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Structural features and anti-AIV- H9N2 activity of three novel polysaccharides from algae

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Prevalence of H9N2 influenza virus has caused widespread poultry mortality in different area of the world including in China. To reduce the prevalence rate and mortality rate the administration of compounds with immunomodulatory or anti-virus effect. In this research, polysaccharides extracted from three seaweeds: *Grateloupia filicina, Ulva pertusa* and *Sargassum qingdaoense* were studied for structural features, immunologic enhancement effect and potential antivirus effect. In the result, the ratio of total saccharide was 53.13%, 40.9% and 20.81 in *Ulva pertusa* polysaccharides (UPP), *Grateloupia filicina* polysaccharides (GFP) and *Sargassum qingdaoense* polysaccharides (SCP) respectively. The monosaccharide composition was determined by high performance liquid chromatography (HPLC) and the sulfated content of UPP, GFP and SCP were 24.99%, 47.33% and 25.81%. Fourier transformation infrared (FT-IR) spectroscopy was applied to assess structure features of these three polysaccharides. Immunologic enhancement effect of the polysaccharides was evaluated both *in vitro* and *in vivo* (in mice) and anti-Avian Influenza virus (AIV)-H9N2 activity was analyzed in the Madin-Darby canine kidney (MDCK) cells. The result indicated that all three polysaccharides could stimulate the spleen cell proliferation effectively *in vitro. In vivo* analysis showed that polysaccharides treated groups obtained higher AIV-specific antibody titers than vaccine group and control group, especially the 50 mg/kg GFP and 50 mg/kg SCP stimulation groups. Meanwhile, the cytokines IFN-γ and IL-4 which can represent the immune level could be stimulated by three polysaccharides, 10 mg/kg group got higher IFN-γ response than the 50 mg/kg group for all three polysaccharides. While for the IL-4 level, the 50 mg/kg treated groups gain better effect than the 10 mg/kg groups. Furthermore, analysis of the CD3+CD4+ T-cell subpopulation level showed that 50 mg/kg groups had better effect than 10 mg/kg groups. Moreover, all of the three polysaccharides could significantly inhibit the activity of H9N2, via measuring the HA level and copies of H9N2. In summary, it revealed that, three polysaccharides are different in structural features, and could enhance the immune level, also have the anti-AIV- H9N2 activity both *in vitro* and *in vivo.*

Biography

Lin Song is now a second-year PhD student at Institute of Oceanology, Chinese Academy of Sciences. She has completed her Master's degree at Lund University in Sweden. During the Master's study, she accomplished her Master thesis project at Purdue University, School of pharmacy, working on the compounds selection of Parkinson's disease. She is now working on the application of algae polysaccharides in Institute of Oceanology, Chinese Academy of Sciences and especially focused on the immune enhancement and anti-virus on animals. Despite being in this field for only one and a half year, she had applied two patents from Chinese Intellectual Property Office, and finished writing one paper.

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