after radiation compared to untreated, irradiated controls. The extract thus appeared to promote recovery from radiation effects rather than to protect against them [15]. Use of an aqueous extract of *A. senticosus* in combination with either cytarabine or N^6-(Δ^2-isopentenyl)adenosine had additive antiproliferative effects on L 1210 leukemia cells in vitro [16].

A crude polysaccharide component, PES, was obtained in 0.5% yield by treatment of a hot ethanol extract of powdered roots of *A. senticosus* with acetone. Polysaccharide components PES-A and PES-B were separated by chromatography of crude PES on DEAE-Sephadex A-25 and elution with water and 0.1 and 0.25 N NaCl solutions. PES-A and PES-B were recovered in 0.1 N and 0.25 N NaCl fractions, respectively, and further purified on DEAE-cellulose DE-32 to a final yield of 0.01% and 0.001% of the root, respectively. Gel filtration on Sephadex G-150 and G-200 showed molecular weights of 7000 for PES-A and of 76 000 for PES-B. Both PES-A and PES-B contained glucose, galactose, and arabinose. The molar ratios of glucose:galactose:arabinose were 33:2:1 for PES-A and 2:9:18 for PES-B [17]. The crude polysaccharide PES and the separated and purified components PES-A and PES-B were effective immunostimulating agents. They potentiated the antibody response against sheep red blood cells and stimulated phagocytosis by peritoneal macrophages of mice. They were also found to decrease toxic effects of thioacetamide and phytohemagglutinin in mice and to enhance resistance to X-ray irradiation [18]. Intraperitoneal administration into mice of PES at a dosage of 125 mg/kg for 5 days simultaneously with 0.2 mg bovine serum albumin (BSA) per animal markedly increased the serum levels of anti-BSA IgG and total anti-BSA antibodies but not the serum level of total IgG indicating that PES stimulates the immune activity of mice against invading foreign substances [19]. In vitro the polysaccharides caused a five- to tenfold increase in interferon titer in S 801 and S 7811 leukemic cell cultures [20].

In addition, a homogeneous glucan with a mean molecular weight of 150 000 and homogeneous heteroxylan with a mean molecular weight of 30 000 were isolated from an alkaline aqueous extract of *A. senticosus* by DEAE-Sepharose CL-6B and Sephacryl S-400 column chromatography. The crude polysaccharide mixture and the heteroxylan stimulated phagocytosis in in vitro and in vivo tests [21].

Furthermore, the glycans eleutheran A–G exerted a marked hypoglycemic effect in normal and in alloxan-induced hyperglycemic mice [4]. 3,4-Dihydroxybenzoic acid and its ethylester inhibited rat platelet aggregation [3].

1.4 *Acanthopanax gracilistylus*

Wujiapi, Cortex Acanthopanacis, is another item derived from the *Acanthopanax* plant and listed officially in the Chinese Pharmacopoeia. It is the dry root bark of *A. gracilistylus* W. W. Smith. The roots are collected in summer and fall, and the rootbark is peeled off and dried. It is used as an antirheumatic, antiedemic, and tonic preparation.

From the root bark of *A. gracilistylus*, sesamin, β-sitosterol, syringin, β-sitosterolglucoside, eleutheroside B_1, kaurenoic acid (*1-30*) 16-α-hydroxy-kauran-18-oic acid (*1-31*), and stearic acid have been isolated and identified [22, 23].