New natural food colourant from vegetal sources with preservative and antioxidant properties

Brief description

ALIMNOVA research group, specialized in the holistic study of food, covering scientific, technological, and social aspects, has developed a new food colorant. This colorant has been obtained from wild fruits and is a natural colorant that provides hues ranging from red to magenta. Due to its characteristics, it can be used in foods intended for children.

Optionally, the colorant can also be used as a preservative (antibacterial and antifungal) and/or as an antioxidant agent.

Both the composition of the colorant and the preparation method, as well as its uses, are protected by a patent (**ES2990137B2**) and several specific applications through utility models.

How does it work?

It is a colorant composition based on anthocyanins, prepared from a seedless fruit extract of the species *Berberis vulgaris* L. and an extract of the fruit peel of *Myrtus communis* L.

The colorant composition provides hues ranging from red to magenta, with a characteristic and recognizable chromatic profile, due to the synergistic effect of the two extracts. Its safety profile makes it suitable for use as a food colorant, even in food products intended for populations especially sensitive to issues arising from the use of artificial colorants, such as child population.

It provides a stable magenta or purple hue when used in environments with a pH between 3.0 and 6.0, which fills a gap in the market regarding natural colorant additives capable of providing this specific coloration, characteristic of berries, without requiring the use of synthetic dyes.

Regarding antimicrobial capacity, these compositions significantly inhibit the growth of foodborne pathogenic bacteria (e.g., *Salmonella* sp., *Listeria monocytogenes, Staphylococcus aureus, Bacillus cereus, Pseudomonas aeruginosa, E. coli*, among others) and fungi such as *Aspergillus*.

In addition, it presents antioxidant capacity since they significantly inhibit oxidative processes in food products through different mechanisms of action, e.g., scavenging free radicals, inhibiting their generation or propagation (oxidative stress), or inhibiting enzymes that generate free radicals.

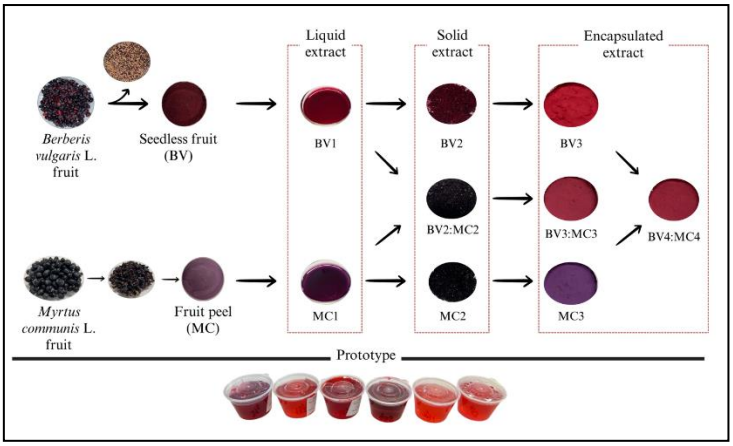

Figure 1. *Obtention process of the colorant composition*

Medicine Faculty. Entrepabellones building 7 y 8.
C/ Doctor Severo Ochoa, 7. 28040 Madrid.
comercia@ucm.es

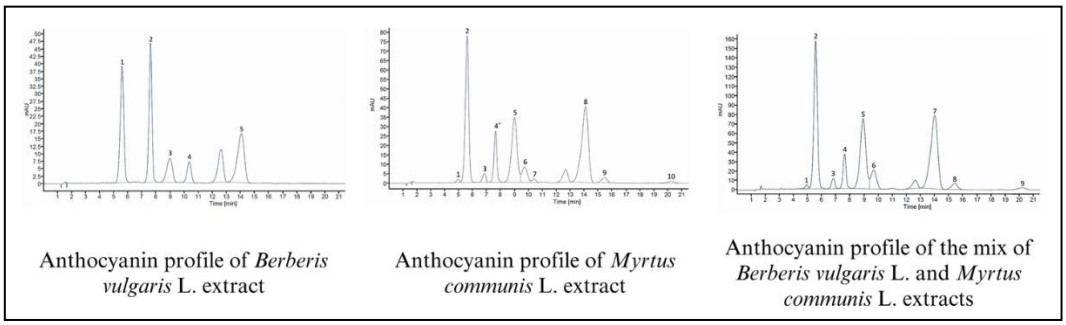

Figure 2. *Anthocyanin profile of the colorant composition*

What problem does it solve?

The use of colourings, mostly synthetic, is currently common in the food industry. However, many of these, especially azo dyes, have been linked to adverse effects, such as exacerbating the symptoms of attention deficit hyperactivity disorder (ADHD), particularly in children. Conversely, the natural colorants available on the market show limitations in stability and variety of hues.

The anthocyanin-based colouring extract covered by patent ES2990137B2 is presented as an alternative to artificial colourings. It offers greater stability over a wider pH range and allows shades, especially in the magenta range, to be obtained that were previously only possible with synthetic colourings.

What future products will it develop?

The developed colorant extracts show significantly higher stability across a wide pH range, making them suitable for use in a wide variety of food matrices, such as dairy products, bakery products, beverages, confectionery and other foods, where the stability of natural colorants was typically compromised by formulation and storage conditions.

Competitive advantages compared to other research

The anthocyanin-based colorant compositions developed by the research group present a colorant capacity that remains stable within a pH range broader than that provided by currently available commercial colorants, and they represent a natural alternative for use in food formulations, allowing the desired colour range to be obtained without the use to artificial dyes such as azoic colorants. This is in addition to their antibacterial, antifungal, and antioxidant properties.

Where has it been developed?

The research leading to these compositions was carried out within the ALIMNOVA research group at the Faculty of Pharmacy from Complutense University of Madrid, as part of the project "Wild edible fruits as a new source of natural dyes. Extracts development and application in children's food (NatColour)" (Ref. PID2019-109365RA-I00), funded by the Ministry of Science and Innovation and led by Prof. Dr. Patricia Morales Gómez.

ALIMNOVA group, led by Prof. Montaña Cámara, was established in 2008, and its interest in food covers the study of scientific aspects (analytical composition, health properties, and food safety assessment), technological aspects (evaluation of new sources of functional ingredients and food additives), and social aspects (compliance with current regulations and consumer acceptance studies), all within the framework of healthy and sustainable nutrition. In addition, the group has an active scientific communication activity through the publication of articles in high-impact journals, participation in congresses and scientific events, as well as the organization of dissemination activities for the general public.

And furthermore…

The group is seeking a company interested in exploiting the patent or the utility models protecting these results (U202530664: Flavoured soft drink formulated with natural colouring extract from Berberis vulgaris L.; U202530664: Yoghurt ice cream formulated with Berberis vulgaris L. extract; U202531761: Cream ice cream formulated with natural colouring extracts from wild berries).

Access to the phytogenetic resources used to obtain the colorant has been carried out in compliance with the regulations of the Nagoya Protocol (permits for access to plant genetic resources for non-commercial research purposes: PN-NC_032021 (ABSCH-IRCC-ES-257749-1) and PN-NC_022022 (ABSCH-IRCC-ES-257749-1); as well as commercial use permit (PN-CM_102024 – ABSCH-IRCC-ES-276420-1) following the signing of agreements with the Generalitat Valenciana and the Government of Castilla-La Mancha).

Researcher in charge

Patricia Morales Gómez, patmoral@ucm.es
Department: **Department of Nutrition and Food Science. Bromatology Unit**
Faculty: **Pharmacy**