

**Title** Effects of seeding density and watering duration on growth characteristics and sprouting atmosphere of black gram (*Vigna mungo* L.)

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**Keyword** black gram; sprouts; hypocotyl

### Abstract

Malaysian consumers prefer black gram sprouts with short hypocotyls and root length and thick hypocotyl. Such sprouts are produced using unknown chemicals which could be hazardous to human health as they are eaten about 5 days after seed germination. A study was conducted to determine if seeding density and watering duration could affect sprouting atmosphere and regulate sprout growth characteristics when grown in a sprout-chamber. Seeds were presoaked in 150 mg/L Ca for 12 h before being put into pots at 50, 75, 100 and 125 g seeds/L pot. Then pots were placed into a chamber and watered at 10, 15 and 20 min every 3 h to enable seeds to sprout for 4 days. Sprout produced using 50 g seeds/L at 10 min watering were long and etiolated with long roots. Hypocotyl length and root length of sprouts decreased as seeding densities and watering duration increased. There was a positive correlation between hypocotyls length and root length. Sprout of 75 and 125 g seeds/L at 15 min watering had optimum hypocotyls diameter. CO<sub>2</sub> production of sprouts from 50 g seeds/L showed an increase during 12 to 36 h of sprouting, followed by a decrease. Sprouts produced at 75, 100 and 125 g seeds/L showed linear decreases in CO<sub>2</sub> production during sprouting. Seeding density of 50 g seeds/L produced sprouts with a rapid increase of C<sub>2</sub>H<sub>4</sub> production from 12 to 60 h of sprouting followed by a decrease. Sprouts produced at 75,100 and 125 g seeds/L showed gradual increases of C<sub>2</sub>H<sub>4</sub> production from 12 to 48 h of sprouting. Thus, manipulating seeding densities and watering duration during sprouting in a chamber created a modified atmosphere that could be used to regulate sprout growth.