

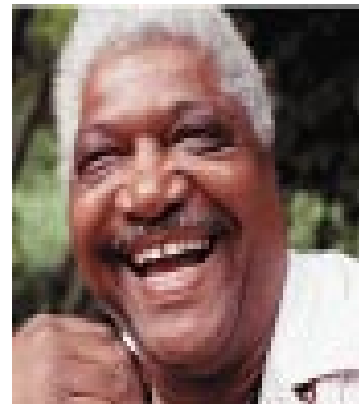
第一讲 食品感官科学引论（下）

第一讲 食品感官科学引论





食品感官科学的一些背景



邓少平



一、引子:

1、食品科学的基本问题是什么？



4、食品的品质与质量

食品质量的定义：满足消费者（consumer）和顾客（customer）需求和期望的能力的总合。

食品作为**食物**
消费者(homo edens)

对食品本质的要求
食品中含有什么

- 1 安全性
- 2 商品性
- 3 营养性
- 4 感官性

满足心理、文化需求
哪里和怎样生产

- 5 生产背景/文化性
- 6 伦理与科学道德

对质量保障体系的要求
谁生产的

- 7 证书/证明
- 8 可追踪性

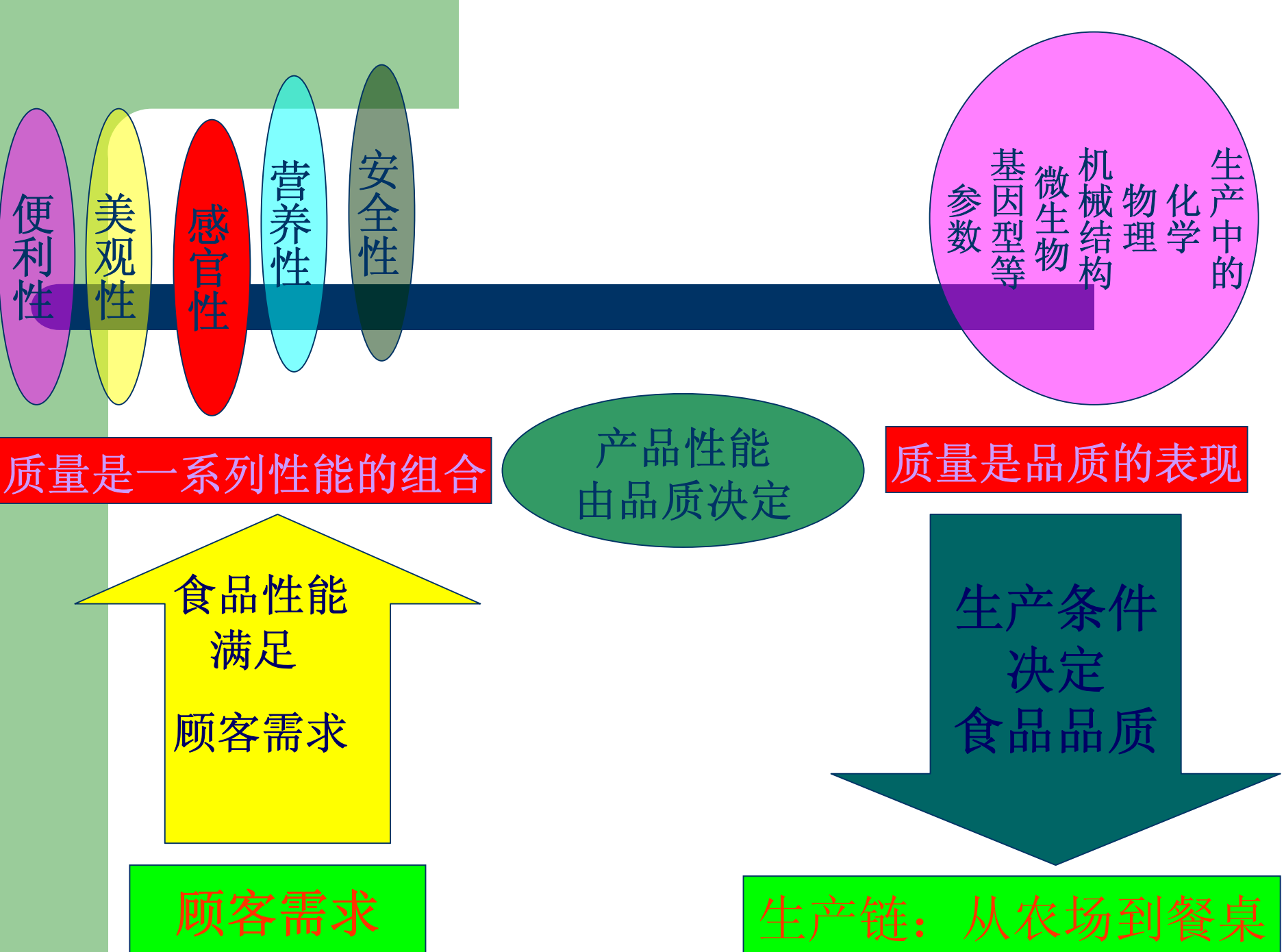
食品作为一种**商品**
顾客(homo oeconomicus)

对生产/包装系统的要求

- 9 包装的功能性和美观
- 10 信息性
- 11 简便性

生产/销售系统的要求

- 12 实用性
- 13 经济性



Sensory Science



Science of Quality
perception

食品质量学



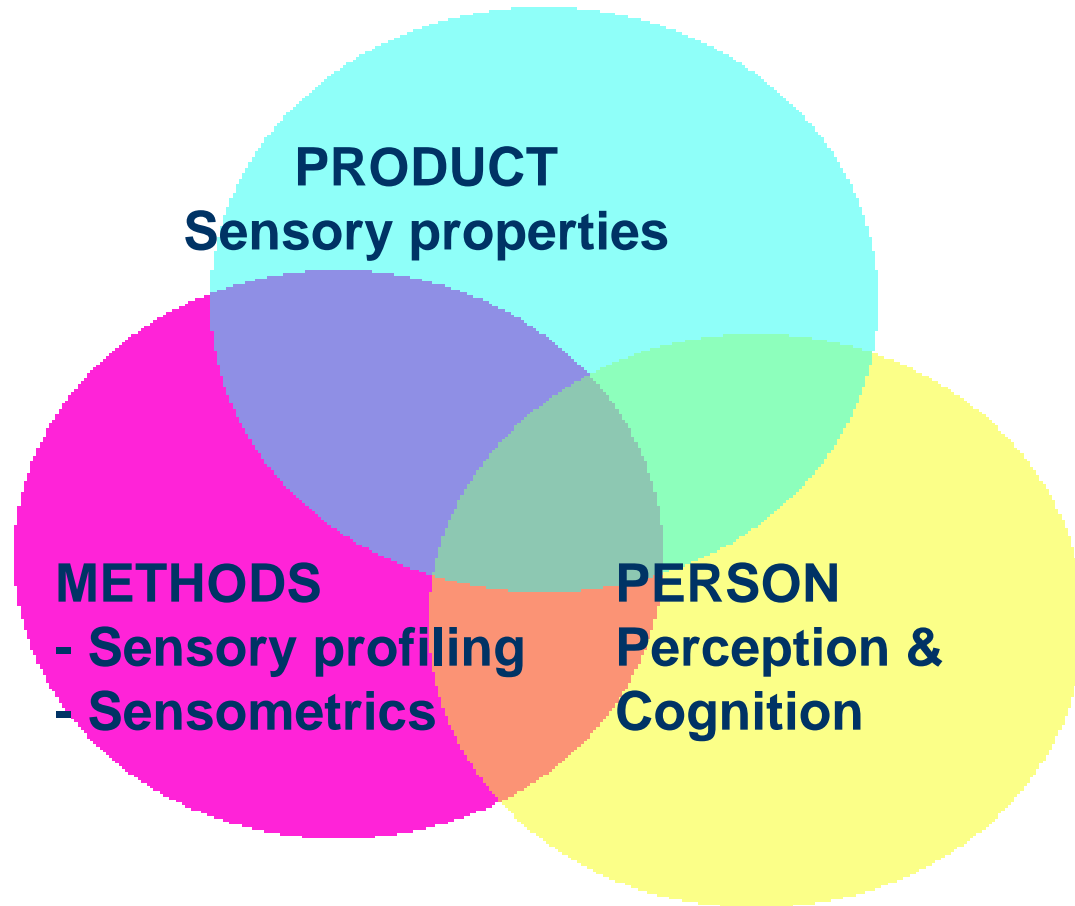
食品品质学



Sensory science research areas

- **Methods: Sensory and Data Analytical**
 - Sensory profiling method development
 - Sensometrics/ Qualimetrics development
- **Product: Sensory properties**
 - Sensory-chemical/physical relationships
 - Sensory-technological relationships
 - Sensory-microbiological relationships
- **Person: Perception and cognition**
 - Perception as information processing
 - Sensory interactions in food perception
 - Physiological and psychological factors

Sensory science research areas



Sensory science The future

- **Research**

These three research areas will continue as 1995-1998

- I) Continues in a FØTEK3 project in collaboration with 4 companies
- II) Continues mainly through students projects (incl. Total 6 Ph.D. students) and collaboration projects (3 applications written and sent in 1998)
- III) Stronger emphasis will be placed on Perception and Cognition of foods. 1½ research project started. Two applications written and sent in 1998.

- **Resources**

We need to have more research scientists for strengthening area III in line with the IAB recommendations in 1996 and 1997.

综合性、交叉性学科？

营养？

安全？

保质期？

口感？



储藏

加工

品种

生长条件



营养

安全

口感

保质期

一个永恒的基本矛盾：

安全、营养、口感、保质期的统一

食品加工相关研究的特殊性

原料、中间制品和产品的组成以及有效成分和微观组织

现代食品加工过程共性与关键性问题的基础性研究

适合微生物的生长

获取更准确地加工过程内在规律

营养成分易损失
热敏性成分变性

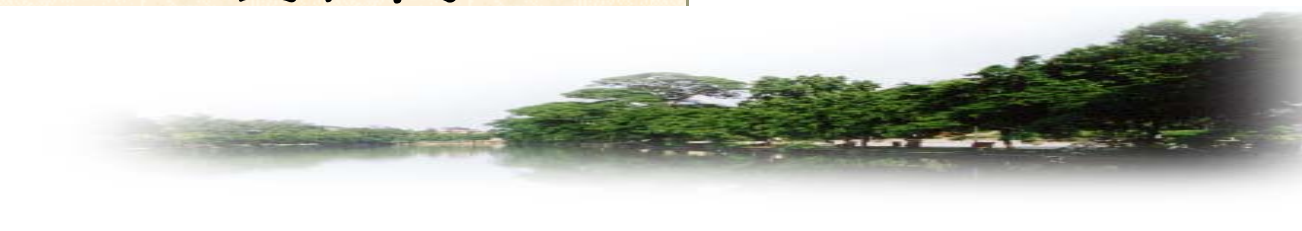
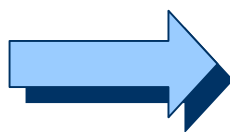
创新性地研发单元技术以满足优质、营养和安全的要求

食品加工过程的主要特点

物料系统的物化性质和生物组分的复杂性

物料系统的富营养性

加工条件的温和性



物理因子

工艺因子

化学因子

流体力学条件

低温过程

机械力、压力

外加物理场

加工过程

有效组分

微生物、酶

复杂食品体系

结构性能

生物活性

致死失活

遗传物质

营养

安全

品质

一些基本的科学问题（讨论）

- 1、营养结构、营养方式怎样影响人类体质智质的现代演变？
- 2、食物基因组、人类基因组与个体营养基因组有着什么样的相互作用？
- 3、食品消费的GDT之谜？
- 4、食品风味嗜好流行的根本原因是什么？
- 5、用什么样的工程技术来支持最大新鲜度与最大货架寿命？



一些基本的科学问题（讨论）

- 6、重组化工程组合食品是未来食品产品发展的主要方向吗？
- 7、信息化、物流化、安全化将会把现代食品产业和食品流通消费业重构成何种格局？
- 8、食品怎样去满足越来越多的特殊环境、特殊人群、特殊嗜好？
- 9、传统性地域化食品怎样实现工业化现代化？
- 10、怎样从食品物料特性创新食品工程高新技术？



启示：怎样从工程技术中
提炼出基本的科学问题！

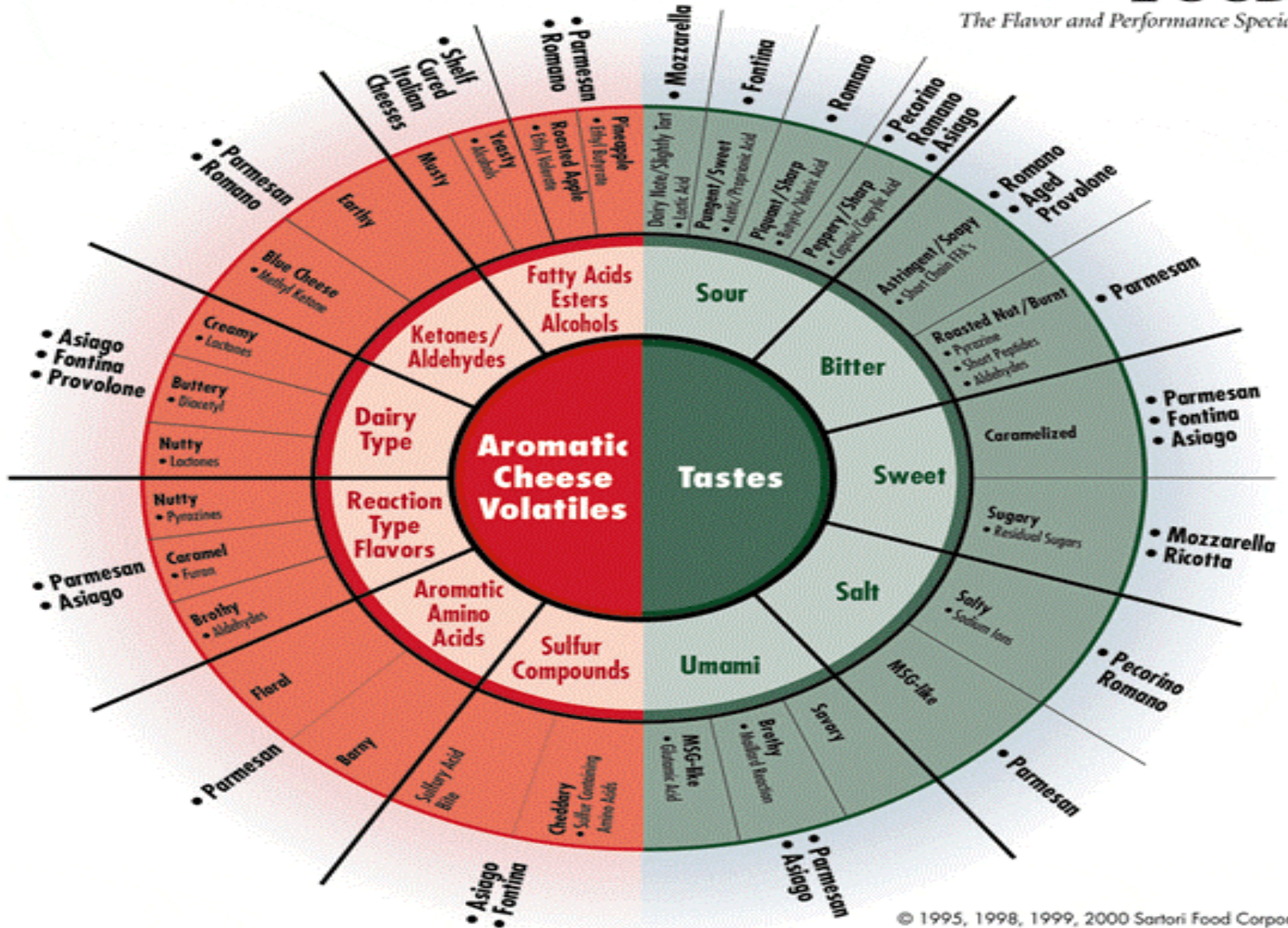


2、品牌风味指纹(**Brand Flavour Fingerprinting**)与风味营销(*f*-business)

[Brand Flavour Fingerprinting.htm](#)

[f-business.htm](#)

Italian Cheese Flavor Wheel





Drinking Water Flavor Wheel



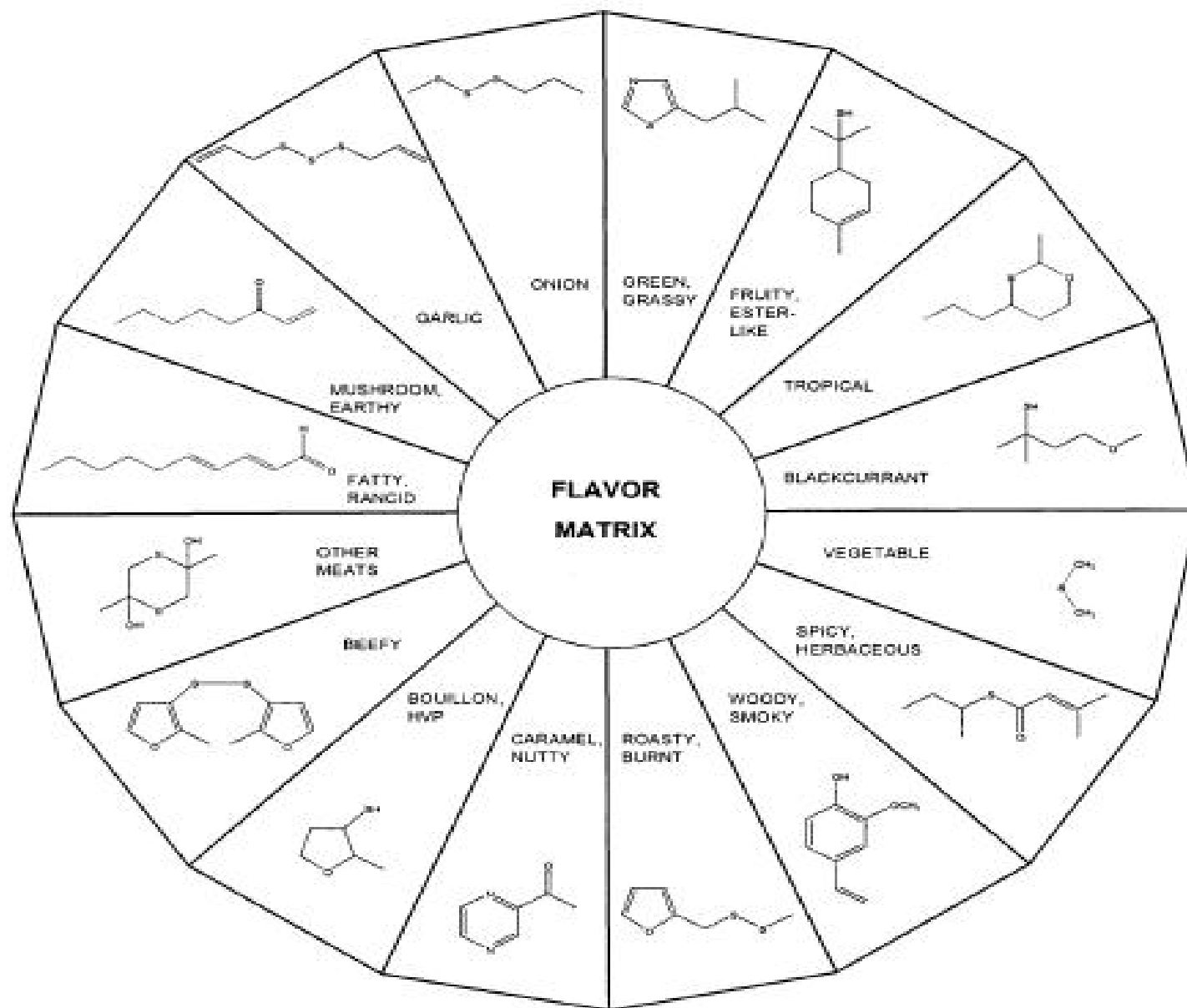
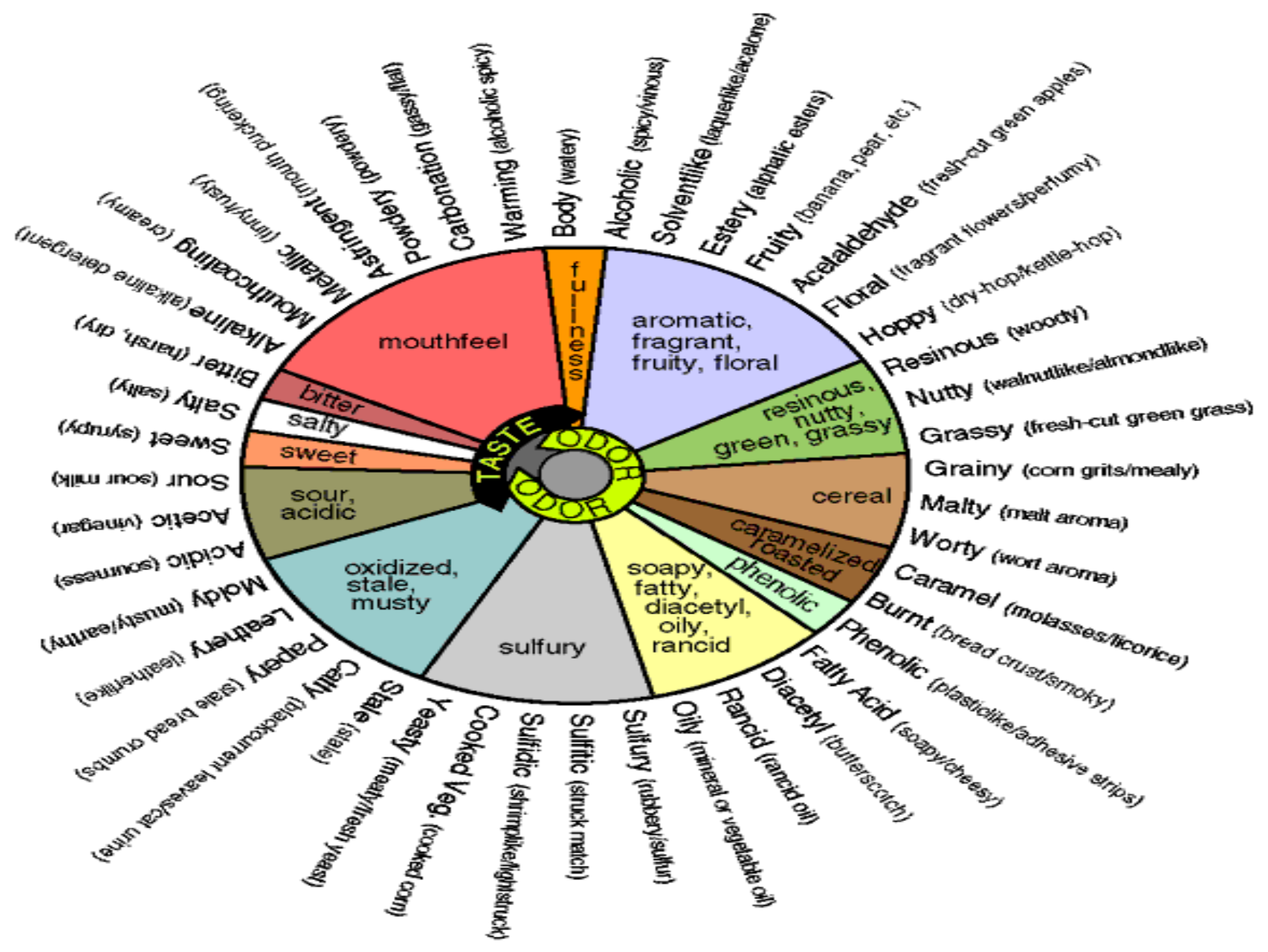


Figure 8. A Flavor Wheel for High Impact Chemicals



Brand

A summary description that uses consumer-friendly terms while providing a technically accurate description of the brand flavour character.

Irish Dry Stout

Summary Description

Powerful roasted grain character, reminiscent of burnt toast with hints of smoked fish, blend with subtle characters of chocolate, caramel and liquorice. A shy hop character underpinned by alcohol and banana characters follow. Full bodied and satisfying with demanding bitterness.

A list of the flavour attributes that are to be expected in this brand.

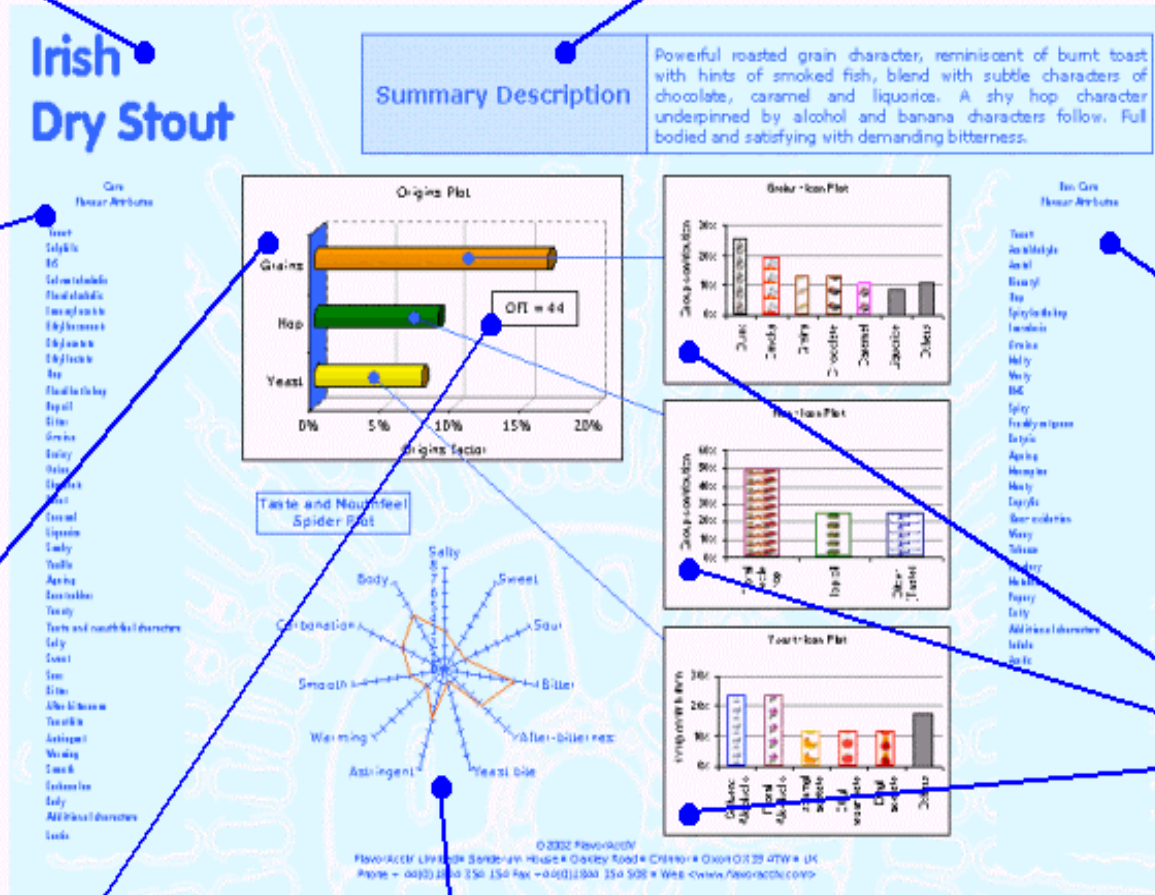
Origins Plot: a summary plot that shows the origin of the brand's main flavour characters (Origins factor = % maximum intensity of group flavour character).

A list of the flavour attributes that shouldn't be found in this brand.

The Icon Plots break down the main areas of flavour contribution into their component flavour attributes (Maximum contribution = 100%).

OFI: Overall flavour index. Scores of <40 represent a lightly flavoured beer, 40-45 a moderately flavoured beer, 45-50 a beer with strong flavour characters, and >50 a beer with very intense flavour characters.

The Taste and Mouthfeel Spider Plot shows the relative contribution of taste and mouthfeel characters to the brand identity (Scale is 0-10).



3、姚念周：感官品评新纪元

[姚念周\index\(13\).htm](#)

[姚念周\apply.htm](#)

[姚念周\classintro.htm](#)

[姚念周\edm.htm](#)

[姚念周\frd.htm](#)

[姚念周\publish.htm](#)

[姚念周\range.htm](#)

[姚念周\serviceall.htm](#)

[姚念周\trd.html.htm](#)

4、嗅觉与味觉研究的中心网站 (<http://www.csa.com/crw/websites.html>)

- 化学感受网站

The ChemoReception Web

Neurobiology, Psychophysics, and Behavior

<u>ABSTRACTS</u> 摘要	<u>WEBSITES</u> 网络链接	<u>BOOK REVIEWS</u> 书评	<u>CONTACT</u> 联系
Sense of Taste 味感	Sense of Smell 嗅感	Pheromones	
<u>Taste Molecules 味分子</u>	<u>Odor Molecules 嗅分子</u>	<u>Invertebrate Behavior 无脊椎动物行为</u>	
<u>Foods, Flavors & Spices 食品、风味料、香料</u>	<u>Perfumes, Fragrances & Aromas 香水</u>	<u>Vertebrate Behavior 脊椎动物行为</u>	
<u>Taints, Off Flavors & Malodors 腐败、异味和怪味</u>	<u>Soaps & Essential Oils 精油</u>	<u>Human Behavior 人类行为</u>	
<u>Olfactory Biology 嗅觉生物学</u>	<u>Chemotaxis 趋化性</u>	<u>Human Physiology & Pathology 人类生理学和病理学</u>	
<u>Methods, Standards, Patents & Legislation 方法、标准、专利和法规</u>	<u>Internal Sensing 内感</u>	<u>Human Psychophysics 人类心理物理学</u>	
<u>Associations & Societies 社团和协会</u>	<u>Research Institutes 研究机构</u>	<u>Companies 公司</u>	

二、感官品评技术标准及文献

- 1、感官分析的标准化

DIN、BS、JIS、**ASTM**、**ISO**、GB

- **E-18**小组（1961）

- **E18.01** Terminology（术语学）

E18.02 ISO（国际标准）

E18.03 Sensory Theory and Statistics（感官理论和统计学）

E18.04 Fundamentals of Sensory（感官基础）

E18.05 Sensory Applications—General（感官应用——一般问题）

E18.06 Food and Beverage Evaluation（食品和饮料品评）

2、ISO感官品评技术标准

(67.240 Sensory analysis, 感官分析)

- ISO 3972:1991 Sensory analysis -- Methodology -- Method of investigating sensitivity of taste

感官分析——方法学——研究味觉敏感性的方法

ISO 4120:1983 Sensory analysis -- Methodology -- Triangular test

感官分析——方法学——三角试验

ISO 4121:1987 Sensory analysis -- Methodology -- Evaluation of food products by methods using scales

感官分析——方法学——利用尺度的食品产品品评方法

ISO 5492:1992 Sensory analysis -- Vocabulary

感官分析——词汇表

ISO 5494:1978 Sensory analysis -- Apparatus -- Tasting glass for liquid products

感官分析——设施——液体产品的品尝杯

- ISO 5495:1983 Sensory analysis -- Methodology -- Paired comparison test

感官分析——方法学——成对比较试验

ISO 5496:1992 Sensory analysis -- Methodology -- Initiation and training of assessors in the detection and recognition of odours

感官分析——方法学——品评员香气辨识入门训练

ISO 5497:1982 Sensory analysis -- Methodology -- Guidelines for the preparation of samples for which direct sensory analysis is not feasible

感官分析——方法学——不能直接感官分析的样品制备指南

ISO 6564:1985 Sensory analysis -- Methodology -- Flavour profile methods

感官分析——方法学——风味剖析方法

ISO 6658:1985 Sensory analysis -- Methodology -- General guidance

感官分析——方法学——一般性指导

- ISO 8586-1:1993 Sensory analysis -- General guidance for the selection, training and monitoring of assessors -- Part 1: Selected assessors
 感官分析——品评员选拔、训练和监督一般指南——第一部分：选拔品评员
- ISO 8586-2:1994 Sensory analysis -- General guidance for the selection, training and monitoring of assessors -- Part 2: Experts
 感官分析——品评员选拔、训练和监督一般指南——第二部分：专家
- ISO 8587:1988 Sensory analysis -- Methodology -- Ranking
 感官分析——方法学——排序
- ISO 8588:1987 Sensory analysis -- Methodology -- "A" - "not A" test
 感官分析——方法学——“A”——“非A”试验
- ISO 8589:1988 Sensory analysis -- General guidance for the design of test rooms
 感官分析——品评室设计一般指南

- ISO 10399:1991 Sensory analysis -- Methodology -- Duo-trio test

感官分析——方法学——二—三试验

ISO 11035:1994 Sensory analysis -- Identification and selection of descriptors for establishing a sensory profile by a

感官分析——由多维尺度手段建立一个感官剖析的描述语的选择和确认

ISO 11036:1994 Sensory analysis -- Methodology -- Texture profile

感官分析——方法学——质地剖析

ISO 11037:1999 Sensory analysis -- General guidance and test method for assessment of the colour of foods

感官分析——食品颜色评定的试验方法和一般指南

ISO 11056:1999 Sensory analysis -- Methodology -- Magnitude estimation method

感官分析——方法学——量值评价方法

3、基本品评方法

- 1、比较（优劣）
- 2、排序（等级）
- 3、描述（剖析）
- 4、特征（是否与有否）
- 5、嗜好（喜欢与不喜欢）
- [Wine Preference Survey.htm](#)

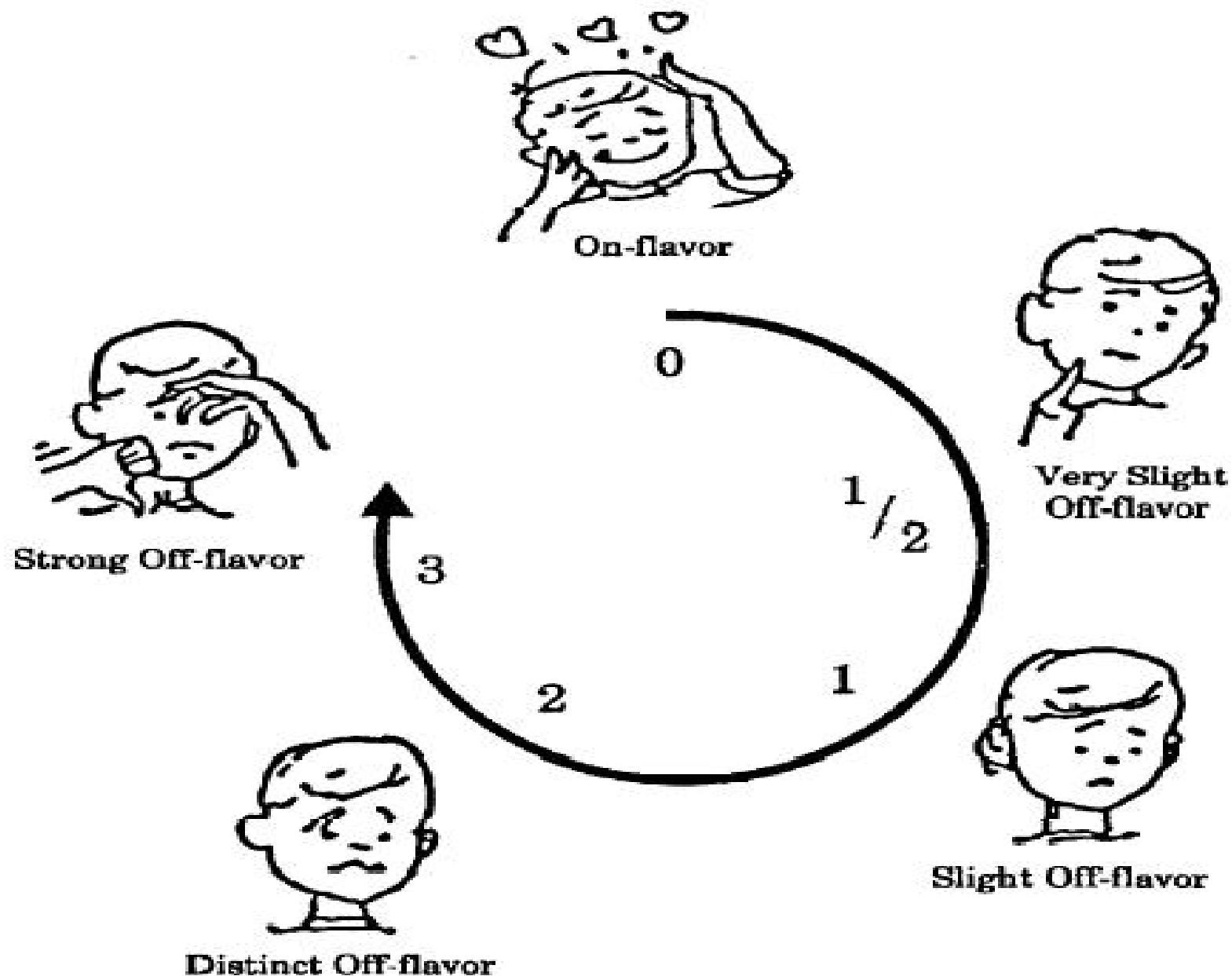


Figure 3. Flavor intensity scale. Adapted from: M. Meilgaard, G.V. Civille, and B.T. Carr. Sensory evaluation techniques. CRC Press, Boca Raton, Florida.



三、相关科学杂志

1 、 Journal of Sensory Studies

Introduction

- Journal of Sensory studies is a journal about sensory which is published (February, April, June, August, October and December) by Food & Nutrition Press Inc. each year in the USA

Aims of journal of Sensory Studies

- The purpose of the journal of Sensory studies is to promote technical and practical advancements in sensory science by publishing papers of broad coverage to include observational and experimental studies in the application of sensory science to the food and beverage, medical, agricultural, biological, pharmaceutical, cosmetic, and material sciences

Scope of Journal of Sensory Studies

- (1) New Development in Sensory Methods.

Innovative application of quantitative and qualitative ideas for use in

- (1) sensory and consumer studies
- (2) taste discrimination
- (3) difference and similarity testing
- (4) time-intensity curve

(2) Consumer and Product Acceptability Testing

- (1) evaluation of panelist/respondent
- (2) product and location variability
- (3) acceptance/preference mapping
- (4) testing with children and elderly
- (5) demographic and cultural studies
- (6) expert/trained versus consumer
- (7) questionnaire design



- (3) Confirmation Study

verification of methods, ideas, theories
under varying and/or same experimental conditions

- (4) Experimental Design

application and modification of statistical designs to suit sensory and consumer testing situation, randomization and carry-over effect issues, sample/base size and power of the test, use of references



- (5)Quality Control

Application of statistical quality control techniques in research,manufacturing,descript-ive analysis,taste panel monitoring system



- (6) Statistical Analysis

Model building, data relationship, comparison of statistical methods of data analysis using multivariate and univariate methods, graphical technique



- (7) Applied Psychophysics

Sensation and perception studies, rating scales, psychometric study of sensory response, word meaning study, sensory vocabulary development for various consumer products



- (8) Computer Application

Data collection system, computer program for data analysis, computerized ballots, simulation, jackknife and bootstrap

- (9) Expository and/or Tutorial papers will

External and internal validity of research guidance panel, descriptive analysis, word meaning/semantic differential technique as applied to sensory science, product category appraisal, philosophies and controversies in sensory science

- Occasionally a Consultants Corner is published that provides papers dealing with specific questions, both theoretical and practical applications of sensory science, and their possible approaches to resolution of the problem.

Sensory professional, both in academia and industry, are invited to contribute in the Consultant Corner



2 、 Journal of Texture Studies

3、**FOOD QUALITY AND PREFERENCE**



Food Quality and Preference publishes original research, critical reviews,

topical and practical features and comment. In addition, the journal publishes special invited issues on important timely topics and on the proceedings of relevant conferences on sensory and consumer science, and sensometrics.

AIM

- bridging the gap between research and application,
- bringing together authors and readers in consumer and market research, sensory science, sensometrics and sensory evaluation, nutrition and food choice, as well as food research, product development and sensory quality assurance.

The journal's coverage includes:

- sensory and motivational studies
- food choice studies of cultural, sensory and environmental factors
- innovative consumer and market research
- geographical, cultural and individual differences in food preferences
- expert versus non-expert perception of quality

The journal's coverage includes:

- Sensory/instrumental correlations
- Sensory and quality changes during processing, storage and distribution
- Quality assurance systems involving sensory and consumer measures
- Mathematical modelling in relation to food acceptability and food quality
- Sensometric analyses and models of food sensory and acceptance parameters

分类

- 感官品评的研究
- 感官与物性的相关性研究
- 加工、储藏等处理对感官、质量的影响
- 食品选择的研究（影响因素、研究方法）
- 食品的接受性研究（转基因食品、新产品、研究应用）
- 感官认知研究
- 食品质量研究（质量保证体系、感官与质量）

4、 Journal of food science

- 1936年开始创刊
- 及时报道最新研究进展和发表关于食品科学的科学性综述
- 量：每年文章500多篇，3000多关于科学综述和最新研究成果
- 覆盖面：90多个国家的作者和50多个国家读者

读者的覆盖面

- 科学家 (scientists)
- 研究者 (researchers)
- 食品从业人员
- 任何希望了解和交流食品知识的工作者

内容

- 综述和假说
- 食品化学和毒理学
- 食品工程和物理特性
- 食品微生物学和安全
- 食品感观和营养质量

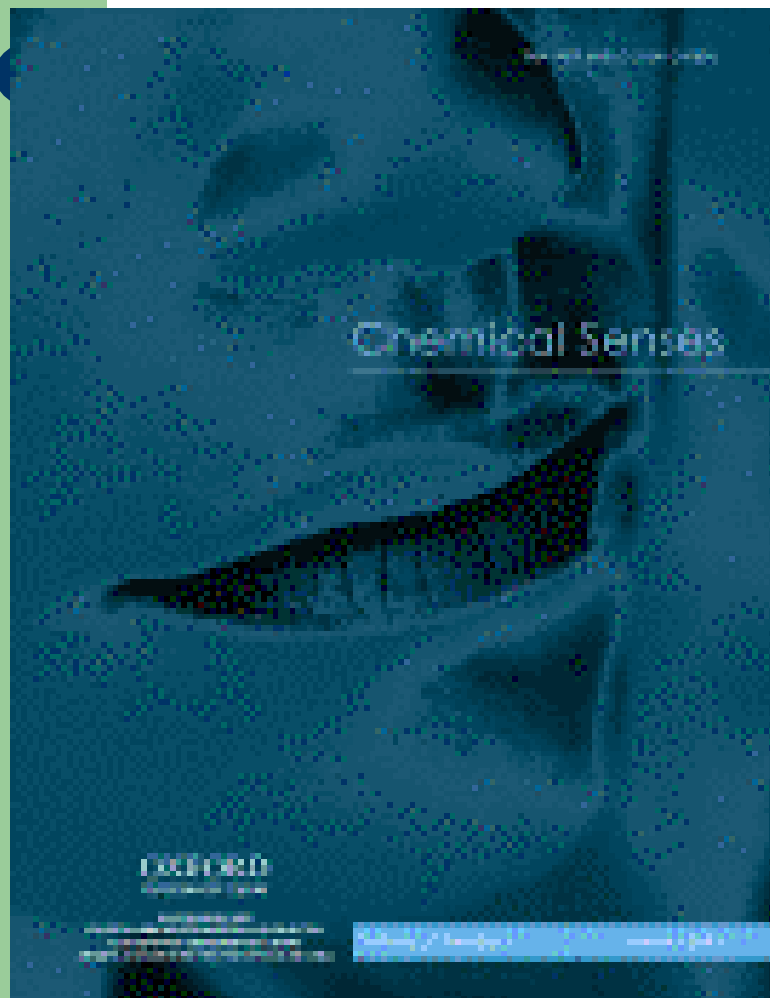
食品感观和营养质量

- 风味、色泽、质地评估
- 营养特性
- 加工、保藏、包装对质量的影响
- 定性、定量两个层面的表述

2 0 0 4

- 脱脂奶粉在长期居室条件下贮藏后感观和营养质量研究
- 大豆酱感官特性评价中发展描述性分析程序
- 测定氧气浓度、物理化学内含物、贮藏条件预测罐装啤酒的感官质量

5、Chemical senses



➤ 内容界定

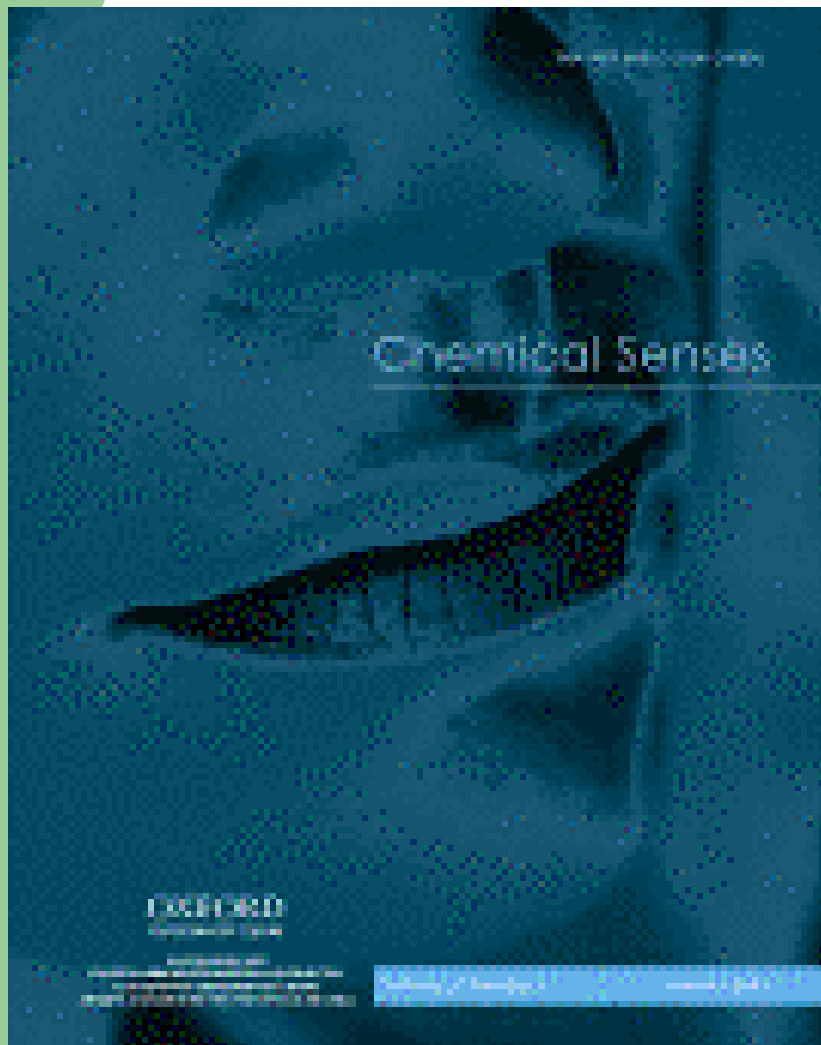
➤ 栏目划分

➤ 2004年度内容概述

➤ 代表性文章介绍

➤ 收获和感想

5、Chemical Senses



内容界定

Chemical senses 是化学感觉领域的一本专业杂志。

主要刊载人和动物在化学感觉各方面最新的研究性和综述性文章。杂志的重点是介绍研究化学感觉及与感官相关的新技术及其发展和应用。涉及的领域有：嗅觉，味觉，神经的感觉等。

Chemical Senses

- 影响因子

年份	影响因子
2002	2.526
2001	2.647
2000	2.176
1999	2.163

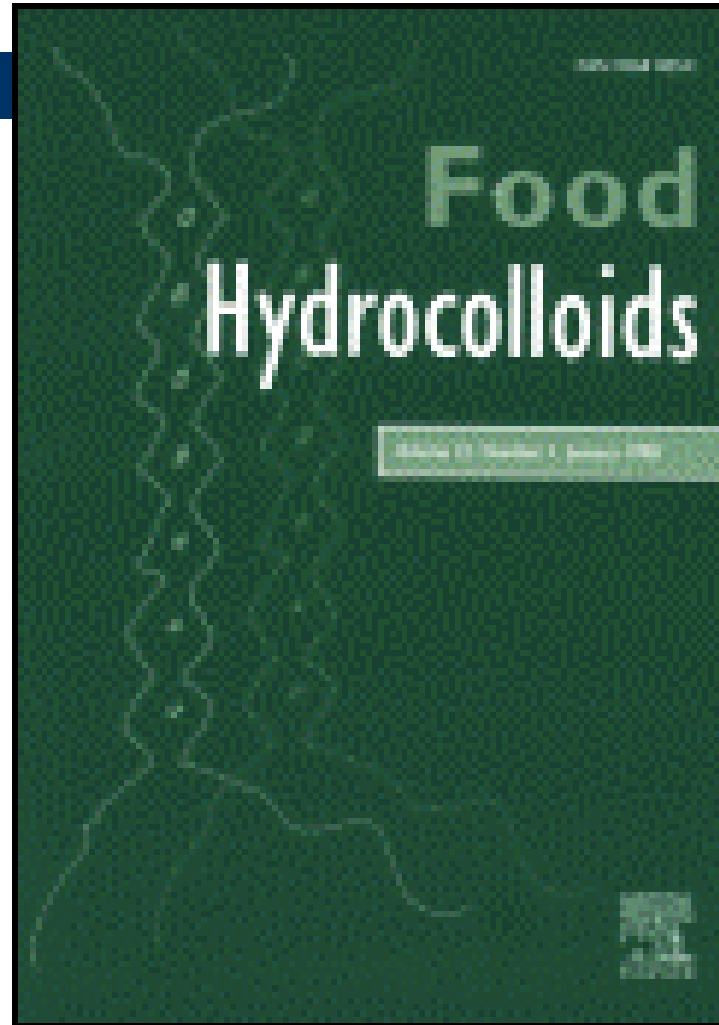
Chemical senses

杂志栏目

Chemical senses 是一本专业性非常强的杂志，因此杂志编辑没有将其内容分类分栏目刊登。为了便于我们研究，可以将其分成几个专业方向来分析。

- 嗅觉
- 味觉
- 神经的感觉反应

6、 Food hydrocolloids



Content of the journal

- isolation procedures, analytical and physicochemical characterization
- structural characterization
- use of cell culture and bacterial fermentation science and technology in the hydrocolloid, and other novel procedures for the extraction and work-up of food hydrocolloids
- gelling mechanisms, syneresis and polymer synergism in the gelation process
- rheological investigations where these can be correlated with hydrocolloids functionality, colloid stability or organoleptic properties
- theoretical, computational or simulation approaches to the study of colloidal stability
- surface properties
- phase behaviour
- droplet and bubble growth, bubble nucleation, thin-film drainage and rupture processes
- fat and water crystallization and the influence of hydrocolloids on these phenomena
- applications of hydrocolloids
- toxicological, physiological and metabolic studies of hydrocolloids



四、计算机感官分析与网络品评公司

[Begin Demo](#)

[About five](#)

[Order Form](#)

[System](#)

five
Menu

Question

Samples

Design

Panelists

Assemble

Test

Run

Results

Modules

Features

Compusense five



*World class Sensory Analysis Software
for Windowstm*

Some helpful information can be found on the top toolbar.
If you wish to focus on a specific component you can move directly to that
area by clicking the appropriate button on the left.

<<

MAIN

SIMS 2000 Program Main Menu

SIMS2000 - Sensory Information Management System

File Edit Execute Analysis Reports Utilities Administrator Help

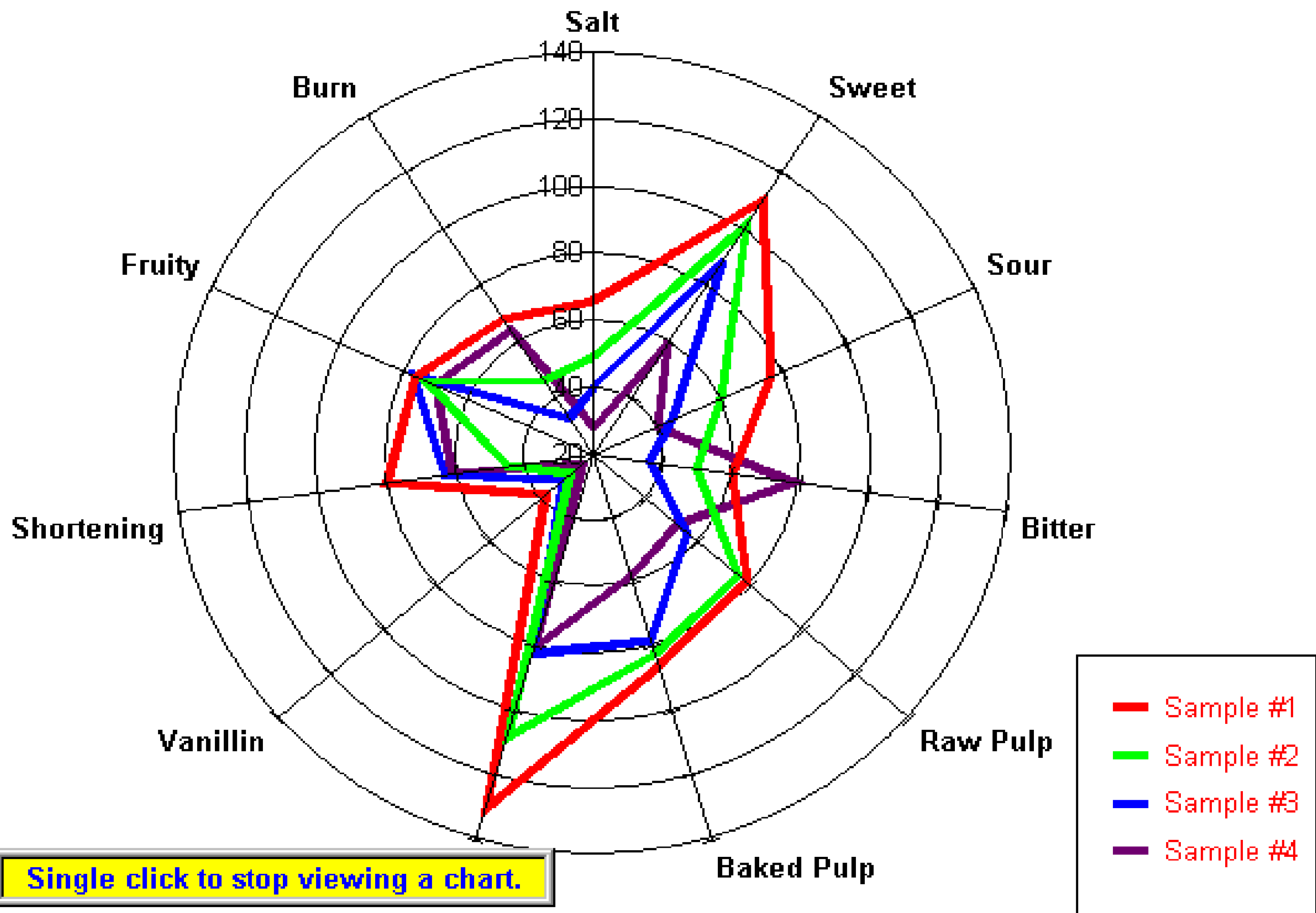


Move your mouse pointer around the screen to view the menu items.

SIMS 2000
for Windows

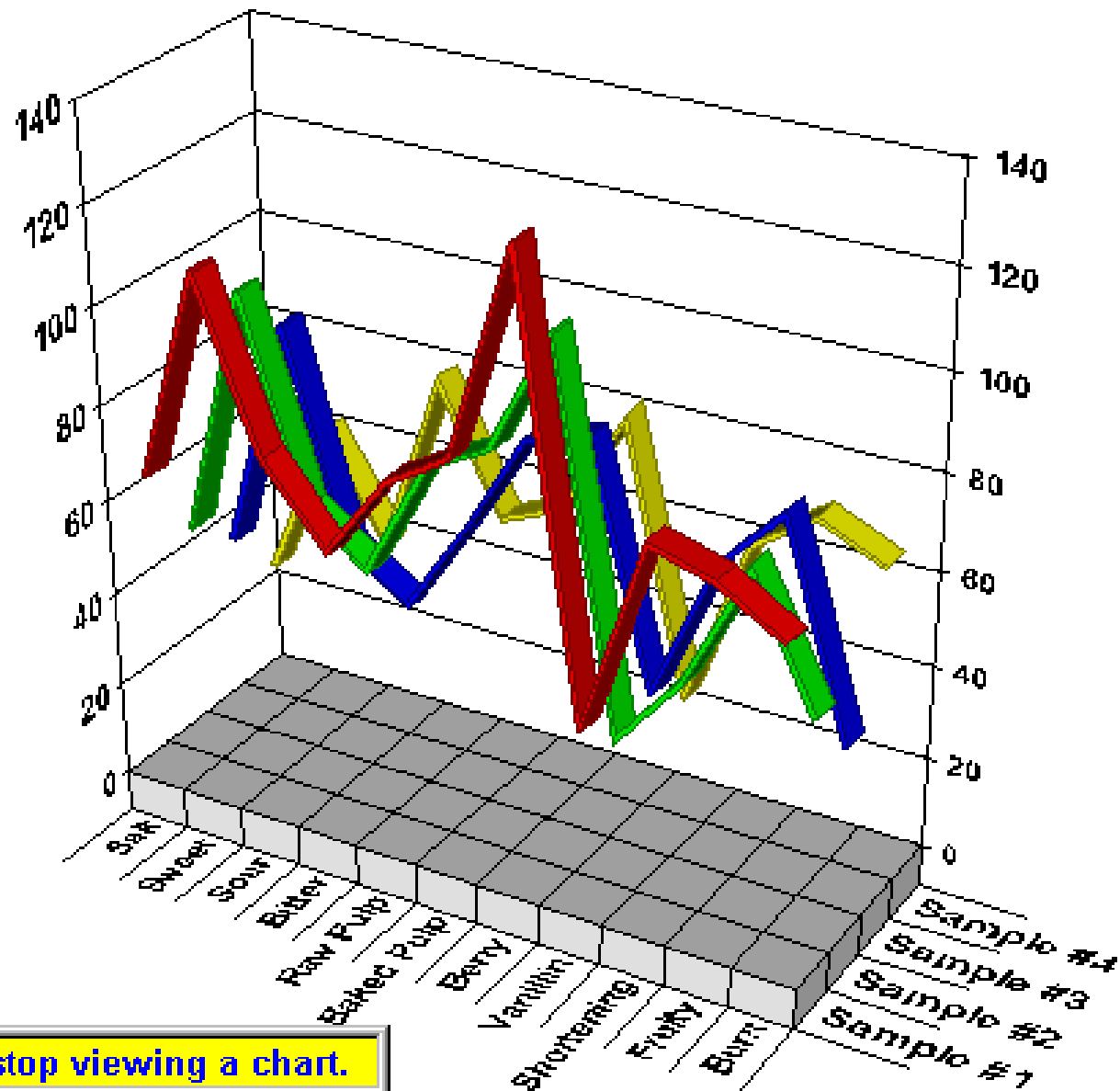
Demo Main Menu

Sensory Computer Systems - Graphs Demo !



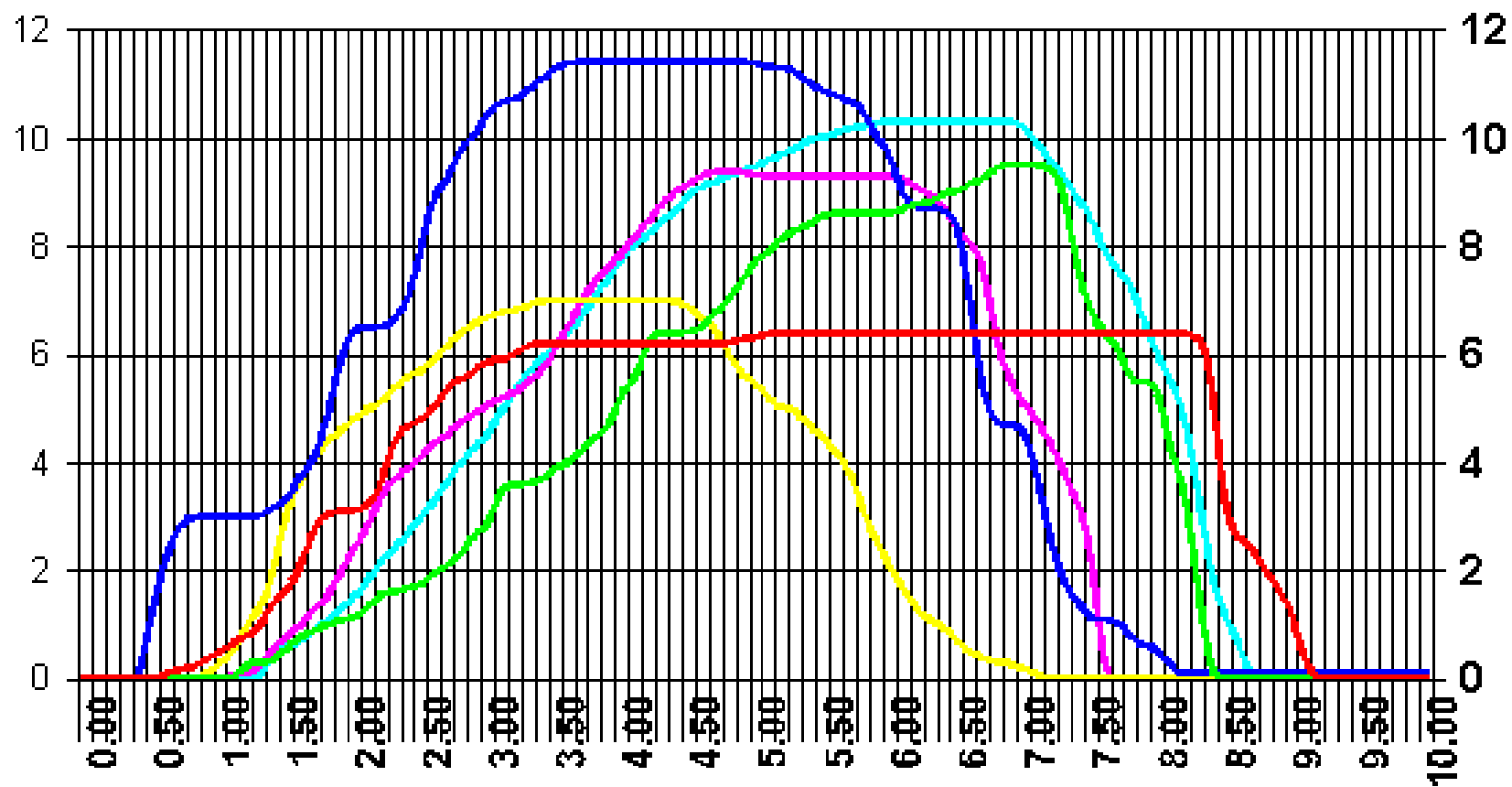
Single click to stop viewing a chart.

Sensory Computer Systems - Graphs Demo !



Single click to stop viewing a chart.

Sweetness - Continuous Time-Intensity



0000000001 / Sample:1 / Rep:1

0000000001 / Sample:2 / Rep:1

0000000002 / Sample:1 / Rep:1

0000000002 / Sample:2 / Rep:1

0000000002 / Sample:3 / Rep:1

Single click to stop viewing a chart.

Advanced Statistical Analysis

This window is the starting point for Advanced Statistical Analysis.
Begin by selecting a SIMS 2000 Test Result Data Code.

Click the
tabs.

SIMS 2000 - Statistical Analysis

Analysis Options View Analysis Files

Choose a Test Data Result Code:

EXAMPLE1 - This Test shows Questionnaire Example 1A - 80

Source of Mean Scores: (complete block)

Duncan's Multiple Range Test
 Tukey's Studentized Range (HSD) Test
 Least Squares

Significance Levels:

* 0.0500
** 0.0100 Reset
*** 0.0010

Binomial Analysis Type:

Alpha One Tailed Analysis
 Alpha Two Tailed Analysis
 Beta Analysis

Multi-Variate Analysis Options:

None Multi-Variate Long Form
 Multi-Variate Short Form (minimum of 3 samples and 3 attributes)

Other Analysis Options:

Use "The Nested Model" - Judge Nested Within Blocks
 Use The Judge | Sample Interactions Model
 Create Additional "Least Squares Contrast" Output
 Include Result Name With Sample Descriptions

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The Industrial-Strength Sensory Automation Tool

SIMS 2000 for Windows, Windows 95/NT

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- ✓ Experimental Designs
- ✓ Unlimited Data Collection
- ✓ Unlimited number of simultaneous tests
- ✓ WYSIWYG Questionnaire Design
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