PENGARUH PEMBERIAN *CRUDE* AGARO-OLIGOSAKARIDA TERHADAP EKSPRESI GEN *iNOS* DAN KADAR NITRIT OKSIDA PADA HEPAR TIKUS (*Rattus norvegicus* (Berkenhout, 1769)) WISTAR TUA

Nindya Dayita Hapsari

21/478040/BI/10763

Dosen Pembimbing: Dr.biol.hom. Nastiti Wijayanti, S.Si., M.Si

INTISARI

Agarosa merupakan salah satu polisakarida penyusun Rhodophyta atau alga merah. Salah satu oligosakarida penyusun agarosa, yaitu Agaro-oligosakarida (AOS) diketahui memiliki potensi antioksidan, karena kandungan *3,6-Anhydro-L-Galactose* (L-AHG) pada ujung pereduksi. Hepar merupakan organ pengatur detoksifikasi, sehingga menjadi salah satu organ penting dalam tubuh. Ketika hepar mengalami penuaan maka terjadi penurunan fungsional. Beberapa tanda penuaan pada organ hepar adalah adanya perubahan indeks organ, meningkatnya ekspresi gen *induced nitric oxide synthase* (*iNOS*) dan kadar nitrit oksida (NO). Ketiga tanda tersebut dapat memberikan informasi ketika terjadi stress oksidatif. Penelitian ini dilakukan dengan tujuan menguji potensi *crude* AOS sebagai antioksidan terhadap stress oksidatif pada hepar tikus tua. Penelitian dilakukan di Fakultas Biologi, Universitas Gadjah Mada. Pengujian dilakukan pada 15 ekor tikus Wistar usia 3 bulan dan 15 ekor tikus Wistar usia 17 bulan. *Crude* AOS diadministrasikan secara *per-oraI* setiap hari selama 4 minggu. Terdapat dua dosis administrasi *crude* AOS, yaitu dosis rendah (0,135 mg/g BB) dan dosis tinggi (0,603 mg/g BB). Parameter yang diukur berupa indeks berat organ, ekspresi gen *iNOS* menggunakan qPCR dan kadar NO pada hepar dengan masing-masing sampel dilakukan tiga kali pengulangan. Berdasarkan penelitan ini didapatkan hasil bahwa pemberian *crude* AOS tidak berdampak secara signifikan terhadap indeks berat organ hepar, ekspresi gen *iNOS* serta kadar NO pada hepar tikus muda maupun tua. Konsentrasi AOS yang digunakan pada penelitian ini tidak menunjukkan fungsinya sebagai antioksidan.

KATA KUNCI: agaro-oligosakarida, tikus tua, antioksidan, *iNOS*, NO

EFFECT OF CRUDE AGARO-OLIGOSACCHARIDES ON iNOS GENE EXPRESSION AND NITRIC OXIDE LEVEL IN HEPAR OF AGED WISTAR RAT (*Rattus norvegicus* (Berkenhout, 1769))

Nindya Dayita Hapsari

21/478040/BI/10763

Supervisor: Dr.biol.hom. Nastiti Wijayanti, S.Si., M.Si

Abstract

Agarose is one of the polysaccharides that make up Rhodophyta or red algae. One of the oligosaccharides that make up agarose, namely Agaro-oligosaccharide (AOS), is known to have antioxidant potential due to the presence of 3,6-Anhydro-L-Galactose (L-AHG) at the reducing end. The liver is an organ that regulates detoxification, making it one of the most important organs in the body. As the liver ages, its functional capacity decreases. Some signs of liver aging include changes in organ indices, increased expression of the induced nitric oxide synthase (iNOS) gene, and elevated nitric oxide (NO) levels. These three indicators can provide information when oxidative stress occurs. This study was conducted to test the potential of crude AOS as an antioxidant against oxidative stress in the livers of aged rats. The study was carried out at the Faculty of Biology, Universitas Gadjah Mada. Testing was conducted on 15 Wistar rats aged 3 months and 15 Wistar rats aged 17 months. Crude AOS was administered through per-oral route daily for 4 weeks. There were two doses of crude AOS administration: a low dose (0.135 mg/g body weight) and a high dose (0.603 mg/g body weight). The parameters measured included organ weight index, iNOS gene expression using qPCR, and NO levels in the liver, with each sample repeated three times. Based on this study, it was found that the administration of crude AOS did not significantly affect the liver organ weight index, iNOS gene expression, or NO levels in the livers of young or old rat. The AOS concentration used in this study did not demonstrate its function as an antioxidant.

KEYWORDS: agaro-oligosaccharides, aging rat, antioxidant, iNOS, NO