

SCREENING OF NATURAL DEEP EUTECTIC SOLVENT (NADES) TOWARDS IMPROVED ISOLATION OF POLYPHENOLIC ANTIOXIDANTS FROM STRAWBERRY TREE FRUIT (*Arbutus unedo* L.)

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Abstract

Strawberry tree fruits (*Arbutus unedo* L.) from *Ericaceae* family is plant originating from Mediterranean with promising bioactive content. Traditional use of *A. unedo* refers to jams, preserves, wines, and liqueurs. Due to confirmed biological activity (gastrointestinal, dermatological, and cardiovascular) natural deep eutectic solvent (NADES) extraction was used for obtaining high-quality extracts. This rapid and simple extraction is eco-friendly, due to use of non-toxic solvents with creating minimal waste streams. The main goal in this study was to investigate the most appropriate NADES solvents in regard to the highest content of phenolic compounds (TP) and antioxidative capacity. Twenty different NADES mixtures according to [1] were prepared and used on strawberry tree fruits. The extraction parameters were: temperature at 50 °C, solid/liquid ratio of 1:10 m/m, extraction time of 60 min, and stirring speed 600 rpm. The only independent variable was the solvent while the other four were held constant, which is known as the OFAT approach (one factor at a time). Analysis of variance (ANOVA) and post-hoc Tukey-test were used to determine the significant differences among NADES mixtures ($p \leq 0.05$). After NADES extraction, followed selection of the most suitable NADES solvents, where obtaining was based according to TP content and antioxidant activity. Results showed that NADES mixtures highly effected TP content and DPPH assay ranging from 2.23-19.99 mg GAE/g and 7.38-25.82 mg TE/g, respectively. Solvent mixture of choline chloride and glycerin, with a molar ratio 1:2 (N9) provided the highest content of TP. Moreover, N6 solvent (betaine-glycerin-water, with a molar ratio 1:2:1) stood out as the most convenient for neutralization of DPPH radicals. Therefore, NADES mixtures made of glycerin, choline chloride and betaine, such as N6 and N9, enabled the high isolation of polyphenols and antioxidants from *A. unedo*. In this way, it was confirmed that strawberry tree fruit represented a highly valuable raw material for isolation of phenolic compounds with antioxidant capacity.

But further optimization of NADES extraction will be necessary in order to obtain as high as possible contents of bioactives from this plant.

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References

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