



**17TH EUROPEAN MEETING
ON SUPERCRITICAL FLUIDS**

**7TH EUROPEAN MEETING
HIGH PRESSURE TECHNOLOGY**



Institute of Chemical and Environmental Technology (ITQUIMA)

APRIL 8 - 11, 2019

PROGRAMME

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From natural resources to bio-based food additives: a focus on extraction methods

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1. Introduction

Natural resources are invaluable sources of bio-based molecules with numerous applications in food industry. Some of these compounds have been explored to serve particular purposes such as substituting artificial food additives. In fact, the increasing consumers' awareness and resistance to artificial compounds often used as additives in many foodstuffs has led to renewed strategies to overcome possible safety issues, while guaranteeing effectiveness.¹ Food additives have long been used to enhance foodstuff properties and are of great value to maintain their quality, which justifies the exploitation of safer bio-based compounds to be used as natural substitutes. Plants and mushrooms seem to be a potential source of such compounds, given their unique richness in coloring, preservative, and bioactive molecules, but more efficient and sustainable extraction methods must be considered.

2. Results and discussion

Several matrices have been studied and certain compounds such as betalains (e.g. gomphrenin II, gomphrenin III, isogomphrenin II, and isogomphrenin III) and anthocyanins (e.g. cyanidin, delphinidin, and malvidin derivatives) were extracted from purple globe amaranth, rose, dahlia, centaurea, strawberry-tree, roselle, and blueberry and were further introduced into ice-cream, yogurt, and waffles for coloring purposes.²

On the other hand, preservative molecules such as flavonoids (e.g. catechin, and quercetin and luteolin derivatives), phenolic acids (e.g. rosmarinic, chicoric, lithospermic, caffeic, and caffeoylquinic acids), and hydrolysable tannins (e.g. trigalloyl-HHDP-glucoside) were obtained from strawberry-tree, basil, lemon balm, sweet chestnut flowers, fennel, and German chamomile, and were tested in loaf bread, cupcakes, yogurt, cheese, and cottage cheese, namely.³

Moreover, phenolic acids (e.g. rosmarinic acid), flavonoids (e.g. quercetin derivatives), and ellagitannins (e.g. sanguin H-10 and lambertianin) from mushrooms, wild strawberry, rosemary, mountain sandwort, and flowers of *silva brava* conferred bioactive properties to gelatin, yogurt, and cottage cheese.⁴

All these high added-value compounds were obtained using optimized protocols, based on extraction processes intensified by microwaves, ultrasound, and ultra-high pressure,⁵ some of which are patented.

3. Conclusions

The proven efficacy of distinct natural food additives in several foodstuff highlights the importance of natural resources such as plants and mushrooms in these novel additives discovery journey. However, it is crucial to use efficient and sustainable extraction processes, which can be successfully intensified by ultra-high pressure.

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