Key active constituents:

Acidic polysaccharides (glucuronoxylomannan) (antitumour, immunostimulatory, antidiabetic, skin enhancing)

Cordyceps sinensis and C. sobolifera

The fungi grow as parasites in larvae of Lepidoptera, gradually taking over the entire larval body. The diseased larvae bury themselves in the soil and die. Later the fungal mass or stroma grows out of the pupa and can be identified and collected.

The caterpillar fungus or Tochukaso has been highly regarded in Chinese medicine for many centuries. It is not a mushroom type fungus and the fruiting structure cannot be cultivated or cultured. The complete structure can be used in many forms, whole, powdered or extracted and has many applications in Chinese medicine (Hobbs, 1995; Halpern, 1999). Anti-cancer polysaccharides have been isolated from several species of Cordyceps and some have been shown to have hypoglycaemic activity as well (Jones, 1997; Itami and Yahagi, 1990; Kun 1998). A major concern with herbal medicine using Cordyceps collected from nature is quality and safety.

However, the pure mycelium of these parasitic fungi can now be easily cultivated in fermentors and is attracting considerable interest as an agent to treat fatigue and improve motor function (Mizuno, 1999). The major chemical, pharmacological and toxicological studies on Cordyceps sinensis have been reviewed for English and Chinese literature by Zhu et al. (1988a,b). These studies show that the main activities of the fungus are in oxygen-free-radical scavenging.
Fig. 12 *Cordyceps* spp. stroma growing out of colonised insects
With this particular fungus it is clear that there will be increased usage of fermenter-produced mycelium. Such methods use selected media under aseptic conditions, providing better quality and homogeneity through process control.

*Key active constituents:*

Galactomannans (antitumour, immunostimulating)
Cordycepin
Sterols

**Schizophyllum commune**

This is a small, whitish fungus with no stalk which grows on dead trees throughout the year. It is a very common fungus and has worldwide distribution (Hobbs, 1995). Pharmacologically it is extremely important because it produces the polysaccharide Schizophyllan which shows considerable anti-cancer activity in xenograph and clinical practice. There have been numerous clinical trials with Schizophyllan which will be discussed later (Ooi and Liu, 2000).

*Key active constituents:*

Beta-glucans (antitumour and immunomodulation).
Fig. 13a  *S. commune* growing naturally on dead deciduous tree

Fig. 13b  *S. commune* view of underside of fruitbody
Agaricus blazei

This mushroom was first discovered in the USA in the 1940s but its main commercial cultivation now occurs in Japan and Brazil. In Japan it is called Himematsutake and is one of the most expensive medicinal mushrooms. A novel polysaccharide-protein complex has been shown to be highly active against a variety of xenographs (Ito et al., 1997).

Key active constituents:

Beta (1,3)-D-glucan, Beta (1-4)-D-glucan, Beta (1-6)-D-glucan (antitumour and immune enhancing)
Proteogluclans (antitumour).

Fig. 14 Agaricus blazei, Himematsutake or the Almond Portobella, grown in cased leachate cow manure (Stamets, 2000)
References


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