Chapter 2.

Mushroom extracts (2)

----- Coriolus versicolor

General Description

Literature References

The Cov-1 Cultivation and Mycelium Preparation

The Extraction of Cov-1 Mycelium

Product Specifications

Attachment

Literature References:

- Yang Q. History, present status and perspectives of the study of Yun Zhi polysacc-haropeptide. PSP International Symposium 2003: P5-15 in Hong Kong.
- Jong S, and Yang X. PSP- a powerful biological research modifier from the mushroom coriolus versicolor. PSP International Symposium 2003: P15- 28 in Hong Kong.
- Yang Q. Yun Zhi polysaccharopeptide (PSP) and the general aspects of its research. PSP International Symposium 2003: P29-38 in Hong Kong.
- Zhou Y, and Yang Q. Active principles from Coriolus Sp. PSP International Symposium 2003: P111-124 in Hong Kong.
- Jin T. Toxicological Research on Yun Zhi Polysaccharopeptide (PSP). PSP International Symposium 2003: P76-79 in Hong Kong.
- Liu T. PSP in clinical cancer therapy- a review. PSP International Symposium 2003: P68-74 in Hong Kong.
- Li X. Advances in immunomodulating studies of PSP. PSP International Symposium 2003: P39-46 in Hong Kong.
- Yin Q. The analgesic effect of Yun Zhi polysaccharopeptide. PSP International Symposium 2003: P47-61 in Hong Kong.
- Xu L. The anti-tumor and anti-virus activity of polysaccharopeptide (PSP). PSP International Symposium 2003: P62-67 in Hong Kong.

Mushroom extracts (2)

----- Coriolus versicolor

General Description

From 1984 to 1987, Chinese researchers collected and screened 80 strains of Yun Zhi *(Trametes versicolor,* Fr), and picked up one strain called Cov-1 (Coriolus versicolor-1) for industry product development based on the contents of polysaccharopeptide (PSP) which biological activity and chemical structure are similar with Krestin (PSK) discovered in Japan. One specific fermentation system called deep layer cultivation technology has been developed for bulk mycelia culture and made this raw material available in commercial market (Yang, Q.Y: PSP Symposium 2003 in Hong Kong).

PSP possesses a molecular weight of approximately 100 kDa. Glutamic and aspartic acids are abundant in its polypeptide component, whereas its polysaccharide component is made up of monosaccharides with alpha-1,4 and beta-1,3 glucosidic linkages. The presence of fucose in PSK and rhamnose and arabinose in PSP distinguishes the two protein-bound polysaccharides, which are otherwise chemically similar. PSP is classified as a biological response modifier. It induces, in experimental animals, increased gamma-interferon production, interleukin-2 production, and T-cell proliferation. It also counteracts the depressive effect of cyclophosphamide on white blood cell count, interleukin-2 production and delayed-type hypersensitivity reaction. Its antiproliferative activity against tumor cell lines and in vivo antitumor activity have been demonstrated. A small peptide with a molecular weight of 16-18 kDa originating from PSP has been produced with antiproliferative and antitumor activities. PSP administered to patients with esophageal cancer, gastric cancer and lung cancer, and who are undergoing radiotherapy or chemotherapy, helps alleviate symptoms and prevents the decline in immune status.(Ng TB: Gen Pharmacol. 1998 Jan;30(1):1-4.).

PSP isolated from the mycelia of Chinese Medicinal fungus Coriolus versicolor has gone through clinical trial phase I, II and III in cancer patients. From the clinical trial data, PSP didn't show any obvious toxicity to humans. The data have shown that PSP plays very important role in immunomodulatory and antitumor activities (Liu, T.F. and Jin, T.Y: PSP symposium 2003 in Hong Kong). Extracted powder has been packaged into different formulas for commercialization as a dietary supplements in worldwide.

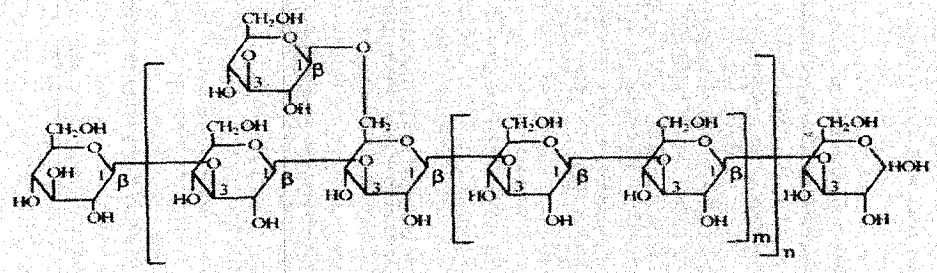

Figure 2. Chemical structure of PSP

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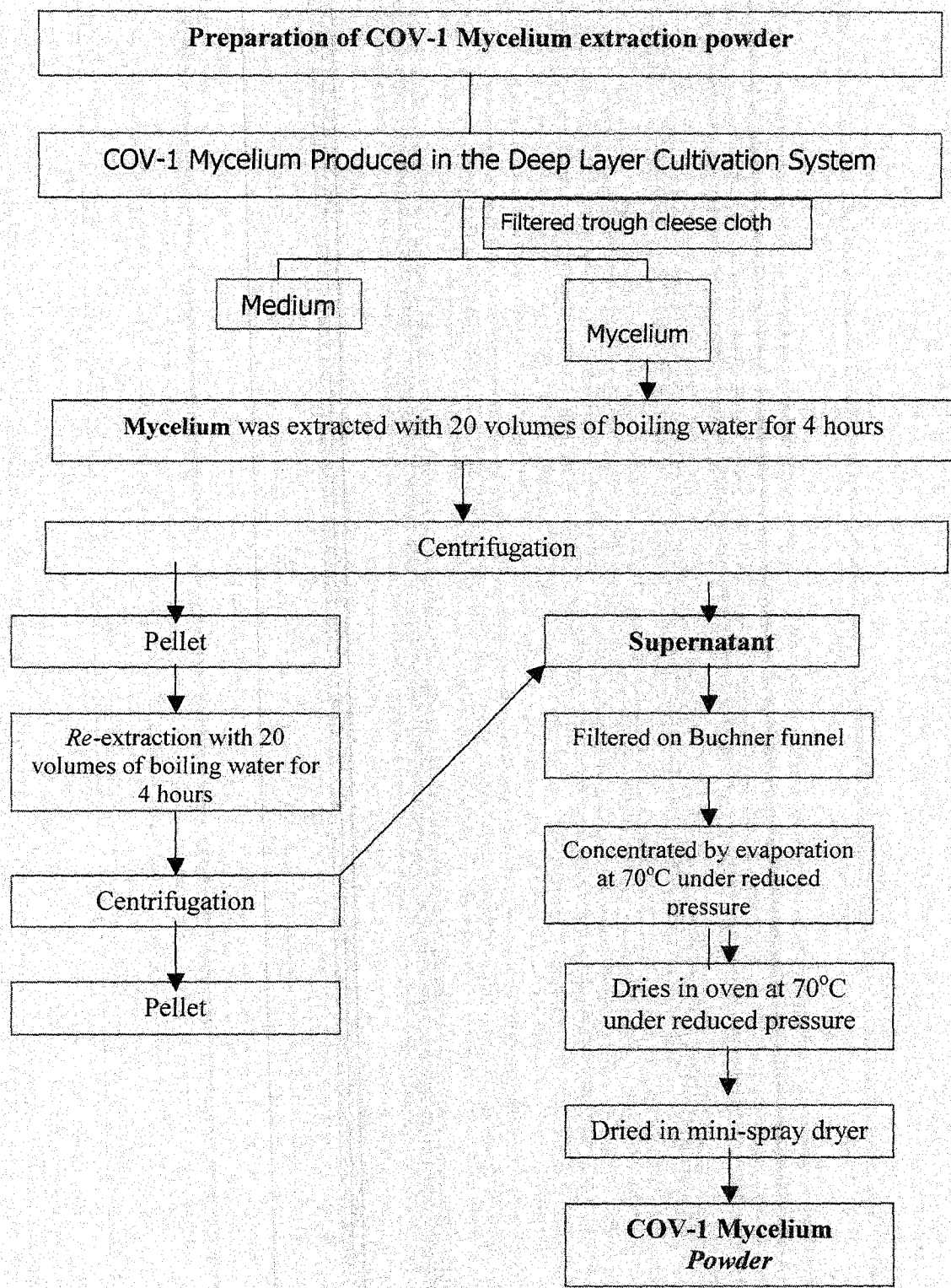
The Cov-1 Cultivation and Mycelium Preparation

Mycelia of Cov-1 are cultured in an industrial fermentation system through the technology called Deep Layer Cultivation Technology invented by Department of Biology, Normal University of Shang Hai. The fermentation system has the production capacity of 1000 tones per year.

The Extraction of Cov-1 Mycelium

The mycelium of Cov-1 with culture medium was filtered and colleted the mycelium for extraction process. Cultured mycelium was extracted with 20 volumes of boiling water for 4 hours. Supernatant could be collected after centrifugation. The pellet after centrifugation was repeated re-extraction in the boiling water for another 4 hours. The supernatant solutions was filtered by the Buchner funnel and concentrated by evaporation at 70°C under reduced pressure, and dried in mini-spray dryer (please see flow chart below).


Preparation of COV-1 Mycelium extraction powder
COV-1 Mycelium Produced in the Deep Layer Cultivation System
Filtered trough cleese cloth
Medium
Mycelium
Mycelium was extracted with 20 volumes of boiling water for 4 hours
Centrifugation
Pellet
Re-extraction with 20 volumes of boiling water for 4 hours
Centrifugation
Pellet
Supernatant
Filtered on Buchner funnel
Concentrated by evaporation at 70°C under reduced pressure
Dries in oven at 70°C under reduced pressure
Dried in mini-spray dryer
COV-1 Mycelium Powder

Product Specifications (translated version from Chinese version by Xin-Kang Pharmaceutical Company)

Product Name: **COV-1 Mycelium *Powder***
Content: 40.0% PSP polysaccharides
Manufacturer: Xin-Kang Pharmaceutical Company
Shanghai Normal University
100# Guilin Rd. Shanghai, China. PC 200234

Microorganisms:

Total plate count	0/g (Less than 10 CPU/g)
E. coli	*0/100g (*Less than 30 CFU/100g)
Yeast	Not detected
Pathogenic bacteria	Not detected

Heavy Metals:

Arsenic	< 1.0 ppm
Cadmium	< 1.0 ppm
Mercury	< 0.5 ppm
Lead	< 1.0 ppm
Copper	< 20 ppm

Pesticide Contamination:

Hexachlorobenzene	Not Detected
Quintozene	
Pentachloronitrobenzene (PCNB)	Not Detected
Pentachloroaniline	Not Detected
Pentachlorothioanisol	Not Detected
Lindane	Not Detected

Mushroom coriolus versicolor

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