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CITRUS AS A MULTIFUNCTIONAL CROP TO PROMOTE NEW BIO-PRODUCTS AND VALORIZE THE SUPPLY CHAIN

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Abstract

Citrus is one of the most important fruit tree crops worldwide, with respect to both total production and economic value. About 80% of the world production is destined to the fresh market, the remaining is processed to obtain various products (juices, jams, etc.). *Citrus* processing residues account for about 50-60% of processed fruits; their huge amounts and peculiar characteristics need a correct management that imply cost for producers and processors. If not well managed, they can represent an environmental issue. On the contrary, *Citrus* residues are a valuable source of bio-based products of interest in several sectors, as well as molecules useful for the chemical industry, cosmetics and human health. In a bioeconomy perspective of full exploitation and valorization of agricultural and processing residues, *Citrus* as a multifunctional crop can therefore generate new economic opportunities and benefits for all stakeholders, promoting at the same time the development of territories. This paper describes the current and promising pathways of valorization of *Citrus* residues by reviewing the most recent scientific literature. Alongside the bioproducts useful in agro-livestock field (feed, fertilizers), energy (biofuels), environmental and industrial sector (bio-sorbents, fibers for papermaking and textiles), a particular emphasis is given to the value added compounds with application in food, pharmaceutical, nutraceutical, cosmetic and chemical industries (polyphenols, carotenoids, essential oils, citric acid, dietary fibers and pectin, single cell proteins, Extracellular Vesicles). To our knowledge this is the first review that considers Extracellular Vesicles as a way to valorize *Citrus* processing residues.

Key words: biofuels, cascading biorefinery, *citrus* processing residues, extracellular vesicles, value added products

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