HOLOGRAPHIC SENSOR FOR DETECTION OF ADULTERANTS IN ESSENTIAL OILS

DESCRIPTION OF THE TECHNOLOGY

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.

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

MARKET APPLICATION SECTORS

The developed holographic technique could have market application for different sectors:

- Food, flavours
- Fragrance
- Parapharmacy
- Pharmacy and cosmetics
- Perfumery

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

- The detection of adulterants is made quickly, obtaining the analysis results immediately.
- The sensor can work with samples of essential oil in the range of microliters, being able to
- detect different types of adulterants without having to be modified.
- The sensor and the tests have a lower cost 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.
- The sensor can be calibrated for a specific adulterant, and a quantitative estimation of the adulteration of an essential oil can be made.

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CURRENT STATE OF DEVELOPMENT

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.

INTELLECTUAL PROPERTY RIGHTS

This technology is protected by a **patent** (previous examination). Application number: P201730488; Application date: 03/30/2017; Grant date: 24/10/2017.

COLABORATION SOUGHT

Companies interested in acquiring this technology for commercial exploitation through patent licensing agreements or R & D projects to adapt the technology developed to the needs of the company.

RELATED IMAGES

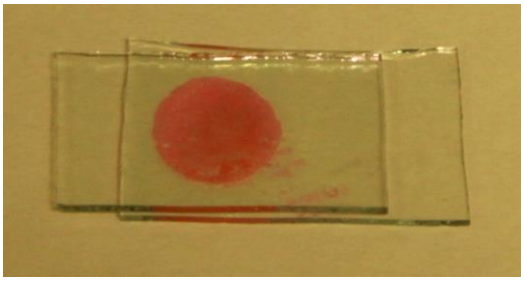

Image 1: Essential oil sample.

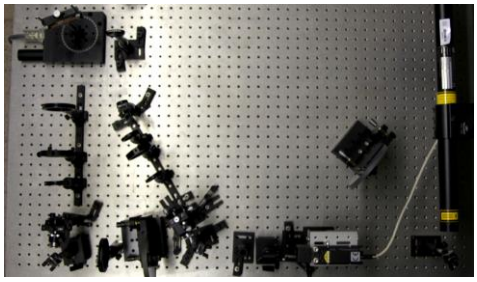

Image 2: Laboratory assembly.

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