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Cis–trans isomerase

Peptidyl prolyl *cis–trans* isomerases (PPIase) catalyse *cis–trans* isomerization of peptide bonds. Such isomers occur rarely in native proteins. Ubiquitous plant proteins, the family of FK506-binding proteins (FK506-BP), are known as *cis–trans* isomerases. After treatment of the immunosuppressive drug FK506, seeds of *Sorghum bicolor* lack detectable levels of peptidyl-prolyl *cis–trans* isomerase and they do not germinate at all. On **page 142**, Sharma and Singh suggest that FKBP-associated PPIase activity is associated with seed-germination.

Altitude and germination

Germination of *Rheum emodi* Wall. ex Meissn. is studied at altitudes 1800 m and 2200 m in the Garhwal Himalayas. *R. emodi* (Rhubarb) has been used as a traditional medicine for various ailments. While survival and yield of plant dry weight are found to be maximum at 2200 m, mortality rate is higher at lower altitude, and the content of active ingredients decreases at lower altitudes. A maximum financial benefit of Rs 1.70 lakhs and 3.15 lakhs is estimated for the sites at 1800 m and 2200 m respectively, after 4 years of cultivation. Nautiyal *et al.* (**page 143**) report their findings on cultivation of *R. emodi* in Garhwal Himalayas.

Structure of Ni-reconstituted haemoglobin

Venkateshrao *et al.* (**page 179**) report the three-dimensional crystal structure of a nickel-reconstituted haemoglobin solved at medium resolution. The atomic model is refined with a crystallographic R-factor of 24.2% with 38 water molecules filling the interstitial crevices of the protein molecules. Human haemoglobin (Hb), purified from erythrocytes, is reconstituted with Ni(II) and the crystals are grown at room temperature using polyethylene glycol-8000 as a precipitant. Good quality crystals containing Ni(II), grew in $P2_12_12$ space group over a period of 10–14 days. The final refined model is compared with the available deoxyhaemoglobin structure. The Ni-substituted haemoglobin assumes a 'permanent' T-state conformation. A comparison based on the superposition of the two sets of atomic coordinates reveals that the changes in the tertiary structure are predominantly observed in the α-subunits, and the metal-ion is penta-cordinated in one of the β-subunits instead of the regular tetra-valent geometry. The report of a penta-cordinated nickel(II) porphyrin complex in Hb is a new feature.

Aquifer in monsoon

Water levels are important parameters for study of dynamic behaviour in aquifer systems which depends on both temporal and spatial variations, making exact analysis of the joint variation difficult. Kumar and Ahmed (**page 188**) describe a study of the variogram of water levels of aquifer system in 32 wells fairly evenly distributed over a hard-rock region in Andhra Pradesh in southern India. It is hypothesized that two variograms, namely monsoon-affected and non-monsoon period, shall suffice to depict the temporal seasonal variations. Another common variogram is derived that reflects the spatial variability of water levels.

Bactericidal titanium

Muraleedharan *et al.* (**page 197**) report a photocatalytic activity of a thin of TiO_2 under near-UV light. The adhesion of cultures of *Pseudomonas* species to the acid-pickled metal surface and anodized films is studied to discover a photocatalytic bactericidal effect that is dependent on exposure to near-UV light.

Ligand-binding to lectins

Sultan and Swamy (**page 200**) analyse the experimental data on ligand–lectin interaction to estimate thermodynamic parameters of binding. *Momordica charantia* lectin (MCL) is a galactose-specific lectin isolated from the seeds of bitter gourd, *M. charantia*. Binding of galactopyranoside ligands is investigated by quenching of fluorescence intensity that is found to decrease with increasing temperature, that could be reversed upon addition of lactose. The association constant estimated from the quenching studies is $1.14 \times 10^4\ M^{-1}$ at 25°C. Analysis of enthalpy and entropy of binding of 4-methylumbelliferryl-α-D-galactopyranoside and its β-anomer suggests that higher affinity of the β-anomer is due to a larger enthalpy that compensates for a negative entropy of binding.

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