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Studies on Constituents of Korean Basidiomycetes (L)

Antitumor Components Extracted from Cultured Mycelia of Several Basidiomycetes

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Abstract ☐ To find antitumor metabolites in Korean basidiomycetes, the shake-cultured mycelia of eight of the higher fungi were extracted with hot water and the extracts, after being partially purified, were subjected to *in vivo* antitumor test. When administered *i.p.* at the dose of 30mg/kg/day for ten consecutive days into the female ICR mice, which had been implanted with 1×10^6 cells of sarcoma 180 twenty-four hours before the first injection, the extracts of *Agaricus campestris*, *Lyophyllum decastes*, *Lyophyllum ulmarium*, *Armillaria tabescence* and *Calvatia exipulitormis* respectively showed inhibition ratios of 64.1%, 65.4%, 60.0%, 53.0% and 49.3%. These five species were selected for further study, whereas the extracts of *Phallus impudicus*, *Coprinus comatus* and *Pholiota squarrosa* which showed the inhibition ratios of 31.2%, 33.5% and 19.0% were discontinued.

Keywords ☐ Basidiomycetes, Antitumor activity, Sarcoma 180, *Agaricus campestris*, *Lyophyllum decastes*, *L. ulmarium*, *Armillaria tabescence*, *Calvatia exipulitormis*, *Phallus impudicus*, *Coprinus comatus*, *Pholiota squarrosa*.

The mycelia of the basidiomycetes were isolated and maintained on PDA slants (Difco Lab., 39g/l). Then submerged cultures were carried out in the medium containing glucose 50g, yeast extracts 10g, peptone 10g, KH_2PO_4 0.87g, $MgSO_4\cdot7H_2O$ 0.5g, $CaCl_2$ 0.3g, $ZnSO_4\cdot7H_2O$ 4mg, $CuSO_4\cdot5H_2O$ 1mg, $MnCl_2\cdot4H_2O$ 7mg, and $FeSO_4\cdot7H_2O$ 10mg per liter (pH 5.5 before autoclaving). After the mycelia were grown on Gallenkamp Orbital Incubator for one to four weeks at 26 ± 1°C at 180 rpm as seed cultures, the main cultures were carried out under the same conditions.

Then the mycelia were harvested and washed with distilled water. The washed mycelia were homogenized and extracted with hot water on a boiling water bath (80~90°C). The extracts were concentrated and precipitated with three volumes of 95% ethanol. The precipitates were obtained by centrifugation (10,000×g, 30 min.) and dissolved in distilled water. The dialysis of these solutions was carried out at 4°C for three days against distilled water and the dialyzates were concentrated. The concentrates were freeze-dried to obtain solid samples for antitumor tests.

Antitumor tests were carried out against female ICR mice implanted with 1 x 10^6 cells of sarcoma 180 into the left groin subcutaneously. In 24 hours after the tumor implantation, the intraperitoneal administration of the samples was continued once daily for ten consecutive days at a dose of 30mg/kg/day. Thirty days after the tumor transplantation, the mice were

Table I: Antitumor activities of the eight Korean basidiomycetes.

Basidiomycetes Tested	Dose (mg/kg/day)	Average Tumor Wt.(g)	Inhibition Ratio(%)	Complete Regression
Agaricus campestris	30	1.12±0.33*	64.1	0/9
Lyophyllum decastes	30	1.08±0.42	65.4	1/9
Control	saline	3.12±0.54	—	—
Lyophyllum ulmarium	30	0.42±0.22	60.0	3/9
Control	saline	1.05±0.30	—	—
Armillaria tabescence	30	1.66±0.48	53.0	1/9
Phallus impudicus	30	2.43±0.41	31.2	0/9
Control	saline	3.53±0.66	—	—
Coprinus comatus	30	3.15±0.93	33.5	0/9
Control	saline	4.74±1.26	—	—
Calvatia exipulitormis	30	1.13±0.25	49.3	1/9
Pholiota squarrosa	30	1.81±0.50	19.0	0/9
Control	saline	2.23±0.29	—	—

* Mean ± S. E.

sacrificed and solid tumors were excised and inhibition ratios were calculated from their weights.

The inhibition ratios of the samples against sarcoma 180 cells varied from 19.0% to 65.4% (Table I). Among the eight samples, the extracts of *Lyophyllum decastes*, *Agaricus campestris* and *L. ulmarium* exhibited relatively strong activities (65.4%~60.0%), whereas those of *Armillaria tabescence* and *Calvatia exipulitormis* showed moderate activities(53.0% and 49.3%). The other samples exhibited almost negligible activities.

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