Tomato Waste Valorization – Zero Net Disposal

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Abstract:

The increase in tomato production is expected to create significant volumes of waste from unripe, imperfect, damaged, and overripe fruits. Management of such waste is deemed challenging because these wastes detrimentally affect human health, natural resources, food security, and the environment. Therefore, the search for robust and sustainable tools for the management and utilization of tomato waste has become inevitable. Valorization of tomato waste can have several benefits, including reducing waste and greenhouse gas emissions, creating new economic opportunities, and promoting a more sustainable food system. Currently, the majority of tomato waste is either sent to landfills or used as animal feed, but given its chemical characteristics, it may be possible to reuse the waste as a low-cost source of numerous high-value bioactive compounds. Therefore, the main objective of the current project is to develop a cost-effective, environmentally friendly, and sustainable technology for tomato waste treatment to upgrade this waste stream to value-added products. In order to achieve this goal, low-cost green solvents will be used for the recovery of bioactive compounds from tomato waste. In addition, the project also aims to treat tomato waste with the anaerobic digestion process. Anaerobic digestion is a promising method for the sustainable management of organic waste, especially tomato waste, which is abundant in agricultural and food processing industries. The anaerobic digestion process converts tomato waste into renewable biogas and produces nutrient-rich digestate usable as biofertilizer. This project advances circular economy goals by reducing waste and emissions while supporting sustainable agriculture.