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Research Article

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Chemical Characterization and Antioxidant Activities of Different Sulfate Content of Carrageenan Fractions from Edible Red Seaweed *Chondrus ocellatus*

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elution was collected, dialyzed, concentrated by rotary evaporation, precipitated with ethanol and dried.

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Sulfate content was determined according to the method of Kawai [5]. Infrared spectra were recorded from polysaccharide powder in KBr pellets on a Nicolet Avatar 360FT-IR spect

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e UV spectra of the polysaccharides did not show any peak in Savenging e ects of the three -Carrageenan fractions from the range of 220-300 nm, indicating almost no nucleic acid and prote@chondrus ocellatus lipid peroxide of rat liver microsome are shown existed in the samples. In Figure 5. All showed similar signi cant e ect and the inhibitory

Neutral monosaccharide constitutions of the polysaccharides were analyzed by GLC. For all three samples, galactose was the only sugar unit.

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Among the three samples, the highest inhibitor of lipid peroxidation was CF3, with an IC of 0.087 mg/mL, and inhibitory rate reaching 90% at 1 mg/mL.

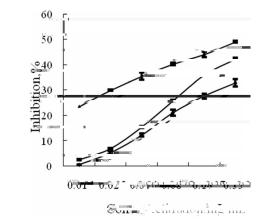
Figure 2 shows the results of hydroxyl radical scavenging activity Figure 6 shows the e ects of the three -carrageenan species from of polysaccharide samples. All the samples showed hydroxyl radical

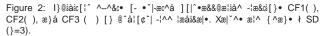
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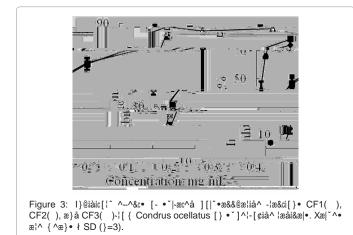
scavenging activity at high concentration with 0 lover 0.1 mg/mL. CF1 and CF2 had similar hydroxyl radical scavenging e ect, while the e ect of CF3 was much stronger.

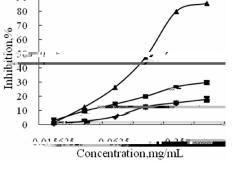
Figure 3 shows the superoxide radical scavenging e ect of the three polysaccharide fractions. All fractions showed weak superoxide radical scavenging activity. CF3 had stronger scavenging activity on superoxide radical than the other fractions, while CF1 had the weakest e ect.

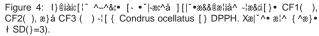
DPPH is one kind of stable organic free radical. e results of DPPH scavenging activity of the three polysaccharide fractions are shown in Figure 4, indicating they all had this activity. e_{50} Gf CF3 was 0.133mg/mL. CF3 had the strongest scavenging activity on DPPH, while CF1 had the weakest e ect.

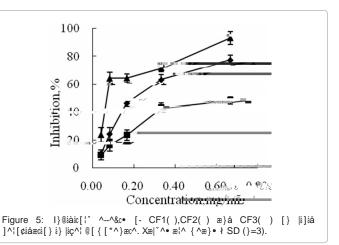


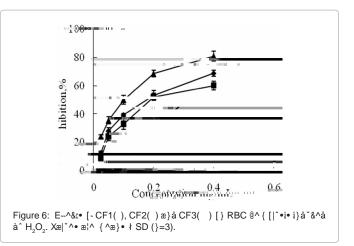












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Chondrus ocellatum H_2O_2 induced hemolysis of rat erythrocytes. e degree of hemolysis of each -carrageenan group were lower than the negative group in each of the ve doses. ey all exhibited stronger scavenging activity at high concentration. eir LC were 0.216 0.312 and 0.120mg/mL, respectively. Also, the di erence was greatest between each -carrageenan group at di erent concentrations.01). is means that concentration of -carrageenan has signi cantly e ect on the activity.

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Currently there is growing interest in using natural medicines to avoid the undesirable side-e ects of synthetic compounds. In this study, three sulfated polysaccharide fractions (CF1, CF2, and CF3) were isolated from naturally-derived degraded -carrageenan, through anion exchange column chromatography. By chemical analysis, we determined that these fractions had the same sugar unit as the original compound, but di ered in their relatively high sulfate content.

e three polysaccharide fractions all exhibited antioxidant activities on di erent degrees. CF3, which had the highest sulfate content, had the strongest scavenging activity on superoxide radical, DPPH, hydroxyl radical and lipid peroxidation in rat liver microsomes. is suggests that sulfate content is important for the antioxidant activities of -carrageenan. CF1 and CF2 had similar sulfate content, as well as hydroxyl radical and superoxide radical scavenging e ect, but showed little di erence in scavenging activity on DPPH. is result was consistent with chemical analysis and IR spectra. According to chemical analysis and IR spectra, CF3 had the highest sulfate content, while CF1 had the lowest sulfate content. CF2 contained a small amount of 3,6-anhydrogalactose. ese results indicate that degraded -carrageenans are e ective antioxidants like other sulfated polysaccharides, and the sulfate content of polysaccharides has a signi cant e ect on their antioxidant activities.

Others have reported on the structure-antioxidant activity relationship of polysaccharides [3,11,7]. ey observed that sulfate

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