

Greenhouse agriculture is a high-growth and high-volume market that rapidly expands worldwide to address the societal needs for food production. The increasing demand for energy to cover their requirements, coupled with the limited amount of fossil fuels available, has turned the agriculture community into finding solutions for the exploitation of renewable energy sources. Intensive research is currently focused on the use of solar energy, one of the cleanest forms of energy, as no combustion process takes place. In recent years, Organic Photovoltaics (OPVs) are constantly gaining ground among other photovoltaic technologies due to their ability to be flexible, their light weight and their tunable optical transmittance. In this work, an experimental study was carried out regarding the effects on growth and behavior of tomato and pepper plants cultivated in an experimental greenhouse, on the roof of which Organic Photovoltaics were installed. The results of this study suggest that the installed OPVs deliver significant advantages on plant behavior, due to the shading. In particular, plants, which grown under the shade of OPVs, produced more fruit mass compared to the plants grown without being shaded. In addition, the height of the shaded plants at the end of the growing season was higher than the height of the remaining plants. This behavior was observed in both tomato and pepper plants. Moreover, the energy benefits that can be generated by the use of Organic Photovoltaics in a greenhouse facility have been examined. Electricity produced contributes to reducing the operating costs of greenhouses, leading to the economic growth of these enterprises. In conclusion, by taking into account the continuing increase in the yields of the OPV devices, it is expected that this technology will enter the market soon, covering needs that are not met by the available technologies.