Nutritional and Medicinal Potential of Twenty-Three Wild Mushrooms from Northeast Thailand

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Twenty-three species of wild mushrooms (mostly polypores from genera *Trametes, Ganoderma, Schizophyllum, Inonotus, Phellinus,* and *Lentinus*) from Sakon Nakhon, northeast Thailand, were collected, and their pure cultures were kept at the Department of Plant Pathology, Khon Kaen University, for further studies.

In this paper, the nutritional value, potential of exo-polysaccharides production, and ability to produce lectins from all species were investigated. In order to produce mycelial biomass, exo-polysaccharides, and lectins culture was grown in a 250 mL Erlenmeyer flask containing 100 mL of rice bran dextrose malt peptone (RbDMP) medium at room temperature on a rotary shaker at 125 rpm for 10–15 days. For nutritional value, the mycelial biomass was analyzed for ash, proteins, and amino acids contents. The content of ash determined by incineration of mycelia at 500 ± 10°C for 8 hours was very low (approximately 4.73 ± 0.36% of dry matter) in all species. The protein content of all species analyzed through the macro-Kjeldahl method was varied among species, and the average of crude protein was 22.2 ± 5.5% (range 13.3–26.5) of mycelium dry weight. Essential amino acids were determined by using modified techniques (Wiedmeier, Porterfield, and Hendrich, 1982) after hydrolysis of freeze-dried samples with 6 N HCl for 24 hours at 110 °C and analyzed through Shimadzu High Performance Liquid Chromatography. The amino acid patterns were shown clearly, and all amino acids contained in all species were calculated. The amount of the essential amino acids accounted for at least 30.77%, by average, of total amino acids content. Tryptophan could not be detected by the method mentioned above. Essential branch chain amino acids such as isoleucine, leucine, and valine were high, which were useful in treatments involving muscle, mental, and emotional upsets as well as for insommia and nervousness. The amount of exo-polysaccharides was obtained by mixed culture filtrate with 4 vol. of 100% ethanol, stirred vigorously, and kept overnight at 4 °C, and the precipitated exo-polysaccharides were air dried and weighted.

Exopolysaccharide production varied considerably among species ranging from 0.33 to 6.59 mg/L with an average of 2.91 ± 0.19 mg/L. Lectin extraction was performed in crude extract by using 5 times (w/v), 10 mM phosphate buffer saline (PBS contained 0.02 M sodium bisulphite, pH 7.2), stirred for 2 hours at 4 °C, filtrated and centrifuged for 15 minutes at 12,000 rpm. A hemagglutination test of a serial two-fold dilution of the crude extract and cultured broth was investigated by using Microtiter U-plates with 2% suspension of red blood cells of animals (six kinds) in PBS pH 7.2. Hemagglutination titers of lectins were positively detected at 1:1 (majority) up to 1:16 (1 species) in mycelium, cultured broth, or both in most of the species investigated. All measurements clearly indicated the potential of those wild polypore mushrooms from northeast Thailand as good sources of alternative nutritional food and potential uses as alternative medicine to promote good health and to enhance the body's adaptive capabilities.