



GREEN PROPOLIS NANOPARTICLES AS A TECHNOLOGICAL ADDITIVE IN FOOD

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INTRODUCTION

Propolis is a resinous and balsamic material with variable colour (green, red, yellow, and brown) created by bees (*Apis mellifera* L.). Is collected from different parts of numerous tree species around then, to protect their hive from invading microorganisms (Kunrath et al. 2017, Brazil J of Food and Tech; Pobiega et al. 2019, Trends in Food Sci & Tech).

It's antioxidant and antimicrobial properties provide scope for use in food technology as food preservatives and one of the most important advantages is that residues may have a generally favourable effect on the health (Alfarrayeh et al. 2020, Saudi J of Bio Sci).

One way that can enhance the properties of propolis is its transformation into nanoparticles. Due to the size of nanomaterials, physical and chemical changes can occur in their structures, indicating greater solubility and reactivity (Seven et al. 2018, Italian J of Anim Sci).

MATERIAL AND METHODS

Propolis nanoparticles were prepared using a spontaneous emulsification method, according to Alberti et al. 2019, Nanotechnol Adv Mater Sci. 0.4 g of poloxamer was added in 100 mL of distilled water to form aqueous phase. For the organic phase, 0.25 g of soy lecithin were solubilized in 100 mL of a mixture of acetone and ethanol at a ratio of 60:40 (v/v). The hydroalcoholic propolis extract, previously prepared with 80% ethanol (v/v), was also solubilized in organic phase with 1 mL at a concentration of 0.3 g/mL. After 3

hours under agitation of 2,500 rpm, the mixture was filtered and removing the organic phase in a rotary evaporator. Particle size were measured at 25°C by using a Zetasizer Nano DLS Detector Malvern PN3700.

RESULTS

The average nanoparticle size was 173.1 ± 0.173 nm. The formulation showed a unimodal distribution with a Polydispersy Index (PDI) of 0.181 ± 0.018 . A low PDI value indicates solution homogeneity. Alberti et al. 2019, Nanotechnol Adv Mater Sci similarly produced its propolis nanoparticles and the average size was 122.1 nm, like that found in this work.

CONCLUSIONS

The spontaneous nano emulsification process for green propolis added protective properties in edible films, reported in another study by the research group, when evaluating the antimicrobial activity against the *Penicillium* fungus in apples (*Malus domestica*).

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