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Dewanti, B.S.D.[a] , Adesta, E.Y.T.[b] , Ismail, A.F.[c]

APPLICATION OF TRIZ TO MODIFY OVEN DRYING FOR SMES TO MAINTAIN THE EUGENOL CONTENT IN DRIED CLOVES

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[a] Department of Materials and Manufacturing, International Islamic University Malaysia, Selangor, Jl. Gombak53100, Malaysia

[b] Department of Safety, Health and Environmental Engineering, Universitas Indo Global Mandiri (UIGM), Jl. Jendral Sudirman No. 629 Km. 4, Palembang, 30129, Indonesia

[c] Department of Mechanical Engineering, Kulliyyah of Engineering, International Islamic University Malaysia, Selangor, Jl. Gombak53100, Malaysia

Abstract

Clove essential oil (EO) has a high eugenol content. Fresh cloves need to go through a drying and distillation process to produce essential oils. However, sun drying cannot be done optimally during the rainy season. Therefore, some farmers (SMEs) use the oven drying method. The initial study found that the eugenol content after the drying process decreased. Therefore, this study aimed to maintain high eugenol content in dry cloves. After identifying the problem, it is solved using the TRIZ method, and research is continued for a new oven prototype. Three issues are found in drying cloves based on field surveys and literature studies. First, the clove moisture content is not uniform after the drying process. The second problem was that the clove was too dry after the drying process and the eugenol content decreased. And the third problem is the oven that has been used so far is still fuel-wasting. The literature studies also found several parameters to be a reference in designing a new oven: the number of trays in the oven, clove thickness, the space between the trays in the oven, and the steam gap on the tray. In addition, the appropriate oven coating material can also be determined (plywood, galvanized plate, and air). In the TRIZ method, several solutions were found to design a new oven. Eight things have been changed from the existing drying oven, including the number of trays in the oven, a steam gap in each tray, the size of the mesh used for the tray base, material for the drying oven, the thickness of the cloves on the tray, the temperature used in the drying process, installation of a thermostat to control the temperature in the oven, separate combustion chamber from the tray space (indirect heating), and without using a blower.

Author Keywords

Clove; Essential oil; Eugenol content; Oven drying; Smes; Triz method

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Correspondence Address
Adesta E.Y.T.; Department of Safety, Jl. Jendral Sudirman No. 629 Km. 4, Indonesia; email: eadesta@uigm.ac.id

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