

In the Codex Alimentarius Commission, Ottawa, India and several other nations demanded more extensive labelling of the transgenic food. 'Genetically engineered herbicide-tolerant crops are laced with high level pesticide residues that may disrupt endocrine function, destroy immunologic defences against diseases, including cancer', according to Romeo Quijano, University of Philippines. 'Transgenic plant technology can create dangerous foods by generating mutation in the DNA of the food processing organism,' says John Fagan, USA. 'The fact is it is virtually impossible to even conceive of a testing procedure to assess the health effects of genetically engineered foods when introduced into the food chain nor is there any valid nutritional or public interest reason for their introduction', says Richard Lacey, University of UK⁶. Canada-based Rural Advancement Foundation International (RAFI) condemned this as a conspiracy for monopoly in the food market. M. S. Swaminathan opines that such technologies should be stopped from entering our country by strict import policies.

The 'Bt genes' introduced may lead to a complete destruction of boll worm ecology leading to impaired biological equilibrium. Transgenic plants becoming weed is one which depends on the nature of the plant to be transformed and gene to be introduced⁴. Other hazards associated

with transgenic plants are horizontal gene transfer, development of new viral strains and effect of toxin on non-target insects⁷.

Social impacts may be a wider gap between the north and the south, and growing disparities in the distribution of income and wealth within societies⁸. Increased production will induce small farmers to grow transgenic plants and ultimately the MNCs will control the world food market leading to a complete disappearance of indigenous cultivars, and seed companies. Thus more than 1.4 million poor farmers in Africa, Asia and Latin America who depend on farm-saved seed as their primary seed source, will have to suffer.

While terminator technology is a threat to food security, agricultural biodiversity and future scientific research, traitor technology will be a tool for agro-terrorism propagated by MNCs⁹, in which seeds should be treated with their own chemicals to activate the disrupter genes, in the absence of which the cysteine protease promoter will activate the barnase enzyme to burn-off the germinating seedlings.

It is a matter of pity that even eminent scientists in this field do not consider the problems associated with the transgenic plants. In a seminar organized by UAS, Bangalore, some scientists and policy makers stated that 'every technology has got its own risk'⁵, which they are reluctant to discuss.

Anything against nature's existence will be wiped off and so also terminator technology. An article which discusses only the positive aspects of any technology cannot be accepted.

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Transgenic crops and biodiversity

We found the article by K. K. Narayanan (*Curr. Sci.*, 2000, **78**, 7) very educative. We would like to present the following points for further consideration.

The author, while trying to alleviate the misconceptions on transgenics, seems to prescribe transgenics as the only alternative for the future and relates it to the needs of the exploding population. In supporting the cause the author also equates the natural selection process to **artificial selection** (transgenics). The cultivation of fewer traditional varieties selected from millions of species is based on human preference over the years; but this cannot be compared to the voluntary addition of any gene into a plant. A con-

scientious biotechnologist will not agree with the statement given in the article 'the addition of transgenic crops does not add any new dimensions to the existing scenario in modern agriculture'. Our view is different. Transgenics are a product of artificial selection and hence they cannot fall in line with the traditional varieties. No doubt, any scientific advancement needs to be received well, accepted and adopted in the modern system after a thorough scrutiny of impact on mankind. At the same time, the traditional varieties also have their own role to play.

The author further says that in future, the world community will have to rely

upon only a few evolved varieties (transgenics) to feed the growing population. This would lead to disaster in countries like India where the per capita income is less and per area population is high. If every available and useful variety is converted into a transgenic variety, then, such a thing may be possible. A news item published in *Nature* (6 January 2000) discusses the pros and cons of transgenics related to patency. While the commercial companies hail the (patency of) transgenics, an environmental group Green Peace criticizes this. Stefan Flothmann, Head of Genetic Engineering Department at Green peace, Germany, had said, 'This could lead to monopolies in the seed

market. The production of transgenics if goes into the hands of few companies, the agricultural diversity in the farmers' field will be reduced to a few patented varieties and in the long term this is a threat to the world's food supplies.'

Hopefully, the collected genetic traits, maintained under storage or in germplasm centres or gene banks like NBPGR in India, will offer sustained free access to the farming community for use in the future. The government should also encourage the collection of such diversified

genetic traits to help the farmers in case the transgenics fail in their task.

We do need transgenics and research on them has to be encouraged. While it is necessary to clear any doubts on transgenics among the consumer-public, it is also necessary to develop genetically modified crops devoid of gene protection (terminator) technology and selectable markers.

Ultimately one should aim not to leave the human community (i) rely upon one or two crops/varieties for cultivation in

the future; (ii) lack self-sufficiency in the fields; (iii) rely upon monopolistic commercialization of essential crops.

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Herbal medicine – Some comments

While dealing with popularity of herbal medicines (HM) all over the world, Kamboj¹ has emphasized some widely used wrong concepts. The claims of safety and lesser side-effects of HM are in stark contrast with the reports published from time to time^{2,3}. The belief that constituents of HM 'have better compatibility with the human body' due to their origin in living systems appears dangerous, as exemplified by an observer: 'I have considerable respect for the potential toxicity of plants. Some of the most poisonous substances known – curare, digitalis, ricin, and many others – are hidden in seemingly innocent greenery'⁴. Other problems associated with the use of HM stem from their heterogeneous nature^{5,6} and admixing of synthetic drugs (like corticosteroids) to herbal formulations by the manufacturers². Simultaneous use of western and herbal remedies may lead to dangerous interactions^{7,8}. A recent systematic survey on some HM in

Canada revealed that most of them were unsafe or ineffective. In some cases sufficient information was not available for their evaluation⁹. Such objective attitude towards HM is, by and large, absent in our country. Most of the reviewers either selectively highlight the promising aspects of these traditional medicines or express skepticism about their efficacy¹⁰. The vast potential of HM to complement western medicines can be hardly denied but problems associated with their use cannot be winked at. As a matter of fact, regulation of HM to ensure their safe use, is a global problem at present. Measures, suggested by Kamboj, for their standardization are useful but the cost involved in maintaining the required research infrastructure is a discouraging factor to the manufacturers.

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Tropospheric ozone: An emerging problem in the urban environment

Chemistry of tropospheric ozone formation is a major complex and nonlinear problem of atmospheric research which is related to the public health, reduction in crop yield and climate change. This correspondence deals with the complex mechanisms of tropospheric ozone forma-

tion in the ambient environment, to identify the current challenges and strategies employed to control the vehicular emission at a national level.

Tropospheric ozone is a secondary air pollutant which is formed in the presence of sunlight by complex photochemical

mechanisms through its precursors like NO_x (oxides of nitrogen), VOC (volatile organic compounds), CO (carbon monoxide) and CH₄ (methane). NO_x and VOC are major precursors of ozone in the urban environment whereas CO and CH₄ are precursors of rural and oceanic enviro-