RINGKASAN

Pengeringan pada biji kakao merupakan salah satu tahap pascapananen yang penting dilakukan. Hal ini dikarenakan biji kakao masih mempunyai kadar air awal yang tinggi, yaitu berkisar 51-60% sehingga rentan mengalami pembusukan akibat mikroorganisme. Pengeringan pada biji kakao bisa dilakukan dengan dua metode, yaitu pengeringan alami dan pengeringan buatan menggunakan alat. Namun, pengeringan alami dibawah sinar matahari langsung memudahkan biji kakao untuk terkena kontaminasi benda asing, sehingga mutu produk yang dihasilkan menjadi kurang optimal. Oleh karena itu, penelitian ini dilakukan untuk melakukan uji kinerja alat pengering energi surya tipe rak dengan media penyimpan panas berupa batu basalt dalam proses pengeringan biji kakao.

Penelitian ini dilaksanakan di Laboratorium Teknik Pertanian Universitas Jenderal Soedirman pada September 2024 hingga Maret 2025. Variabel yang diamati meliputi iradiasi surya, suhu, kelembapan relatif, kadar air, susut bobot, laju pengeringan, efisiensi kolektor, efisiensi pengering energi surya tipe rak, dan perubahan mutu fisik biji kakao.

Hasil penelitian menunjukkan bahwa biji kakao membutuhkan waktu 26 jam untuk mencapai kadar air di bawah 7,5%. Rak 1 memiliki kadar air akhir 6,62%bb, rak 2 sebesar 7,38%, dan rak 3 sebesar 6,24%. Rata-rata laju pengeringan pada rak 1 adalah sebesar 0,36 g/menit, rak 2 sebesar 0,35 g/menit, dan rak 3 sebesar 0,37 g/menit. Susut bobot paling tinggi terdapat pada rak 3 sebesar 55,9%, dilanjutkan rak 2 sebesar 55,4%, dan rak 1 sebesar 55,8%. Efisiensi kolektor diperoleh sebesar 22,83% dan efisiensi pengeringan sebesar 16,19%. Hasil mutu pengeringan yang dihasilkan alat pengering energi surya tipe rak telah sesuai SNI, yaitu kadar air tidak melebihi 7,5%, tidak ditemukan biji pecah, biji berjamur, biji berserangga, dan biji berkecambah. Kadar kotoran yang ditemukan masih dalam batas aman yang sesuai dengan ketetapan SNI, yaitu sebesar 0,78% pada rak 1, 0,92% pada rak 2, dan 0,50% pada rak 3.

SUMMARY

Drying of cocoa beans is one of the important post-harvest stages. This is because cocoa beans still have a high initial moisture content, which ranges from 51-60%, making them susceptible to spoilage due to microorganisms. Drying of cocoa beans can be done by two methods, namely natural drying and artificial drying using tools. However, natural drying under direct sunlight makes it easier for cocoa beans to be exposed to foreign contamination, resulting in less than optimal product quality. Therefore, this study was conducted to test the performance of a rack-type solar energy dryer with heat storage media in the form of basalt stones in the process of drying cocoa beans.

This research was conducted at the Agricultural Engineering Laboratory of Jenderal Soedirman University from September 2024 to March 2025. The observed variables included solar irradiation, temperature, relative humidity, moisture content, weight loss, drying rate, collector efficiency, drying efficiency, and changes in the physical quality of cocoa beans.

The results showed that cocoa beans took 26 hours to reach a moisture content below 7.5%. Rack 1 had a final moisture content of 6.62%bb, Rack 2 had 7.38%, and Rack 3 had 6.24%. The average drying rate on rack 1 was 0.36 g/min, rack 2 was 0.35 g/min, and rack 3 was 0.37 g/min. The highest weight loss was found on rack 3 at 55.9%, followed by rack 2 at 55.4%, and rack 1 at 55.8%. Collector efficiency was obtained at 22.83% and drying efficiency at 16.19%. The drying quality results produced by the rack-type solar energy dryer are in accordance with SNI, namely the moisture content does not exceed 7.5%, no broken seeds, moldy seeds, insecticidal seeds, and germinated seeds are found. The level of impurities found is still within safe limits in accordance with SNI provisions, which were 0,78% on rack 1, 0,92% on rack 2, and 0,50% on rack 3.