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The effect of artificial light on the growth of alfalfa sprouts

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Introduction & Aim: Plant sprouts are a very valuable and beneficial diet component. They can be cultivated all year round. Sprouts can grow with access to light or in some cases in the dark. Their morphology and chemical composition may differ depending on the source of light used during sprouting. This work aims to investigate the effect on sprouts of various light sources such as traditional bulbs as well as fluorescent and modern LED light (in every case 1180 lux). The photosynthetic pigments, vitamin C and protein content were determined.

Methods: In this work, the effect of the light on individual pigments, and vitamin C was analyzed using chromatography (HPLC). Pigments were determined in cotyledons. The protein content was established by the Khiejdahl method. Sprouts were cultured for seven days.

Results: The highest pigment contents in cotyledons were recorded in the sprouts cultivated in artificial LED light; moreover, substantial differences were found in plant morphology. Cotyledons comprised 50% of the plant's weight in the sprouts growing under LED light; 37% in those from traditional bulb light; and 27% in sprouts cultured under energy-saving bulbs' light. Despite the smaller mass of cotyledons, the sprouts cultivated in the light of a traditional bulb contained more protein compared to those illuminated by fluorescent and LED light, by 40 and 17% respectively. On the other hand, the sprouts growing both in traditional and fluorescent light had by 31% less vitamin C.

Conclusion: With regard to the sprouts growing in artificial light, the application of modern LED lighting is reasonable, since these sprouts are characterized by larger cotyledons and higher contents of pigments and vitamin C. However, in order to obtain plants with increased protein content the light should be used with an increased proportion of wavelengths 600-780 nm (as in the case of traditional bulbs).

Biography

G Fiutak has completed his PhD from University of Agriculture in Krakow. He is the Assistant Professor at University of Agriculture in Krakow Faculty of Food Technology. He has published more than 26 papers in reputed journals and participated in 29 scientific conferences. He is the grant Principal Investigator from the National Science Center - Miniatura 1: no. DEC-2017/01/X/NZ9/00206.

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