

Crop biology under agrivoltaics systems' skewed spectrum light

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Abstract

Agrivoltaics refers to the concurrent production of crops with solar-derived electrical generation. It offers a means of generating 'green' energy while producing exploitable biomass and enhancing profit by reducing production costs. Semi-transparent, colour-tinted panels, in addition, permit light transmission, produce power for the farm/growth house, and provide tailored lighting wavelengths for different growth processes and sector need. The aim of this project is to evaluate contrasting crop types and the positive and negative effects of growth under tinted systems. Root, leafy and soft fruit crops were compared under the skewed spectrum resulting from orange tinted panels, to understand their growth and biochemistry in such red-enhanced light conditions. Plant growth, morphology and nutrient content were observed to differ in all crop types. Rocket and tomato biomass under tinted conditions showed a smaller reduction, when compared with neutral density shaded plants, than that of radish varieties. An increased protein content previously reported was consistently observed. Further aspects of biochemistry and fruit characteristics suggest other high value features may compensate for deleterious biomass effects.