

# Effect of 2,4-D and BAP on Growth and Chemical Characteristics of Bean Sprouts (*Vigna mungo* L.)

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## Abstract

Bean sprouts or “tauge” is a popular vegetable among the Malaysians. Sprouts are rich in nutrients, easily digested, but are perishable and have a short life cycle. Relatively, standard sprouts have long, thin hypocotyls and long roots. Some farmers use plant growth regulators, such as the 2,4-dichlorophenoxyacetic acid (2,4-D) and 6-benzylaminopurine (BAP), to increase the hypocotyl thickness and inhibit bean sprout growth. Calcium makes the sprouts crispy, healthy and fresh. Thus, the objective of this study was to determine the efficiency of 2,4-D and BAP in influencing the growth of bean sprouts. *Vigna mungo* (black gram) seeds were used in this study. The bean seeds were treated with 2,4-D and BAP at 5, 10, 15 and 20 mg L<sup>-1</sup>, and each with the addition of 100 mg L<sup>-1</sup> calcium. The beans sprouts were analyzed for soluble solids concentration (SSC), pH, titratable acidity and vitamin C. Physical characteristics, such as hypocotyl length, diameter and weight and root length, were determined. The experimental design was a randomized complete block design with a factorial arrangement of treatments. The results showed that seeds treated with 2,4-D and BAP produced significantly shorter sprout hypocotyl and roots length, thicker hypocotyls diameter and higher hypocotyls weight than sprouts from control (water treatment). Also, treated seeds produced sprouts with higher pH, vitamin C, SSC and titratable acidity compared to control. In conclusion, 2,4-D and BAP, produced desirable commercial characteristics of the bean sprouts.

## INTRODUCTION

“Tauge” or bean sprout is a popular vegetable among the Malaysians. The bean sprout is eaten for its high nutritive constituents such as protein, lysine, phosphorus, pro-vitamin A and vitamin C. Moreover, the bean sprouts can be produced all year round as their production does not require sunshine or a medium for growth (Lee and Lee, 1992). Kurtzweil (1999) reported that, sprouts, which are the germinated form of seeds and beans, require only water and moderate temperature. According to Lee and Liew (1989), the growth of the bean sprouts are relatively short, as it usually takes 4 to 5 days, depending on the hypocotyl lengths needed, for their production. Usually, the bean sprouts are sprouted from the seeds of *Vigna radiata* (mung bean) and *Vigna mungo* (black gram). Traditional production produced long, thin hypocotyls and long roots sprouts that are undesirable to consumers as the roots have to be trimmed before the sprouts are used. In commercial sprout production, sprouts with thick hypocotyls and short roots are produced by introducing ethylene gas into the sprout chamber (Choon et al., 2010). The ethylene gas inhibits root growth and stimulates radial hypocotyl swelling of the sprout. However, this technology is too expensive for small sprout growers. Plant growth regulators (PGR) such as the 2,4-dichlorophenoxyacetic acid (2,4-D) and benzylaminopurine (BAP) have been used widely to produce short and thick sprouts. The 2,4-dichlorophenoxyacetic acid (2,4-D) and 6-benzylaminopurine (BAP) have been reported to be used for producing sprouts (Liew and Cheah, 1990). Also, 2,4-D, a synthetic auxin, is used as herbicides and has been reported to have carcinogenic effect

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