

In this issue

CFD modelling of solid suspension in stirred tanks

Solid suspension and mixing are crucial in many important processes, including multiphase catalytic reactions, crystallization, precipitation, etc. In recent years, various efforts have been made to numerically simulate solid-liquid flows in stirred vessels using Computational Fluid Dynamics (CFD). Sardeshpande and Ranade (**page 1539**) present a brief account of their group's efforts of developing and using CFD models for simulating solid suspension in stirred tanks. Development of computational models and comparison of the simulated results with the experimental data (their own as well as published) are presented. Efforts of developing appropriate sub-models for capturing influence of the prevailing turbulence and solid volume fraction on effective inter-phase coupling terms are discussed. Some unique aspects like hysteresis in variation of height of cloud of suspended solids with impeller rotational speed and dynamic settling of solid cloud by sudden stoppage of impeller are discussed. These results will be useful for realizing better solid suspension at lower effective power consumption and for better evaluation of CFD models. The approach, models and results presented here will be useful for extending applications of CFD models for simulating industrial stirred slurry

reactors as well as further research in the field.

IgG2 subclass isotype antibody and intrauterine infections

Foetal health is still a major concern across the globe largely due to intrauterine infections, during the period in which the foetus is dependent almost solely on the passive immunity conferred on it by the mother's immune system. The antigens of the microbes are polysaccharide in nature and the humoral immune response to these is predominantly of IgG2 subclass. Paradoxically, unlike the other three subclasses of IgG, the IgG2 type cannot cross the placenta efficiently, therefore, infections persist and may lead to serious conditions like miscarriage and stillbirth. Syal and Karande describe (**page 1534**) in brief the properties of the IgG subclasses, the common intrauterine infections seen during pregnancy and discuss the possible strategies to afford protection to the foetus.

Antibiotics and diatom communities – exploring the linkages

Antibiotics are one of the most commonly known and widely used microbial products. The scope of use of antibiotics has also widened; they are now used in medicine, veterinary sciences, animal husbandry, aquaculture, horticulture, etc. The resulting

persistence of antibiotics in the environment has led to an increase in the number of studies exploring the effect of antibiotics on non-target organisms. However, most studies on these aspects are limited to bacteria and do not consider other trophic level organisms that are closely linked with bacteria. For example, diatoms, primary producers in aquatic environments, that are closely linked with bacteria, and play important roles in supporting the base of food webs. The study by D'Costa and Anil (**page 1552**) aims to fill this gap and focuses on the effects of three antibiotics (penicillin, streptomycin and chloramphenicol) on diatom communities. This study is especially relevant in view of the diverse ecological roles of antibiotics, ranging from defensive to signalling functions. Characteristic shifts in diatom communities were observed in the antibiotic treatments. These changes were influenced by the mode of action of the antibiotics used, which ranged from direct effects (chloramphenicol and potentially streptomycin) to bacteria-mediated effects (penicillin). These observations highlight the complexity in the responses of the diatom community to different antibiotics. In view of this, future studies on the fate of antibiotics in antibiotic-polluted and natural environments must take into account their effects on not only bacteria, but diatoms and other trophic levels as well.