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ENCAPSULATION OF LAUREL (*Laurus nobilis* L.) LEAF POLYPHENOLS BY SPRAY-DRYING AND ELECTROSTATIC EXTRUSION

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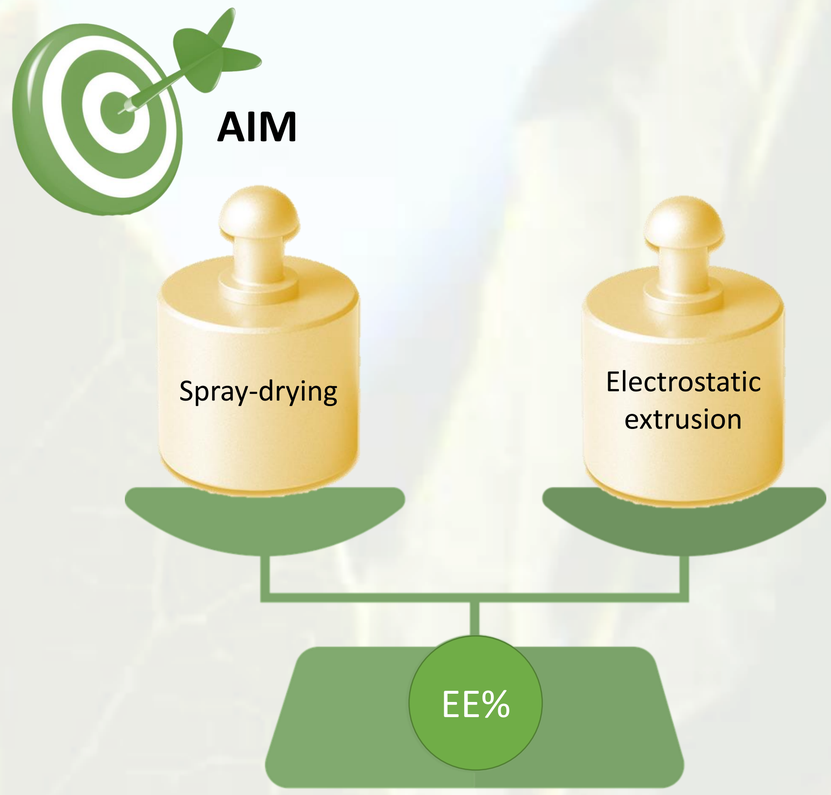
INTRODUCTION

Laurus nobilis L. is an evergreen Mediterranean shrub whose leaves have traditionally been used in folk medicine due to their beneficial health effects that can largely be attributed to the **presence of polyphenols** which include flavonoids, phenolic acids, tannins and lignans (Dobroslavić et al., 2022). In order to utilize the valuable compounds from *L. nobilis* leaf, the crucial steps are isolation and characterization of the obtained compounds. Since polyphenols are **unstable and prone to degradation** during storage, it is of great importance to improve their stability to make them applicable in the industry. This can be achieved by different methods of encapsulation such as spray drying and electrostatic extrusion with the main goal of achieving high encapsulation efficiency and stability of the encapsulate system with required release characteristics, biocompatibility and bioavailability of the active compounds (Aguiar et al., 2016).



EE%= encapsulation efficiency

MATERIALS AND METHODS

50% ethanol *L. nobilis* leaf extract

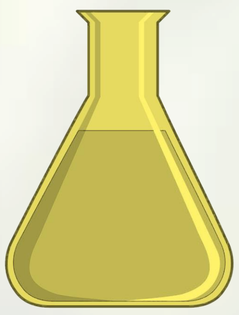
Spray drying

120°C
β-ciklodextrin:maltodextrin (1:1)
extract dry matter:carrier 1:2

1 g powder in 10 mL 80% methanol

Filtered through 0.45 µm filter

Ultra-performance liquid chromatography-tandem mass spectrometry

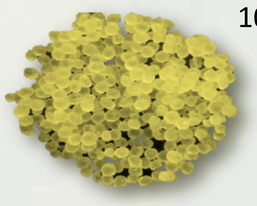


Water *L. nobilis* leaf extract

Electrostatic extrusion

1,0% alginate in extract
1,5% $CaCl_2$ + 0,5% chitosan as a gelling solution

Polyphenols encapsulated in the powder and bead structures



100 mg beads in 10 mL 5% sodium citrate

RESULTS

Spray-drying	Electrostatic extrusion
88.32%	68.46%

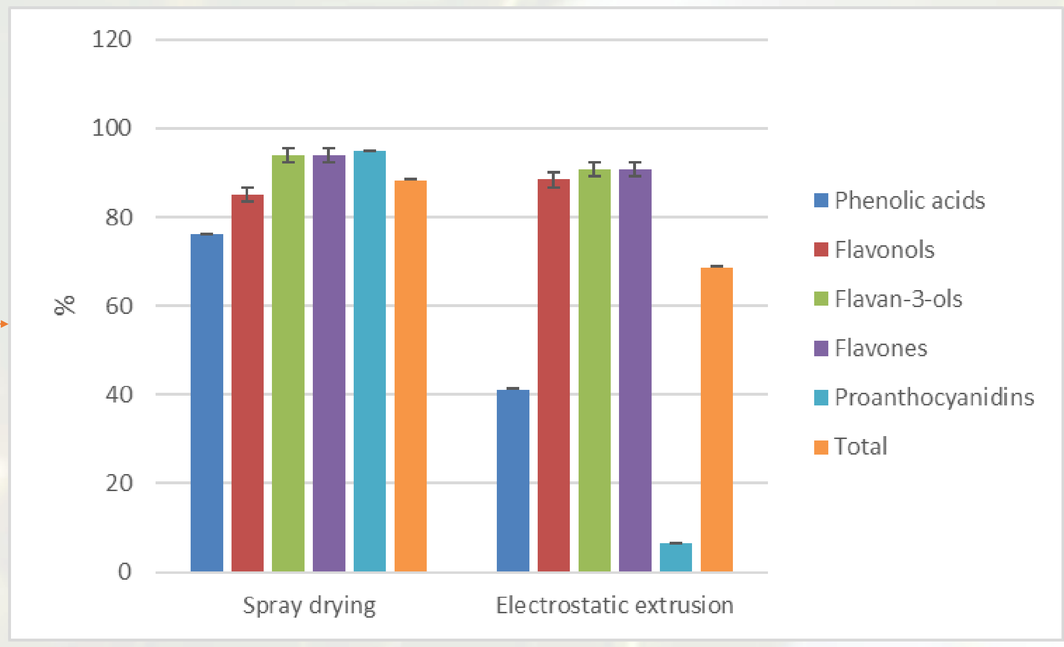
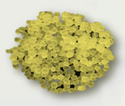


Figure 1. Encapsulation efficiency (%) of polyphenolic groups identified in the obtained powders and beads

Among all polyphenolic groups, flavan-3-ols (95.67%) had the highest, and phenolic acids (76.10%) lowest EE% in the powders obtained by spray-drying.



Flavones (90.82%) had the highest, and proatnhocyanidins (6.38%) the lowest EE% in the beads obtained by electrostatic extrusion.

CONCLUSION

The results showed the advantage of using spray-drying over electrostatic extrusion in order to achieve higher encapsulation efficiency. Another advantage is found in the possibility of using aqueous ethanol solutions for polyphenol extraction, which combines the maximum efficiency of extraction and encapsulation, while electrostatic extrusion is applied only on aqueous extracts. Despite this, both methods showed relatively high percentages of encapsulation, and the future choice of method will depend above all on the final purpose of the encapsulated systems.

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