Food allergy — how much of a problem really is this in India?

S V Gangal & B K Malik

Food allergy affects 1-2 per cent of the whole population. However, its prevalence in children is quite high. Food hypersensitivity is an immunological reaction resulting from the ingestion of a food. This reaction occurs only in some patients when only a minute quantity of the substance is ingested. The reaction can be mild, moderate or severe, leading to anaphylaxis and sudden death. IgE mediated reaction accounts for most of the well-characterized food allergic reactions although non-IgE mediated immune response is also seen occasionally.

Perceptions of participating scientists on international R&D collaborations

M K D Rao

The perceptions of Indian scientists on their experience in the overseas R&D collaborations, in a public-funded physics laboratory, are collected through a questionnaire-cum interview schedule. The role of international collaboration, the difficulties faced, the outcome of partnerships, the lessons learnt for best practice, and suggested mechanisms of strengthening bilateral S&T cooperation are discussed. The study also seeks answer to the vital questions, what managerial variables impinge on the success of international R&D collaborative projects? Are all collaborative projects subject so same set of success factors? The paper concludes that in order to increase the appetite of the scientists for international collaboration, provision of defined budget for travel, equipments, and contingencies, improvement in procedural requirements, and, development of comprehensive monitoring system are required.

Modelling for the pressure field calculation in acoustic cavity

S Chakraverty & S K Panigrahi

Describes an efficient methodology for the solution of acoustic pressure field inside a rectangular enclosure. The developed method of boundary characteristic orthogonal polynomials is used to model the problem and the usefulness of the method is discussed by obtaining simple expression for the sound field. The pressure field calculation is given in terms of 3-D analysis.
Predicting effective mass transfer area in randomly-packed column — design considerations

Describes the performance of a randomly packed distillation column depending on the effective vapor-liquid interfacial area \((a_e)\) and the flood ratio (per cent \(F_l\)) estimated by the Eckert flooding model. Capacity, pressure gradient, and efficiency data obtained on 6.25 mm size of a Raschig-type ceramic ring are used to establish the basis for the model reliability analysis. The reliability of design models is analyzed against observed performance statistically by using a log-ratio objective function. Details underlying some aspects of selection of an appropriate packed column design algorithm are discussed. An example of scaling-up a pilot-plant with respect to the resulting statistical factors is elucidated. Finally, an approach to design in terms of the derivatives of the function \(a_e = f(\text{per cent } F_l)\) is interpreted analytically.

Studies on solar drying of two liquid biowastes

Deviations from the usual practice, solar drying of liquid materials is attempted. Liquid wastes like starch water and mature coconut water are subjected to solar drying. Apart from bringing it to a dried form, more importance is given to bring a reuse from these dried materials. This option of reuse minimizes pollution and brings about effective waste management. Energy content of the dried materials is also calculated. But the recovery obtained after drying is in small quantity and drying needs a large surface area. Dried mature coconut water is used as an additive in culture media for orchid seed germination studies in Spathoglottis plicata. It is found that incorporating the mature coconut water concentrate in the culture medium enhances the seed germination percentage.
Composites of SBR — a comparative study using inert fillers

D G Hundiwale, U R Kapadi, M C Desai, A G Patil & S H Bidkar

Evaluation of properties of fibres extracted from certain weeds for use in paper and cordage industries

T Goswami & C N Saikia

Influence of zeolite on the mineralogical properties of autoclaved aerated concrete

Mustafa Albayrak & Turhan Ayyildiz
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Papers

813 Treatment and decolourisation of an azo dye in industrial effluent

The electrochemical behaviour of Orange II is studied voltammetrically using Pt foil and steel foil as working electrodes, while Pt wire and Ag/AgCl are used as auxiliary and reference electrodes, respectively. Controlled potential electrolysis is carried out at -1.20 V. The decrease in cathodic peak and peak current lead to decolourisation of solution ($2 \times 10^{-4}$ M) with a significant decrease in COD from 1840 to 174 mg/l. Orange II is found to yield a mixture of sulphamic acid and 1-amino-2-naphthol upon electrochemical reduction. Based on voltammetric and spectrophotometric analysis, rate of the reaction determined and found to be of first order.

Rajeev Jain, Meenakshi Bhargava & Nidhi Sharma

820 Effect of compounding ingredients on rheometric characteristics and physical properties of a rubber based shoe sole

The effects of base polymer and filler types like, NR, NR/SBR, NR/SBR/NR blends, Hind clay and SRF N770 fillers and their dosage on rheometric and physical properties of a shoe sole compound are studied. In addition to hardness, other related important properties of the shoe sole like, tensile strength, modulus at 100 per cent strain, abrasion resistance, cut growth resistance up to 300 per cent, elongation at break are also measured for the vulcanizates. The curing characteristics of the vulcanizates are determined by using a Monsanto MDR 2000 rheometer. The economic validity of the different formulations is also evaluated.

N Karak & M Roy

827 Seasonal variation of PM10 and SPM levels in ambient air around a cement plant

Monitoring of PM10 and SPM levels in ambient air from stack emissions is observed. PM10 and SPM levels are found to be in the range 84-222 μg/m³ (PM10) and 174-473 μg/m³ (SPM) in post-rainy season; 150-480 μg/m³ (PM10) and 551-1120 μg/m³ (SPM) in winter season; and 110-460 μg/m³ (PM10) and 365-978 μg/m³ (SPM) in the summer season, respectively, in downwind direction. Smaller values of such emissions are obtained in sites of upwind direction. Ratios of PM10 to SPM and correlation coefficient values between PM10 and SPM are also worked out. A positive correlation coefficient is obtained between PM10 and SPM. Order of occurrences of PM10 and SPM in downwind direction in all three seasons is found to be winter > summer > post-rainy.

Rajnikant Sharma & Shamsh Pervez
Extraction and separation of Pt(IV) and Pd(II) is carried out with Cyanex 923 in chloride media. Pt(IV) is quantitatively extracted from 3.0-8.0 M HCl in the presence of 0.01 M SnCl₂ while Pd(II) from 4.0-5.0 M HCl with $5 \times 10^{-3}$ M Cyanex 923 in toluene. Pt(IV) is then quantitatively stripped from the organic phase with 5.0 M HNO₃ while Pd(II) is quantitatively stripped with 1:1 HCl + HClO₄ in single step and also with 7.0 M HClO₄ in two steps. Pt(IV) is also extracted without using SnCl₂ as a labilising agent with 0.1 M Cyanex in toluene at 2.0-3.0 M HCl. Separation of Pt(IV) and Pd(II) is observed in various ratios. The methods developed are applied to the recovery of these metal ions from a synthetic solution of similar composition to that of leaching of spent autocatalysts in 6.0 M HCl.

Study focuses on dispersion and transportation phenomenon of ambient particulates around an integrated steel plant. The dispersion and transportation of emitted particulate matter is greatly affected by various meteorological conditions such as, wind speed, relative humidity, wind direction, and temperature. Ambient air monitoring for levels of particulate matter in the vicinity of an integrated steel plant located in southeastern Chattisgarh is carried out. The specific objectives are the determination of spatial and seasonal variability of levels of ambient particulates and their relationship with the selected meteorological parameters such as, relative humidity (RH) and wind velocity (WV). Samples are collected in post-rainy, winter and summer seasons of the year September 2000 – June 2001. The results show a marked seasonal trend and spatial variability of ambient particulate levels in the study area, which is highest in winter and lowest in summer. Seasonal variation in transportation pattern of PM₁₀ (particulate matter, aerodynamic diam ≤ 10 μm) and SPM is also observed. Ratios of PM₁₀ to SPM and Pearson correlation coefficient values between both sizes of particulate matter and with selected meteorological parameters are also worked out. Relative humidity and wind velocity have shown an inverse relation with particulate deposition pattern.
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