

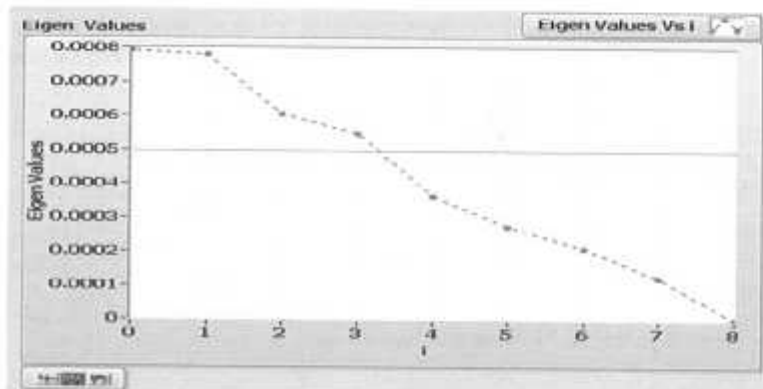
CONTENTS

Management & Information Technology

593 **RF Signal Sensing in a Wide Band Spectrum with SubNyquist Sampling for Cognitive Radio**

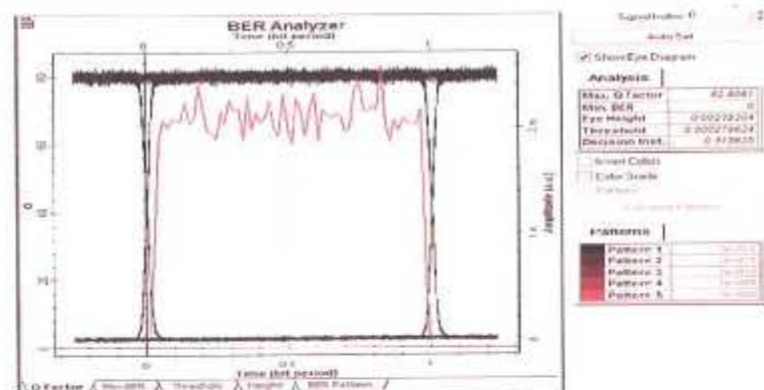
Current trend in Cognitive Radio (CR) technology demands that the CR system not only detects the occupancy of the spectrum to identify any available spectrum opportunity, but should achieve the same dynamically in real time, in order to efficiently exploit the opportunity while leaving the PUs undisturbed. This seemingly contradictory requirement, demands for the CR to have the capability to achieve reliable and quick sensing of the data over the entire spectrum, which the conventional methodologies operating at Nyquist rates cannot meet. Fortunately, the knowledge that the signal spectrum is generally sparse, compressed sensing techniques paves way for meeting the demands. In this paper, subNyquist sampling technique is employed to reduce the computational complexities, still retaining a high rate of probability of detection. This is achieved by computing the correlation matrix of a finite number of noisy samples, and Simplified MUSIC-like (SML) algorithm is adapted to identify the vacant and active cells of the wideband spectrum. The performance of this methodology is evaluated by computing the detection probabilities as a function of number of samples and the SNR of the randomly input signal. Simulation results show that the proposed sensing algorithm is reliable even at lower sampling rates and is robust against noisy (low SNR) environment.

K Chandrasekhar, Hamsapriye,
T G S Moorthy, S K Kumar &
V K Lakshmeesha



598 Maximizing Throughput of Free Space Optics Communication link with Array of Receivers

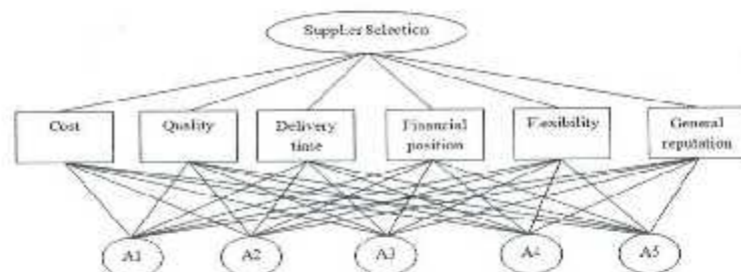
This paper analyse the integration of optical amplifiers and optical filters with free space optics link (FSO) for improving its performance. These components play a crucial role for enhancing and conserving pulse shape of transmitted signal. Different amplifiers and filters are critically investigated to improve the optical wireless link output. The high quality link is analysed to increase its acceptability in terms of bit error rate, Q factor and height of eye diagram. Further, the optimal combination of an amplifier and a filter is chosen so as to give the best output for a particular application of FSO. To further enhance the versatility of the designed optical link the performance of FSO link has also been analysed using array of receivers and under different weather conditions. After simulations it is found that the usage of specific filter – amplifier combination significantly improves the performance of FSO link.



A Gupta, Shaina & S Bakshi

604 Designing of Multi Criteria Decision Making Heuristic Model Based on Fuzzy Inference System Approach for Evaluating Raking of the Alternatives

This paper concerns with proposing a Fuzzy Inference System based expert system to breakthrough Multi Criteria Decision Making (MCDM) problem. Several approaches exist in the literature to objectively evaluate suppliers including fuzzy logic and total cost of the company. External purchase of products and services generally account for more savings can be realized by effectively selecting suppliers. In this study, we proposed a supplier selection analysis model considering Fuzzy Inference System technique is used for calculating the supplier ratings. The main objective of this study is to reduce procurement cost and develop closeness and long term relationship between buyer and suppliers in today's competitive scenario.



A K Rajak, M Niraj & S Kumar

S & T and Industrial Research

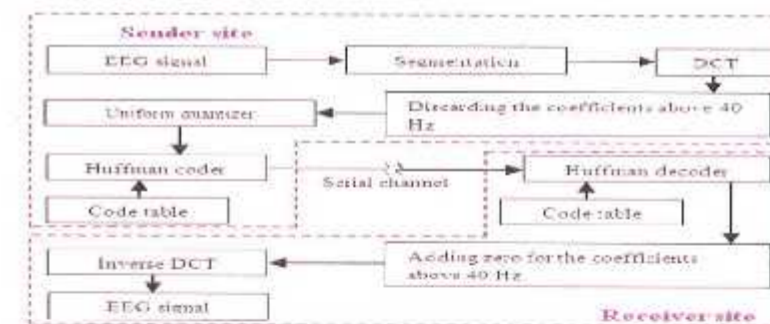
609 Bioprocess Development for β - and γ -rubromycin Production: A Human Telomerase Inhibitors, by *Streptomyces* sp. ADR1

Rubromycins are important group of antibiotic produced by actinomycetes. For many years this telomerase inhibitor anticancer bioactive compound was mainly produced by either microbes belongs to actinomycetes or by mean of chemical synthesis. In this work, we used a new thermotolerant rubromycins producer strain (*Streptomyces* sp. ADR1) isolated from Algerian desert. This strain was able to produce a mixture of rubromycins (β and γ), at relatively high concentrations. At first, the most suitable medium composition for production process was selected through screening of different medium used for secondary metabolites production by actinomycetes followed by complete studies on growth and production kinetics in shake flask level. At this stage, the maximal rubromycins production were 24.58 mg/L and 256 mg/L, for β -rubromycins and γ -rubromycins, respectively. After this step, cultivations were conducted in 16-l stirred tank bioreactor for further study the industrial potential of this process. The results showed that transferring the process from shake flask to bioreactor level and cultivation under non-oxygen limitation increased the volumetric production up to 27.41 mg/L, and 580.35 mg/L, for β -rubromycins and γ -rubromycins, respectively.

A Z Boumejira, R A Malek, N Z Othman, I Ware, S Ramli, K Malek, H Hacène & H A El-Enshasy

615 Lossless EEG Compression Using the DCT and the Huffman Coding

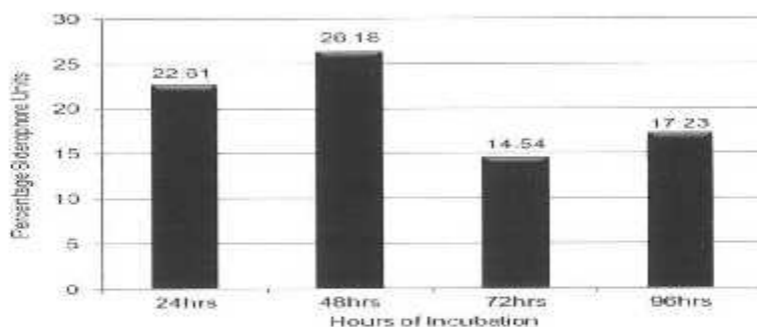
The telemedicine and ambulatory monitoring development motivates many researchers to focus on the lossless electroencephalogram (EEG) compression in recent years. Nevertheless, most of these studies could not present the potential of compression techniques such as discrete cosine transform (DCT), and Huffman coding due to lack of attention to the signal and technique characteristics. In this work, we developed a lossless hybrid EEG compression method based on the characteristic of DCT frequency spectrum and the Huffman coding. In our method, we calculate the DCT coefficients below 40 Hz (dominant components) of the EEG segments. Then, we code these quantized DCT coefficients using a Huffman coder in the transmitter site. In the receiver site, we add a zero set for the DCT coefficients above 40 Hz, and then reconstruct the EEG segments using the inverse DCT. We applied our method for the five sets (denoted A-E) of the Bonn University database. The results indicate that our algorithm can improve the average compression ratio of these sets up to 1.78, 1.94, 2.66, 3.35, and 1.78 times of the best results in the literature, respectively. Therefore, our hybrid method could compress the single-channel signal satisfactory enough.



R Y Karimu & S Azadi

621 **Optimization of Process Parameters for Siderophore Production Under Solid State Fermentation Using Polystyrene Beads as Inert Support**

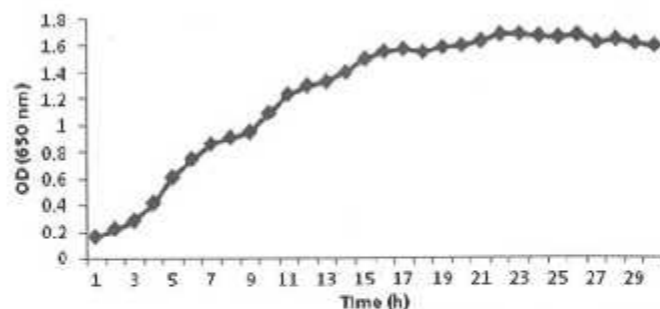
Kuttanad, commonly called the rice bowl of Kerala, is noted for its paddy cultivation well below sea level. Decrease in micro and macro nutrients is a common phenomenon in all agricultural lands and the micro-biota plays a major role in maintaining soil fertility of agrarian regions. Iron is one of the most common limiting trace elements in nature which is essential for the growth and metabolism of almost all living organisms. Deficiency of iron is primarily due to its poor solubility. Bacteria secrete iron chelating agents known as siderophores to absorb iron, which promotes plant growth. In the present study, soil and water samples from Kuttanad were screened for siderophore producing bacteria. Ten siderophore producing bacteria were isolated from the soil and water environments by primary screening. Secondary screening using Chrome Azurol Sulphonate agar was done to confirm siderophore producers. A *Pseudomonas* strain isolated from the soil was selected for siderophore production under solid state fermentation using polystyrene beads as inert support. Process parameters of the fermentation process along with additional carbon, nitrogen and amino acid sources were optimized so as to increase the production of siderophores. Succinate medium of pH 8, incubation temperature of 35°C and incubation time of 48 hours were proved optimum for siderophore production. 0.5% v/w glycerol, 0.5% w/w ammonium chloride and 2.5 % w/w L-asparagine were the carbon, nitrogen and amino acid sources which gave maximum siderophore production respectively. This is the first study of its kind and has tremendous potential for further research.



C N Prabhu & P Bindu

626 **Optimization of Simple Sugars and Process pH for Effective Biohydrogen Production Using Enterobacter Aerogens: An Experimental Study**

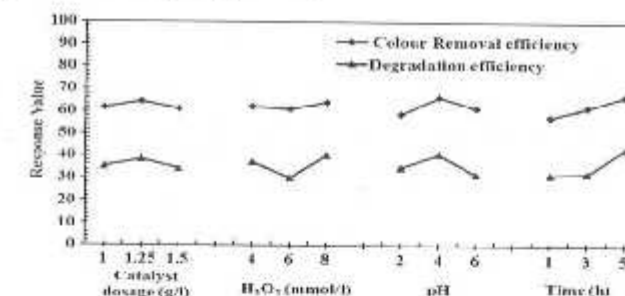
This communication presents the potential of process parameters including simple sugars and pH for biohydrogen production using facultative anaerobic bacteria *Enterobacter aerogens*. The obtained data was fit in the modified Gompertz equation and the regression coefficient (R^2) was found in the range of 0.998 which provides a strong correlation between the experimental data and the curve fit. The study revealed that glucose is the most compatible and cost effective substrate for biohydrogen production having yield of 0.87 mol H_2 /mol of glucose consumed. It is also found that there is a strong possibility to use sugar based organic substrate from residues and wastewater for clean energy products which are cost effective and environmental friendly.



V Kumar, R Kothari, V V Pathak & S K Tyagi

632 **Photocatalytic Degradation of Nitrobenzene and Azo Dye Using Zinc Oxide Nanoparticles Prepared by Electrochemical Method**

Photocatalytic degradation of nitrobenzene (NB) and an azo dye (namely azophloxine) was carried out using zinc oxide (ZnO) nanoparticles which were prepared by electrochemical method using zinc electrodes in aqueous oxalic acid solution. Taguchi methodology was applied for studying the effects of four experimental parameters namely catalyst dosage (g/l), time of reaction (h), pH and H_2O_2 dose. Degradation efficiency of NB was found to increase with an increase in H_2O_2 concentration and decrease in catalyst dosage and pH. Maximum NB degradation efficiency of 98% was observed at catalyst dosage=1 g/l, pH=3, H_2O_2 to $C_6H_5NO_2$ ratio of 7 mol/mol after 5 h of treatment. Similarly, maximum dye degradation efficiency of 58% and color removal efficiency of 78% was observed at catalyst dosage=1.25 g/l, pH=4, H_2O_2 concentration of 8 mmol/l in 5 h. Overall, prepared ZnO nanoparticles performed better for NB degradation in comparison to azo dye degradation.

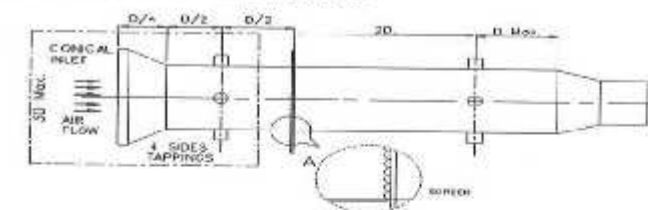


V Anand & V C Srivastava

Waste Utilization

638 **Computational Fluid Dynamics Modeling and Experimental Investigation of Waste Collection Blower**

Centrifugal fans play an important role in the proper functioning of cleaning the machine and fluffs collection for industrial traveling cleaner. In this research work, to standardize the Volute and fan for both cleaning and fluffs collection system, it is proposed to analyze the performance and design of radial and forward fan blowers for standardization with better performance. This study presents a design methodology to examine the performance of both fans using computational fluid dynamics approach. The effects of fan geometry at the inlet on performance of the fan have been assessed and the volute dimensions have been kept constant. Total discharge and total pressure are the output parameters calculated. The volute and fans were modeled using SolidWorks and prior to simplification the geometries of the blower models were meshed in ICEM CFD. Analysis is carried out and the solution is obtained using FLUENT V6. The post processing is carried out using CFD POST and the results are presented and discussed in detail. The results obtained were then validated using the experimental method for real application. Result showed that 21.6% Mass flow rate and 4.5% Total pressure increases in Radial fan blower.



C N Jayapragasan & K J Reddy

Author-Reader Platform

643 **Instructions to contributors**