Ancient glaze ware

The glazed wares have been part and parcel of the society since time immemorial and during the medieval period the use of glazed wares has increased significantly. A. S. Gaur et al. (page 670) report the elemental oxides analysis of glazed and non-glazed sherds recovered from Gogha, western bank of the Gulf of Khambhat, Gujarat. The findings throw light on cultural sequence prevailed in a specific time-bracket. Scanning electron microscope and energy dispersive spectrum studies were made to understand the chemical composition of sherds in addition to manufacturing techniques and firing. The analysis of elemental oxides of the ancient sherds showed the craftsmanship of medieval potters for preferable usage of certain oxides and their ability to embellish their final product.

These sherds were found along with the stone anchors of Indo-Arab type, which suggest that vessels of glazed ware were used in overseas voyages during the medieval period. Extensive studies in the Gogha region and its vicinity will provide more clues on origin and divergence on ceramic manufacturing techniques prevailed in the medieval period. Gogha was a very active port town during the medieval period in the Gulf of Khambhat.

Vegetation composition and diversity

R. Kanade et al. (page 637) have assessed the woody species composition and diversity in the Chandoli National Park. The study was made as a part of an ongoing initiative (2004–08) entitled ‘Mapping and quantitative assessment of geographic distribution and population status of plant resources of Western Ghats’, which intensively samples plant resources at an entire eco-region level. The study gives a complete account of species diversity patterns and changes in species composition encompassing an entire National Park from northern Western Ghats. A new floristic subtype Memecylon–Syzygium–Olea of previously defined Memecylon–Syzygium–Actinodaphne floristic series was identified based on abundance. The pooled data followed a log-normal distribution and the Shannon’s diversity ranged from 2.0 to 3.2. Along with an exhaustive species list, the study also highlights various species attributes and their uses. This study forms a reference document for protected area managers for better management of biodiversity and to strengthen the ongoing Government proposals for notification of the study area as World Heritage Sites-serial nomination.

Bacillus clausii MB9

The marine environment is vast and there is a tremendous potential to harness the ocean’s microorganisms for their unusual metabolites. Bacillus species are ubiquitous and diverse both in the terrestrial and marine ecosystems. But, reports documenting the presence of alkaliphilic Bacillus sp. from Indian coastal environment are meagre. N. K. Asha Devi et al. (page 627) have isolated Bacillus clausii MB9 from the eastern coastal environment of Tamil Nadu, South India. Cultural, biochemical and anti-microbial studies were performed for screening, isolation and characterization. 16S rRNA sequence-based molecular characterization and BLAST analysis were also made. The secondary metabolite (culture supernatant) produced by B. clausii MB9 at different culture conditions of salinity, temperature and pH were stable at elevated temperature conditions and having enhanced shelf life properties. The culture supernatant from this isolate remained active and retained its antimicrobial activities even after the supernatant was subjected to autoclaving temperatures (121°C). UV, FTIR and NMR spectral analysis revealed the presence of aliphatic amine groups in the supernatant.

The study focuses on the production of secondary metabolite(s) with tremendous antimicrobial and industrial potentials, i.e. protease enzyme related and detergent-resistant activities from the isolate. The results indicate that the new isolate B. clausii MB9 producing a highly thermo stable secondary metabolite with wide spectrum of antimicrobial activity was an ideal candidate for industrial scale production of bio-active compounds and reiterate the urgency of preserving, protecting and profiling the untapped microbial bio-resources from the marine environment.

Natural anthocyanins as photosensitizers for dye-sensitized solar devices

Solar photochemical energy conversion is an important long-range option for meeting future energy needs. Parallel to the development of conventional solar cells, most of them based on the semiconductor silicon, research has been conducted for several years now on new, innovative types of solar technology given by ruthenium dye-sensitized solar cells (DSCs). In contrast to conventional silicon photovoltaic devices, DSCs convert light energy to electricity on a molecular level – similar to natural photosynthesis. However, there remains the need for alternative photosensitizers, especially due to the high cost and the long-term availability of ruthenium complexes dye. Therefore, application of naturally occurring pigments such as anthocyanins, carotenoids and chlorophylls for DSCs have several advantages over rare metal complexes. In this context, among the natural dyes, anthocyanins are a group of naturally occurring phenolic compounds responsible for the colour of many flowers, fruits (particularly in berries) and vegetables. Fernando and Senadecera (page 663) have extracted natural dyes mainly containing anthocyanins from easily available different flower species and show the potential use of them as sensizers in DSCs. Due to their simple and cheap preparational techniques, these devices could also be useful in educational purposes of DSCs, specially in undergraduate courses to popularize this emerging technology.