Thesis Title Trypsin Inhibiting Effect and Possible Formation of Nitroso Compound of Conventional Thai Mushrooms.

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Abstract

The extracts of twenty one edible mushrooms namely, *Agaricus bisporus* (Lang) Sing (เห็ดกระดุม), *Termitomyces fuliginosus* (Heim) (เห็ดโคน), *Amanita vaginata* (Fr.) (เห็ดระโงกเหลือง), *Agrocybe cylindacea* Quel var fulva Gill (เห็ดยานาหงิ), *Boletus edulis* (Bull.) (เห็ดตับเต่า), *Volvariella volvacea* (เห็ดฟาง), *Russula delica* (Fr.) (เห็ดตะไคล), *Clitocybe* sp. (เห็ดขอนขาว), *Lentinus edodes* (เห็ดหอม), *Pleurotus citrinopileatus* (Vass.) Sing (เห็ดนางรมทอง), *Pleurotus cornucopiae* (Pers) Rolland (เห็ดนางรมขาว), *Pleurotus cystidiosus* (เห็ดเป๋าฮื้อ), *Pleurotus eous* (เห็ดนางรมภูฐาน), *Pleurotus flabellatus* (เห็ดนางนวล), *Pleurotus sajor caju* (Fr.) Sing (เห็ดนางฟ้า), *Tricholoma crassum* (Bert.) Sacc (เห็ดตีนแรด), *Craterellus* sp. (เห็ดขมิ้นน้อย), *Ganoderma lucidum* (เห็ดหลินจือ), *Schizophyllum commune* (เห็ดแคลง), *Auricularia polytricha* (เห็ดหูหนูหนาดอกน้ำตาล) and canned *Astreaus* sp. (เห็ดเผาะ) were studied on the apparent

in vitro trypsin inhibitor (TI) activity. The determination on p-nitroaniline after hydrolysis of substrate, N-benzoyl-DL-arginine-p-nitroanilide hydrochloride (BAPA) with trypsin was performed. The results showed that only three mushroom species of *Termitomyces fuliginosus* (เห็ดโคน) *Volvariella volvacea* (เห็ดฟาง) and *Tricholoma crassum* (เห็ดตีนแรด) had antitryptic activity. However, TI presence in *Volvariella volvacea* (เห็ดฟาง) was 9.67 TUI/mg dry wt which provided higher activity than that of the other two mushrooms with very low activity compared with soybean trypsin inhibitor (SBTI).

The effects of heat treatment on the destruction of TI in the aqueous extracts of mushroom were studied. TI of *Volvariella volvacea* (เห็ดฟาง) was more thermolabile than the inhibitors of soybean. The inhibitory activity remained 23.68% after heated at 37°C for 24 hours. The TI of *Volvariella volvacea* (เห็ดฟาง), *Termitomyces fuliginosus* (เห็ดโคน), *Tricholoma crassum* (เห็ดตีนแรด) and soybean were almost completely destroyed after autoclaved at 121°C, 15 lb/in^2 for 30 minutes. Interestingly, destruction pattern of trypsin inhibitor activities of *Termitomyces fuliginosus* (เห็ดโคน) and *Tricholoma crassum* (เห็ดตีนแรด) were nearly the same.

All mushroom extracts produced considerable amount of N-nitroso compound (calculated as N-nitroso morpholine (NMOR)) after being nitrosated with exogeneous

nitrite at pH 3.0-3.5 and 37°C for 4 hours. The range were between 0.66 to 59.09 nmol/gram wet wt whereas the highest amount was found in the extract of *Ganoderma lucidum* (เห็ดหลินจือ) and the lowest of *Auricularia polytricha* (เห็ดหูหนูหนาดอกน้ำตาล).

The nitrate and nitrite contents in twelve mushrooms were 0.40-2.64 μmol/gram wet wt and 3.48-45.50 nmol/gram wet wt, respectively.

The results from concomitant study demonstrated that some mushrooms had antitryptic activities. All species contained possible N-nitroso compound precursors after nitrosated in acidic condition. Therefore, the consumption of cooked mushroom and with an avoidance of nitrite-cured food might be good to health.