

Abstract

Cordyceps, one of the well-known traditional Chinese medicines, is a composite consisting of the stromata of the fungus, *Cordyceps sinensis* (Berk.) Sacc. (Family: Hypocreaceae) parasitized on the larva of some species of insects (Family: Hepialidae). The polysaccharides are considered to possess antioxidant, immuno-modulation, anti-tumor, and hypoglycemic activities. However, most reports usually focused on the chemical and biological research on polysaccharides from cultured *Cordyceps*. To date, there is few study on the polysaccharide from natural *Cordyceps sinensis*, and the difference of polysaccharides between natural and cultured *Cordyceps sinensis* is still unknown. In addition, how to control the quality of polysaccharides is a problem due to their complexity and similarity.

In this study, a high-performance thin-layer chromatography (HPTLC) method was firstly developed to distinguish the polysaccharides from 6 traditional Chinese medicines (TCMs), including *Cordyceps sinensis*, *Panax ginseng*, *Panax notoginseng*, *Panax quinquefolii*, *Ganoderma lucidum* and *Astragalus membranaceus*, using 7 monosaccharides and 2 glycuronic acids as references. Then, alkaline polysaccharides from natural *Cordyceps sinensis* were prepared and purified. The partial characteristics of purified polysaccharide were analyzed and elucidated. Finally, the antioxidant activities of crude alkaline extracted polysaccharides (CAP) and the purified polysaccharides (PCAP) were determined using DPPH and ABTS assay.

There are three chapters in the thesis.

Chapter 1 was a mini-review on *Cordyceps* polysaccharides related to the chemical research, biological activities, and quality control.

Chapter 2 described a high-performance thin-layer chromatography (HPTLC) method for the discrimination of polysaccharides from six traditional Chinese medicines. The acid hydrolyzates of polysaccharides were analyzed by HPTLC combined with two coloration methods and thin layer scanning technique. In this method, 7 monosaccharides and 2 glycuronic acids were used as reference compounds, and 6 crude polysaccharides were easily discriminated.

The separation, purification, characteristics elucidation and antioxidant activity of CAP and PCAP were shown in **Chapter 3**. The techniques such as ultrafiltration, column chromatography were used, and a pure polysaccharide (PCAP) was obtained. The characteristics of PCAP, total sugar content, IR spectrum, molecular weight, constituted monosaccharide and their molar ratio, were analyzed using HPTLC, HPLC, and IR. DPPH and ABTS free radical scavenging assay was applied for evaluation the antioxidant activity of CAP and PCAP.

Key words: *Cordyceps sinensis*, Alkaline extracted polysaccharides, Chromatography, Quality control, Antioxidation