Warsaw University of Life Sciences - SGGW
Faculty of Human Nutrition and Consumer Science

Effect of umami substances on the flavour profile and temporal characteristics of model foods

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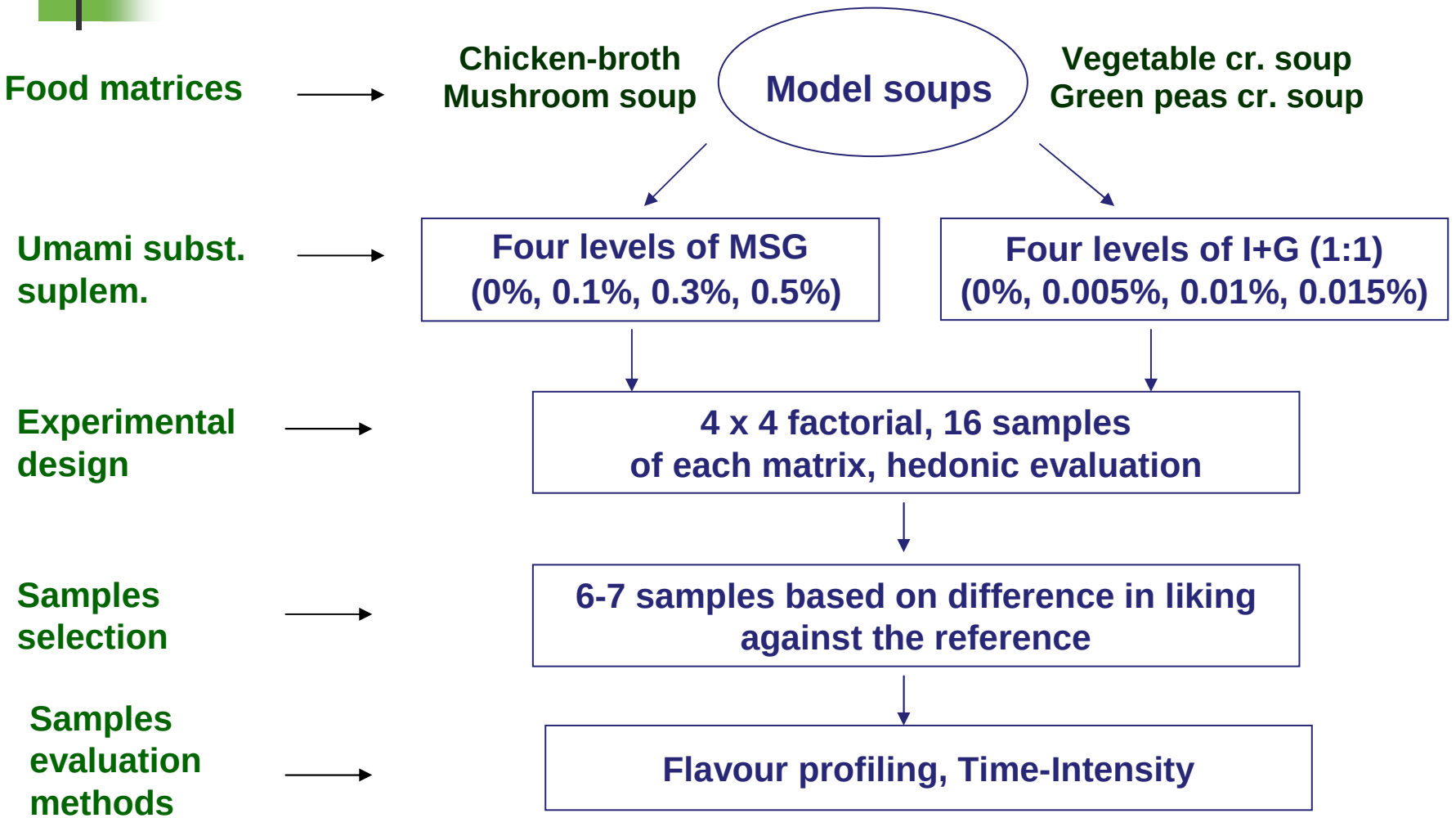
Background

- Umami substances are known and widely applied in food manufacturing and culinary practice for over hundred years;
- Despite of common practical use, they are still an object of interest in various area of basic and applied research for their unique and not fully understood flavour-enhancing properties;
- The hedonic aspects of above properties were the objective of numerous studies - much less studies concern their cognitive aspects;
- Food flavour is a complex phenomenon, consisting of many attributes of various intensity and mutual ratios. It is relatively little known how those single attributes are affected by rising amount of umami additives in various food matrices.

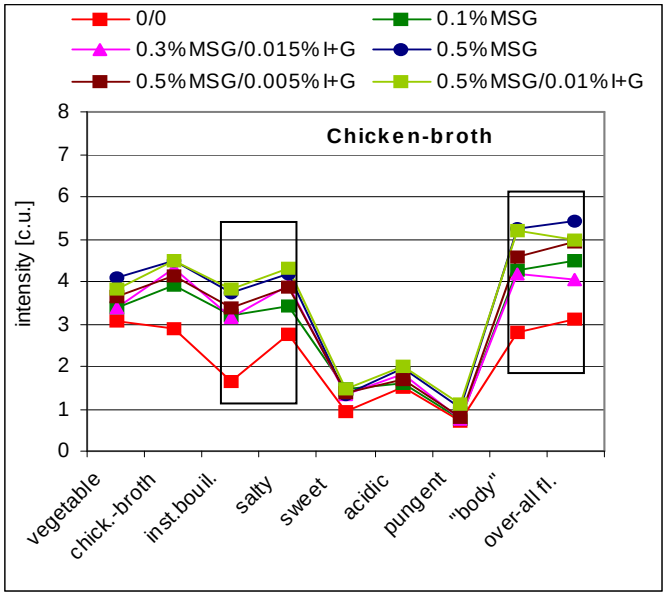
Objectives

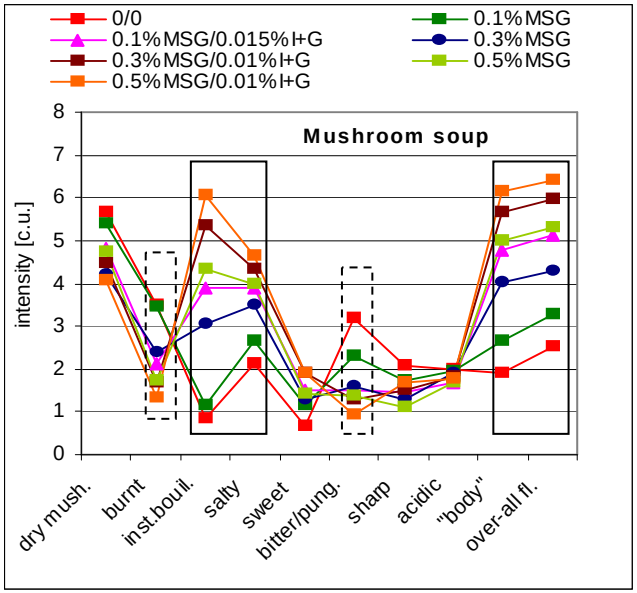
To elucidate cognitive aspects of the effect of umami substances on flavour profile attributes in various model soups

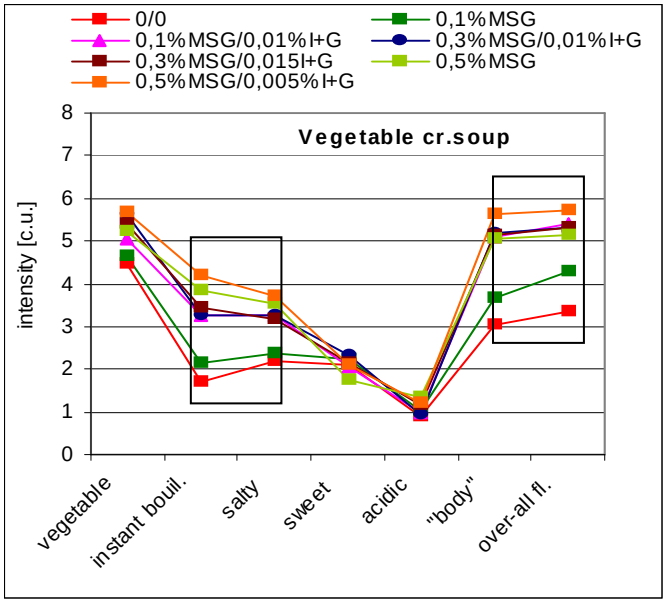
Experimental

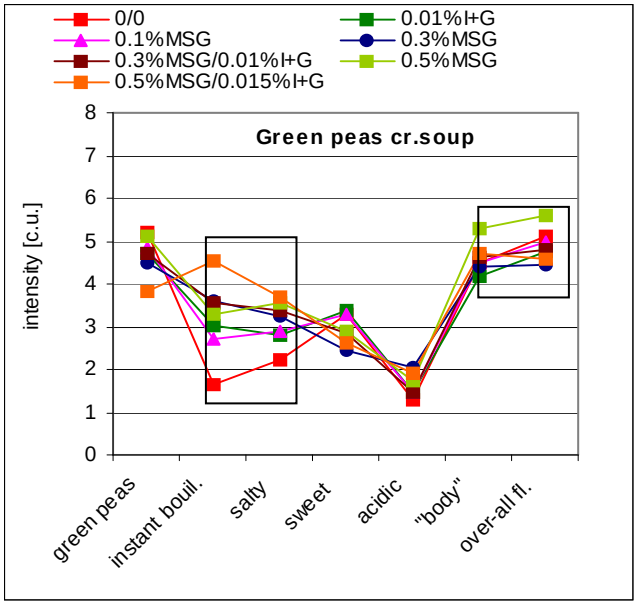


Differences in flavour profiles affected by various MSG/I+G supplementation

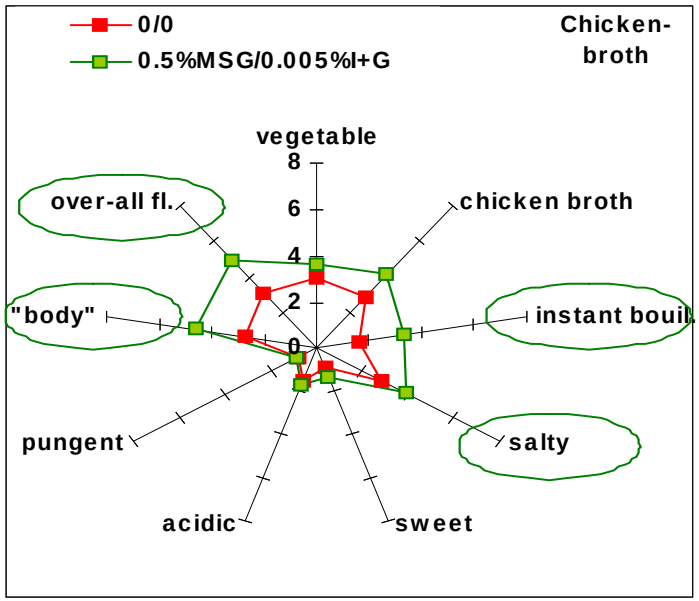


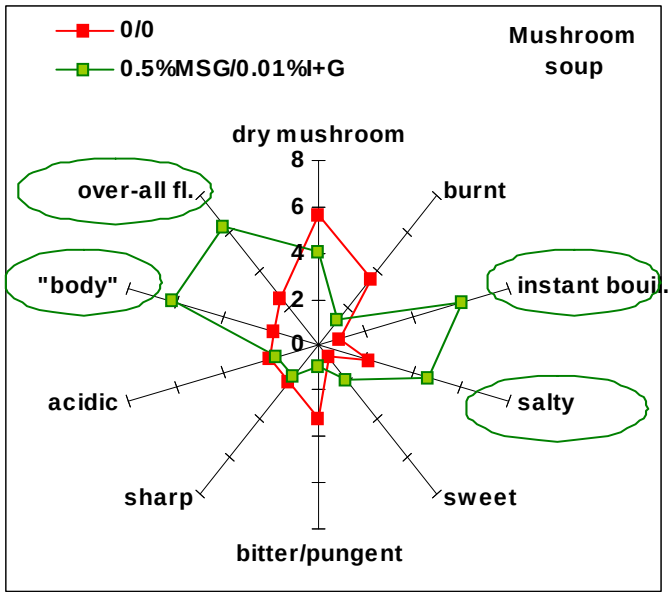


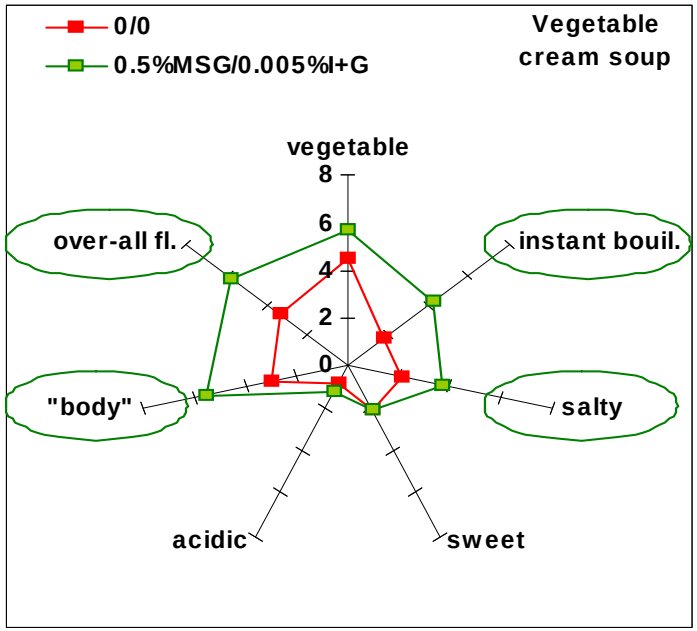


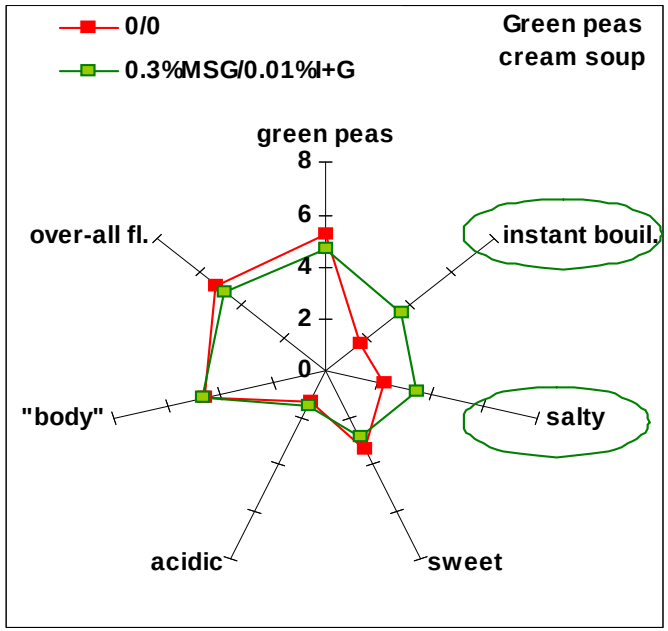


Differences in the profile: reference/most liked sample

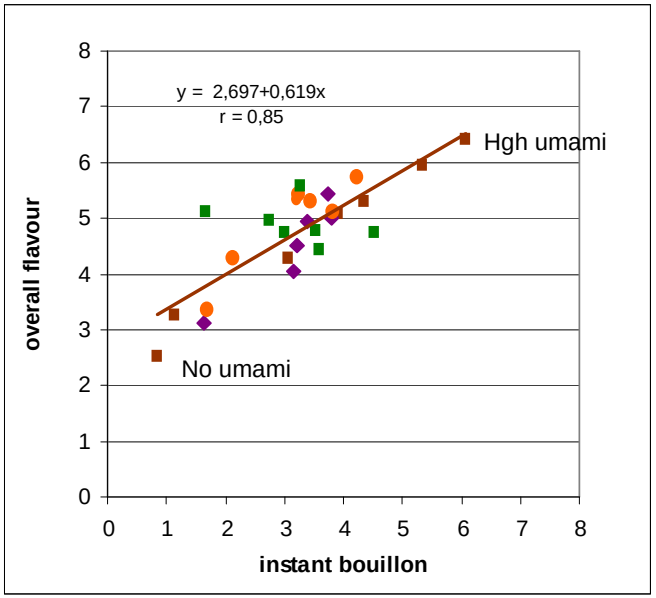


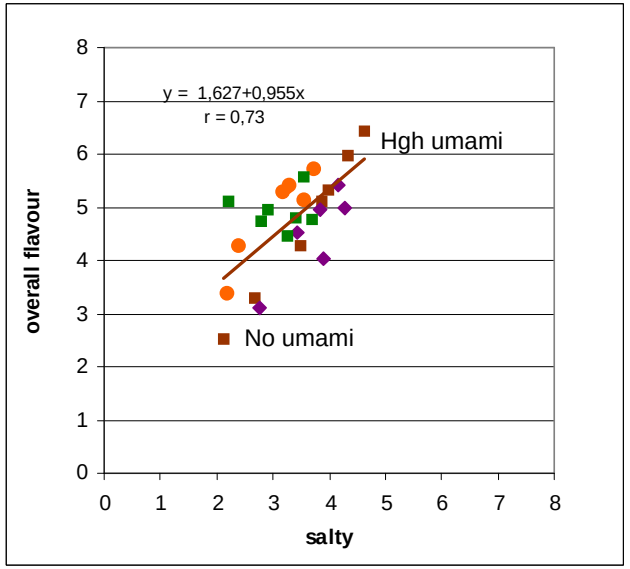


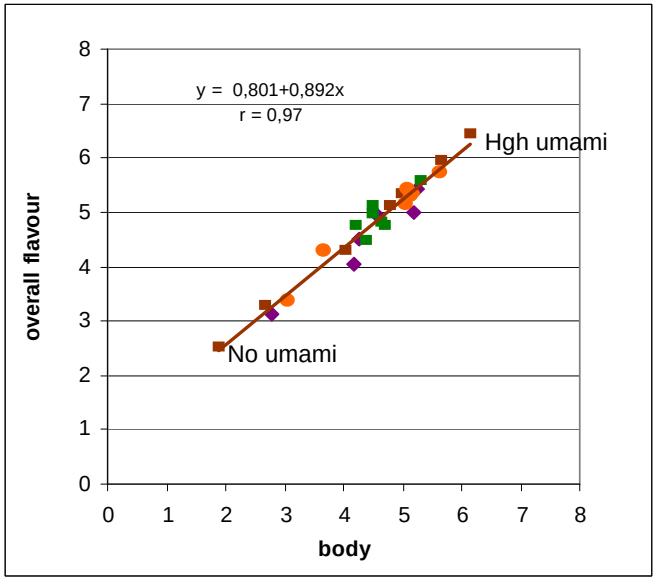




"Positive" attributes vs. overall flavour in model soups

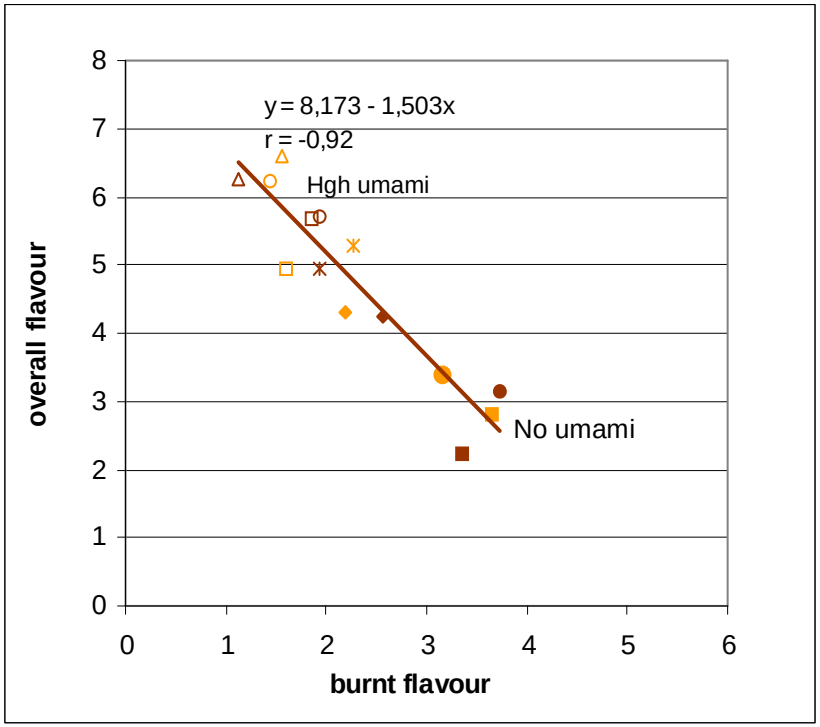


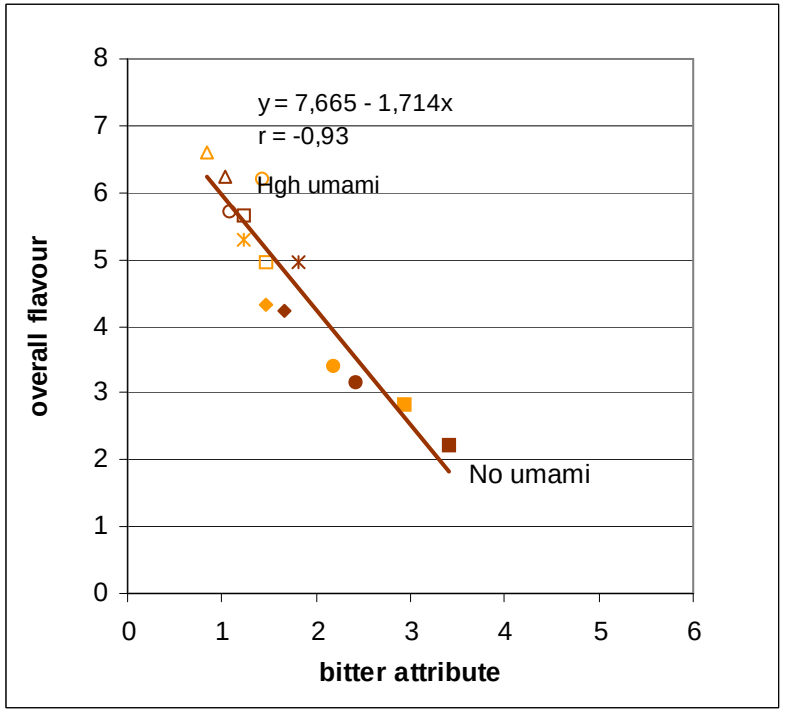




- mushroom soup
- chicken broth
- vegetable cr. soup
- green peas cr. soup

"Negative" attributes vs. overall flavour (mushroom soup)





■ 0/0 ● 0,1%MSG ♦0.3%MSG □ 0.5%MSG ∗ 0.1%MSG/0,015%I+G
o 0.3%MSG/0.01I+G Δ 0.5%MSG/0.01%I+G

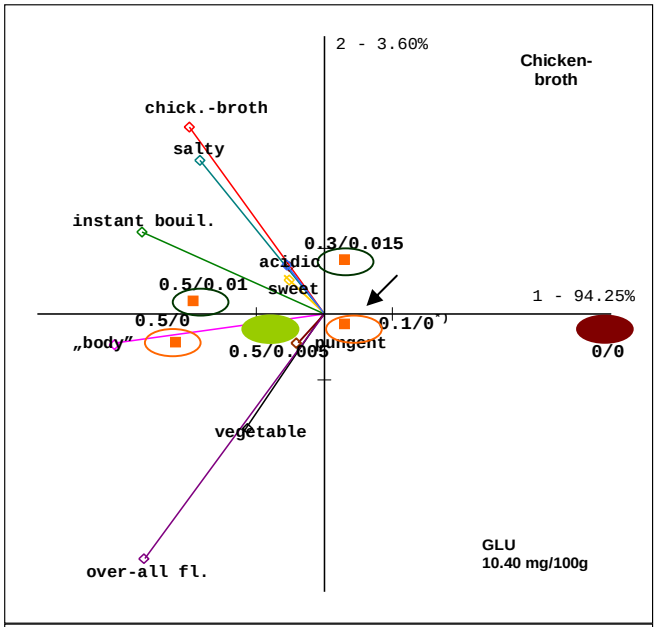
The effect of added MSG/I+G on the changes in the profile – PCA biplots

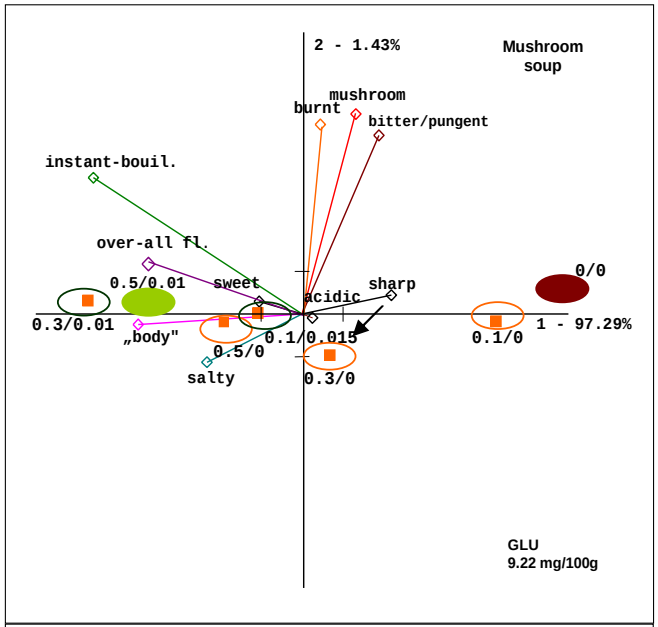
Reference

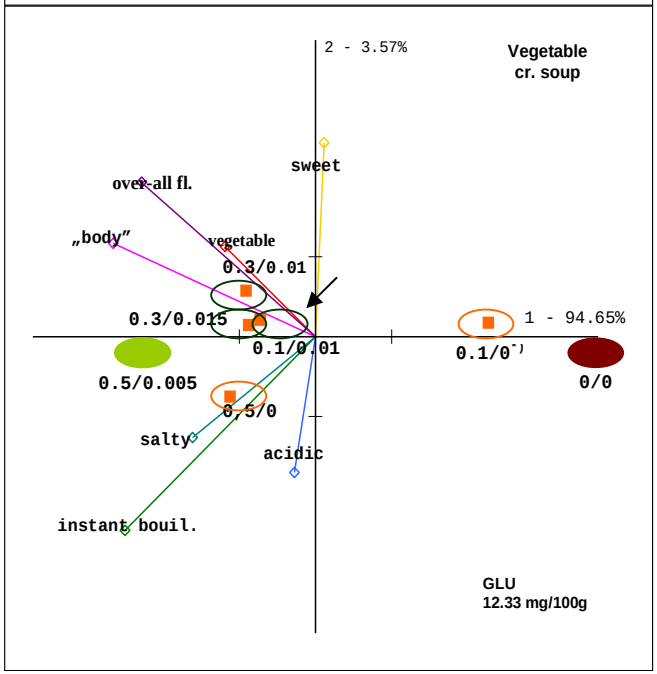
%MSG/%I+G (most palatable sample)

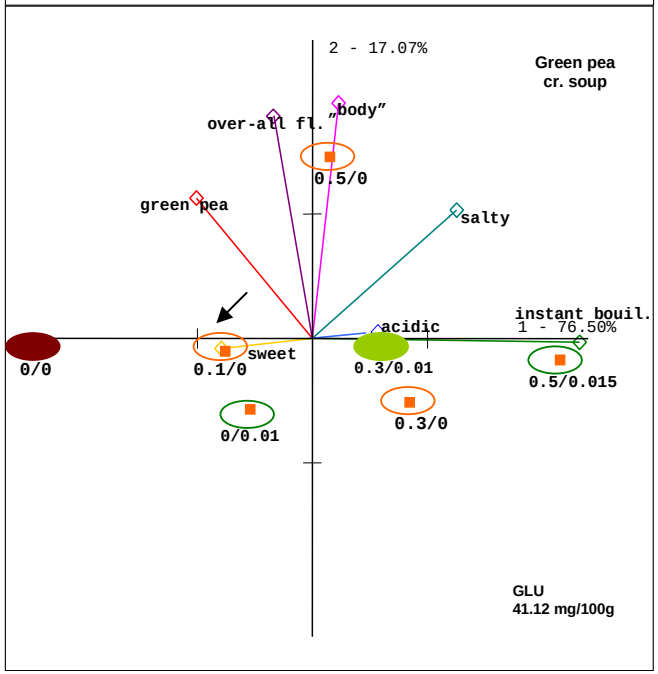
%MSG

%MSG/%I+G



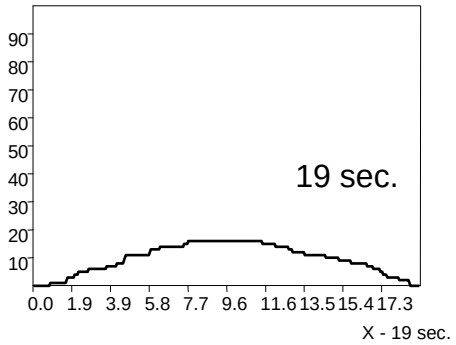


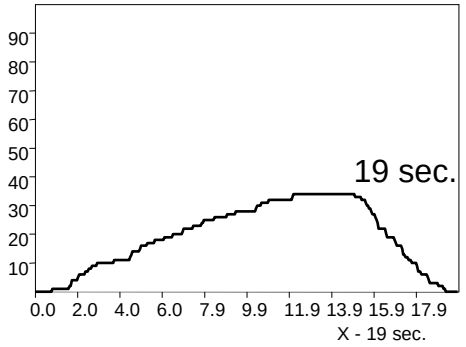


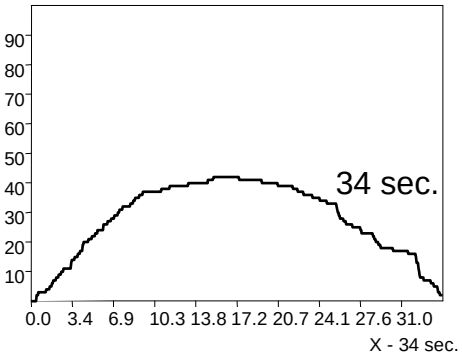


T-I of three attributes (mushroom soup) – example of individual results (K.K.)

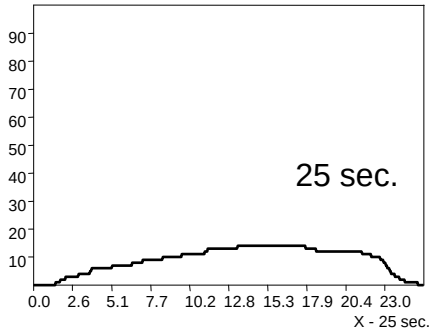
Salty

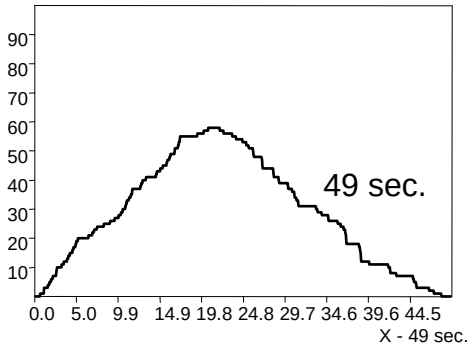


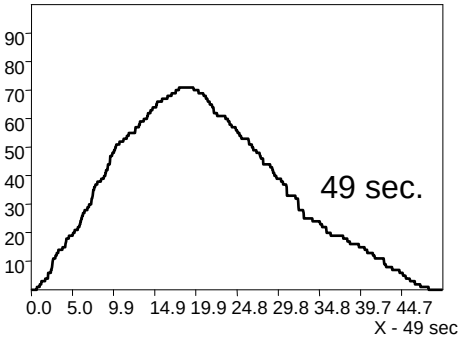




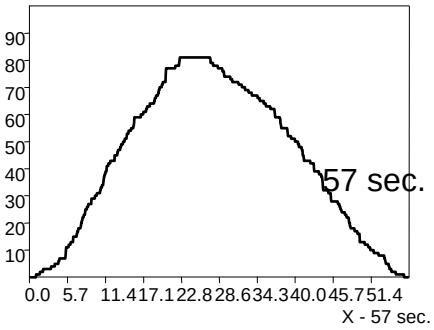
Instant bouillon

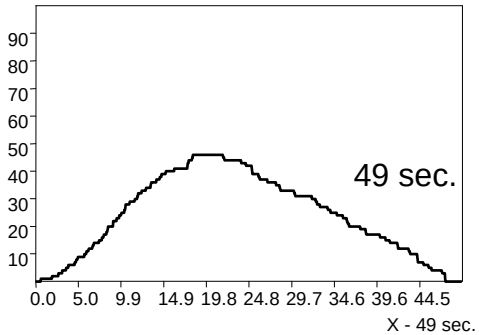


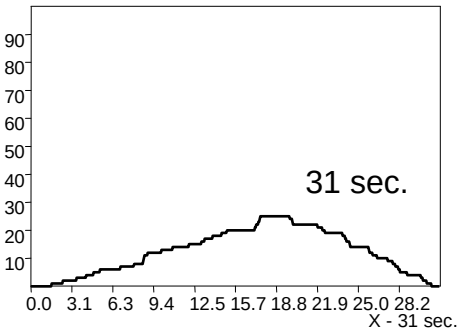




Burnt







Samples: **0/0** **0.3%MSG** **0.5%MSG/0.01%I+G**

Imax and Ttot of „positive" common attributes in model soups with rising umami amount

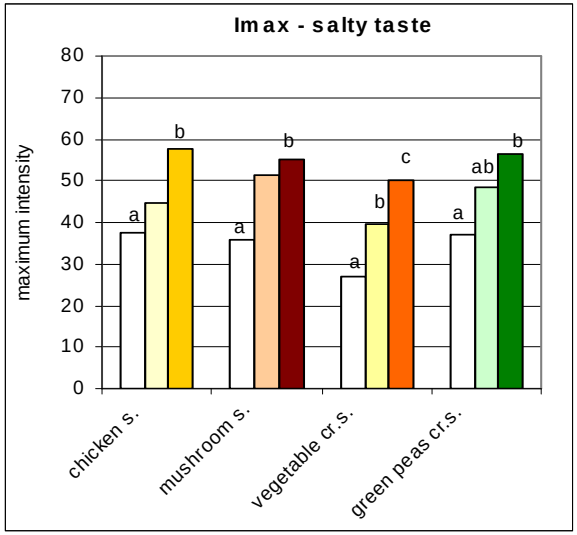
Samples (MSG/I+G):

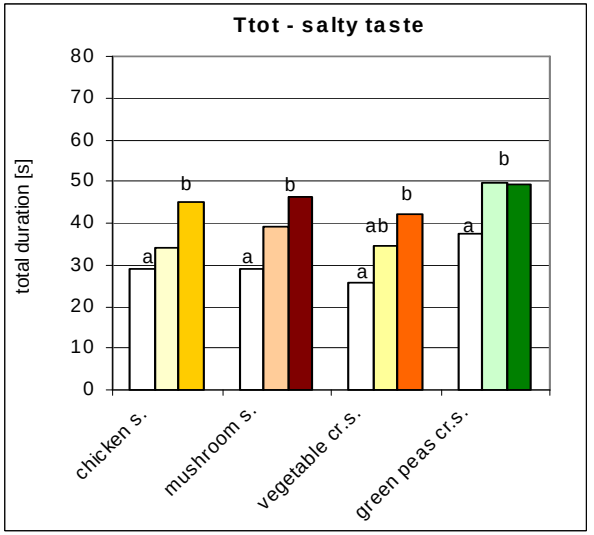
chicken
☐ 0/0 ☐ 0.1/0 ☐ 0.5/0

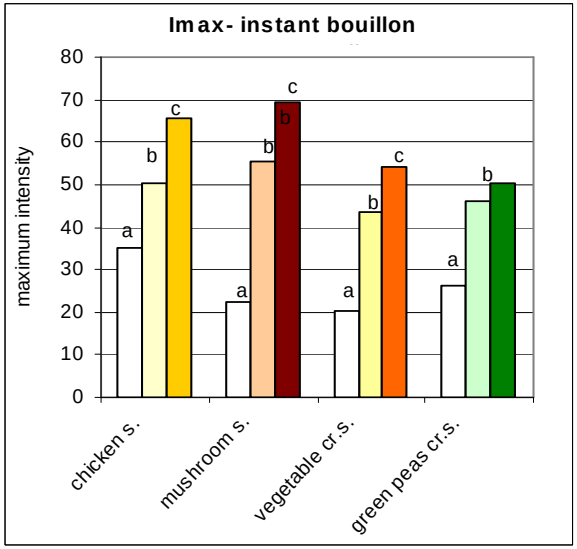
mushroom
☐ 0/0 ☐ 0.3/0 ☐ 0.5/0.01

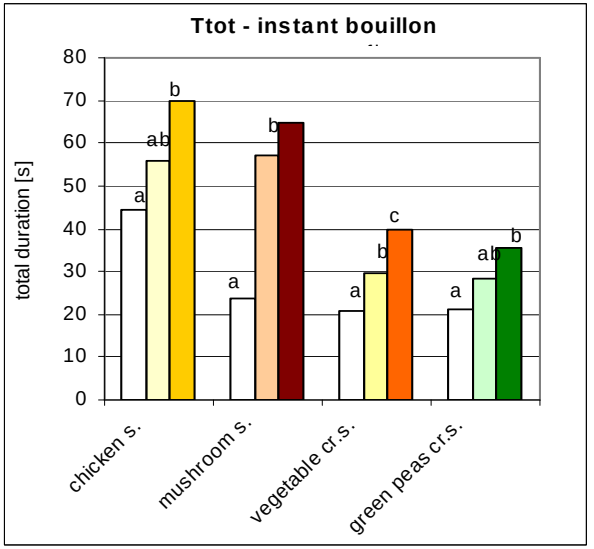
vegetable
☐ 0/0 ☐ 0.1/0 ☐ 0.5/0.005

green peas
☐ 0/0 ☐ 0.1/0 ☐ 0.5/0.015









Imax and Ttot of „negative" and „non-reatcing" attributes (mushroom and green peas soup)

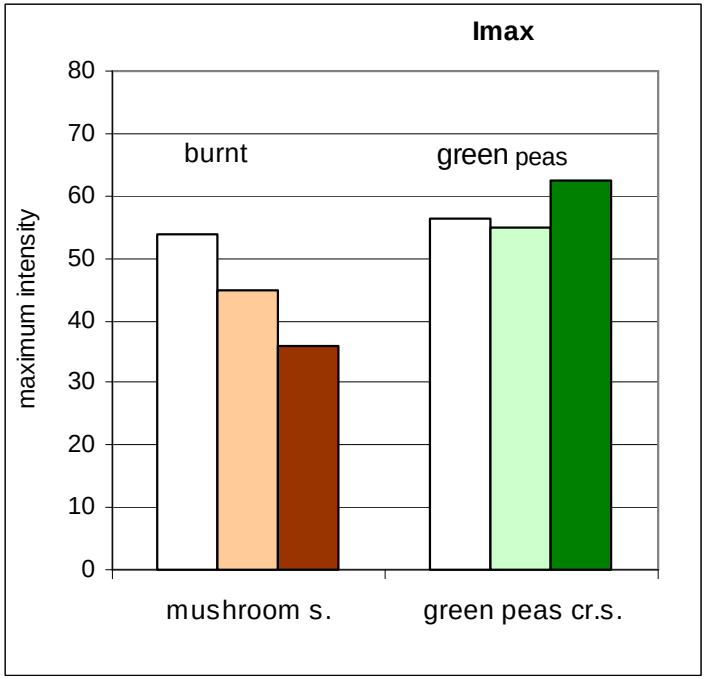
Samples (MSG/I+G):

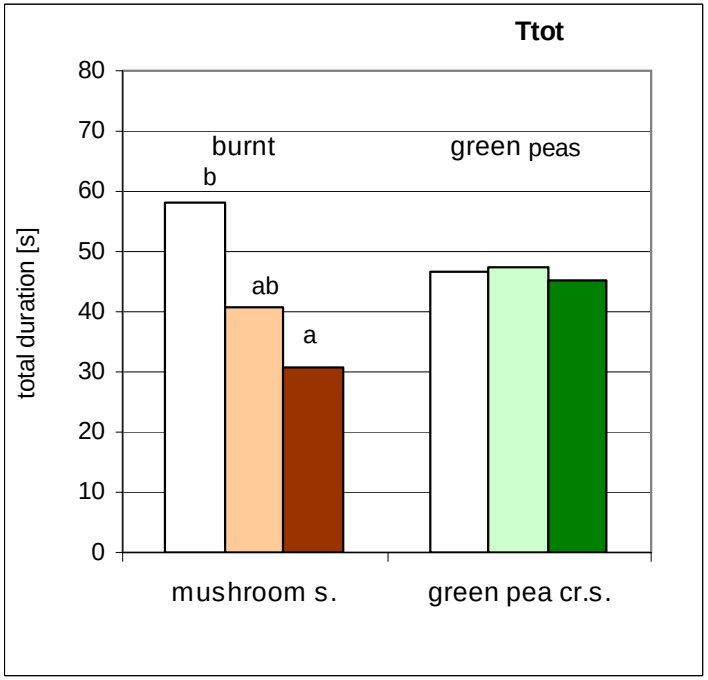
mushroom

□ 0/0 □ 0.3/0 ■ 0.5/0.01

green peas

□ 0/0 □ 0.1/0 ■ 0.5/0.015





Conclusions

- Flavour-enhancing effect of rising amount of umami substances added to four soup matrices was strongly matrix dependent;
- Intensity of “bouillon-like” and “salty” attributes increased in all soups with rising umami amount – while “body” and overall flavour – only in three of them (except green peas soup);
- In mushroom soup rising umami amount affected oppositely attributes “dry mushroom”, “burnt” and “bitter/pungent” lowering their intensity;
- Added umami substances affected not only intensity, but also perception time of the attributes.

Acknowledgements

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- Special thanks the authors express to all panel members; without their skill, motivated cooperation and responsibility the study could not be successfully completed

THANK YOU

FOR ATTENTION