HOLOGRAPHIC SENSOR FOR DETECTION OF ADULTERANTS IN ESSENTIAL OILS

TECNOLOGÍA PATENTADA

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RESUMEN

The research group of Holography and Optical Processing of the University of Alicante has developed a holographic technique for the detection of adulterants in essential oils.

This technique is able to detect different types of adulterants qualitatively. In addition, a quantitative measurement of the degree of adulteration of an essential oil can also be performed by means of pre-calibration of the sensor for a particular adulterant. The sensor could be miniaturized and manufactured at a low cost compared to traditional methods of analysis such as gas chromatography and high performance liquid chromatography. The sensor can be used by unqualified personnel.



INTRODUCCIÓN

Essential oils are mixtures of intensely aromatic substances obtained from plants, flowers, fruits, woods, resins or roots by means of physical processes such as distillation, extraction with solvents or compression. They can reach a very high price in the market due to their low proportion in plants and difficult extraction.

Essential oils are used in a large number of consumer products, from food and flavour for food, to cosmetics and perfumery. The number of companies that use essential oils as raw material for their products is very high, however, most of them do not have the economic resources and the qualified personnel necessary to perform tests by high performance liquid chromatography or gas chromatography.

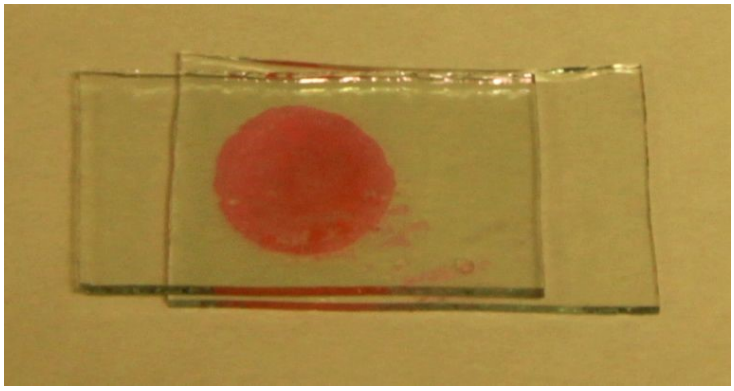
Therefore, a practical way is necessary to determine adulterations in essential oils without the need for specialized personnel or expensive investments in analytical equipment. Moreover, the tests could be performed quickly and with a low cost.

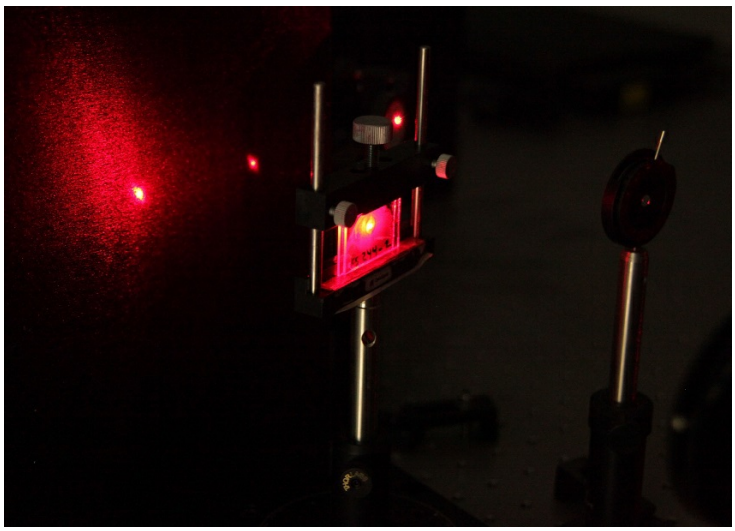
DESCRIPCIÓN TÉCNICA

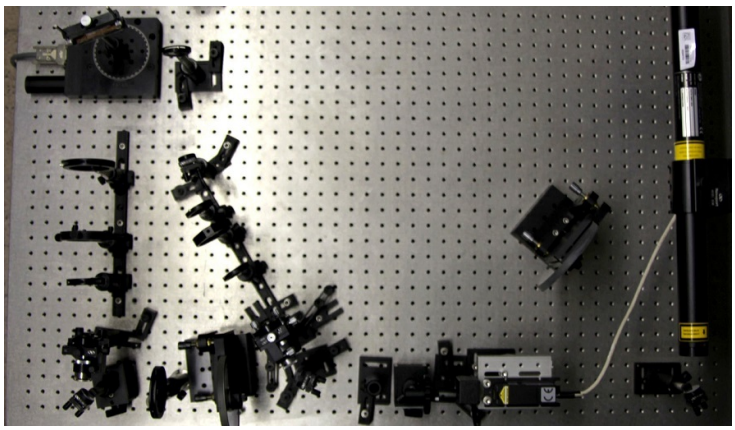
The present invention uses a holographic technique and a photopolymer as recording material. The adulterated essential oil is combined with the photopolymer, modifying its characteristics. The modification introduced by the essential oil in the photopolymer makes possible to detect an adulteration of the essential oil by means of the optical technique.

The sensor consists of two laser beams and radiometers. The laser beams pass through the photopolymer modified with the essential oil. From the diffraction and transmitted light beams it can be deduced if a specific sample of essential oil has been adulterated.

Taking account the great sensitivity of holographic techniques, it is also possible to determine the degree of adulteration, i.e. to perform a quantitative analysis. For this the sensor must be previously calibrated for a specific adulterant.







VENTAJAS Y ASPECTOS INNOVADORES

MAIN ADVANTAGES OF THE TECHNOLOGY

- The detection of adulterants is made quickly, with the result of the analysis immediately.
- The sensor can work with samples of essential oil in the range of microliters.
- The sensor and the tests have a cost lower than conventional analysis methods: gas chromatography and high resolution

liquid chromatography.

- The sensor can be manufactured in a portable device and can be miniaturized.

- It can be handled by personnel with a minimum training without the need to be an expert in chromatography.

INNOVATIVE ASPECTS

- Ability to miniaturize, with the advantage of portability, small size and low cost.

- The tests require little time and results are obtained immediately.

- The sensor can detect different types of adulterants without having to be modified.

- The sensor can be calibrated for a specific adulterant, and a quantitative estimation of the adulteration of an essential oil can be made.

ESTADO ACTUAL

The technology has been developed at the laboratory level. There are prototypes that are not portable. A limited number of essential oils and possible adulterants have been tested.

APLICACIONES DE LA OFERTA

- Food, flavours
- Fragance
- Parapharmacy
- Pharmacy and Cosmetics
- Perfumery

COLABORACIÓN BUSCADA

Companies interested in acquiring this technology for commercial exploitation are sought by the following ideas of collaboration:

- Patent licensing agreements.
- R & D projects to adapt the technology developed to the needs of the company.

DERECHOS DE PROPIEDAD INTELECTUAL

This technology is protected by a granted patent.

- Title of the patent: "Holographic sensor for detection of adulterants in essential oils and method of obtaining said sensor"
- Application number: P201730488
- Application date: 03/30/2017

SECTORES DE APLICACIÓN (3)

Agri-food and Fisheries
Pharmacology, Cosmetics and Ophthalmology
Chemical Technology