

# **Techno-economic evaluation of citrus waste valorization for the production of biofuels and high added-value products**

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## **Abstract**

Annual world production of citrus fruits is approximately 90 Mt and almost half is used for juice production. The by-products of the juice production including peel, segment membranes and other by-products are considered as citrus wastes (CWs). These CWs can be dried and used as raw material for pectin extraction or pelletized for animal feed but a significant fraction of CWs is still deposited every year. As CWs contain different carbohydrate polymers they are a potential source for production of biogas, bioethanol and many high value-added materials. In this work a comprehensive techno-economic analysis is presented to estimate the economic potential for CWs valorization. The process for the production of biofuels and high value-added products is synthesized and simulated in commercial software. The relevant equipment is designed in detail for several levels of annual production. Finally, indices of economic performance are calculated and the economic viability of the venture is evaluated.

**Keywords:** Biofuels, Citrus waste, Economic Analysis, Valorization.