ANTIOXIDANT ACTIVITY OF WATER-SOLUBLE PROTEINS AND PEPTIDES OBTAINED FROM THE SQUID INK

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Introduction. Animals use a variety of defenses against predators, among them chemical defenses. Marine mollusk, have a striking defensive behavior—releasing ink when attacked. Cephalopod inks function as anti-predatory visual stimuli, either as “smoke screens” or distracting decoys (Caldwell, 2005). The ink of the cephalopods has been recognized as a perfect biological system of melanogenesis (Russo et al. 2003). Enzymes, pigment (melanine) and some amino acids are compounds of interest that have been found in the ink of squid (Derby et al. 2007).

The objective of this work was fractionated proteins soluble in H_2O (albumin) of the ink of squid for the obtaining of peptides with antioxidant activity.

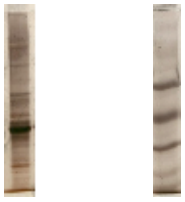
Methods. The ink was obtained from species of the Mexican Pacific and freeze until use. We performed a proximate analysis and microbiological test to evaluate the quality. The albumins of ink were isolated by their water solubility (Gornall, 1984). The SDS-PAGE profile was determinate (Laemmli, 1979) and analyzed means of image analyzer software.
Peptides were obtained by ultrafiltration (10 kDa). Antioxidant capacity was determinate in the peptides (Re et al., 1997). All analyzes were performed in triplicate.

Results. The results of the proximate analysis of ink are shown in Table 1. The main component detected was the moisture and the lowest percentage was of the ashes.

Table 1. Proximate analysis of ink of squid

Analysis	Percentage
Moisture	87
Ash	0.1
Protein	12
Fat	0.2
Carbohydrates	0.7

The microbiological analyses showed growth of psychrotrophic bacteria at 48 h ($2X10^2$CFU) and there wasn´t presence of enterobacteria. The protein was fractionated by solubility in H_2O, the protein content had a value of 2.18 mg/mL The electrophoretic profile of this fraction is shown in Figure 1.



A B

Figure. 1 Electrophoretic profile of albumins of ink of squid
A. ink albumin protein; B. Molecular Weight Marker

The electrophoretic profile showed bands in the molecular weight range of 97 kDa to 6.5 kDa.

The values of the antioxidant capacity in the both samples [protein (albumins) and peptides obtained by ultrafiltration (<10 kDa)] were different significantly ($P<0.05$), the highest values were detected in the albumins, and the percentage inhibition of oxidation was 13.22% and 6.71%, respectively.

Conclusions. The ink might be a marine product that can potentially be used for the pharmaceutical industry and/or food to decreased oxidation reactions.

References.

1. Caldwell, R. L. 2005. *Pac. Sci.* 59:69–72
2.- Derby, D.D., Kicklighter, C.E., Johnson P.M, Zhang X. 2007.. *J Chem Ecol* 33:1105-1113
3.- Russo, G.L., Nisco, E.D. Fiore, G., Donato D.P., D´Ischia, M. and Palumbo, A. 2003.. *BBRC* 308:293–299
4- Gornall A. J., Bardawill C. J., y David M. M. 1949. *J Biol Chem*, 177:751-766.
5.- Laemmli, U.K. 1970. Nature 227:680-685.
6- Re R, Pellegrini N, Proteggente A, Pannala A, Yang M, Rice-Evans C 1999. *Free Rad. Biol. Med.* 26: 1231-1237