

ABSTRACT

The Influence Of Coconut Drying Conditions On The Moisture Removal Rate, Oil Yield And Quality

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The influence of the drying parameters of temperature, particle size, and air flow rate as well as the presence of the coconut shell on the moisture removal rate, oil yield and quality from coconut kernels was investigated and mathematical models of the relationship between the moisture content of the kernels and drying time derived for each set of drying conditions.

The effect of temperature was examined by drying coconut kernels of one particle size, at different temperatures, under natural convection drying conditions using an oven. The effect of particle size was examined by drying kernels of different particle sizes, at one temperature, under natural convection drying conditions using an oven. The effect of air flow rate was investigated by drying kernels of one particle size, at a fixed temperature, under forced convection drying conditions at different air flow rates. The effect of the presence of the coconut shell was examined by drying half-kernels without and with their shells under natural and forced convection drying conditions.

The research showed that edible coconut oil of good quality may be produced from coconut half-kernels dried without their shells at 75°C by natural convection or from coconut half-kernels dried in their shells at the same temperature by forced convection using a drying air flow rate of 0.65 m/s.

The mathematical models for these drying conditions were found to be: $M = 22.9 e^{-0.0505t} + 0.42$ and $M = 16.9 e^{-0.0696t} + 0.42$ respectively.

The drying constants for the drying of coconut kernels were found to increase as the drying air temperature and flow rate were increased, and as the particle size of the kernels was decreased.

The equilibrium moisture content of coconut half-kernels was found to decrease with the drying air temperature.

It was also shown that the presence of the shells around coconut half-kernels dried at 75°C by natural convection increased the moisture removal rate and the free fatty acid content of the oil produced but did not affect its yield or shelf-life.

The oil yield from coconut half-kernels dried at 75°C by forced convection using an air flow rate of 0.65 m/s was found to be unaffected by the presence of their shells around them. However, the presence of these shells did exert an influence on the moisture removal rate, the free fatty acid content and shelf-life of the oil produced.

It was also revealed that regardless of whether coconut kernels are dried without their shells by natural convection at 75°C in halves, quarters or eighths the copra production time, yield and quality of the oil produced were all similar.

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