

ABSTRACT

**GRANULAR CHARACTERIZATION OF CLOVE LEAVES
EXTRACT (*Eugenia caryophyllata* Thunberg) PRODUCTION OF
INDUSTRIAL SCALE AND ANTIFLATULENT *IN VITRO*
ACTIVITY TEST**

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This study aims to determine characterization and in vitro antiflatulent activity of industrial-scale clove leaf extract granules. Characterization of granules test included: flow properties, angle of repose, moisture content, granule morphological analysis using a Scanning Electron Microscope (SEM), stability of eugenol levels against storage temperature. For in vitro antifaltulence test, it was carried out based on Kougias Method.

The results of granules characterization of clove leaf extract showed flow properties and angle of repose data of 23 g/s and 20 °. Moisture content test obtained a result of 4.1%. this moisture content results did not meet requirements of literature, namely 1.0-2.0%. The results stability test of eugenol levels against accelerated temperature storage, room temperature, temperature 30°C. shows the half-life ($t_{1/2}$) 12.0 months; 11.4 months; 10.9 months. And expiration time (t_{90}) 2,4 months; 2,3 months; 2,2 months. Statistical results with One Way Annova Method for stability test of eugenol levels against storage temperature showed a significance value of 0.931 ($p > 0.05$). So it can be concluded that there is no significant difference reduction of eugenol levels between three storage variables, namely accelerated, room temperature, and temperature 30°C. Analysis of granule morphology used Scanning Electron Microscope (SEM) showed that granule particles had irregular shape with a rough surface and agglomerate together with each other. For the results of antiflatulent

observation test, data obtained were positive control, negative control, and treatment of granule samples with a concentration of 3% with a residual high foam of 0.2 ± 0.0 ; 1.8 ± 0.1 and 0.8 ± 0.0 . Statistical analysis used One Way Anova method showed a significant difference in removed foam between negative control and treatment samples with a significance value of 0.034 ($p < 0.05$). The sample of clove leaf extract granules with a concentration of 3% also showed a percentage of antifatulent effectiveness at 54.6%. So it can be concluded that granules of clove leaf extract produced on industrial scale with a concentration of 3% have significant in vitro antifatulent activity.

Keywords : Characterization, *Granular*, *Eugenia caryophyllata* Thunberg., *Antifatulent*