In this issue

Isotopic studies of megacryometeors

Unusually large icy conglomerates, sporadically falling from a clear sky even when there are no clouds or precipitation, are known as megacryometeors, and are different from hailstones. The formation mechanism for megacryometeors is poorly understood due to unpredictability of location and time of fall, logistic difficulties of spontaneous sample collection and proper preservation. Four

such megacryometeors, weighing several kilograms fell, in Western India during October–November 2010, of which samples from three could be retrieved. The oxygen and hydrogen isotopic composition (δ^{18}O and δD), chemical composition and γ-activity were measured to study the origin and formation mechanism of these megacryometeors. No γ-activity from cosmogenic radionuclide ^{26}Al, characteristic of extraterrestrial matter, was detected in the ice, melt water and inherent dust. The chemical parameters of these samples were within the normal range of variation in rainwater in western India, except for chloride and electrical conductivity. The δ^{18}O and δD values were within the range of variation for local precipitation. The slope and intercept of δ^{18}O–δD regression line were comparable to that of local meteoric water line. These observations indicate that water molecules in the sampled megacryometeors could be of atmospheric origin. However, the three fall locations lie below one of the busiest air-corridors in western India. This coupled with the observed increase in the relative humidity at above 4 km elevation, during a few days before and after the fall, suggest that perturbations in atmospheric parameters and/or mediation of aircrafts may be responsible for their formation in the present cases. See **page 728**.

Anti-diabetic biomolecules from plants

Indian medicinal plants have attracted a lot of attention recently as an alternate source of medicine especially for controlling complex diseases such as diabetes, obesity, etc. In this issue, Ayesha Noor *et al.* (**page 721**) review the utility/benefits of Indian medicinal plants especially in controlling diabetes which has become a major health concern. The authors report the beneficial effects of selective medicinal plant species such as *Allium cepa*, *Allium sativum*, *Aloe vera*, *Azadirachta indica*, *Gymnema sylvestre*, *Syzygium cumini* and *Pterocarpus marsupium*, and emphasize on the role of active biomolecules which possess anti-diabetic activity. Indian medicinal preparations are often considered being effective due to a mixture of active ingredients rather than a single constituent. The phytochemicals such as phenolics, phytosterols, saponins and flavonoids play a major role in the alleviation of diabetes through different pathways and they may provide a new chemotypes. At present the effectiveness of these plants has been demonstrated mostly in animal models and requires further validation in humans for its effective utilization. To realize its potential in humans there is a need for defining the targets and understanding the mode of action of specific components with better efficacy and pharmacokinetic profiles either in preventing or controlling the progression of the disease and its secondary complications. It is hoped that these efforts will lead to cost effective in management of diabetes through dietary interventions, nutrient supplementation and combination therapies with synthetic drugs.

Iron smelting in the Khasi Hills

The discussion on the early development of iron metallurgy in India has been shaped by two concepts – a diffusive spread of iron smelting technology from the northwest related to the migration of the Aryans and an independent origin of iron metallurgy within Indian subcontinent. Although in both cases, North East India was not taken into consideration, the remnants of the former iron ore excavation and iron manufacturing, visible today in the landscape of the Khasi Hills (located in Meghalaya), indicate that it could be the result of prolonged occupation by the Meghalaya inhabitants. Radiocarbon dating of charcoals and the results of chemical, microstructure and phase composition of iron ore and slags, indicate that the smelting of iron in the Khasi Hills was initiated at least 2000 years ago and continued up to the middle of the 19th century. It is the earliest iron smelting area studied in the entire region of North East India. The relative isolation of the Khasi people, who inhabited a highly elevated plateau, is evidence of the indigenous origin of manufacturing technology. On the other hand, given their trade contacts with surrounding lowlands, one cannot exclude the possibility of the diffusion of iron production knowledge from the West. See **page 761**.