

ABSTRAK

Tape ketan merupakan makanan tradisional Indonesia yang dihasilkan melalui proses fermentasi beras ketan dengan ragi. Selama ini, proses peragian tape ketan pada Usaha Kecil dan Menengah (UKM) masih dilakukan secara manual sehingga membutuhkan waktu lama, tenaga besar, serta kurang efisien dalam memenuhi permintaan pasar. Penelitian ini bertujuan untuk merancang mesin peragi tape ketan yang mampu meningkatkan produktivitas dan efisiensi proses produksi. Metode penelitian meliputi studi literatur, perancangan konsep, pemodelan dengan perangkat lunak Computer Aided Design (CAD) SolidWorks, serta analisis numerik menggunakan metode elemen hingga (Finite Element Method/FEM). Mesin yang dirancang memiliki kapasitas 15 kg/jam dengan motor bensin berdaya 5,5 HP, sistem transmisi puli, dan pengaduk berbahan stainless steel. Hasil analisis menunjukkan bahwa tegangan maksimum pada rangka sebesar 35 MPa, jauh di bawah tegangan luluh material ASTM A36 sebesar 250 MPa. Faktor keamanan (safety factor) sebesar 7 menunjukkan bahwa konstruksi rangka aman untuk diproduksi. Dengan adanya mesin ini, proses pencampuran ragi dan ketan dapat dilakukan lebih cepat, merata, dan efisien dibandingkan cara manual. Mesin peragi tape ketan diharapkan dapat meningkatkan kapasitas produksi UKM, mengurangi ketergantungan pada tenaga kerja manual, serta mendorong pengembangan industri rumahan sekaligus melestarikan kuliner tradisional Indonesia.

Kata kunci: Tape ketan, mesin peragi, fermentasi, produktivitas, efisiensi.

ABSTRACT

Tape ketan (fermented sticky rice) is a traditional Indonesian food produced through the fermentation process of glutinous rice with yeast. Until now, the fermentation process in Small and Medium Enterprises (SMEs) has mostly been carried out manually, which requires a long time, considerable labor, and is less efficient in meeting market demand. This research aims to design a tape fermentation machine that can improve productivity and efficiency in the production process. The research methods included literature study, concept design, modeling using Computer Aided Design (CAD) software SolidWorks, and numerical analysis with the Finite Element Method (FEM). The machine was designed with a capacity of 15 kg/hour, powered by a 5.5 HP gasoline engine, equipped with a pulley transmission system, and a stainless steel stirrer. The analysis results showed that the maximum stress on the frame was 35 MPa, which is far below the yield strength of ASTM A36 material at 250 MPa. The safety factor of 7 indicates that the frame construction is safe for production. With this machine, the process of mixing yeast and sticky rice can be carried out faster, more evenly, and more efficiently compared to the manual method. The tape fermentation machine is expected to increase the production capacity of SMEs, reduce dependency on manual labor, and encourage the development of home industries while preserving Indonesia's traditional culinary heritage.

Keywords: tape ketan, fermentation machine, fermentation, productivity, efficiency