# Encapsulation of the natural antioxidant of sweet potato (Ipomoea batata) in biodegradable PLA nanoparticles.

B.Guerrero[1], G. Corbino[2], N. D'Accorso[1], N.L. García[1*]

[1] CIHIDECAR (CONICET) Dpto. de Química Orgánica, FCEyN, UBA, Buenos Aires, Argentina.
2: INTA Estación Experimental Agropecuaria Area Poscosecha y Calidad de FyH. San Pedro (Buenos Aires) Argentina.

Presenter: nancylis@gmail.com

## INTRODUCTION

The encapsulation of active ingredients in colloidal nanocarriers has interesting potential to be used in controlled release. In particular, it is well know the interest of the different industries, such as pharmaceutical, food and cosmetic in the encapsulation of active principles in different types of nanoparticles (NPs). The goal of this research is focused in the possibility of encapsulation of natural antioxidants in biodegradable polymer nanoparticles.

Antioxidants of various types (synthetics or naturals) have been encapsulated in differents biodegradables polymers. In this case, we used natural antioxidants from sweet potato (Ipomoea batata), which were encapsulated in polilactic acid (PLA) nanoparticles, using the emulsification-solvent evaporation technique.

## MATERIALS AND METHODS

Materials: PLA with molecular weight (Mw) 24491 g/mol and polydispersity index of 1.56, determined by SEC, was obtained by condensation methodology. The poly (vinyl alcohol), PVA (Sigma Aldrich) 99+% hydrolyzed and the solvents acetone and methanol were of reactive grade. Antioxidants (antocyanins) from the sweet potato variety "Arapey" was extracted and isolated with methanol or ethanol under cold conditions, using weak acids to prevent degradation of the pigment [1].PLA NPs were prepared by dispersing polymer, according to the emulsification – solvent evaporation technique [2], in the presence of various amounts of antioxidant of sweet potato. Nanoparticles were characterized by size distribution with dynamic light scattering (DLS) and their morphology by scanning electronic microscope (SEM). The encapsulation efficiency was estimated indirectly using UV-Vis spectrometry, by quantification of the non-encapsulated compound, which was retained in the aqueous phase after nanoparticle recovery.

## RESULTS AND DISCUSSION

**Encapsulation efficiency (%EE).** At 20% drug loading (mass of antioxidant per mass of PLA, w/w), is observed a higher encapsulation efficiency (90.8%) compared to other naturals antioxidants registered in the literature[2]. In the same conditions, when increase the drug loading at 60%, exist a significant increase in the efficiency encapsulation reaching values of 99%. The values recorded by DLS size particles are slightly higher than those observed by SEM due to hydrodynamic volume.

**Scanning Electronic Microscope (SEM).** It is observed in the micrographs; the PLA nanoparticles have spherical shapes and smooth surface, with a size of 50 nm, approximately, meanwhile the PLA nanoparticles loaded with the antioxidant, form a chain of nanoparticles whose spherical shape was slightly distorted. The results demonstrated that the technique is satisfactory for the system antocianyns-PLA. In the course of the investigation they are being evaluated variables such as molecular weight of the PLA, temperature and stirring speeds.

## REFERENCES

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