobial activities and its ability to reduce the side effects of cancer therapy. In this work, the biotherapeutic yeast *Saccharomyces boulardii* has been used as a potential biofactory for extracellular invertase production using semi-defind cultivation medium in different submerged cultivation systems. The initial results showed that the optimal sucrose concentration for invertase production was 30 g L<sup>-1</sup> which yielded volumetric enzyme production of 6540 U L<sup>-1</sup>. Further studies for bioprocess optimization were carried out in shake flask, bioreactor cultivations under uncontrolled and controlled pH conditions. The results clearly demonstrated that, scaling up of process from shake flask to bioreactor level increased volumetric enzyme production up to 8111 U L<sup>-1</sup>. However, this increase was due to the increase in biomass production (from 3.6 g L<sup>-1</sup> up to 4.4 g L<sup>-1</sup>) rather than cell productivity as both cultures showed almost the same specific enzyme production of about 1980 U g<sup>-1</sup>. Further improvement in the production process was achieved in pH-controlled bioreactor culture (pH 5.5). The maximal invertase production in the controlled culture was increased up to 14830 U L<sup>-1</sup> concomitant with a significant increase in biomass up to 7.5 g L<sup>-1</sup>. However, on calculating the specific growth rate, the specific enzyme production was about 2269 U g<sup>-1</sup>. Thus, we can conclude that the increase in invertase production in bioreactor under controlled pH condition was not only due to the increase in biomass but also due to the increase of cell productivity.

**H A El Enshasy & E A Elsayed**

## CONTENTS

485 **Twin Screw Extrusion Cooking of Lotus Rhizome and Broken Rice Flour Blends: A Response Surface Analysis**

Lotus rhizome supplementation increases the fibre content of starch based expanded snacks. Therefore, a systematic study was conducted for optimizing the blending level of Lotus rhizomes and broken rice flour for the production of expanded snacks through co-rotating twin screw extruder. Response surface methodology was used to study the effects of feed composition, feed moisture, screw speed and barrel temperature on specific mechanical energy, bulk density, water absorption index, water solubility index, expansion ratio and breaking strength whose values varied from 41.08 to 88.95 Wh/kg, 101 to 613 Kg/m<sup>3</sup>, 2.68 to 7.05 g/g, 4.54 to 8.41%, 1.76 to 3.98 and 61.6 to 212 N respectively. Response surface regression models were established to determine the responses as functions of process variables. Regression models for all the responses were highly significant ( $p < 0.01$ ) with high co-efficient of determination ( $R^2 > 0.95$ ). The compromised optimum conditions obtained by numerical optimization for development of extruded snacks were lotus rhizome flour to broken rice flour ratio (40:60), moisture content 15%, screw speed 500 rpm and die temperature 170°C. This paper therefore explores the optimization of processing conditions for the development fibre rich extruded food from lotus rhizome and broken rice flour blends.



S Z Hussain, F Ali, R Jabeen & I Zargar

494 **Effect of Indigenous Plant Extracts on the Incidence of Scirpophaga incertulas (Walker) (Lepidoptera: Pyralidae) in Kharif Rice Ecosystem**

The field evaluation was carried out to determine the efficacy of the plant extracts of eight plant species viz; Vitex trifolia (L.), Melia azedarach (L.), Acorus calamus (L.), Ageratum conyzoides (L.), Artemisia nilagirica (C. B. Clarke), Jatropha gossypifolia (L.), Kegelia pinnata (Dc.) and Lantana camara (L.) with cow-urine and commercial biopesticide Multineem against Scirpophaga incertulas on KD 2-6-3 variety of rice during Kharif season (2012-2013) in Manipur. Cow-urine + J. gossypifolia and Cow-urine + A. nilagirica extracts @7500ml/ha were recorded the least DH (0.97%) and WEH (0.87%) infestations, respectively. However, the highest DH (2.15%) and WEH (2.16%) were recorded from the plot treated with Cow-urine + K. pinnata extract@7500ml/ha over the control plots (4.94% of DH and 3.20% of WEH). The maximum grain yield (6.58 t/ha) was harvested from the plot treated with Cow-urine + A. nilagirica extract with highest cost benefit ratio (1:35.69). However, Multineem (Azadirachtin 300ppm) showed as lowest benefit (1:7.32) because of its less effectiveness and extra cost of insecticide. The bioactivity of A. nilagirica, J. gossypifolia and M. azedarach@7500ml/ha with cow-urine gave more benefit than the commercial plant product against S. incertulas and may be recommended at the agro-climatic conditions of Manipur.

S Yumnam, K I Singh & D C Ray

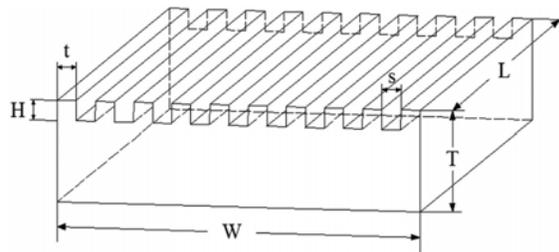
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**Energy and Environment**


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**501 Experimental Investigation of Natural Convective Heat Transfer Around Micro-fin Arrays**

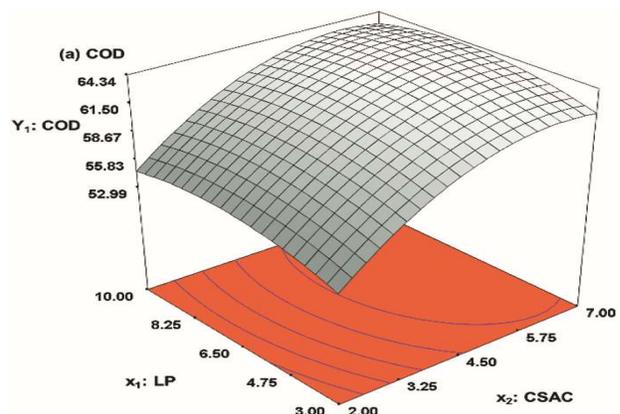
In recent years development of high speed computers leads to production of IC's with high performance which leads to more heat generation. With the available space and power, micro-scale natural convection plays a significant role in heat removal mechanism. Researchers worldwide extensively reported the natural convection in macro fin array and analyses on natural convection in micro fin array is not much well researched. This study experimentally investigates the effects of micro fin height and spacing on heat transfer coefficient of heat sink when operating under steady state natural convection conditions. The three different materials such as copper, aluminium and stainless steel were considered and micro fin array are fabricated on it through Wire Electro Discharge Machining (WEDM). Micro fin array with height of 0.25 mm and fin spacing ranging from 1.25 to 2.25 mm are fabricated on the test pieces. The study reveals that micro fin made up of copper shows the highest value for convective heat transfer co-efficient of 11.3 Wm-2K-1 for fin height of 0.25 mm and fin spacing of 2.25 mm.



R Thanigaivelan, D Deepa, T Mythili & R M Arunachalam

**506 Statistical Determination for Eco-Friendly Composite Adsorbent Preparation for the Removal of COD, Colour and Cu(II) from Textile Effluent**

This study evaluates the effect of preparation conditions for the production of eco-friendly composite adsorbent for the removal of COD, colour and Cu(II) from actual textile effluent by adsorption. The composite adsorbent was prepared by determining the optimum ratio of limestone powder (LP) and palm shell activated carbon (CSAC) as the precursors. Viscous gum (AG) which was extracted from brown seaweed (*Laminaria digitata*) was mixed with the precursors during the adsorbent preparation as the binding agent. From laboratory experimental and statistical analysis, the preparation condition of the composite adsorbent indicated that the models developed for COD, colour and Cu(II) removals showed higher coefficient of determination with more than 94% which reflects good agreement between calculated and the observed results. The findings also demonstrated that CSAC, LP and AG dosage had significant relationship towards parameters removal when tested with three dimensional plots. The optimization procedure revealed that 7 g CSAC, 3 g LP and alginate binder ratio of 2.49% (w/v) were the best preparation condition that could remove 81.10%, 83.60% and 79.50% of COD, colour and Cu(II), respectively.



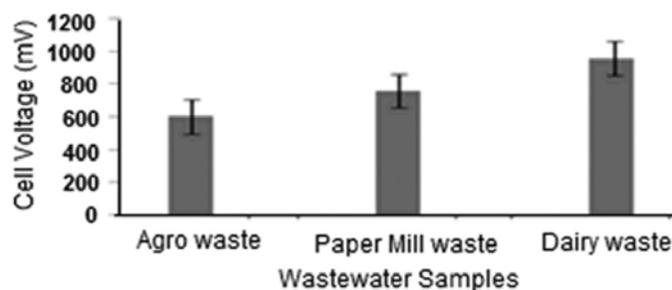
M A Kamaruddin, M S Yusoff, H A Aziz & R Alrozi

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**Short Communication**
**512 Generation of Electricity Using Non Mediated Microbial Fuel Cell by Utilizing Different Types of Wastewater**

The aim of the present investigation was to treat the pulp and paper mill, agro-waste and dairy wastewater by using Microbial fuel cell (MFC). Waste water served as an effective substrate for power generation by using microbial fuel cell as they are rich in organic content. In MFC, bacteria's were grown under anaerobic conditions. It had been observed that MFC gives a maximum of 957 mV after 10 days of operation when used with dairy waste water, while the cell using agro-waste functioned disappointingly to give a maximum of 601 mV as compare to other wastes. In case of paper mill waste a maximum of 758 mV was observed



P Singh, A Srivastava & N Srivastava

**515 An Innovative Integrated Jute Grading Instrument**

The quality parameters of jute fibres are key factors in its utilization and fixing the prices. During the marketing of jute fibre, price is usually fixed on the basis of rough subjective judgment of the fibre quality and the assessment of quality of fibre may vary from grader to grader. Six quality parameters of jute fibres are considered for the assessment of the quality and grading of fibres. These parameters are strength, root content, defects, fineness colour and bulk density. Grading of jute fibre by hand & eye method is very difficult for a farmer because there are different sub-groups for each parameter. So the growers are deprived by the purchaser due to their inability to grade the product. Therefore, keeping the interest of the farmers and traders in mind, an automated integrated jute grading instrument has been developed. This instrument is easy to operate and gives reliable results comparable to those obtained from the existing instruments.



G Roy, S C Saha, A Sarkar & G Sardar

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**Author-Reader Platform**
**519 Instructions to contributors**


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