Spanish university offers a method of extraction of bioactive compounds from plants

Summary

Profile type
Technology offer

Company's country
Spain

POD reference
TOES20250224007

Profile status
PUBLISHED

Type of partnership
Research and development cooperation agreement

Commercial agreement with technical assistance

Targeted countries
• World

Contact Person
Enrico FRANZIN

Term of validity
24 Feb 2025

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General Information

Short summary

A Spanish university has developed a new technology aimed at obtaining rockrose extracts with high antioxidant capacity due to their levels of polyphenols and flavonoids, through the use of fluids in conditions below their critical point (subcritical conditions).

They seek commercial agreement with technical assistance and/or research and development cooperation agreement.

Full description

The research group is composed by all the professors and researchers of Chemical Engineering at this university. This group aims to apply the foundations of Chemical Engineering to address various challenges of the modern food industry.

Rockrose (Cistus ladanifer, the most common species), like other plant species, contains essential oils and bioactive compounds (polyphenols, flavonoids) with high antioxidant capacity that can be used in the production of cosmetics, pharmaceutical preparations and as ingredients in products in human food.

To obtain bioactive compounds from plants, conventional extraction techniques usually require high reaction /

extraction times (on the order of hours) and the use of organic solvents (such as ethanol, acetone, etc.). The final product obtained by techniques that use organic solvents requires a purification process to be carried out.

The technology developed by the UBU refers to a green technology known as extraction with pressurized liquids in which the liquid used for the extraction is water. The advantage that water offers as a solvent is the zero environmental and human toxicity compared to organic solvents, so it does not pose a risk of contamination during its use, as well as it does not make the purification of the final product necessary, in addition to being a solvent abundant and readily available.

The technique proposed in the present invention is based on the use of a harmless solvent present in large quantities and easily available, such as water, which, by modifying its physical and chemical properties through changes in temperature and/or pressure, acquires similar properties to organic solvents, and can be used for the same purpose, eliminating toxic risks and subsequent treatment of the extracted product.

The installation for obtaining rockrose extracts, consisting of the input of a solvent, mainly water, which is pumped up to a work flow by the pumping system while it reaches the working pressure. This solvent or fluid will pass through a heating device. A bypass divides the line system into two ways: one way allows the fluid to reach the extractor that will house the raw material that contains the compound to be extracted, and the second way diverts the flow of the fluid towards the outlet of the system. The change from one way to another of the bypass is carried out by means of a flow cut-off device such as a valve. The solvent that passes through the extractor and the raw material and contains the compounds of interest, or the solvent that comes from the other bypass line. This procedure allows operation in a semi-continuous or discontinuous regime.

Potential applications of the installation are as follow:

- Obtaining bioactive compounds from rockrose that can be used in pharmacy magisterial formulas, cosmetics and ingredients in food products

The university is looking for commercial agreement with technical assistance and/or research and development cooperation agreement.

Advantages and innovations

- The patented process allows working in a semi-continuous and discontinuous regime.
- The process incorporates a line called "bypass" that allows the solvent to acquire the optimal extraction conditions prior to its passage to the extractor without being in contact with the raw material, preventing the composition of the raw material from being modified.
- Control system based on "friendly" and open programming hardware, reducing the cost of automation.
- Water can be used as a solvent or a mixture of water with organic solvents (ethanol).
- The biocomposites dissolved in the solvent are separated from it by drying techniques in which recoverable fluids are used and that do not leave residues in the final product.
- The heating system can be a clamp-type electric heater, which requires less space than an oven.
- Organic solvents are not used to extract compounds from the raw material, reducing total toxicity and causing economic savings in the process.
- The use of a "green" solvent such as water does not leave toxic residues in the final product, so it is not necessary to purify it.
- Reaction times for extraction to occur are shorter when superheated liquids are used as solvents (hours to minutes). At an industrial level it is an important factor.
- By modifying one of the two operating parameters, temperature or pressure, or both, the compound of interest can be extracted.

Technical specification or expertise sought

Stage of development

Lab tested

IPR Status

IPR granted

IPR Notes

Sustainable Development goals

- **Goal 9: Industry, Innovation and Infrastructure**

Partner Sought

Expected role of the partner

Type: basic chemical companies, pharmaceutical industries, food industries, other industries or public institutions.
Role: pharmacy magisterial formulas, cosmetics and ingredients in food products.

Type of partnership

Research and development cooperation agreement

Commercial agreement with technical assistance

Type and size of the partner

- **Other**
- **SME <=10**
- **Big company**
- **SME 11-49**
- **SME 50 - 249**

Dissemination

Technology keywords

- **06006012 - Bioprocesses**
- **06006004 - Biopolymers**
- **06006001 - Biobased Materials**
- **05001004 - Organic Chemistry**

Market keywords

- **09005 - Agriculture, Forestry, Fishing, Animal Husbandry & Related Products**

Targeted countries

- **World**

Sector groups involved