Health and economic implications of imported toxic legumes

Ramesh V. Bhat and T. C. Raghuram

The importance of legumes in human nutrition has been well recognized. They play an important role in Indian dietaries, specially in view of higher cost and scarcity of animal proteins as well as the vegetarian way of life. With the success of green revolution, there has been a significant increase in the production of cereals such as wheat and rice. Similarly, thanks to the efforts of the Oil Technology Mission, there has been a spurt in oil seed production. However, the production of legumes has remained almost static over the years. To meet the domestic needs, pulses have been imported from several countries. In contrast to cereals and oilseeds, some of these legumes do contain naturally occurring toxic substances such as unusual amino acids[1].

Outbreaks of diseases such as Lathyrism due to consumption of *Lathyrus sativus* as a staple food, specially during drought conditions, have been well documented[2]. Even consumption of smaller quantities of *L. sativus* for prolonged periods is suspected to result in spasticity[3]. The other members of the subfamily of *Lathyrus* namely *Vicia* and *Lens* are also known to contain toxic principles. In India, the pulse *Vicia sativa* was considered a forage legume, and a weed growing along *L. sativus*. It is reported to be poisonous to cattle, pigs, poultry and even to primates, causing symptoms like lupinosis. However, it is used for feeding cattle after detoxification[4].

During the last two years, Australian farmers have been cultivating 'blanche fleur' cultivar of *V. sativa* on a large scale as a food export cash crop. In 1992 alone, about 10,000 tonnes of this pulse was exported as split red vetch. Recently, Tate and Enneking[5] have warned the consumers and scientific community of the possibility of red vetch, exported to the Middle East under different names such as 'split blanche fleur/red legumes/red dhal/split red lentils', being used for human consumption. They have also considered the likely reexport from the Middle East to Indian subcontinent. Many varieties of vetch contain toxic amino acids such as beta cyanoalanine and its gamma glutamyl derivative, making them unsuitable for human consumption[6]. In addition, they are also reported to contain relatively higher quantities of the pyrimidine glucoside vicine[7] which is known to cause favism—a disease in humans characterized by fatal haemolytic anaemia. In spite of these serious health implications, the Australian Grain Legume Committee has defended the export of toxic pulse under the pretext that although 'there are problems in certain sectors of the livestock industry when excessive amounts of *V. sativa* are included in rations, to extrapolate these findings to humans would endanger the credibility of the proponents of such action'[8]. Since most of the toxicological evaluation studies in relation to food safety are based on animal experimentation, such an argument is totally unscientific and questions the very validity of the use of animal experimentation in biomedical research. In addition, even to consider such a contention, it will be of interest to know whether the National Food regulation authorities of that country, where such toxic pulses are cultivated and exported, would permit its consumption by its population.

The blatant and selfish violation of the scientific principles by the trade, disregarding human health implications among the consumers of such toxic pulse, raises important ethical considerations for food export/import. It is in this context that we had earlier called for appropriate guidelines to safeguard human health by the Codex Alimentarius Commission of the FAO/WHO as well as countries exporting, importing or cultivating legumes reported to contain toxic constituents[9].

Even as these issues are being debated in academic circles, some Indian traders have gone a step further and imported these 'vetches' as Australian lentils from Australia with tax concessions under the 'export promotion scheme'! Recently, it is alleged that 450 metric tonnes of vetches have been seized in Maharashtra by the Department of Revenue Intelligence for misuse of 'export promotion scheme'. The Food and Drug Administration in Maharashtra is seized with the issue and the adulteration of Indian lentils (masur dhal) with imported *V. sativa* is being investigated by the Directorate of Central Food Laboratories, Pune.

The import of toxic *V. sativa* from Australia under various names, misleading the Indian customs and health authorities, poses a serious health hazard to the Indian consumers. In addition, such gross adulteration has enormous economic implications. However, such episodes are not new. A few years ago, even yellow lentils were imported from Turkey by the Indian traders and passed on to the consumer as pigeon pea (tuar dhal). It is in this context that the Government of India has recently taken the right decision to ban the import of *V. sativa* in order to safeguard the interests of Indian consumers. In the light of these recurring episodes, greater vigilance needs to be exercised by the food control authorities of the Government, import/export regulating authorities and consumers. Meanwhile, the wholesale and retail trade as well as the importers have to evolve a code of conduct for self-regulation. Only a combination of such concerted efforts combined with education of the consumers would safeguard the interests of the nation.

In India, there are several food regulations such as Prevention of Food Adulteration (PFA) act, Agricultural Produce (Grading and Marketing) act, Fruit Products order, Export (Quality Control and Inspection) act, Meat Products order, Vegetable Oil Products order, and ISI (Certification Mark) act. These regulations are supervised and implemented by several agencies of Central and State Governments spread

over in the Ministries of Health, Food, and Commerce, and there is hardly any coordination among various agencies in this regard. In order to improve the functioning of the existing set up and to integrate the activities of various agencies involved in food safety regulation, there is an imperative need to set up an apex body at the national level. Although such a recommendation has been made earlier[10], the recent incidents, circumventing the existing regulations, reinforce the immediate need for such a body.

1. Liener, I. E., *Toxic Constituents of Plant Foodstuffs*, Academic Press, New York, 1980, p. 502.
2. Tulpule, P. G., Nagarajan, V. and Bhat, R. V., *Environmental Causes of Food Contamination*, Department of Environment, Government of India, New Delhi, 1982, p. 84.
3. Dastur, D. K. and Manghani, D. K., *Curr. Sci.*, 1992, **63**, 470–484.
4. *The Wealth of India, A Dictionary of Indian Raw Materials and Industrial Products, Raw Materials*, vol. X, Sp-W, Publication Information Directorate, CSIR, New Delhi, 1976, pp. 465–468.
5. Tate, M. E. and Enneking, D., *Nature*, 1992, **359**, 357–358.
6. Ressler, C. J., *Biol. Chem.*, 1962, **237**, 733–735.
7. Brown, E. G., *Nature*, 1992, **360**, 9.
8. McCallum, A. D., *Nature*, 1992, **360**, 9.
9. Bhat, R. V. and Raghuram, T. C., *Nature*, 1992, **360**, 505.
10. Bhat, R. V. and Rao, B. S. N., *National Strategy for Food Quality Control*, National Institute of Nutrition, Hyderabad, 1985, pp. 200–204.

The authors are in Food and Drug Toxicology Research Centre, National Institute of Nutrition, Indian Council of Medical Research, Hyderabad 500 007, India