



Effect of Urea and Calcium Nitrate Application Timing as Top-Dressing Fertilizer on Texture Variation of Pickling Gherkin (*Cucumis sativus* L.)

W. M. H. H. Wijesuriya¹, H.K.M.S. Kumarasinghe^{2*}, S. R. Amarasinghe², P. A. B. N. Perumpuli²

¹ Faculty of Graduate Studies, University of Ruhuna, Matara.

² Faculty of Agriculture, University of Ruhuna, Matara.

*Corresponding author: skumarasinghe@agri.ruh.ac.lk

This study evaluated the effects of fertilizer type (urea and calcium nitrate) and the commencement date of the first top-dress application 10, 15, 20, and 25 days after seedling emergence (DASE), followed by repeated applications every 10 days up to 60 days on the texture variation of pickling gherkin (*Cucumis sativus* L.) during vinegar fermentation. Calcium nitrate was applied with nitrogen content equivalent to that of urea (kg/ha). The experiment followed a factorial randomized complete block design (RCBD) with six replicates. Firmness was measured using a digital force gauge (Newton) in fresh fruits at, 45, 75, and 105 days of fermentation, with ten fruits sampled per-treatment and period. Data were analyzed using two-way ANOVA, and means were separated by Duncan's Multiple Range Test at $p < 0.05$. Results showed that both fertilizer type and top-dress timing had significant effects on fruit firmness, while their interaction was not significant. Calcium nitrate application produced significantly higher firmness compared to urea in fresh fruits (37.16N), 45 days (23.53N), 75 days (19.69N), and 105 days (18.19N) of pickling. Considering the top-dress timing, commencement at 15 DASE resulted in significantly higher firmness at fresh (35.68N), 45 days (25.68N), 75 days (18.95N), and 105 days (17.55N) of pickling. Furthermore, commencement at 20 DASE produced significantly higher values at fresh (32.18N), 75 days (19.73N), and 105 days (18.23N), while commencement at 25 DASE yielded significantly higher firmness in fresh fruits (37.17N), 75 days (18.34N), and 105 days (16.84N). In contrast, plants where top-dressing commenced at 10 DASE recorded significantly lower firmness values in fresh fruits (32.09N), 45 days (18.55N), 75 days (17.40N), and 105 days (16.03N). These results indicate that calcium nitrate and top-dressing initiated at 15, 20, and 25 DASE were most effective for maintaining fruit firmness during vinegar fermentation.

Keywords: Fruit Firmness, Gherkin, Pickling, Top-dress, Vinegar Fermentation