

# Upcycling Culinary Organic Waste: Production of Plant Particles from Potato and Carrot Peels to Improve Antioxidative Capacity

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## Article Information

### Identifiers and Pagination:

**Year:** 2021

**Volume:** 2

**Issue:** 1

**First Page:** 62

**Last Page:** 70

**Publisher ID:** [CNT-2-62](#)

**DOI:** [10.2174/2665978601999200925163905](#)

### Article History:

**Received Date:** 26/04/2020

**Revision Received Date:** 01/09/2020

**Acceptance Date:** 04/09/2020

**Electronic publication date:** 2021

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**Background:** Vegetables and fruits are consumed in considerable amounts worldwide producing huge quantities of organic leftovers comprising primarily of peels. Peels of potatoes (PP) and carrots (CP), for instance, are often considered as waste, albeit they still represent a rich source of interesting phytochemicals. Traditional waste management of such materials, usually vermicomposting, therefore represents a low-value approach and also a considerable burden to the environment.

**Objective:** Aiming to convert some of this waste into raw materials for further applications, methods were explored to prepare suspensions of PP and CP. Antioxidant activities of these suspensions were compared to bulk-suspensions and the corresponding ethanolic extracts in anticipation of possible applications in Nutrition and Cosmetics.

**Methods:** The peels of potatoes and carrots were subjected to high-speed stirring (HSS) and high-pressure homogenization (HPH) to produce suspensions which were characterized for size distribution by Laser Diffraction (LD), Photon Correlation Spectroscopy (PCS), and light microscopy (LM). Ethanolic extracts of peels were also produced. Samples were evaluated for antioxidant activity employing 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay.

**Results:** HPH produced suspensions of peels comprising particles with diameters in the range of 268 - 335 nm for PP and 654 - 1,560 nm for CP. These suspensions exhibited a significantly stronger antioxidant activity compared to the bulk-suspensions. Moreover, the suspension of PP (1% w/w) exhibited comparable antioxidant activity to the ethanolic extract (1% w/w) whilst the CP suspension (1% w/w) exhibited lower activity compared to the ethanolic extract.

**Conclusion:** Production of suspensions of vegetable peels may unlock some biological potential which could be optimised for applications in Nutrition, Agriculture, Medicine and Cosmetics.

**Keywords:** Antioxidants, carrots, extracts, homogenization, suspensions, potatoes, up-cycling.