

Effect of Three Drying Methods on Antioxidant Efficiency and Vitamin C Content of *Moringa oleifera* Leaf Extract

Authors : Kenia Martínez, Geniel Talavera, Juan Alonso

Abstract : *Moringa oleifera* is a plant containing many nutrients that are mostly concentrated within the leaves. Commonly, the separation process of these nutrients involves solid-liquid extraction followed by evaporation and drying to obtain a concentrated extract, which is rich in proteins, vitamins, carbohydrates, and other essential nutrients that can be used in the food industry. In this work, three drying methods were used, which involved very different temperature and pressure conditions, to evaluate the effect of each method on the vitamin C content and the antioxidant efficiency of the extracts. Solid-liquid extractions of *Moringa* leaf (LE) were carried out by employing an ethanol solution (35% v/v) at 50 °C for 2 hours. The resulting extracts were then dried *i* in a convective oven (CO) at 100 °C and at an atmospheric pressure of 750 mbar for 8 hours, *ii* in a vacuum evaporator (VE) at 50 °C and at 300 mbar for 2 hours, and *iii* in a freeze-drier (FD) at -40 °C and at 0.050 mbar for 36 hours. The antioxidant capacity (EC₅₀, mg solids/g DPPH) of the dry solids was calculated by the free radical inhibition method employing DPPH' at 517 nm, resulting in a value of 2902.5 ± 14.8 for LE, 3433.1 ± 85.2 for FD, 3980.1 ± 37.2 for VE, and 8123.5 ± 263.3 for CO. The calculated antioxidant efficiency (AE, g DPPH/(mg solids·min)) was 2.920 × 10⁻⁵ for LE, 2.884 × 10⁻⁵ for FD, 2.512 × 10⁻⁵ for VE, and 1.009 × 10⁻⁵ for CO. Further, the content of vitamin C (mg/L) determined by HPLC was 59.0 ± 0.3 for LE, 49.7 ± 0.6 for FD, 45.0 ± 0.4 for VE, and 23.6 ± 0.7 for CO. The results indicate that the convective drying preserves vitamin C and antioxidant efficiency to 40% and 34% of the initial value, respectively, while vacuum drying to 76% and 86%, and freeze-drying to 84% and 98%, respectively.

Keywords : antioxidant efficiency, convective drying, freeze-drying, *Moringa oleifera*, vacuum drying, vitamin C content

Conference Title : ICCE 2017 : International Conference on Chemical Engineering

Conference Location : Miami, United States

Conference Dates : December 14-15, 2017