OPTIMIZATION OF ANTIOXIDANT ACTIVITY OF AGROINDUSTRIAL BY-PRODUCTS USING RESPONSE SURFACE METHODOLOGY


aDepartment of Chemical, Federal Technological University of Paraná (UTFPR) - Pato Branco/PR, Brazil. bDepartment of Agri-Food Industry, Food and Nutrition, “Luiz de Queiroz” College of Agriculture, University of Sao Paulo (USP) – Piracicaba/SP, Brazil. cDepartment of Physiological Sciences, University of Campinas (UNICAMP) - Limeira/SP, Brazil.

Nowadays, millions of tons of by-products are generated during food processing in agroindustrial plants. Most of them are rich in bioactive compounds and constitute natural sources of these substances, which can be directed to technological uses in food and pharmaceutical industries. This study aimed at assessing the antioxidant activity of three agroindustrial by-products – Cabernet Sauvignon grape stalks and pomace (Vitis vinifera) and peanut skin (Arachis hypogaea) – as well as optimizing the process of antioxidant compound extraction. The antioxidant activity in ethanolic extracts (ethanol:water, 80:20) was assessed by the DPPH radical-scavenging method. A 2² factorial planning was performed using solvent concentration and extraction temperature as variables. In this process we used three solvents (acetone, ethanol, and propylene glycol) in five concentrations (39%, 45%, 60%, 75%, and 81% in water v/v) and five temperatures (30°C, 35.8°C, 50°C, 64.2°C, and 70°C). As to the results obtained using the response surface method, the extracts prepared with acetone presented the highest DPPH radical-scavenging activities. For the three by-products assessed we observed higher DPPH radical-scavenging activity as the extraction temperature and acetone concentration increased. Therefore, the best conditions for the extraction of antioxidant compounds were acetone at 60% and extraction temperature of 70°C. The results obtained in this study showed that the agroindustrial by-products analyzed are rich in natural phenolic compounds with high antioxidant activity and, therefore, should be explored more efficiently by food and pharmaceutical industries.