

BOOK OF ABSTRACTS

9th International CONGRESS of
Food Technologists, Biotechnologists and Nutritionists



**International CONGRESS of Food
Technologists, Biotechnologists
and Nutritionists**

HOTEL INTERNATIONAL, ZAGREB, CROATIA
October 03-05, 2018

Published by:

Croatian Society of Food Technologists, Biotechnologists and Nutritionists

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Printed by:

MGM studio Novel d.o.o., Zagreb

ISBN 978-953-99725-7-6

A CIP catalogue record for this book
is available from the National and University Library
in Zagreb under 001007442

Organized by:



CROFOST - Croatian Society of Food Technologists,
Biotechnologists and Nutritionists, Zagreb, Croatia



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The official language of the Congress is English.

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OPTIMIZATION OF ULTRASOUND-ASSISTED EXTRACTION OF SOLANESOL FROM TOBACCO WASTE

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Abstract:

Solanesol is long-chain polyisoprenoid alcohol with nine isoprene units present in solanaceous crops, primarily in tobacco, and in potatoes, tomatoes, eggplants and peppers. It represents an important pharmaceutical intermediate for the synthesis of ubiquinone drugs such as coenzyme Q10 and vitamin K2. Besides that, solanesol possesses antibacterial, antifungal, antiviral, anticancer, anti-inflammatory and anti-ulcer activities. Considering the composition of solanesol which includes nine isoprene units, the synthesis of this compound is difficult; so it is therefore mainly extracted from tobacco plants. According to many authors, the content of solanesol in tobacco leaves is 0.3-3.0%.

In this study ultrasound-assisted extraction technique was applied for extraction of solanesol from tobacco leaves and tobacco waste (cigarette machine crumbs, dust and mid-rib) obtained from "Fabrika Duhana Sarajevo" from Bosnia and Herzegovina.

The influence of extraction temperatures (33.78, 40, 55, 70, 76.2 °C) and time (8.78, 15, 30, 45, 51.21 min) on solanesol content in obtained extracts was determined. Extraction was improved by adding NaOH into the extraction solvent in concentration of 0.05M. Solanesol content in analyzed extracts was determined by High Performance Liquid Chromatography (HPLC). Extraction optimization was conducted using response surface methodology (RSM). The results showed that concentrations of solanesol in different types of wastes extract were different (5.03 - 18.28 µg/mL).

Keywords:

Tobacco waste, by-product, ultrasound extraction, solanesol, optimization