## Bioprocess Engineering

### P-027 - EXTRACTION OF POLYPHENOLS FROM VINE PRUNING RESIDUES OPTIMIZATION

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**Background**

Vine pruning residue (VPR) is a by-product obtained after annual pruning of vines, abundant in Portugal, and a natural source of compounds with antioxidant activity. In a previous work, an integral valorization of this residue was proposed in which 13.7 kg of xylooligosaccharides, 13.1 kg of ethanol and 27 kg of lignin per 100 kg of VPR were extracted[1]. Here, we aim at optimizing antioxidants extraction using different fractions of organic solvent (ethanol /water). Therefore, the objective of this work was to attain an optimum extraction condition for polyphenolic compounds from grapevine pruning using a response surface methodology.

**Method**

For each assay the temperature (46-114°C), the extraction time (19-221 min) and ethanol concentration (30-70%) were determined by factorial design. The solids/solvent ratio was 40:1 (mL/g). The characterization and quantification of phenolic compounds was performed by UPLC. Total phenolic contents, expressed as gallic acid equivalents by absorbance following Folin-Ciocalteu method[2]. Antioxidant activity of VPR extracts was also determined following methods FRAP (ferric reducing antioxidant power), DPPH (radical scavenging activity assay) and ABTS (radical cation decolorization) expressed as Trolox equivalents[3-4] both were quantified by spectrophotometry. The percentage of inhibition was calculated as a function of the concentration of extracts and Trolox.

**Results & Conclusions**

The optimum extraction conditions were as follows: ethanol concentration, 45%; extraction time, 120 min; and temperature, 80°C. In these conditions the obtained extracts had 2.16 kg of phenolic compounds per 100 kg of VPR and thus higher antioxidant activity were obtained (FRAP = 3.81 kg Fe(II)/100 kg VPR, DPPH = 4.70 kg TE/100 kg VPR and ABTS = 16.48 kg TE/100kg VPR). In this context the VPR is a promising waste material for the generation of compounds with added value.

**References & Acknowledgments**

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[2] Ballesteros et al. (2015) Carbohydr. Polym. 127: 347-354.
[3] Karacabey et al. (2012) Food Bioprocess Technol. 5: 359-371.

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