

Simulation and design of automatic microwave heating system for studying effect of microwave on quality of crude palm oil

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In the small-scale palm mill industries, the processes have produced low quality crude palm oil. The oils have high free fatty acid content ($\text{FFA} > 5$) and low Deterioration of Bleachability Index ($\text{DOBI} < 2$), which are classified as grade B oils. Since, they used hot air for too long time in pre-treatment process. In this research, microwave will be used as heating source for pretreatment, to shock the fresh palm fruits by rapidly increasing the temperature. The microwave heating can inhibit the action of lipase in the reaction oxidation to decrease FFA content. At the same time microwave heating will melt crude palm oil in mesocarp, that resulting in DOBI increasing. To develop microwave heating system, microwave propagation in waveguide and cavity are simulated, therefore optimum dimensions of cavity and positions of waveguide installation were obtained. At the optimum conditions the electric intensities of 2.45 GHz microwaves are strongest at position of palm fruit placement. The optimum dimension of the cavity is 33 cm x 33 cm x 33 cm.

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