**Role of cuttlefish (*Sepia officinalis*) skin protein hydrolysates on the bioactive properties of gelatin-based edible films**

H.Kchaou1,2, M.Jridi1, N. Benbettaieb2,3, F.Debeaufort2,3\*, M. Nasri1

*1Lab. de Génie Enzymatique et de Microbiologie, Ecole Nationale d'Ingénieurs de Sfax, Université de Sfax, B.P. 1173, 3038 Sfax, Tunisia.*

*2Univ. Bourgogne Franche-Comté/AgroSup Dijon, UMR PAM A02-102, Food and Wine Physical-Chemistry lab, 1 esplanade Erasme, Dijon 21000, France*

*3IUT-Dijon-Auxerre Dpt BioEngineering, 7 blvd Docteur Petitjean, Dijon Cedex 20178, France*

*\*Corresponding author. E-mail:* *frederic.debeaufort@u-bourgogne.fr*

Fish processing factories generate more than 60% of by-products as wastes including skins, heads, bones and viscera, which consequently caused serious environmental and economic problems1. From these by-products, natural biopolymers can be extracted and used as edible packaging materials2. In this context, cuttlefish (*Sepia officinalis*) skin, a major processing by-product from fish industry, has been valorized by the extraction of cuttlefish skin gelatin (G), protein isolate (PI) and its protein hydrolysates (PH). Then, edible films based on G incorporated or not with PI and its hydrolysates have been prepared and characterized. Particularly, the *in-vitro* antioxidant activity of gelatin based films was investigated by means of reducing power, DPPH free radical-scavenging activity and β-carotene bleaching inhibition assays.

The enrichment of cuttlefish skin gelatin films with protein hydrolysates or isolate~~s~~ led to colored films with higher UV-barrier property and thermal stability. However, mechanical properties decreased and hydrophilicity increased for hydrolysates incorporated films compared to isolates enriched film and control gelatin films. Conversely, the addition of PH and PI significantly increased the antioxidant capacity of gelatin films through different antioxidant mechanisms. Control film showed the lowest antioxidant activity. Films radical scavenging ability was increased by 88% after the addition of PH while the β-carotene-linoleate bleaching inhibition capacity was enhanced by 79% by the incorporation of PI. However, the addition of PH leads to increasing the reducing power of gelatin films by only 23%.

*References*

1. Alfaro, A. d. T., Balbinot, E., Weber, C. I., Tonial, I. B., & Machado-Lunkes, A. (2015). Fish gelatin: characteristics, functional properties, applications and future potentials. *Food Engineering Reviews*, 7(1), 33-44.
2. Kchaou, H., Jridi, M., Abdelhedi, O., Nasreddine, B., Karbowiak, T., Nasri, M., & Debeaufort, F. (2017). Development and characterization of cuttlefish (*Sepia officinalis*) skin gelatin-protein isolate blend films. *International Journal of Biological Macromolecules, 105*(Part 2), 1491-1500.