



Determination of morphological development, yield and protein characteristics of sprouts from different soybean (*Glycine max* L.) cultivars grown under hydroponic conditions

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Abstract

Sprouting plants under hydroponic conditions optimizes resource use and enables sustainable production with high yield and quality in a short time. This study aimed to determine the morphological development, yield and protein characteristics of sprouts obtained from soybean (*Glycine max* L.) cultivars grown under hydroponic conditions. This research was conducted in 2025 in a 3×2×2 m hydroponic plant production room belonging to Selcuk University Cumra School of Applied Sciences. The experiment was designed in a randomized plot design with three replications, using four soybean cultivars (Traksoy, Mersoy, İlksoy and Kristal22) as plant material. In the hydroponic system, 40×120 cm plastic trays were utilized for the ebb-and-flow irrigation system, while perforated aluminum containers measuring 25×35 cm were used as germination trays. The results revealed statistically significant differences among cultivars in terms of sprout growth, biomass yield, dry matter ratio and yield, as well as protein ratio and yield ($p<0.01$). Plant height, root length, biomass yield, dry matter ratio and yield, protein ratio and yield were determined as 24.73 cm, 8.20 cm, 32.50 kg m⁻², 15.87% and 3.98 kg m⁻², 42.41% and 13.63 kg m⁻², respectively. In terms of plant height, the Mersoy was prominent; whereas İlksoy stood out in terms of root development, biomass, dry matter yield, and protein yield. The Traksoy exhibited the highest protein content, while Kristal22 was distinguished by its dry matter content. Among the essential amino acids, lysine, leucine, phenylalanine, threonine, and isoleucine were significant at $p<0.01$, while valine was significant at $p<0.05$. Statistically significant differences were also determined for all non-essential amino acids, except tyrosine ($p<0.01$). Among the non-essential amino acids, the highest values were found for aspartic acid (17.72 g 100 g⁻¹) and glutamic acid (4.89 g 100 g⁻¹). Lysine (3.76 g 100 g⁻¹) and leucine (2.68 g 100 g⁻¹) were the dominant essential amino acids.

Keywords: Hidroponic system, Soybean sprout, Yield, Protein, Aminoacids, Sustainable production

