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Journal of Scientific & Industrial Research

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Earth, Environment & Atmospheric Sciences

There is a growing interest in implementing sustainable technologies within reach of the population to cover the need for the rational energy consumption of refrigeration systems. Therefore, this work shows the design and simulation of a cooling chamber, which will be part of a vapor-compression solar cooling system, useful for the agro-industrial sector to conserve perishable products directly at the harvesting site. This portable system uses photovoltaic panels as a source of motive power. The above was developed from the knowledge of the fruit to be conserved for its modeling and subsequent simulation. In this case the fruit is guava. Also, a photovoltaic analysis was carried out. It is possible to obtain a cooling capacity for the chamber of 183.10 W and a heat loss of 6.85 W.

Daniel Silva Cruz, José de Jesús Pérez Bueno, José Abel Paredes, Arnulfo Terán López & Yunny Meas Vong
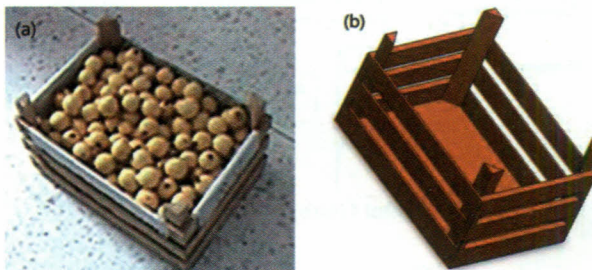
This study has dealt with synthesis of doped strontium hexaferrite / zero-valent iron nanocomposite ($SrFe_{12}O_{19}$/nZVI) and adsorption of Congo Red (CR) dye by the nanocomposite from aqueous solution was evaluated. The adsorbent was characterized using Fourier transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD) analysis and Scanning electron microscopy (SEM). Optimization of experimental conditions such as pH, initial concentration of pollutant, adsorbent weight, contact time, and temperature was done. Maximum removal efficiency was achieved at pH of 8.5, initial concentration of CR=20 μg mL^{-1}, adsorbent weight of 0.12 g with 15 min contact time and 25ºC temperature. Langmuir isotherm with R^2=0.9959 seems to have best fit to the CR adsorption results. Also, kinetic studies revealed that adsorption of CR was fitted to the pseudo-second-order model with R^2=0.9969. In addition, thermodynamic parameters were evaluated.

Shaghayegh Mehrjooyan, Mahmoud Reza Sohrabi & Saeid Mortazavinik

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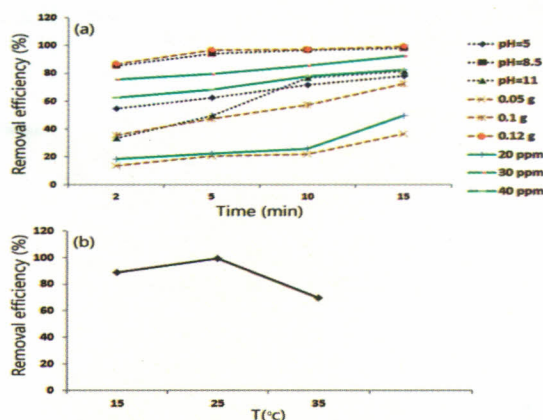
The characterization of the liquid produced from the co-cracking of Polypropylene extrusion grade (PPX) and Residual fuel oil (RFO) was carried out using analysis techniques like Gel Permeation chromatography (GPC), Ultimate analysis, Calorimetry analysis, Fourier-transform infrared spectroscopy (FTIR) analysis and Nuclear magnetic resonance (NMR) analysis technique. The resulting liquid from the co-cracking of the two feedstocks in presence of catalyst Zeolite Socony Mobil–5 (ZSM-5) was observed to have high calorific values of 44.084 MJ/Kg comparable to that of the commercial diesel and therefore has the potential to be used as source of renewable fuel.

Over the past decade presence of antibiotics in soil and water is a major environmental concern which needs to be address on a priority basis. The present study was done to evaluate the potential of basil (*Ocimum basilicum*) for phytoremediation. A greenhouse study was conducted for removal of tetracycline from soil. The plants were grown with 200 mgkg^{-1}, 400 mgkg^{-1}, and 600 mgkg^{-1} of tetracycline for four weeks. Accumulation of tetracycline in shoot and root was observed with HPTLC in plants. They showed a maximum of 97% remediation capability with 200 mgkg^{-1} of tetracycline treated plants. Secondary metabolites were lepoxygenase pathway products in stress condition. The same were analyzed by GCMS. Alpha-terpineol and methyl acetate completely degraded in all samples, while they were present in plants grown without tetracycline.
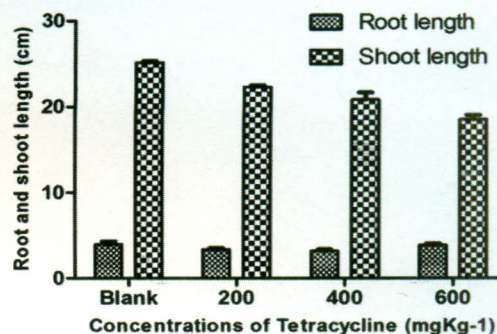

Nanotechnology

Nanotechnology is a multidisciplinary science and its popularity is increasing day by day. Nanotechnology could be applied to processing of many materials. Textile is one of such applications. Textile products which are produced by nanotechnology are more functional and superior than other products. It can improve material finishing, product processing or yarn production. Some examples of Nanotechnology mediated improvement are high strength and electrical properties. Polymer matrix nanocomposites are suitable for textile industry applications. For last several years lots of studies have focused on polymer matrix nanocomposites. Polypropylene (PP) is example of one of the polymers, being engaged for such purpose. Polypropylene fibers have high mechanical strength and light weight with widespread usage starting from automatives to packaging.
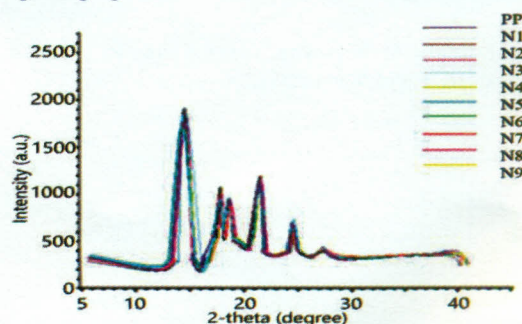
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Civil Engineering

Pipeline networks are the most efficient means for transporting large quantities of oil and gas through large distances. These pipelines cross different geographical terrains and are subjected to different manmade and natural hazards. Also these pipelines are prone to failures due to aging. Leakage in pipelines, particularly those carrying fuels is very dangerous as it leads to environmental pollution and also fatal accidents. The pipeline infrastructure industry has seen extensive growth in the recent years and hence there is a huge necessity for the development of real time pipeline monitoring technologies for reliable and safe operation of pipeline networks. Presently, health assessment and real time monitoring is gaining popularity among the researchers as it provides quality information on the performance of complex systems during its operation. There are different types of technologies developed for real time monitoring of pipelines using distributed fiber optic sensors, acoustic emission techniques and guided wave techniques. This paper presents in detail the theory of brillouin based distributed optical.

Arun Sundaram B, S Parivallal & K Kesavan
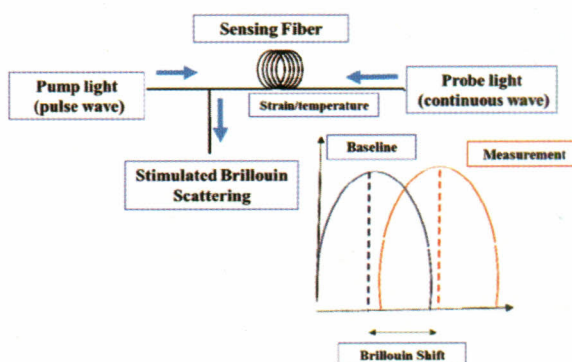
Microbiology and Biotechnology

Technology forecasting research is an indispensable means to master the development trend of technology and provide decision support for scientific research management. For patent documents, it does not provide keyword information, which makes the keyword based technology prediction method have some limitations in revealing research content and hidden topics in specific fields. In order to better reflect the technical information in the patent, this paper combines topic analysis and social network analysis to study the development trends of gene editing technology. First, the patent data of gene editing technology is collected from Derwent Innovations Index. Secondly, text mining software is adopted to draw a network graph of topic words, combined with Inverse Document Frequency (IDF) to construct a weighted adjacency matrix, and Social Network Analysis is used to obtain the degree of centrality of technical topic words.

**Jia Liu, Jiaqi Wei & Yuqin Liu**

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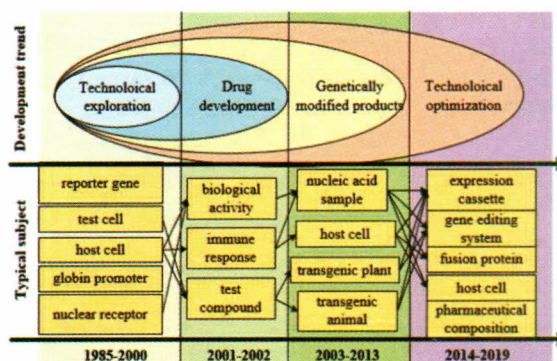
Electronics & Telecommunication

The present study aims at identifying the brain response for auditory/visual stimuli in typically developing (TD) and children with autism through electroencephalography (EEG). Early diagnoses do help in customized training and progressing the children in regular stream. To reveal the underlying brain dynamics, non-linear analysis was employed. In the current study, Recurrent Quantification Analysis (RQA) with varying parameters was analyzed. For better information retrieval, cosine distance metric is additionally considered for analysis and compared with other distance metrics in RQA. Each computational combination of RQA is measured and the responding channels were analyzed and discussed. It was observed that the FAN neighborhood with cosine distance parameters was able to discriminate between ASD and TD prominently.

R Menaka, M Thanga Aarthy, Renuka Mahadev Chavan, R C Perumal & Mahima S Menon
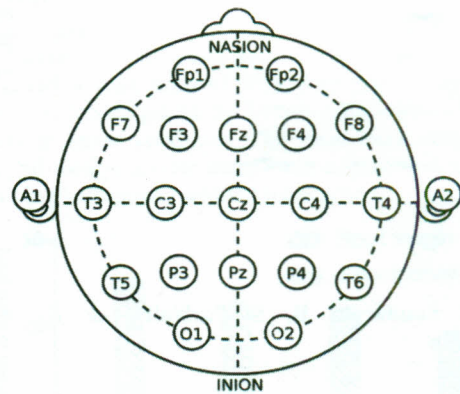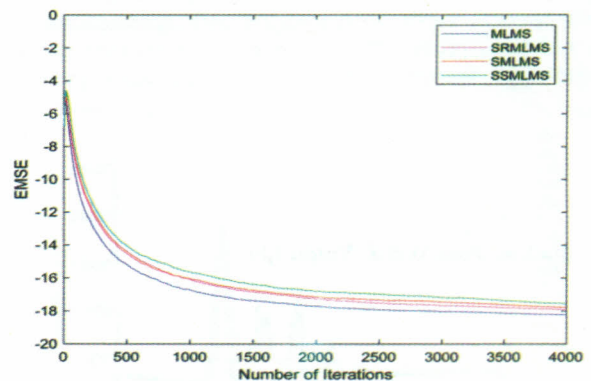
Computer Science & Information Technology

Wearable wireless sensors play a vital role in healthcare applications to connect remote patients with the hospital. Generally, wearable devices are used for monitoring, diagnosing, and treating various medical conditions. In this paper authors propose a novel energy detection scheme for spectrum allotment to a medical telemetry network. By using medical body area networks, we can improve remote patient monitoring as well as facilitating immediate response from the service provider. Further, we also outline the challenges of implementing spectrum sensing for body sensor networks. In this work, spectrum sensing using energy detection is used for developing medical telemetry networks. The proposed Normalized Median Least Mean Square (NMLMS) algorithm with sign regressor operation also solves the problem of complexity of circuit in basic spectrum sensing using energy detection phenomenon.

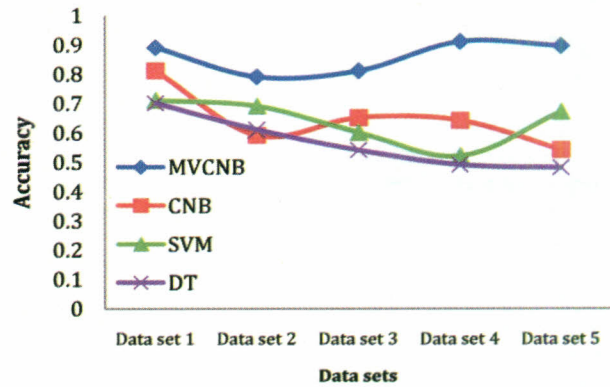**S Surekha, Md Zia Ur Rahman & Navarun Gupta**

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Data Mining Techniques has attained its momentum in several areas, and its efficient performance in decision support has outperformed and made it a reliable choice. The medical world is one such empirical domain in which a perfect decision at right time would turn out to be a lifesaver. Medical data figures out to be majorly multi-dimensional, where relevant feature extraction is a challenging factor. Several classification approaches like SVM, Decision Trees, and Naive Based are considered to handle these profound challenges. One such challenge discussed in our paper emphasizing on Medical decision support system with Machine Learning (ML) Methodology considering diseases and treatments with their semantic relations in the document of Pub med abstracts. The proposed Multi variant classification framework aims at reducing data into attributes using PCA Transformation infusion with an efficient classification Algorithm - CNB.

M   Supriya   Menon   &   Pothuraju Rajarajeswari

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