Vitamin values of *Pleurotus* mushrooms

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Abstract. Ascorbic acid, thiamine, niacin, riboflavin, pantothenic acid and folic acid contents were determined in four different species of *Pleurotus* mushroom grown on wet chopped unfermented rice straw. The estimated values for the respective vitamins ranged from 92-144, 1.36-2.23, 60.6-73.3, 6.66-8.97, 21.1-33.3 mg and 1222-1412 μg per 100 g mushrooms on dry weight basis. These vitamin values were comparable with those of *Agaricus bisporus*, but were higher than those of *Auricularia*, *Lentinus* and *Volvariella*.

Introduction

Mushrooms are a food delicacy item which are liked for their characteristic biting texture and flavour. In recent years, there has been an increased interest in understanding their exact role in human nutrition. Although there is considerable information on the protein and mineral contents of mushrooms, our knowledge about their vitamin contents is very scanty. Literature values available on vitamin contents of mushrooms are restricted for the most part to *Agaricus bisporus* [1, 15, 16]. There is considerable information on the protein content, amino acid composition [4], predicted biological value [7] and mineral contents of *Pleurotus* species [8], but their major vitamin contents have not been reported.

*Pleurotus* as a class of edible mushrooms is gaining popularity in recent years. It is being cultivated in many parts of the world [5, 6, 12-14, 18, 19]. Their easy cultivation, coupled with their high efficiency of substrate conversion into biomass, are decided advantages of the *Pleurotus* species [9, 20].

In the present paper, values for the major vitamins of four species of *Pleurotus* are reported.

Materials and methods

Cultures

The cultures of *Pleurotus flabellatus* and *P. eous* were isolated from the dead wood of Moringa tree. The original culture of *P. sajor-caju* was obtained
from Dr J.N. Kapoor (Division of Mycology and Plant Pathology, Indian Agriculture Research Institute, New Delhi, India). The culture of *P. florida* (PL-II Somycel 3025 France) was obtained from Dr F. Zadrazil (Institute für Bodenbiologie Braunschweig, Germany).

**Growth conditions and collection of the mushroom fruit bodies**

All the four species of *Pleurotus* were cultivated according to the method described by Bano et al. [5] for *P. flabellatus*. Rice (*Oryza sativa*) straw chopped to a length of 2–3 cm was soaked in tap water (40 litres of water for every 2.5 kg dry chopped straw) at room temperature (22–28°C) for 18 h. After draining away the excess water, every 3 kg of the wet chopped straw containing about 80% moisture, was mixed with 100 g of 20–30 days old spawn (raised on cooked jowar grains, aseptically, using the cultures mentioned above), and 25 g horse-gram (*Dolichos biflorus*) powder (mill size Ca. 0.5–1 mm) and then placed in 150–200 gauge (thickness) polyethylene bags (30 x 40 cm) with perforations (of 1 cm diam) at intervals of 7 cm. The mouth of the bag was tied with a piece of thread and incubated at ambient temperature of 22–28°C and relative humidity 55–75%. After a period of 18–20 days incubation, the polyethylene bags were cut open, the exposed blocks were watered heavily and fully grown mushroom fruit bodies were harvested on the third day after primordia formation. The harvested fruit bodies were dried in an oven at 50°C under vacuum (62.5 cm) to a constant weight and then ground to a fine powder (60 mesh) prior to analyses.

**Vitamin analyses**

Thiamine was estimated by a fluorimetric method [2]. Niacin and riboflavin were estimated by the microbiological assay technique [1] using *Lactobacillus arabinosus* and *Leuconostoc mesenteroides* as test organisms respectively. For the estimation of folic acid, the samples were prepared using human plasma as a source of enzyme, i.e., Folyl-γ-glutamyl carboxy peptidase [21] to release folic acid from the samples and it was estimated microbially using *Streptococcus faecalis* as the test organism. In the case of pantothenic acid, the samples were subjected to enzymatic hydrolysis by a mixture of papain and takadiastase in sodium acetate buffer at pH 4.62, according to the method followed by Carrera et al. [11] and the vitamin was then estimated by microbiological assay [10] using *Lactobacillus arabinosus* as the test organism. Ascorbic acid was estimated by titration using dichlorophenol indophenol dye [3]. For each analysis, three replicates of each of three samples from different batches of cultivation were analyzed.

**Results and discussion**

Values for levels of ascorbic acid, thiamine, niacin, riboflavin, pantothenic acid and folic acid from different species of *Pleurotus* are presented in