

# Method and Apparatus for Characterization and Analysis of Aroma Mixtures

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## ABSTRACT

Complex mixtures of aroma compounds are often responsible for the overall aroma of a food, beverage, cosmetic or other product. Two or more odorants can frequently lead to an aroma that is not similar to any of its components. A new method and apparatus allow for more precise and informative analysis and characterization of aromas and volatile constituents.

## FULL DESCRIPTION

Aroma perception is the result of stimulation of the olfactory system by volatile chemicals and mixtures. Most current analytical approaches for characterizing and quantifying the relationship between aroma perception and chemical composition in complex mixtures (e.g., foods, beverages and perfumes) require an initial separation of the mixture into individual components. The components are identified and quantified and those compounds that are determined to be present at concentrations above sensory thresholds may be obtained in pure form and then mixed back together to make an aroma reconstitute that matches as closely as possible the original aroma of the sample. Such methodologies are necessarily reductive in their approach, however, and do not fully assess the aroma quality of complex mixtures of compounds, particularly in cases where not all aroma-active compounds can be characterized or accurately quantified. As a result, these previous methods frequently suffer "reconstitution discrepancy," wherein the aroma of the reconstitution still smells different from the original mixture.

Researchers at the University of California Davis have devised a novel platform to assess the perceptual effect of mixing an arbitrary number of volatile compounds from a mixture without the need for reconstitution with pure chemical standards. This novel instrumentation and method allow for in-instrument preparation of mixtures containing precise sections from a sample's chromatogram, up to and including the entire volatile fraction, allowing for aroma characterization of the impact of one or a few volatiles in a complex mixture.

## APPLICATIONS

- ▶ Analysis and characterization of aromas and component volatiles are vital features in food, beverage, substance detection, and cosmetic industries

## FEATURES/BENEFITS

- ▶ The novel invention allows for the non-reductive characterization of complex aromas and flavors.
- ▶ The invention can be used to identify subsets of compounds in a sample that are responsible for the aroma character of the sample.
- ▶ The invention does not require chemical standards, reductive aroma models, or calculation of Odor Activity Values to identify important subsets of compounds that contribute to a substance's aroma and flavor.

## CONTACT

Victor Haroldsen  
[haroldsen@ucdavis.edu](mailto:haroldsen@ucdavis.edu)  
 tel: 530-752-7717.



## OTHER INFORMATION

### KEYWORDS

aroma, food, volatiles,  
 cosmetics, perfume,  
 apparatus

### CATEGORIZED AS

- ▶ **Biotechnology**
  - ▶ Food
- ▶ **Materials & Chemicals**
  - ▶ Chemicals
  - ▶ Other
- ▶ **Research Tools**
  - ▶ Other
  - ▶ Screening Assays
- ▶ **Sensors & Instrumentation**
  - ▶ Analytical
  - ▶ Other
  - ▶ Scientific/Research

### RELATED CASES

2012-462-0

► The invention allows for the characterization of emergent perceptual properties that arise from the interactions of complex volatile mixtures that are encountered in everyday smell and flavor situations.

## RELATED MATERIALS

► [Johnson AJ, Hirson GD, and Ebeler SE, Perceptual Characterization and Analysis of Aroma Mixtures Using Gas Chromatography Recomposition-Olfactometry, PLoS ONE \(Aug 2012\) 7\(8\): e42693. - 08/17/2012](#)

## PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	<a href="#">9,188,568</a>	11/17/2015	2012-462

**University of California, Davis**

**Technology Transfer Office**

1 Shields Avenue, Mrak Hall 4th Floor,  
Davis, CA 95616

Tel:

530.754.8649

[techtransfer@ucdavis.edu](mailto:techtransfer@ucdavis.edu)

<https://research.ucdavis.edu/technology-transfer/>

Fax:

530.754.7620

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