

SOLIEVA process as solution for environmental risk related to untreated Table Olive Production Wastewater (TOPWW) accumulation ponds.

Polyphenols, a high added value organic compound

Miguel Ayuso*, Presentación García, Ángel Martínez, David Quintín, Esther García and Pablo Flores

National Technological Centre for the Food and Canning Industry, CTNC, Murcia, Spain

*Corresponding Author: ayuso@ctnc.es

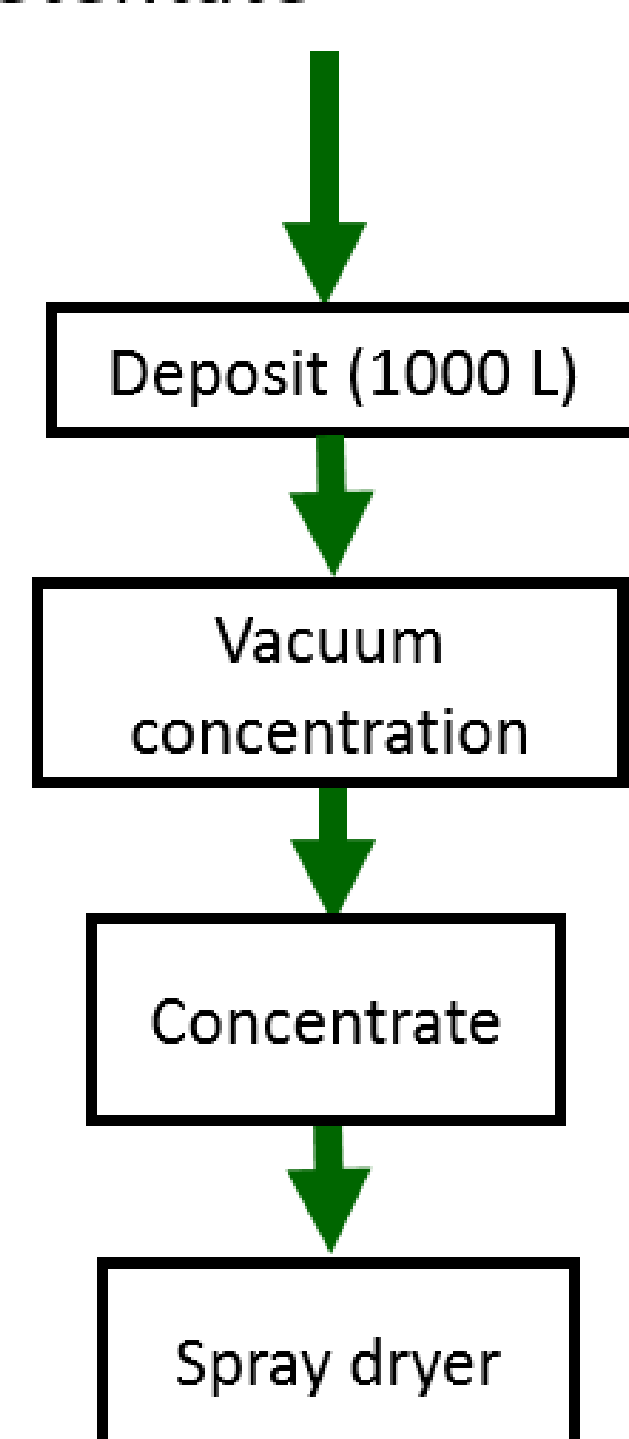
INTRODUCTION

The presence of phenolic compounds, such as hydroxytyrosol (2-(3,4-dihydroxyphenyl) ethanol), represents one of the main problems for treatment of TOPWW, mainly because they are hardly biodegradable and, secondly, because of their important activity antimicrobial, which reduces the efficiency of biological processes in wastewater treatment plants. On the other hand, recovering valuable polyphenols to be used in the food and health industry opens an opportunity to create new business models following the principles of industrial symbiosis.

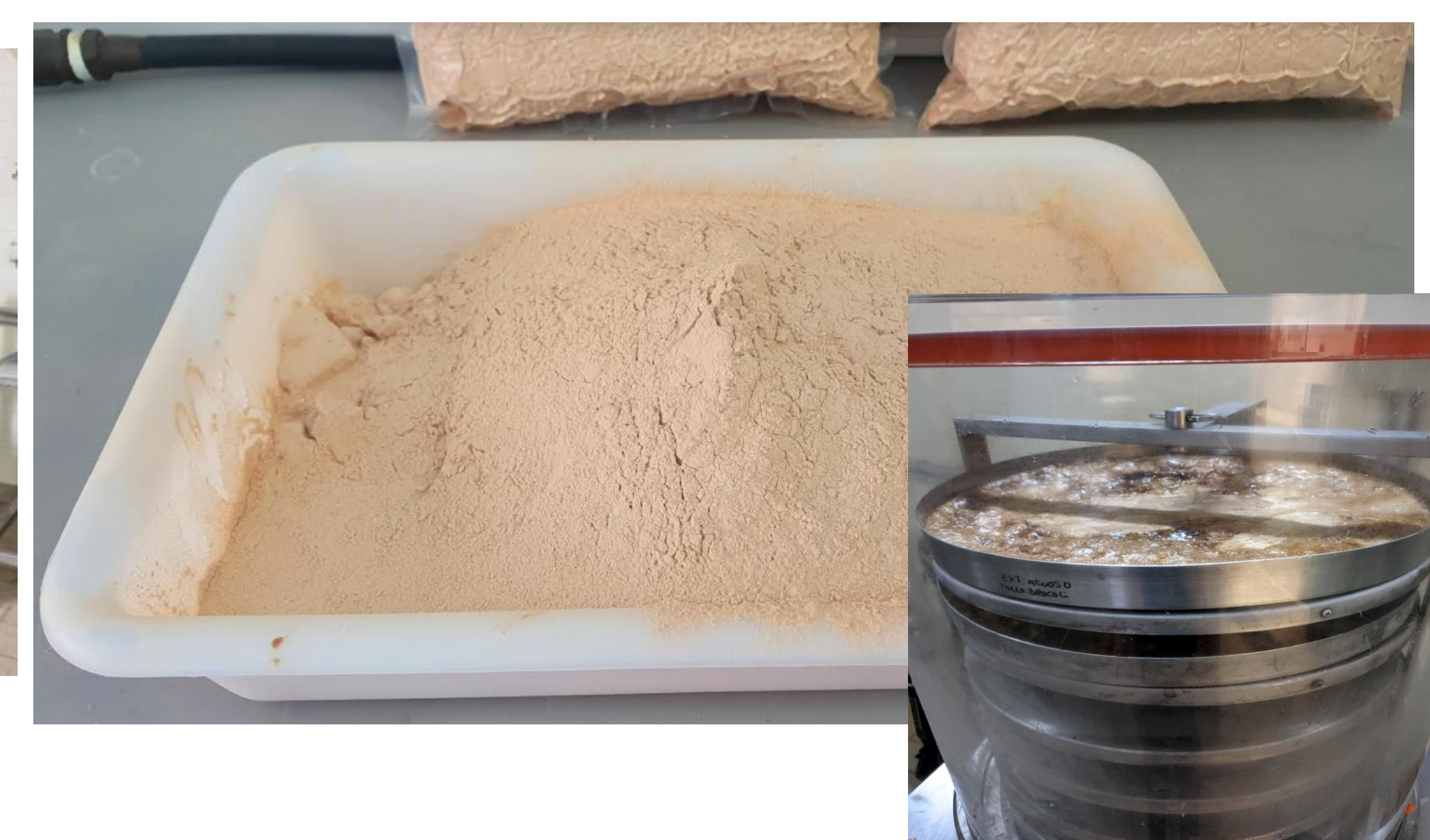
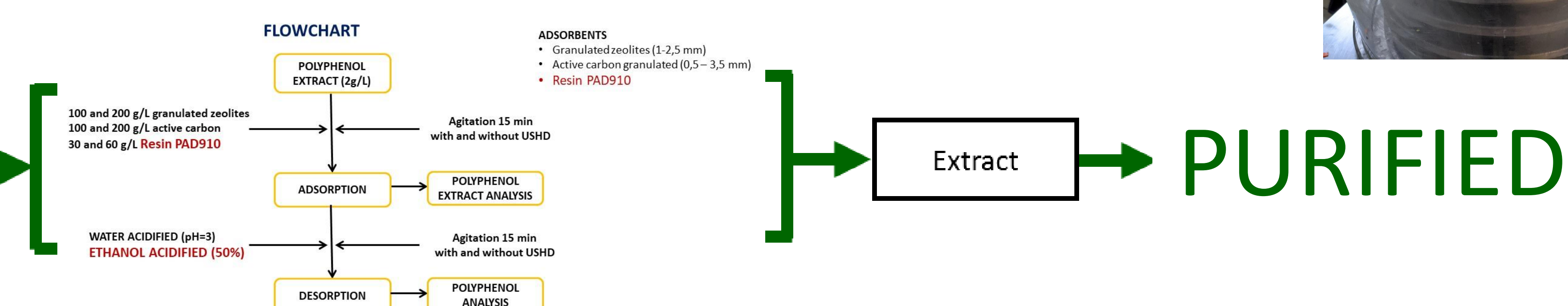
OBJECTIVES

1. Monitoring of TOPWW (characterization of different wastewater streams).
2. Design of organic compound recovery module: membrane stage and polyphenol recovery stage.
3. Concentration and dried of the nanofiltration retentate from membrane stage. Vacuum evaporator + spray dryer
4. Purification of extract. Adsorption/desorption methodology. Lyophilization.

TOPWW - from plant Retentate



POLYPHENOL RECOVERY WITH PURIFICATION



RESULTS

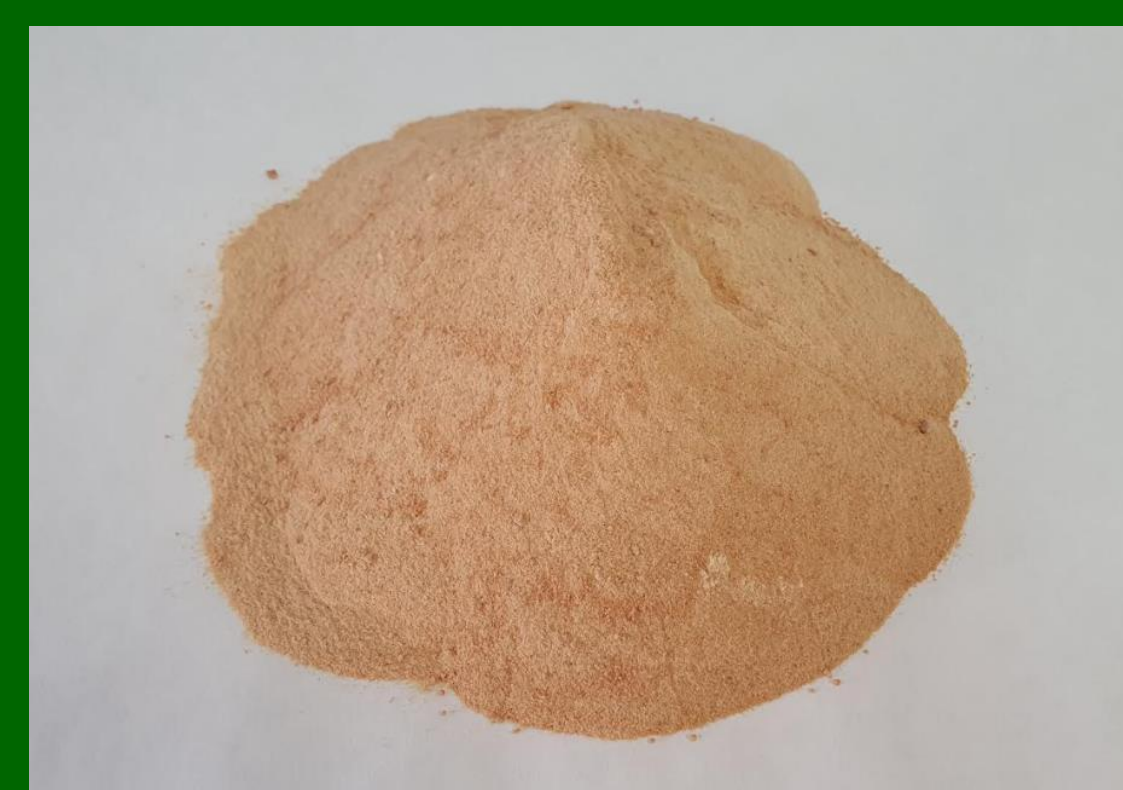
1. Characterization of TOPWW

Parameters	Spent brines	Bleaching waters	Washing waters
pH	4.85	12.77	11.13
CE (μS/cm)	80,140	94,320	2,015
TSS (mg/L)	547	303	25
TOC (mg/L)	7,563	2,173	362
BOD (mg O ₂ /L)	> 8,000	> 8,000	694
COD (mg O ₂ /L)	36,262	14,798	1,194
Oils & Fats (mg/L)	< 1	1.5	< 1
Chloride ions (mg/L)	33,744	35,635	363
Total Polyphenols (mg/L)	1,850	131	34
Total sugars (mg/L)	< 2,500	< 2,500	90

2. Work criteria: °Brix ≤ 16
(Maximum value to work Spray Dryer)

3. Polyphenol recovery

Global performance: 92.5%
Recovery: ~ 50% of Polyphenols
Total polyphenols: 5 – 7 %



100% water soluble extract

	Purified extract
Total sugars (g/100g)	28.2
Moisture (g/100g)	2.5
Total fats (g/100g)	0.6
Total carbohydrates (g/100g)	81.5
Proteins (g/100g)	1.5
Hydroxytyrosol (mg/Kg)	72,068
Energy value (kcal/100g)	337

CONCLUSION

Validation of working parameters to scale up SOLIEVA technology as a sustainable management system of TOPWW.
Spent brines are the most interesting wastewater stream because they have high phenolic compounds concentration.