

OVA aerosol inhalation challenge. Histopathological changes were examined to study the effects of *Perilla* consumption.

**Results** The rat model of bronchial asthma was successfully established. Compared with model group, large, medium and small doses of *Perilla* seed significantly increased the weight of bronchial asthma rats ( $p < 0.01$ ) and significantly decreased serum levels of NO and IL-6 ( $p < 0.01$ ).

**Conclusions** *Perilla frutescens* seed has a protective effect in the rat model of bronchial asthma.

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## Biochemical Pharmacy

### 13 THE EFFECTS OF BIO SUGAR INFLUENCE ON TOAD SCIATIC NERVE-TRUNK ACTION POTENTIAL

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**Objectives** MSD is a type of bio sugar made by an MS bio sugar research institute in South Korea. The bio sugar has a glycan structure with a functional group on the monosaccharide. Our objective was to observe the effects of different concentrations of MSD on toad sciatic nerve-trunk action potential, and whether MSD can improve the inhibitory effect on toad sciatic nerve-trunk action potential of hypertonic glucose solution.

**Methods** Toad sciatic nerve trunks were randomly divided into three groups, namely a control group, an MSD group and a hypertonic glucose group. Following soaking with different concentrations of MSD, toad sciatic nerve-trunk action potential amplitudes and conduction velocities were determined using a BL-420 biological function experimental system.

**Results** Compared with the control group, 1% MS inhibited toad sciatic nerve-trunk action potential amplitude and conduction velocity but the effects disappeared after 10 min, while 0.5% MSD decreased action potential amplitude and increased conduction velocity. Soaking in 10% hypertonic glucose with 0.5% MSD after processing permanently inhibited toad sciatic nerve-trunk action potential. MSD can inhibit toad sciatic nerve-trunk action potential amplitude and conduction velocity.

**Conclusions** The activity of 0.5% MSD is better than that of 1% MSD. MSD can improve the inhibitory effects of 10% hypertonic glucose solution on toad sciatic nerve-trunk action potential.

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### 14 EFFECTS OF SAMPLE EXTRACT METHODS ON THE PRODUCTION AND ANTIOXIDANT ACTIVITY OF *LEPISTA SORDIDA* POLYSACCHARIDES

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**Background** Polysaccharides, one of the main bioactive compounds in natural resources such as fungi, plants and algae, have attracted lots of attention in biomedical and functional food science due to their significant pharmaceutical activity. In this study, four extraction methods were compared regarding the production, physicochemical properties and antioxidant activity of polysaccharides from *Lepista sordida* using hot water, an alkaline solution, a multiplex-enzyme method and an ultrasonic-assisted method.

**Methods** Bioactive polysaccharides from *L. sordida* were extracted using hot water, an alkaline solution, a multiplex-enzyme method and an ultrasonic-assisted method. The anthrone-sulfuric acid method was applied to measure the crude polysaccharide content and Coomassie Brilliant Blue (CBB) G-250 staining was used to detect protein content. The scavenging effect of the hydrolysates on  $\alpha$ ,  $\alpha$ -diphenyl- $\beta$ -picrylhydrazyl (DPPH) free radical was measured.

**Results** Polysaccharides extracted using the multiplex-enzyme method had the highest DPPH scavenging efficiency of 91.62%. The extraction efficiency of the multiplex-enzyme method was  $19.61 \pm 0.60\%$ , only 1.49% lower than that of the alkaline solution method, but the polysaccharide content was  $94.47 \pm 3.84\%$ , which was much higher than the  $74.93 \pm 5.98\%$  obtained using the alkaline solution. The polysaccharides extracted using the multiplex-enzyme method had a low protein content.

**Conclusions** The multiplex-enzyme method was selected to extract the antioxidant polysaccharides of *L. sordida* due to a higher extraction efficiency, better purity and powerful DPPH radical scavenging ability, and lower energy consumption than the other methods. The results are of great significant for developing functional food from *L. sordida* bioactive polysaccharides in the future.

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### 15 ANTITUMOUR ACTIVITY OF GLUCOSAMINE HYDROCHLORIDE IN VITRO

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**Background** Glucosamine hydrochloride, a natural biopolymer present in the daily diet, has various biological activities including antitumour properties and protective effects against pathogens. Early studies showed that daily administration of a derivative of glucosamine induced proliferation of leukemia cells and prolonged overall survival in mice; importantly, no toxicity was associated with the glucosamine treatment. However, the potential mechanism of the antitumour effect is unknown. This study aimed to investigate the inhibitory mechanism and effect of glucosamine on human gastric carcinoma cells in vitro.

**Methods** Gastric carcinoma MKN-45 cells were exposed to 0, 100, 500 and 1000  $\mu\text{g/mL}$  glucosamine hydrochloride for 72 hours, and then the viability and proliferation of gastric carcinoma cells in vitro was measured using the MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay. Quantitative gene expression of MMP-2 and -3 was determined by real-time polymerase chain reaction. Protein level was analyzed using an enzyme-linked immunosorbent assay (ELISA).