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Cyanogen content in bamboo plants

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The emerging succulent bamboo shoots are edible. They are a delicious vegetable item. Bamboo shoots contain the cyanogenic glycoside (taxiphyllin) which is hydrolysed and decomposes to hydroxy benzaldehyde and hydrogen cyanide (cyanogen). The cyanide present in the fresh and fermented bamboo shoots was analyzed .The cyanide content were found to decrease substantially in the fermented samples below the human toxic level.

Key words : Cyanogen, Bamboo shoots, Phytotoxin

INTRODUCTION

Most of the succulent young tender bamboo shoots contain cyanogenic glycosides that break down to hydrogen cyanide (HCN), which can cause toxicity in humans. Cyanogenic glycosides are phytotoxins which occur as secondary plant metabolites in many plant species, of which a number of species are used as food in some areas of the world (Conn, 1979; Nartey, 1980; Rosling, 1994). In the intact plant, the enzyme and the glycosides remain separated, but if the plant tissue is damaged both are put in contact and cyanohydric acid is released (Bell, 1981; Gruhnert *et al.,* 1994). When the edible parts of the plants are macerated, the catabolic intracellular enzyme ß-glycosidase can be released, coming into contact with the glycosides. This enzyme hydrolyzes the cyanogenic glycosides to produce hydrogen cyanide, glucose and ketones or benzaldehyde (Harborne, 1972 and 1993). The hydrogen cyanide is the major toxic compound causing the toxic effects. Plant products, if not adequately detoxified during the processing or preparation of the food, are toxic because of the release of this preformed hydrogen cyanide.

The present work is undertaken to assess the content of cyanogens in fresh and fermented succulent bamboo shoots so as to search out the likelihood of cyanide intoxication from consumption of fresh and fermented bamboo shoots and to stimulate new uses of bamboo shoots in the existing markets.

MATERIALS AND METHODS

The emerging young fresh succulent bamboo shoots of the species of *Bambusa balcooa, B. tulda, Dendrocalamus halmiltonii, Melocanna bambusoides and Arundinaria callosa were* collected during the growing season (May- July) from different districts of Manipur, India. The outermost scale portions of the fresh succulent bamboo shoots (which are discarded) were peeled off and kept aside for the experiment. The inner delicious edible inner soft shoots were washed with water and any fibrous tissues at the base is trimmed and assessed for cyanide content (Bradbury *et al.*, 1999). To assess the cyanide content of the whole bamboo plant, parts of the plant like the stem, leave, rhizome, and inflorescence and seed of bamboo plant were also assessed.

Fermentation:

In Manipur, India, the fresh succulent bamboo shoots and the fermented preparation of bamboo shoot slices which were done in large scale, locally called *soibum* is a highly prized vegetable item. The traditionally fermented samples, locally called *soibum* were collected from different districts/localities in Manipur where traditional fermentation of bamboo shoots is done in large scales (Khongkhang, Andro, Noneh, Tengnoupal, Churachandpur, Kotha etc.). Bamboo shoots of many species like *Bambusa tulda, B. balcoa, Dendrocalamus hamiltonii, Melocanna bambusoides* and *Arundanaria callosa* were used for traditional fermentation. The *soibum* is prepared traditionally by storing thin slices of fresh succulent and soft bamboo shoots in certain containers/ chambers for 2-3 months. The fermented chambers are either made of bamboo planks or of roasted earthen pots. The inner surface of bamboo chambers are lined with banana leaves and a thin polythene sheets. The upper surface is sealed with polythene sheet and weights are

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