

# Molecular Sensory Science

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Aroma, perceived through olfaction, and taste, perceived through gustation, are the major drivers for consumers' food selection. In each kind of food, a rather small number of sensory active chemical compounds are causative for its aroma and taste. These substances are called key aroma compounds and key tastants, respectively. The primary intention of the molecular sensory science approach is to objectify the sensory properties of food via the determination of structure and concentration of these sensory active key players. Once the key compounds are known, they may be used as tool to optimize breeding, food processing, and storage. Further targets include the elucidation of the formation pathways of sensory active compounds and the molecular mechanisms involved in their sensory perception.

The course will address the following topics:

## 1. Introduction

*The basic idea of molecular sensory science* ▪ *sensory properties and food quality* ▪ *the physiology of human sensory perception* ▪ *sensory active compounds vs. sensory active key compounds* ▪ *a general approach to identify sensory active key compounds*

## 2. The identification of key aroma compounds

*Methods for the isolation of the volatile fraction* ▪ *activity-guided odorant screening by GC-O* ▪ *GC-O based ranking methods* ▪ *structure elucidation of odorants* ▪ *volatiles fractionation* ▪ *odorant quantitation methods* ▪ *odor activity values* ▪ *aroma reconstitution* ▪ *omission tests*

## 3. Case studies:

*Key aroma compounds in guavas (Psidium guajava L.)* ▪ *key aroma compounds in roasted sesame*

## 4. Sources and formation pathways of food odorants

*Biochemical pathways in intact plants* ▪ *enzymatic reactions upon tissue disruption* ▪ *oxidative lipid degradation* ▪ *microbial aroma generation in fermented foods* ▪ *thermal aroma generation* ▪ *intraoral aroma generation/modification during consumption*

## 5. Using key aroma compounds as tool to optimize food processing

*Typical scenarios* ▪ *pineapple juice* ▪ *white pepper* ▪ *apple juice*

## 6. Taste compounds

*How to identify key taste compounds* ▪ *case study: bitter compounds in carrots* ▪ *important tastants in foods* ▪ *taste modifiers*

## 7. Sensory active compounds as food additives

*The legal situation in the EU* ▪ *approaches to produce flavor compounds* ▪ *composing food flavorings* ▪ *structure/odor relation studies* ▪ *aroma release* ▪ *flavor encapsulation* ▪ *analytical techniques to detect flavor adulteration*

## 8. Recent developments: Perspectives or pitfalls?

*Electronic noses* ▪ *molecular sensory science and non-food materials* ▪ *non-targeted flavor analysis*

<b>Termin</b>	<b>Dzień tygodnia</b>	<b>Godzina</b>	<b>Miejsce</b>
<b>19.05.2014</b>	<b>Poniedziałek</b>	<b>12.15 – 15.00</b>	<b>Minicentrum Konferencyjne (Luwr)</b>
<b>20.05.2014</b>	<b>Wtorek</b>	<b>12.15 – 15.00</b>	<b>Minicentrum Konferencyjne (Luwr)</b>
<b>21.05.2014</b>	<b>Środa</b>	<b>12.15 – 15.00</b>	<b>Minicentrum Konferencyjne (Luwr)</b>
<b>22.05.2014</b>	<b>Czwartek</b>	<b>12.15 – 15.00</b>	<b>Minicentrum Konferencyjne (Luwr)</b>
<b>23.05.2014</b>	<b>Piątek</b>	<b>12.15 – 15.00</b>	<b>Minicentrum Konferencyjne (Luwr)</b>