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Mutagenic Impact of Sodium Azide on Growth and Development in Spinach (Spinacia oleracea L.)

Kharade Swati, Darzi Shamsunnisa, Ghare Humera

Anjuman Islam Janjira, Degree College of Science, Murud-Janjira swatideshmukh814@gmail.com

Abstract: Spinacia oleracea L. (spinach) is a nutritionally rich leafy vegetable with significant medicinal and agricultural value. This study examines the mutagenic effects of sodium azide (NaN \square) on spinach growth and development by assessing seed germination rates, shoot and root growth. Seeds were treated with varying concentrations of NaN \square (0.001%–0.005%) and observed over 8, 16, and 24 hours. Results revealed a dose-dependent decline in germination, decreasing from 94% (control) to 9% at 0.005% NaN \square after 24 hours. Similarly, shoot and root lengths were significantly reduced, with shoot length declining from 7.2 cm (control) to 1.4 cm, and root length from 1.5 cm to 0.4 cm at the highest concentration. While some phytochemical variations were observed, NaN \square primarily exhibited inhibitory effects on growth. These findings suggest that while controlled doses of NaN \square may induce genetic variability beneficial for crop improvement, careful application is necessary to mitigate its adverse effect.

Keywords: Spinacia oleracea L., sodium azide (NaND), mutagenic effects, seed germination



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