

ABSTRACT

Machine design is the process of analyzing, assessing, compiling, and improving a physical and non-physical system by utilizing existing information in order to achieve maximum machine usefulness. The loss of several machine design stages in the manufacturing of 1.5 kg capacity vacuum frying machine at CV Rumah Mesin caused various complaints from consumers both in terms of technical and prices. Then the process of the design stages in the form of analysis of the force, mechanism, as well as the design of the elements is needed in the manufacturing of the machine so that the use of raw materials is more efficient, the engine capacity is optimal, while reducing the risk of technical problems that will occur.

The design process begins with observations on the old design of the 1.5 kg vacuum frying machine to find out the problems and needs related to the machine. Then a literature study was carried out to add references based on existing theories, especially related to tube shafts, frying baskets, frying tubes, motors, centrifugal pumps, and water tanks. Then a new machine concept is made based on calculations in the form of a 3D design.

The vacuum frying machine with a capacity of 1.5 kg that designed in this study has specifications such as the outer diameter of the frying basket is 209 mm made of food grade stainless steel, the outer diameter and outer length of the frying tube are 270 mm and 370 mm made of food grade stainless steel, the tube shaft is 25,4 mm in diameter using stainless steel AISI 304, 1/4 hp motor using WIPRO brand type YC 7124, gear reducer WPA 50 with 1:20 ratio, 1000 Watt centrifugal pump using Interdab Hatén brand XHM/5B model, and volume of water tank if half filled is 138.06 liters.

Keywords: machine design, vacuum frying

INTISARI

Perancangan mesin merupakan proses menganalisis, menilai, menyusun, dan memperbaiki suatu sistem fisik maupun non fisik dengan memanfaatkan sumber informasi yang sudah ada agar mencapai kebermanfaatan mesin yang maksimal. Hilangnya beberapa tahapan perancangan pada pembuatan mesin *vacuum frying* kapasitas 1,5 kg di CV Rumah Mesin menimbulkan berbagai keluhan dari konsumen baik dari segi teknis maupun harga mesin. Maka proses tahapan perancangan berupa analisis gaya, mekanisme, juga rancang elemen diperlukan dalam pembuatan mesin tersebut agar penggunaan bahan baku lebih efisien, kapasitas mesin optimal, sekaligus mengurangi risiko masalah teknis yang akan terjadi.

Proses perancangan diawali dengan observasi pada desain lama mesin *vacuum frying* kapasitas 1,5 kg untuk mengetahui kendala dan kebutuhan terkait mesin tersebut. Kemudian dilakukan studi literatur untuk menambah referensi berdasarkan teori yang ada terutama terkait poros tabung, keranjang penggoreng, tabung penggoreng, motor penggerak, pompa sentrifugal, dan bak air. Lalu dibuat konsep mesin yang baru berdasarkan perhitungan dalam bentuk desain 3D.

Mesin *vacuum frying* kapasitas 1,5 kg hasil perancangan pada penelitian ini mempunyai spesifikasi diameter luar keranjang penggorengan 209 mm berbahan *stainless steel food grade*, diameter luar dan panjang luar tabung penggoreng adalah 270 mm dan 370 mm berbahan *stainless steel food grade*, poros tabung berdiameter 25,4 mm dengan bahan *stainless steel* AISI 304, motor penggerak berdaya ¼ hp merek WIPRO tipe YC 7124, gir *reducer* WPA 50 dengan rasio 1:20, pompa sentrifugal berdaya 1000 Watt dengan merek Interdab Hatén model XHM/5B, dan volume bak air jika diisi setengah adalah 138,06 liter.