3rd International Conference on

Past and Present Research Systems of Green Chemistry

September 19-21, 2016   Las Vegas, USA

Multi-response optimization based on Response Surface Methodology (RSM) and desirability function for the separation of Lutein and Chlorophyll from spinach by-products by a saponification procedure

Maelle Derrien, Ashraf Badr, Andre Gosselin, Yves Desjardins and Paul Angers
Université Laval, Canada

Green chemistry, also called sustainable technology, is a major challenge in industry and research. In fact, there is a growing need for more environmentally acceptable processes in the chemical industry. Industrial vegetable by-products contain high levels of valuable phytochemicals that can be use as a great source of biomolecules. The main objective of this project was to develop a sustainable, safe and ecological process, to extract and separate Lutein and Chlorophyll from spinach by-products respecting the main principles of green chemistry. A saponification in an aqueous medium was carried out in order to hydroxylate the ester bond of the aliphatic chain of Chlorophyll. Polar Chlorophyll derivatives were thus formed, remaining in the aqueous medium. Lutein, remaining apolar, stayed in the residue and was finally extracted by maceration in 95% ethanol. However, the saponification step was responsible of a significant degradation of lutein. This last stage of separation was consequently studies through response surface methodology in order to determine which saponification parameters gave the highest recovery of lutein in the final ethanolic extract with the lowest amount of Chlorophyll. Through this procedure, using the Derringer's desirability function, the optimal conditions for separation were 16h of saponification, at 20°C and with 17.2% of sodium hydroxide. This procedure can be streamlined in a commercial extraction process for these compounds.

Biography

Maelle Derrien is a PhD student in Food Science at the University Laval in Quebec, Canada. She obtained a degree in Biology and Biochemistry from University of Rennes, France. Her research field is Green Chemistry, in order to valorize crops by product by an ecological extraction of their biomolecules content. For this goal, she uses innovative green chemistry techniques optimized using statistical models. She is a Researcher and Professor at the University of Laval in the Department of Food Science.

maelle.derrien.1@ulaval.ca

Notes:

Organic Chem Curr Res 2016
ISSN: 2161-0401 OCCR, an open access journal

Green Chemistry 2016
September 19-21, 2016

Volume 5, Issue 3(Suppl)

Page 60