In this issue

Central Universities in India

A research output comparison

There are nearly 700 universities in India. And 39 of them are Central universities. These Central universities are generally better funded than the State universities and the private ones.

In this issue, researchers from the Banaras Hindu University and the South Asian University, New Delhi, examine the research output from the Central universities and compare the best in India with the Cambridge and Stanford universities to demonstrate that Indian universities have far to go before they catch up with the best in the West. Read the General Article on **page 2198**.

IBM Fellows: Lessons Learned

IBM allocates USD 5–6 billion for R&D, nearly 6% of its total revenue, for its 12 research laboratories in 6 continents. And it has systems in place to recognize research talents: IBM Fellow, the distinction granted in recognition of outstanding achievements.

The IBM Fellows programme started in 1963, with a vision: 'Creativity has made the difference between an ordinary and one of the great companies of the world'. Between 1963 and 2016, more than 9000 patents were filed by 278 IBM Fellows. And the IBM grew into the world's leading cognitive solutions company, dealing with Big Data and analytics, cloud, mobile and security technologies – technologies that are changing the world today.

Five IBM Fellows received Nobel Prizes in Physics – a statistic that most countries in the world will fail to equal. In these times when many countries are cutting down on state funding of research, the IBM case study provides many important lessons for Industry leaders. So read this General Article on **page 2208**.

Now imagine, a country which allocates 6% of its GDP for research. Will it take 50 years for that country to become world leaders in research in the era of knowledge economy?

Milk Adulteration in the NCR

India is the largest milk producer in the world with an output of 160 million tonnes. The National Dairy Development Board projects the need to increase production to 200 million tonnes in the next 5 years to meet rising demand.

Growing demand and inadequate supply has led to widespread adulteration. Researchers at the Maitreyi College, New Delhi, examined milk supplied in Delhi, Gurgaon and Faridabad to estimate the extent of adulteration and the materials used.

They find that all milk samples had caustic soda, sodium bicarbonate or sodium carbonate, usually added to neutralize the pH, to prevent curdling and, thus, to increase apparent shelf life. Excessive carbonates and bicarbonates disrupt hormonal signals and affect development and reproduction.

Detergent is another major adulterant. It emulsifies and dissolves oil in water giving a frothy white solution. It may look good, but causes food poisoning and gastrointestinal complications.

Urea is found in natural milk at very low concentrations. In adulterated milk, it may go up to a few grams per litre. It increases the consistency and whiteness of milk, but creates hormonal imbalances and overburdens the kidneys often leading to renal failure.

Ammonium sulphate is used to increase the lactometer reading of milk diluted with water. But among consumers it may lead to coronary disease and gastrointestinal irritation.

If reading the Research Communication on **page 2316** makes you want to shift from the National Capital Region, details of studies done elsewhere in India might dissuade you.

The only way out is to make sure that the relevant laws are strictly enforced. Surveillance mechanisms have to be put in place to discourage milk vendors from falling prey to greed. And, ultimately, urgent steps have to be taken to fill the gap between the supply and demand of milk, to ensure that the practice becomes unprofitable.

Mephedrone Abuse

If ever you go to Yemen, you may find people chewing khat leaves. Unlike the betel leaves used in Asia, you don't need any additions. Just pluck the fresh leaves and chew. It is an age-old tradition.

The leaves of *Catha edulis* are edible. They contain cathinone, an alkaloid which acts on both serotonin and norepinephrine containing neurons. So it makes you more alert and wakeful, like amphetamine does and makes you euphoric, like cannabis.

Thus, if you find more than 50% of the people in Yemen chewing khat, it is understandable: humans are metaphorical lotus eaters. Though it is not addictive – in the sense that it does not produce any physiological symptoms when you drop the habit – it may produce psychological dependence among users. As cannabis does.

However, unlike cannabis, you need fresh leaves. Though dried leaves are used in some places to make a form of tea, it does not have the same effect. And the khat tree does not grow everywhere as abundantly as in East Africa and Arabia. So the habit of chewing khat leaves did not spread.

But to produce synthetic derivatives of cathinone, you don't need the plant. In fact, even a chemical plant is not needed. Just a small laboratory. You can even tweak the molecule to make Mephedrone, with enhanced effects. Since the law has not woken up to it, it is not even illegal in most countries. You can order it on the Net.

But wait. Lawmakers do not chew khat. Yet, they are wakeful and alert. There is now an Indian law. Researchers from the Punjabi University, Patiala provide us with a Review Article that looks at the emerging issue of Mephedrone abuse in India. On **page 2212** read about the chemistry, pharmacodynamics, drug–herb interaction, abuse, effects and methods to detect the chemical.

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