

## Potential antioxidant activity of *Eptatretus burgeri* (hag fish) and *Enedrias nebulosus* (white spotted eel) flesh and skin

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### **Introduction**

Antioxidants are substances capable of slowing the rate of oxidation in autoxidizable materials. Substitution of synthetic antioxidants by natural antioxidants has gained much attention during the past decade due to the suspected toxic and carcinogenic effects of synthetic antioxidants on human health. Extracts from spices, herbs, and hulls are known to have various degrees of antioxidant activity. However, antioxidants from animal sources have not yet much explored by the researches. *Eptatretus burgeri* (hag fish) and *Enedrias nebulosus* (white spotted eel or tidepool gunnel) are two popular eel species in food industry. Apart from their role as a food item, they also possess a value as a traditional medicinal material. Some of these medicinal properties are thought to be a result of the presence of antioxidative compounds. Thus, the aim of the present study was to investigate the potential antioxidative properties of flesh and skin of *E. burgeri* and *E. nebulosus*.

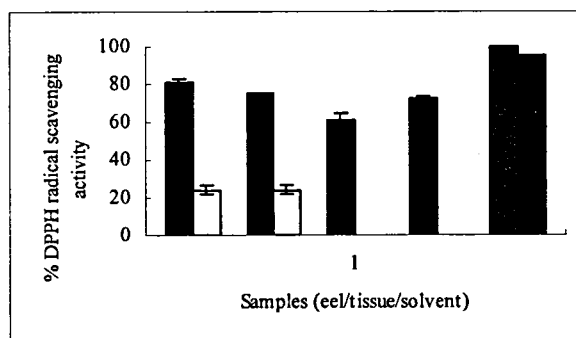
### **Methods**

Preliminary studies were carried out to establish extraction procedure. As a result, 1 g of each sample was first extracted with 20 mL of methanol followed by diethyl ether or ethyl acetate for 24 h in a shaking incubator at 4 °C. The concentrations were adjusted to 4 mg/mL. The extracts were tested for DPPH free radical assay (Bilos, 1958). The extract showing positive activity was further tested for superoxide anion scavenging assay (Markulund and Markulund, 1974),

Hydrogen peroxide scavenging activity (Muller, 1985), Hydroxyl radical scavenging activity (Chung et al., 1997) and heat stability at 4 different temperatures (25, 50, 75 and 100 oC) for 30 min.. Commercial antioxidants; BHT and  $\alpha$ -tocopherol were dissolved in DMSO (4 mg/mL) and used as the controls in all assays.

## Results

All extracts of *E. burgeri* showed higher DPPH radical scavenging activities compared to *E. nebulosus*. Significantly higher results were observed for hydroxyl radical scavenging activity when compared with commercial antioxidants. Relatively moderate activity and very low activity were exhibited for superoxide scavenging and hydrogen peroxide activities, respectively. Diethyl ether extracts of *E. burgeri* were stable with increased temperature while ethyl acetate extracts were stable up to 75°C . Thus, there is a high potential that *E. burgeri* being rich with heat stable antioxidants that can scavenge hydroxyl radicals.



<Fig. 1.> DPPH scavenging activity of (■) *Eptatretus burgeri* and (□) *Enedrias nebulosus* extracts. A, skin/ethyl acetate, B, flesh/ethyl acetate, C, skin/ diethyl ether D, flesh/diethyl ether, E, BHT and F,  $\alpha$ -tocopherol. Each bar represents the mean value of three determinations  $\pm$  standard deviation. The concentration of eel extracts and commercial.

## Reference

- Bilos M.S. (1958). Antioxidant determinations by the use of a stable free radical. *Science* **181**: 1199-1200.
- Chung S.K., Osawa T. and Kawakishi S. (1997). Hydroxyl radical scavenging effect of spices and scavengers from Brown mustard (*Brassica nigra*). *Bioscience Biotechnology Biochemistry* **61**: 118 -124.