

STATISTICAL MIXTURE DESIGN AS STRATEGY TO RECOVER ANTIOXIDANT COMPOUNDS FROM GRAPE SEEDS BY ENZYMATIC HYDROLYSIS

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Abstract: The recovery of bioactive compounds with antioxidant properties from wine residues is one of the sustainable alternatives for the food industry in the production of natural ingredients. This study evaluated the antioxidant properties of the extracts produced by enzymatic hydrolysis of grape seeds, using a statistical mixture design. The enzymes pectinase (Pectinex FE Multifect), cellulase (Celluclast 1.5L) and protease (Alcalase 2.4L) were applied singly, in binary or ternary mixtures to reach a final concentration of 1% using grape seed flour (100 mg/mL) as the substrate. The reactions were incubated for 1 h at 50 °C. The results showed that the responses ranging from 5.88 to 10.12 mg of gallic acid equivalents per g of sample (mg GAE/g), 85.62 to 126.08 µmol Trolox equivalent per g of sample (µmol TE/g), 66.19 to 103.23 µmol TE/g and 21.00 to 31.60 µmol TE/g for Total Phenolic Compounds (TPC), ABTS, FRAP and DPPH, respectively. In general, extracts obtained from hydrolyzed samples with only protease resulted in increases of 7.5%, 13.8%, 6.4% and 71.2% in TPC, ABTS, FRAP and DPPH values, respectively, when compared with the control (non-treated sample). Proteases are rarely applied to recover phenolic compounds from wine residues. Presumably, proteases promote the breakdown of the structural proteins that strengthen the cell wall structure, as well as contributing to the release the phenolics present in the cell vacuoles by breaking the protein tonoplast surrounding them. The extracts produced after enzymatic hydrolysis of

the grape seeds exhibited improved antioxidant properties, representing a source of bioactive compounds to obtain ingredients with high added value.