

Abstract

The main objective of this work is to study and compare the functional properties of jujube fruit (*Zizyphus jujuba*) powders obtained from two different drying processes: hot-air drying and swell-drying by combining Instant Controlled Pressure-Drop (DIC) with conventional air drying process. For this purpose, we performed the convective drying kinetics of pitted whole fruit at an atmospheric pressure of 2 m/s, 85°C, and 4% relative humidity. DIC treatment was carried out with 0.35 MPa saturated steam pressure for 15 s after eliminating a water content of 12.5 g H₂O/100 g db (dry basis) through the first stage of ambient temperature convection drying. Under these experimental conditions, the effects of drying processes, the type of solvent and powder granulometry were studied. The results showed that swell-dried compared to hot-air dried powders had a higher availability of phenolic compounds (20.14 ± 0.07 against 13.28 ± 2.06 mg Gallic Acid Equivalent GAE/g dry basis db) and flavonoids (72.3 ± 7.1 against 17.5 ± 4.7 mg Quercetin Equivalent Querc. E/g db). The presence of several active compounds thanks to DIC texturing was observed in all the granule sizes. The biological activities of swell-dried jujube flavonoids extracts showed the highest antimicrobial activity. The physical and pharmacological properties of jujube tablets were compared to Fumacur, which is known as an Algerian traditional drug used against anemia. In terms of metals, swell-dried jujube powder contains a higher concentration of metals than that of Fumacur. This first approach greatly encourages the use of these natural pharmaceutical tablets as a very effective and economical drug to fight certain health problems.