

# Enzyme-Assisted Drying of Grapes: A Strategy for Enhancing Raisin Quality under Controlled Processing Conditions

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## Abstract

Grape drying is a popular method of preservation in production of raisin, but in most cases, traditional drying leads to quality loss because of structural recalcitrance of the waxy cuticle, pectin-enriched cell walls. The common chemical pretreatments used in traditional raisin processing include ethyl oleate, NaOH and K<sub>2</sub>CO<sub>3</sub> to improve the drying rate, which can compromise on product quality and safety. The current research examines the possibility of pretreating enzymes with pectinase at three levels (0.2%, 0.4%, and 0.6%) to increase the effectiveness of drying and quality of raisins. Tray drying of the treated samples was carried out at 40°C, 50°C and 60°C and the low-temperature low-humidity drying at 10, 20, and 30 percent relative humidity. The experiment considers the major quality parameters such as moisture content, color, proximate composition, bioactive compounds, SEM, tannins, sugars, organic acid, which are important quality indicators of raisins. Pectic substances are likely to be broken down by enzymes, thereby affecting the integrity of the cell walls, making them easier to diffuse moisture and reduce drying resistance. Changes in temperature and humidity are expected to effect the mass transfer and retention of quality attributes and thus, final raisin quality. Initial findings show that the level of enzyme concentrations and drying conditions are important in determining quality traits of raisins. Combining optimized enzyme dosage in a controlled drying environment could enhance physicochemical and functional properties of the raisins. This research offers a foundation towards process optimization to achieve high quality raisins with better nutritional and antioxidant properties to be used in grape farms and better raisin quality.

Keywords: Drying, Enzymes, Raisins, Quality, Pretreatment

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