



Department of Food Science



Molecular Gastronomy and Sensory Science

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Snails in the Kitchen Garden

Molecular gastronomy is a meeting place for chefs and scientists

- MG – definition and debate
- MG at University of Copenhagen
- Sensory Science contributions to Molecular Gastronomy
- Expectations and surprise
- Conclusions
- Suggestions for future directions



The Fat Duck visiting us May 2008
In our gastronomy lab in Dept. of Food Science
Photos Jannie Vestergaard

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Molecular gastronomy – definitions and debates

Science and Gastronomy

Working title for conference Erice 1992

Molecular Gastronomy, the science of choosing raw materials, preparing and eating good food.'

Thorvald Pedersen, UCPH-LIFE, Emeritus Professor

'Molecular Gastronomy, the application of scientific principles to the understanding and improvement of small scale food preparation'

Nicholas Kurti, Oxford University

'The scientific study of deliciousness'

Harold McGee, food writer

Gastronomic trend - ***'Experimental cooking'***

Molecular Gastronomy is dead – long live new Cookery

Ferran, [Blumenthal](#), Keller & McGee , dec. 10 2006

Creativity means not copying (Ferran, 1987)

Multisensory experience (Blumenthal, 2008)

Contemporary cuisine (Keller)



(Molecular) Gastronomy trickles down



Nursery menu
Unskilled chef



Texturas - for Professionals,
Teachers and Amateur gastronomes
'experimental cooking for dummies'

Molecular Gastronomy at University of Copenhagen

- serving a good course

Food Chemistry

Professor Leif Skibsted (Project head)

Associate Professor Jens Risbo

PhD-student Pia Snitkjær Nielsen

PhD-student Louise Mørch Mortensen

Sensory Science

Associate Professor Michael Bom Frøst

Associate Professor Per Møller

Professor Wender Bredie

Scientific assistant Line Holler Mielby

Scientific assistant Ditte Hansen

Gastronomes

Adjunct Professor Claus Meyer

Chef Torsten Vildgaard

Physicist

Professor Peter Barham (Velux-funded)

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Cooking of Meat

Soups and stocks

- as thermodynamic and kinetic systems

Restaurant eating experience

Olfactometry

Inspiration for better
foods from gastronomy to
science and from science to
gastronomy



Sensory Science contributions to MG

Eating in a restaurant is a multisensory experience influenced by

- Expectations - **the hype and reviews**
- Environment - **ambience**
- Context – **presentation**
- Guest(s) – **their background and reasons**
- Staff – **interaction with guests, behind the scene**
- Food – **of course**
- Conversation
- Waiting time for the check!

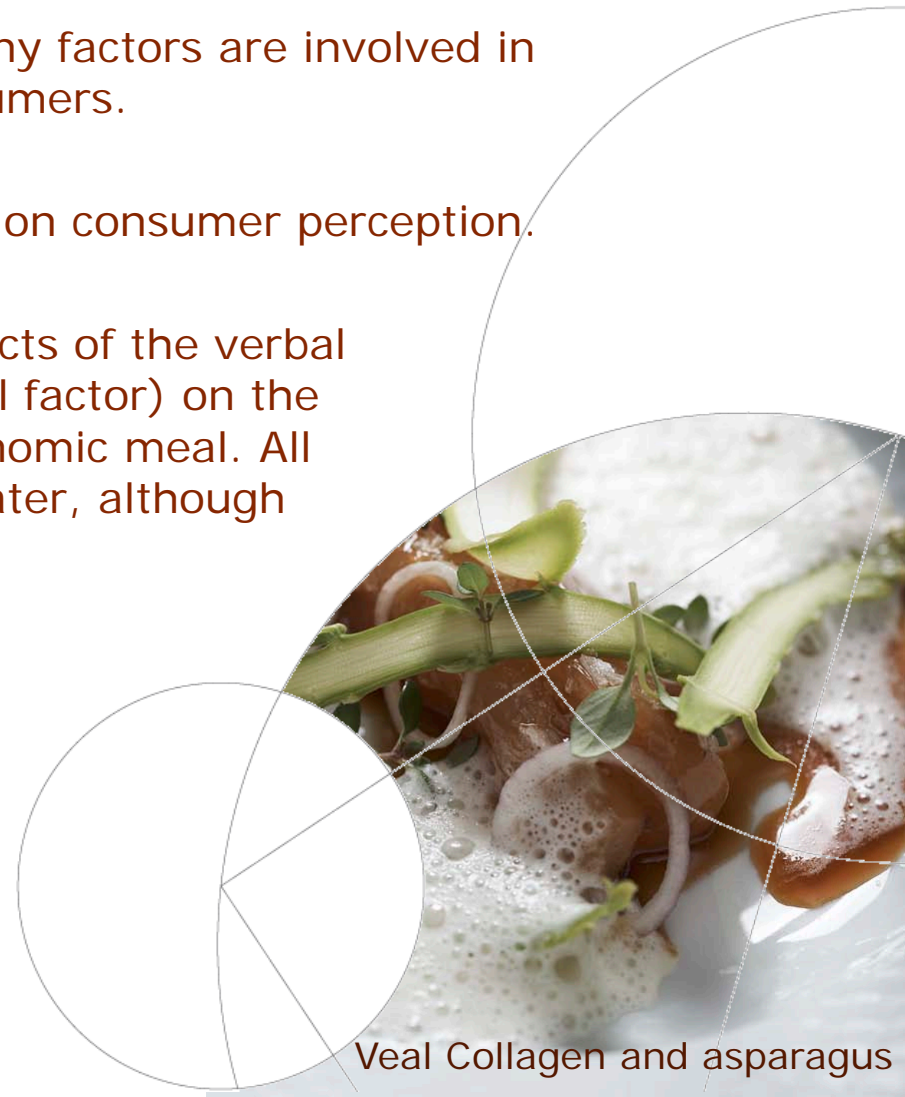


Results from experiment

Expectations and surprise

Purpose

- Within molecular gastronomy many factors are involved in affecting and surprising the consumers.
- Contextual factors have an effect on consumer perception.
- The main scope was to study effects of the verbal presentation of dishes (contextual factor) on the experience of a molecular gastronomic meal. All dishes intended to surprise the eater, although in different ways.



Results

Relationships to 'Liking'

- High correlation (0.929) with 'Eat again'
- 'Curiosity' (0.187)
- 'Surprising' (0.068)
- 'Challenging' (0.157)



Field of Potatoes



**Salad Roots and
"Ardent Love"**



Cheese and Rhubarb



**Frozen Wood
Sorrel and Milk in
Textures**

Least liked dishes were completely novel and very unusual

Results and conclusion

Expectations and surprise

- The type of verbal presentation affected 'Liking', 'Surprising' and 'Challenging', but not in a straightforward manner.
- Dishes presented by Process information were in general more liked, more surprising and more challenging
- Dishes presented with Hedonically Evocative and Experience information generated the lowest ratings for the same statements.
- For Liking, the type of presentation was more important for least liked dishes than most liked dishes.

The complex interplay between dish and presentation should be considered carefully in the context of 'experimental cooking'



Conclusions and suggestions for future directions

- Increase in collaboration on progress of culinary processes and eating between chefs and scientists
- Be aware of different agendas and time perception!

- Science and Gastronomy
- Dissemination
- Eating meals
 - A meal is a plethora of sensations, including alimentary interoception



Peas and Mint
Photo Jannie Vestergaard

Thank you for your attention

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White asparagus, Rhubarb and Spruce shoots

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All food by Thorsten Vildgaard

Photo: Jannie Vestergaard



References and web resources

www.khymos.org Authoritative website

McGee on Food and Cooking

- http://www.curiouscook.com/cook/on_food.php

Barham, P.J.; Nielsen, P. S.; Mortensen, L.M.;, Frøst, M.B.; Bredie, W.L.P.; Møller, P.; Risbo, J. & Skibsted, L.H. (2009) Review of molecular gastronomy, *Chemical Reviews, under review*

Mielby, L.H. & Frøst, M.B. (2009) Expectations and surprise in a molecular gastronomic meal, *Food Quality and Preference, under review*

Snitkjær, P.; Frøst, M.B.; Skibsted, L.H. & Risbo, J. (2009) Flavor development during beef stock reduction, *submitted to Food Chemistry*

