J Food Process Technol 2016, 7:12 (Suppl)
http://dx.doi.org/10.4172/2157-7110.C1.057

Green extraction: An innovative technology to obtain bioactives with high-value added market

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This presentation will introduce a new and innovative area in the frontiers of chemistry, biology and processing: Green extraction with special emphasis on natural products. Green extraction is a part of the sustainable development concept; its history, concept, principles and fundamentals will be described. We will pay special attention to the strategies and the tools available to make biorefinery greener. The representation will present the innovative research in this area these past five years in term of innovative techniques (microwave, ultrasound, pulse electric field, etc.) and alternative solvents (ionic liquids, sub and supercritical fluid, agro-solvents, water, etc.) applied to this new area green extraction of natural products with special examples applied to biorefinery concept.

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Food waste reduction in the dairy industry by recovering food ingredients, energy and water with advanced technologies

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Traditionally, the dairy industry has to face with a serious problem related to the huge amount (more than 90% of the processed milk) of highly polluting and quickly perishable whey and other solid and liquid food waste (FW) resulting from washing, commercialization, packaging, food safety assurance, and others. At present, in order to overcome this problem, the large companies use the whey as raw material for producing concentrated protein powders (WPI) for human consumption, and/or single cell proteins (SCP) by lactose fermentation, thus eliminating/reducing the waste management costs. However, for small and medium dairy firms, localized in orographically difficult areas, environmental problems often conflict with the firm profit. In this contribution, the results obtained by applying two innovative technologies for recovering high quality products and biofuel are reported and discussed in detail. In particular, the feasibility of applying supercritical anti-solvent (SAS) to obtain a high value infant formula ingredient, and hydrothermal carbonization (HTC) for making energy intensive solid fuel, was investigated. The integration of SAS and HTC with membrane filtration based processes, allows to: a) reduce drastically the volume of concentrated whey to be collected in the facility devoted to the production of the food ingredients; b) produce a net amount of high quality water (about 60% of the milk); c) easily destroy all the solid and liquid FW still remaining after the whey management and, at the same time, produce a valuable solid biofuel.

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