

Title Drying kinetics of chestnut (*Castanea sativa* Miller): dependency of the variety and experimental conditions

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Abstract

Several varieties (*Famosa*, *Longal*, and *Judía*) of chestnuts, with relevance for manufacturing and industrial processing and human consumption mainly in Galicia and the north of Portugal, were employed to determine their respective drying kinetics. The experiments were carried out in a dryer, pilot-plant scale, with a hot air closed circuit and assisted by a heat pump. Several experimental conditions were employed: varying temperature (45, 55 and 65°C), relative humidity (20, 30 and 40%) and velocity (1.8, 2.4 and 2.7 m•s⁻¹) of the air. Chestnuts of each variety were put in contact with the convective air in several dispositions: with the presence of pericarp (external skin), tegument (internal skin) or without these natural resistances (previous careful peeling). The last disposition means direct contact between the parenchyma and the surrounding air. Four to six chestnuts were used in each run, following periodically weight and colour, to make the corresponding kinetics for each variable. After each experiment the dry basis was determined at 70°C and 10⁴ Pa. Moisture content of fresh chestnuts varied between 49-57% (wet basis (w.b.)) and chestnuts were dried up to 10% (w.b.). The results showed drying kinetics were faster when the driving force was higher and the resistances were eliminated. In this way, at higher temperatures and at lower relative humidities of the air the drying time was shorter. The use of different varieties didn't show significant differences on drying kinetics. When higher temperatures were employed the chestnut colour changes were more important.