

On the effects of forced air drying on cocoa quality

Michael O. Faborode^a, John F. Favier^b and Omolayo A. Ajayi^a

^a Department of Agricultural Engineering, Obafemi Awolowo University, Ile-Ife, Nigeria

^b Department of Agricultural and Environmental Science, University of Newcastle upon Tyne, Newcastle upon Tyne NE1 7RU

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Abstract

Experiments were carried out to investigate the effects of forced air drying and intermittent resting on the fundamental drying mechanism of fermented cocoa beans, and the quality characteristics of the resulting raw cocoa. Two temperature, three relative humidity and three resting regimes were investigated, at a constant air flow rate of 0.2 m s^{-1} in a computer-instrumented drying apparatus which permitted continuous monitoring of drying air condition and sample weight. The results indicate that after an initial warm-up and surface drying period of very short duration, forced air drying of cocoa beans involves a succession of falling rate periods, the number of which appears to depend on drying temperature and post-rest moisture content if the beans are subjected to intermittent resting. For continuous drying, a critical transitional moisture content of 70% dry basis was observed at both high (60 °C) and low (40 °C) temperature, while a further transition at 30% dry basis was only noted at the lower temperature. Quality assessment of the dried cocoa beans showed that best results were obtained from drying at low temperature or intermittent resting of the beans during high temperature drying, though the exact resting sequence needs further investigation. However, continuous drying at a high temperature of 60 °C does not adversely affect cocoa quality. Similarly, removal of the mucilage coating from the fermented beans prior to drying has no adverse affect.

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