

EFFECT OF DIFFERENT LIGHT SPECTRA, MEDIA AND HARVESTING DURATIONS ON QUANTITATIVE AND QUALITATIVE YIELD OF MUSTARD MICROGREENS

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The study was designed to optimise the growing conditions of mustard (*Brassica juncea*) microgreens for improving resource efficiency and ensuring quality, with the prospects of supporting sustainable and profitable semi-intensive vertical farming. A series of controlled experiments were undertaken, with distinct light sources of white, red, and blue LEDs to assess the impact on shoot height (cm), shoot fresh weight (mg/shoot), and fresh weight (g cm⁻²) of mustard microgreens. Growing media, comprising jute, tissue, rockwool, coir, and different growing media compositions of coir (900 g)+tea waste (100 g), coir (800 g)+tea waste (200 g), were tested combining with three light sources. The best light source and media combination were selected and subjected to different harvesting durations to evaluate the optimal time for harvesting in terms of yield, shelf life, and sensory quality. Shelf-life evaluation was performed with 7th, 10th, and 14th-day-old microgreens under ambient temperature and refrigerated conditions, assessing weight loss percentage and visual colour. Sensory analysis was conducted by 30 untrained panellists for attributes, including colour, odour, texture, visual quality, and general acceptability. Significantly high shoot height and fresh shoot weight of mustard microgreens were recorded under blue light on coir media. Blue light and sole coir media were selected as the best for the growth of microgreens, and the experiment was continued under these conditions. The highest fresh weight (g cm⁻²) was obtained from 14-day-old microgreens, yet the consumer preference was significantly higher for 7-day-old fresh microgreens. Under ambient conditions, microgreens deteriorated within two days after harvesting, while under refrigerated conditions (5°C), 7-day-old microgreens could be stored for seven days without losing consumer acceptance. In industries or culinary contexts where ensuring customer satisfaction was the primary concern, prioritising the harvesting of microgreens at 7-days old may have been more beneficial, despite lower fresh weight compared to their older counterparts.

Keywords: *Brassica juncea*, Coir, LED, Shelf life, Tea waste