

## RESEARCH NOTE

### RAPID DRYING OF PARCHMENT COFFEE IN UNSTIRRED BINS

Laboratory studies have shown that it is possible to dry a 24-inch depth of parchment coffee from fully wet (54 percent m.c.w.b.)<sup>1</sup> to safe storage levels (12 percent m.c.w.b.) in a single stage within a 24-hour period. The parchment coffee was drained but neither stirred, mixed, turned nor pre-dried. An air drying temperature of 130° F. was used with an air flow of 70 feet/minute and a plenum pressure of 1.5 inches of water, gage. The final moisture gradient was 34–7.1 percent m.c.w.b. After thorough mixing and storage in sacks for 6 days an average moisture content of 11.9 percent was found. Samples submitted to *Cooperativa Cafeteros de Puerto Rico* for grading were classified 1-A, well dried, uniform, of excellent odor, and quality.

As the drying process was stopped before the top layers of the bed were dry, the exhaust air was almost completely saturated throughout the drying period. This resulted in a high thermal efficiency and the use of less than 50 kw. -hr. of energy per 100 pounds of market parchment coffee (at 12 percent m.c.w.b.) produced. The heat added to the drying air per pound of water evaporated averaged 1,660 B.t.u.

In the past, recommendations for unstirred bin driers have been limited to depths of 12 inches, and air-drying temperatures of 120° F. or less in order to minimize moisture gradients through the bed. Mixing during the course of drying has also been considered necessary for the same reason. These studies support the previous findings of Boyce<sup>2</sup> that coffee can be dried in beds up to 24 inches deep without mixing or stirring. Steep gradients can be tolerated provided the bed is well mixed afterwards and adequate time in storage is allowed for the moisture to equalize between beans. By using an air-drying temperature of 130° F. rather than 95–100° F., as used by Boyce, the time of drying is reduced from 60–70 hours to approximately 20 hours, with a slight improvement in specific energy consumption.

Thus parchment coffee can be dried as rapidly in unstirred bins as in other types of driers. As the fan is the only moving part and the bin can be built by farm labor, the investment and operating cost for a bin drier is very much less than for other types.

As thermal efficiency is high and exhaust air temperature low, specific

<sup>1</sup> m.c.w.b. means "moisture content, wet basis."

<sup>2</sup> Boyce, D. S., Further investigations into single-stage drying of parchment coffee, *J. Agr. Eng. Res.*, 12 (2): 115–18, 1967.

fuel consumption can be expected to be much less than that of other driers. Hence this method for drying coffee can be expected to reduce drying costs. A complete report of the studies is being prepared.

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