

In this issue

Terminal truth about terminator gene?

9 November 1998; 2.30 pm.

The venue: Chambers of the Minister of Agriculture, Karnataka State Government.

The issue: Terminator seed technology and (versus) Transgenic plants.

The context: An article in the daily, *Indian Express*, a few days back had stirred a hornet's nest over the issue and there were claims and counter claims in TV, radio and news magazines about the merits and otherwise of the Bollguard cotton, terminator seeds and the allegiance of Monsanto company to terminator gene technology.

Sitting at one edge of the semicircular conference table laid in front of the minister, I was wondering about the purpose and wisdom of my presence in these corridors where policy decisions are made often on the basis of public demands and other immediate pressures than on the scientific grounds. At the end of a long sitting, we were all indeed greatly impressed by the ease with which the minister consumed all the details some of which we thought might be too technical for him, and by his own understanding of some of the deeper social implications of the terminator gene and the transgenic plants. We came out with the impression that if there is ignorance in these corridors about such issues we may have to blame our own arrogance in thinking that the powers here are dumb to us. They are not!

10 November 1998; 12.30 pm.

The same venue; the same issue; it was a press conference by the minister.

Now sitting in the outermost ring of the audience, I was again, like my other colleagues, highly impressed by the perfection of the details the minister delivered to the press.

But 11 November morning, newspapers belied our expectations. They seemed unwilling to deviate from their general tendency to sensa-

tionalize the news. Almost all daily papers had picked up only those details which by a slight twist or turn could make the readers suspect the intentions and the maturity of the state and the system in dealing with the issue. Thus the questions that were so intensely discussed at the minister's chambers still remained unresolved:

Do we need to allow transgenic plants to India? Do we need to allow terminator seed technology to India? Is Monsanto holding the patent for the terminator gene? If it does, can we prevent it getting it into India? Should Monsanto be particularly prevented from introducing the transgenic plants to India because of its allegedly 'not-so-honest' track record in offering environment-friendly technology?

Should one link the benefits our farmers might derive from Monsanto's transgenic plants with the bad experience of the 'Agent Orange' that this company supplied to US army in the Vietnam war? Should we take the failure of 'Bollguard' cotton in some places in USA as a warning signal for a possible repeat of the suicide cases of cotton farmers in India if we introduce it?

In this era of information explosion there is a great need to develop a system to screen the right news from the wrong. This screening task seems to be much more important than that of netting the information *per se*; info shops are growing probably faster than coffee shops and now are in almost every corner. But we need service centres to filter the right from the wrong information and sense from the nonsense.

In the absence of such service centres one way, and not an efficient way of course, is flooding with the right information such that it gets noticed simply by the process of inundation. In this background another article on terminator gene (after a couple of earlier articles) and its social and political implications by Gupta finds its rightful place in this issue of *Current Sci-*

ence (page 1319). This article besides offering the details of the technology also suggests possible ways to guard ourselves against the impending problems of the terminator technology.

K. N. Ganeshaiah

Vortex breakdown in turbomachinery

A significant fraction of our generated power comes in the form of hydroelectricity where the potential energy of stored water is used to drive a hydraulic turbine connected to an electric generator. The turbine itself consists of a number of specially-shaped blades attached to a hub on a rotating shaft; in a well-designed turbine, the flowing water turns the runner efficiently with as little loss as possible so that its energy is converted to useful electrical energy. In this process it is inevitable that a certain amount of angular momentum will be imparted to the flowing water and under certain circumstances a strong vortex will be formed in the draft tube or ducting downstream of the turbine. The existence of this vortex, which is essentially a swirling flow field, can have serious consequences for the performance of the turbine.

It is a well known fact that water turbines perform poorly when operated at off-design conditions. Under these circumstances the flow becomes unsteady with powerful periodic oscillations in the pressure and power and with consequent increase in vibrations and noise in the machinery; needless to say the efficiency falls. It is believed that this condition is due to the eccentric rotation of the vortex core formed by the high swirl of the flow coming out of the turbine into the draft tube. A related phenomenon is that of *pressure surge* in turbines operating at small part load; these pressure oscillations can be so severe that the turbine has to be shut down. It appears that surge is caused by *vortex breakdown*, where the swirling flow

suddenly switches to a topologically different mode with attendant unsteadiness and losses. All this points out the need to understand and control vortex phenomena in turbomachinery.

In this issue Sharma *et al.* (page 1355) present a study relevant to the flow fields mentioned above. They use hot wire anemometry to examine the swirling flow in a draft tube generated by a runner or turbine driven

by air in a blow down wind tunnel. When the signals from the hot wire are analysed using an FFT spectrum analyser they find that, outside a narrow range around the design point, oscillations similar to those found in vortex breakdown do indeed occur. They conclude that these oscillations are identical to those found in water turbine surge. Moreover, because these experiments done in the laboratory are

controlled, the dependence of vortex breakdown in the draft tube on a well-defined angular momentum parameter can be quantified. Scientific studies such as these can play an important role in incrementally improving the design and performance of industrial equipment with consequent benefit to the whole economy.

P. N. Shankar

THE INSTITUTE OF SCIENCE, MUMBAI

Applications are invited for the award of Junior Research Fellowships (Two) in Biochemistry Department of the Institute of Science, Mumbai on DAE/BRNS project entitled 'Structure-function relationship of wheat proteins with special reference to chapati-making qualities as affected by irradiation'.

Candidates with M Sc in Biochemistry/Food Technology/Food Science/Food & Nutrition with consistently good academic record can apply.

Application on plain paper giving the curriculum vitae (educational qualification, professional and research experience, etc.) should reach Dr Mrs M. M. Bapat, Head, Biochemistry Dept., The Institute of Science, 15, Madame Cama Road, Mumbai 400 032, before 4 February 1999.