India higher education internationalization: problems and possibilities

The Guest Editorial by Lavakare[1] concerning international students makes some important points that I would like to emphasize. India without any question needs clear guidelines and policies – and action – concerning international education, the role of international students in the country, and more broadly, its role in the increasing important and competitive global world of higher education. Indeed, India's role as an 'intellectual power' and its future success in science and technology depends in significant part on the excellence and international connectedness of its higher education sector, and as Lavakare has pointed out, India lags far behind its direct competitors, such as China, as well as the top academic systems in the world.

India has the potential to be an important 'destination' country for international students, but only if expectations are realistic and infrastructure are in place. The country's rapidly growing economy and increasingly important place in world affairs have increased global interest. India has the second largest higher education enrolments in the world. As Lavakare points out, large numbers of Indians go abroad to study (and many do not return), but only a trickle of foreign students choose to come to India. The country has not traditionally been on the world stage in higher education. No Indian universities are in the upper reaches of the global rankings. Most international students coming to India are exclusively from the developing countries. Only the Indian Institutes of Technology and to some extent the Indian Institutes of Management are well-known abroad.

India has not as yet figured out how to constructively interact with the world's universities. The failure, over a number of years, to enact policies and regulations relating to foreign branch campuses, and relations with foreign institutions generally has meant that the country has relatively few overseas partners. The proposed legislation, had it been passed, imposed unrealistic expectations of foreign partners in any case.

It is quite unlikely that India will attract many students from Europe, North America, or Australasia for full degree study. Despite China's more advanced higher education system, relatively few students from these regions are degree students in Chinese universities. Degree students are likely to continue to be from the developing countries of Africa and South and perhaps Southeast Asia. This reality is not necessarily a negative. Thus, India has good potential for attracting students from the developing world for degree study – and thus building relationships with future leaders of those countries and contributing to its 'soft power'. However, it is the case that the top students from the developing countries will probably choose to study in the West – thus if India wants to attract the 'best and brightest', Indian universities will have to actively compete and offer attractive terms and conditions for study.

India does have considerable potential for attracting students from Europe and North America for 'semester abroad' or other short-term programmes, and for postgraduate research. However, this potential can only be achieved if Indian institutions forge effective partnerships with counterparts abroad – at the governmental level, but especially with universities. Indian universities must also have the relevant infrastructure to host international students and provide them with appropriate assistance and academic guidance. With a few notable exceptions, these facilities do not exist at present.

Few Indian universities have professional staff with the knowledge and expertise to deal with international students. Indeed, India lacks a cadre of professionals in international education, and has no place to provide training in this rapidly expanding field. Most Indian universities lack hostels and other facilities to host international students – and particularly short-term students who cannot be expected to find such facilities on their own. At the heart of any exchange are the academics. It is fair to say that most Indian academics have little experience with international exchanges, although many senior professors have their doctorates from Western universities. Without a significant commitment from the Indian academic profession, exchange programmes will not succeed.

Successful internationalization presents a significant challenge for India. Progress must occur on a number of fronts simultaneously if India is to achieve success. Any effort to bring Indian universities up to world-class status will require internationalization.

1. Lavakare, P. J., *Curr. Sci.*, 2017, **113**(11), 2225–2226.

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Need to explore camel milk as probiotics

Consumption of probiotics is evidently on the rise globally because of their various health benefits on human beings. The search for novel probiotics with diverse properties is the necessity of time. Properties of camel milk were first mentioned in the 'Words of The Prophet Mohammed' in the Surah, a section of the Koran (volume 7, book 71, number 5909)[1]. Camels (genus *Camelus*) are the fingerprint of the desert and were first domesticated by humans in southern Arabia and Somalia between 2500 and 3000 BC (ref. 1). Since then, they have been benefiting humans through many ways by providing milk, meat, hair, as working animals for transporting goods and in the military during 19th–20th century. The

usefulness and diverse benefits of camel milk are the hot topic of current research. Although the studies are preliminary, the observations are significant in terms of the benefits revealed. These studies have stressed the requisite to further explore camel milk as probiotics.

Very few studies have been carried out with respect to the isolation and characterization of probiotic bacteria from camel milk. The earlier study revealed the predominant genera as *Lactobacillus* and *Lactococcus* have different phenotypes, viz. gas production from glucose, arginine hydrolysis, fermentation of other 20 carbohydrates, inhibitory effect against *Salmonella typhimurium* ATCC14028, *Escherichia coli* 8739 and *Staphylococcus epidermidis* and production of bacteriocins[1,2]. Studies also showed they have capacity to tolerate Oxgall (2%), pH (3.0) and simulated intestinal juice, and mostly sensitive to common antibiotics also[3]. Previous reports have stated that camel milk has a very high concentration of mono- and polyunsaturated fatty acids, albumin, immunoglobulins, vitamin E, manganese and iron, helping in numerous functions being performed by the body. It has proven applications in diarrhoea, diabetes, hepatitis C and B, and reduction of cholesterol in the blood. Camel milk has no allergic response in children; it improves the immune system. Also, the use of camel milk and urine has led to a reduction in the growth of cancer cells[4,5].

Furthermore, the composition of camel milk is unique compared to that of other ruminants[6]. Camels from India and Pakistan can produce up to 12,000 l of milk in the lactation period from 9 to 18 months[7], which is very high compared to camels from all over the world[8]. The level of vitamin C is three times higher than that of human milk. During drought conditions, the concentration of sodium, potassium, phosphate and chloride in milk increases, while urea concentration remains unchanged. The lactose milk sugar can be easily digested by those suffering from lactose intolerance[8]. The defensive milk proteins such as lysozyme, lactoferrin and lactoperoxidase are also present. Camel milk also has insulin which remains available for absorption in the intestine as the milk does not coagulate in an acidic environment. There is also strong evidence that intake of raw camel milk can reduce the dose of insulin required for glycaemic control, and zero prevalence of diabetes among camel milk-consuming Raica community of northwest Rajasthan, India has been noted[9]. Further research is necessary to isolate the actual protective factor in camel milk for anti-diabetic properties.

The studies discussed here have provided vital insights into the camel milk chemistry and bacterial composition. Further research on adhesion to human mucosal and non-mucosal cell lines, cell cytotoxicity assay, production of short-chain fatty acids, auto-aggregation, co-aggregation, antioxidant activity and exopolisaccharide production is necessary. Also, camel milk proteins, especially insulin can be tested for prebiotics. Data on these aspects are currently unavailable and organized research is essential to target the probiotic bacteria. Moreover, the roles played by these bacteria in human health and understanding the microbial community dynamics in the gut environment of humans need to be explored.

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Polyembryony in *Psophocarpus tetragonolobus* (L.) DC. from Kerala, India

Psophocarpus tetragonolobus (L.) DC. is commonly known as winged bean or asparagus bean. The plant is a twinning perennial herb belonging to the family Fabaceae. Almost every part of this plant is tasty and edible. The protein and oil content of the plant is comparable to soybean[1]. Moreover, the winged bean extract inhibits both wrinkle formation and lichenification of the epidermis in human chronic eczematous dermatitis[2]. Delayed and poor germination of seed is a serious problem of this crop. The low percentage of seed germination is attributed to its hard seed coat rather than to seed dormancy. Many studies have debated about seed viability and seed priming strategies for germination of winged bean[3–5]. So far there is no report on polyembryony. The present study was conducted to examine germinability of different genotypes of