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FATTY ACID COMPOSITION OF CULTIVATED EDIBLE MUSHROOM *LENTINUS TUBERREGIUM* VKJM24 (HM060586)

J. Manjunathan[1], S. Shymala Gowri[2]* and V. Kaviyarasan[3]

[1&3]Centre for Advanced Studies in Botany, Guindy Campus, University of Madras, Chennai. 600 025.

[*2]PG and Research Department of Botany, Pachaiyappa's College, Chennai 600 030.

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***Corresponding Author**
S. Shymala Gowri
PG and Research Department of Botany, Pachaiyappa's College, Chennai 600 030.

ABSTRACT

Fatty acids were recorded in *Lentinus tuberregium* and detected by gas chromatography. However, the maximum amounts of Palmitic acid (4.55%), Moroctic acid (0.43%), stearic acid (6.75%) were recorded. From these studies, it was concluded that the supplementation of this mushroom with cereal diet would help to overcome lysine deficiency. The present study proved the potential of mushrooms which can enhance the health status of an individual.

KEYWORDS: *Lentinus tuberregium*, fattyacid, gas chromatography.

INTRODUCTION

More than 2000 species of mushrooms exist in nature; however, less than 25 species are widely accepted as food and only a few have attained the level of an item of commerce (Lindequist, Niedermeyer, & Julich, 2005; Smith, 1972). Wild mushrooms are becoming more and more important in our diet for their nutritional (Breene, 1990; Crisan & Sands, 1978; Manzi, Gambelli, Marconi, Vivanti, & Pizzoferrato, 1999), organoleptic (Maga, 1981) and pharmacological (Bobek & Galbavy, 1999; Bobek, Ginter, Jurcovicova, & Kunia, 1991; Bobek, Ozdyn, & Kuniak, 1995) characteristics. The consumption of wild edible mushrooms is increasing due to a good content of proteins and trace minerals (Ogundana & Fagade, 1982; Senatore, 1990; Thimmel & Kluthe, 1998). Some investigations have even contended that the amino acid compositions of mushrooms are comparable to animal proteins (Fink & Hoppenhaus, 1958; Gruen & Wong, 1982), which is particularly important considering that human nutrition has become more complicated since the outbreak of diseases connected with

animal meat. Although, the nutritional potential or implications of this gradual replacement of meat with mushroom requires careful examination which involves detailed chemical and biological studies. Concerning the use of mushrooms as a functional food and as source for the development of drugs and nutraceuticals, we have been interested in the evaluation of bioactive properties of wild edible mushrooms from Northeast Portugal, namely antioxidant and antimicrobial activities.

Several studies have been carried out on the chemical composition and nutrition quality of edible mushrooms from different countries, particularly on Spanish (Die´z & Alvarez, 2001), Italian (Manzi, Aguzzi, & Pizzoferrato, 2001; Manzi, Marconi, Aguzzi, & Pizzoferrato, 2004), Turkish (Yildiz, Karakaplan, & Aydin, 1998), Indian (Agahar- Murugkar & Subbulakshmi, 2005; Longvah & Deosthale, 1998) and Nigerian (Aletor, 1995; Fasidi, 1996) species.

In spite of the immense popularity of this food in the region and their increased exportation to foreign countries (particularly Spain, France and Italy), data regarding the nutritive value of the wild mushroom varieties available in the region are very meagre. Herein, we report the chemical composition of cultivated edible mushrooms (Lentinus tuberregium), with reference to the content of fatty acid. The fatty acid profile was obtained by gas–liquid chromatography coupled to a flame ionization detector (GLC/FID). On the basis of the sample composition, an estimation of the mushroom fatty acid role was also performed.

MATERIALS AND METHODS

CULTIVATION OF MUSHROOMS

Lentinus tuberregium was grown on paddy straw beds prepared from paddy straw soaked in water for 15 hr. The size of the paddy straw beds might vary, but the best results were achieved in beds of 1 ft2 and 9 in. in thickness. The beds were kept on a raised platform under shade. Spawns of *Lentinus tuberregium* was prepared by inoculating sterilized paddy straw in a bag; 1- month-old spawns were used for inoculating the beds. Cajanus cajans (red gram) powder (40 mesh) was the best source of nutrient in the beds. The beds were watered twice a day, and the mushrooms appeared 20 days after inoculation. The yield of mushrooms was about 150 to 200 g per bed (Bano and Srivastava, 1963). Fresh mushrooms were taken and dried in a desiccator (over P205) to constant weight. Samples for analysis were prepared as described below.

ESTIMATION OF FATTY ACID BY GAS CHROMATOGRAPHY

Introduce about 0.45 g of the substance to be examined into a 10 ml volumetric flask, dissolve in hexane R containing 50 mg of butylhydroxytoluene R per litre and dilute to 10.0 ml with the same solvent. Transfer 2.0 ml of the solution into a quartz tube and evaporate the solvent with a gentle current of nitrogen R. Add 1.5 ml of a 20 g/L solution of sodium hydroxide in methanol, cover with nitrogen, cap tightly with a polytetrafluroethylene lined cap, mix and heat in a water bath for 7min. Cool, add 2 ml of borontricholoride methanol solution, cover with nitrogen, cap tightly mix and heat in a water bath for 30 min. Cool to 40-50°C, add 1 ml of trimethylpentane, cap and vortex or shake vigrouslyfor atleast 30 seconds. Immediately add 5 ml of saturated sodium chloride solution, cover with nitrogen, cap and vortex or shake thoroughly for at least 15 seconds. Allow the upper layer to become clear and transfer to a separate tube. Shake the methanol layer once more with 1 ml of trimethylpentane and combine the trimethylpentane extracts. Wash the combined extracts with 2 quantities, each of 1 ml, of water and dry over anhydrous sodium sulphate. Prepare 2 solutions for each sample.

The chromatograph consist of Ashmaco GC flame ionization detector, carrier gas as hydrogen or helium, oxygen for ignition purpose. Column BPX – 70 (50% cyanopropyl 50% methylsiloxane). Injection port 250°, detector port 280°, oven starting temperature 160° and increase by 7.0° per minute the final oven temperature is 240°.

RESULTS AND DISCUSSION

The results for fatty acid composition, total saturated fatty acids (SFA), of the studied mushroom is shown in Table 1. In general, the major fatty acids found in the studied sample were palmitic acid (C16 30:6) and moroctic acid (C18:4 44:6), followed by stearic acid (C18 33:5). This is in agreement with the results reported for the Indian mushrooms, *Schizophyllum commune* and *Lentinus edodes*, in which linoleic (65%), palmitic (20%) and oleic (10%) acids accounted for almost the whole of the fatty acids determined (Longvah & Deosthale, 1998). Similar observations have been made in other mushrooms (Senatore, Dini, & Marino, 1988). The fatty acid profile of several *Tricholoma* species was already determined and once more, for *T. portentosum* and *T. terreum*, oleic (57%) and linoleic (28%) acid were the main fatty acid constituents, while other fatty acids detected were found only in small amounts (Die´z & Alvarez, 2001). It is known that linoleic acid is the precursor

of 1-octen-3-ol, known as the alcohol of fungi, which is the principal aromatic compound in most fungi and might contribute to mushroom flavour (Maga, 1981).

This is consistent with the observations that, in mushrooms, unsaturated fatty acids predominate over the saturated in the total fatty acid content (Die´z & Alvarez, 2001; Longvah & Deosthale, 1998; Mauger et al., 2003). A rapidly expanding literature documents the importance of trans fatty acids (TFAs) in human health due to the increased risk of cardiovascular disease where they are negatively correlated with plasma HDL-cholesterol concentration and positively correlated with plasma LDL-cholesterol level (Minamide & Hammond, 1985). It is also important to point out that, in contrast to other fungi (Die´z & Alvarez, 2001; Longvah & Deosthale, 1998), no other fatty acids with an odd number of carbon atoms have been detected in considerable amounts.

Table1: Fattyacid Composition In Fruitbody Of *Lentinus Tuberregium*.

Fatty acid	FRUITBODY
Palmitic acid	4.55%
Moroctic acid	0.43%
Stearic acid	6.75%
Oleic	5.98%
Linolenic	7.44%
Alpha linolenic	3.44%
Moroctic acid	0.112%

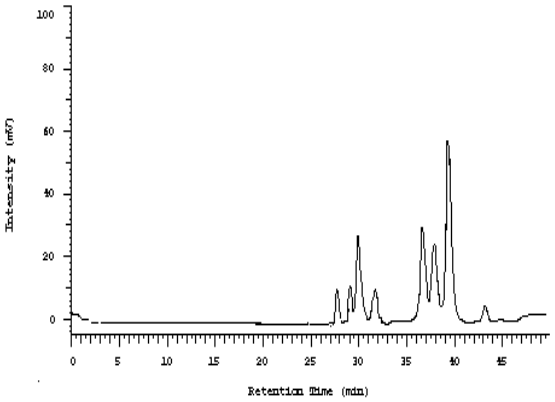

Fig 1: Fatty acid standard graph.

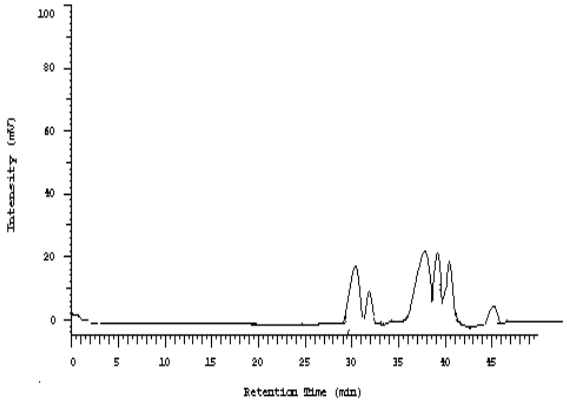

Fig 2: Fattyacid composition in *Lentinus tuberregium* (Fruitbody).

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