



Leading to Better

Sodium Reduction:

Technical Approaches to a Complex
Problem
Part 2

Dr Martin Dovey
SAAFoST Workshop
17 May 2018



Agenda

Basics (Flavour & Salt)

General approaches to sodium reduction

Conclusion

Toolbox

Literature highlights

Kerry solutions – Taste Sense™

Basics

Why? – Because we have to.....

**R.214 of 2013
(G.G. 36274 of 20/03/2013)**

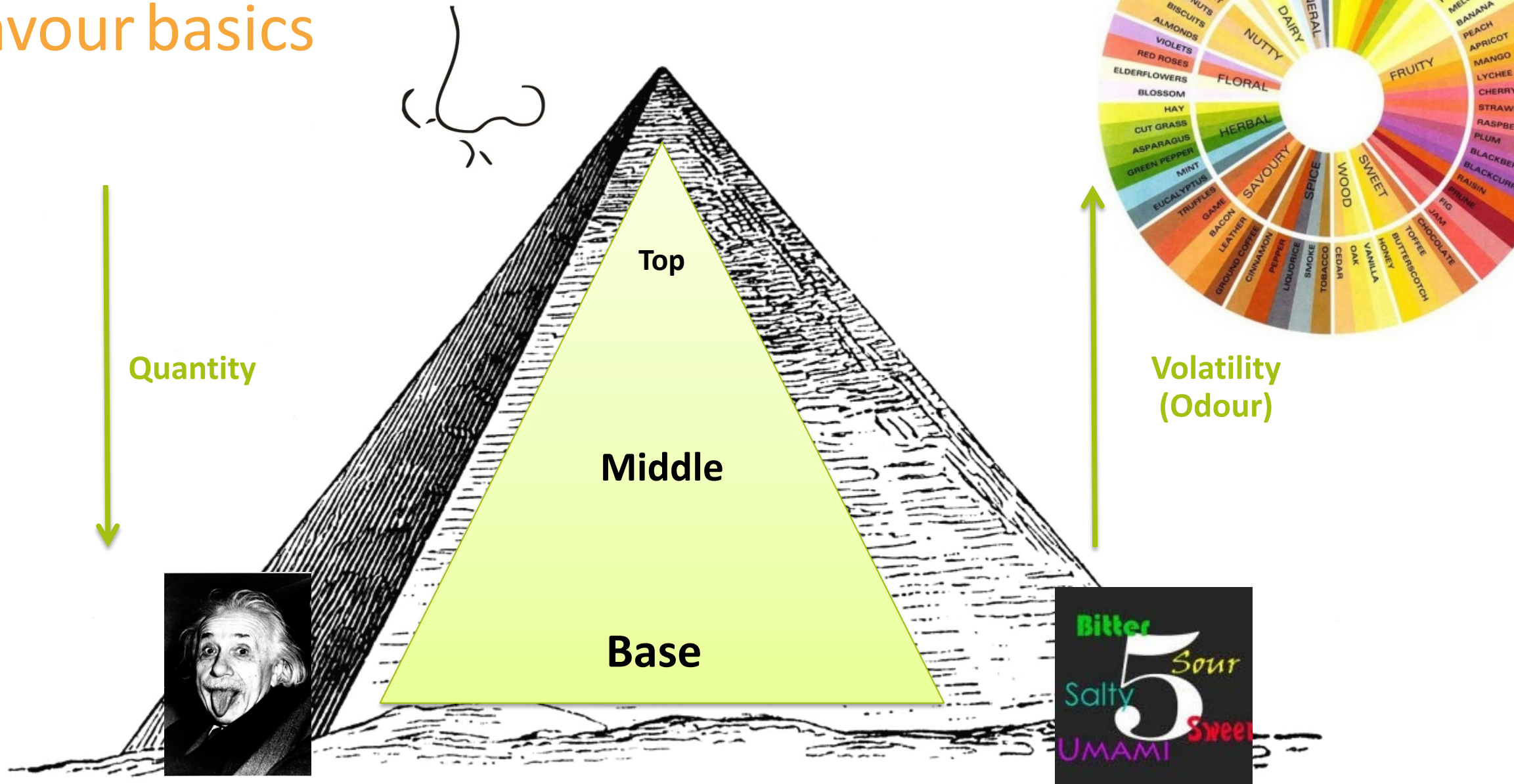
FOODSTUFFS, COSMETICS AND DISINFECTANTS ACT, 1972 (ACT 54 OF 1972)

**REGULATIONS RELATING TO THE REDUCTION OF SODIUM IN CERTAIN FOODSTUFFS AND
RELATED MATTERS**

Basics

10.	Dry <u>savoury</u> [<u>soup</u>] powders (not the instant type) Includes dry soup/ <u>stew</u> powders intended to be reconstituted, cooked up and consumed as a soup/ <u>stew</u> and /or used to thicken and/or add flavour to any type of savoury dish, <u>where a thickener is a significant ingoing ingredient.</u>	5500 mg Na	30 June 2016
		3500 mg Na	30 June 2019
11.	Dry gravy powders and <u>savoury</u> sauce powders, including all dry savoury gravy/sauce powders that require cooking or which are of the instant type, used as an accompaniment to a meal.	3500 mg Na	30 June 2016
		[1500] 2000 mg Na	30 June 2019
12.	Dry savoury powders with dry instant noodles to be mixed with a liquid Includes quick cooking Asian style noodles composed primarily of dry noodles with a seasoning sachet.	1500 mg Na	30 June 2016
		800 mg Na	30 June 2019
13.	Stock cubes, Stock powders, stock granules, stock emulsions, stock pastes or stock jellies Includes concentrated stocks / stew products in various formats used <u>primarily</u> to flavour <u>savoury</u> dishes.	18000 mg Na	30 June 2016
		[13000] 15000 mg Na	30 June 2019

Flavour basics



Basics

The main source of sodium is sodium chloride (salt) but there are other sources.

Functions

- Sensory – one of 5 basic tastes, as well as being a flavour enhancer (all foods)
- Preservation – lowering a_w (meat, pickles, fish)
- Structure – interaction with protein and influences water binding (bread, meat)
- Enzyme and microbial activity – (cheese)



General approaches to sodium reduction

Approach	Summary
Physical	• Morphology: Salt crystals of different shape, size and surface area, that provide greater salty taste than regular salt. • Distribution: Reduces adaptation to salt • Concentration: Greater salt perception when concentrated in one phase of a product.
Chemical	• Replacers: Ingredients that taste salty, but do not contribute to sodium levels. • Enhancers: Ingredients that enhance saltiness (or overall taste), but themselves don't taste salty.
Cognitive	• Awareness: Create a desire in the consumer to appreciate lower salt. • Stealth: Gradually lower salt levels without being noticed by consumers.

Busch, J.L.H.C., Yong, F.Y.S., Goh, S.M., *Trends in Food Science & Technology*, 29, (2013), 21-34.

Conclusion

Objective:

Reduce sodium to legislated levels, while maintaining sensory perception, and minimising on-cost.

Reality:

Beware the silver bullet!

It is very difficult to maintain saltiness perception and minimise on-cost.

It is more technologically feasible to re-balance the entire flavour of the product.

The objective of the re-balancing should be to produce a preferred flavour profile, not necessarily one that has equivalent saltiness.

This provides the opportunity to adjust other components that are cost drivers, and achieve minimum on-cost.

The Product Developers' Tool-box

Ingredient	Function	Application
Micronised salt Spray dried salt Speciality salt	Greater salt intensity per gram than regular salt.	Topical applications, or where salt is in solid form (snacks, coatings).
Potassium chloride	Provide saltiness without adding sodium.	All applications. Generally wet applications (soups, bouillons etc).
MSG, I+G, lysine, taurine, HVP and yeast extracts	Bitter masking agents.	In conjunction with KCl.
Flavours (topnotes and extracts)	Increase overall flavour intensity.	All applications.
MSG, I+G, HVP, yeast extracts, organic acids, sweeteners	Basic tastes. Overall flavour balance.	All applications.
Salt	Consider ways of adjusting homogeneity, or concentration.	All applications.

Technical Highlights

Saltiness enhancement in bread by inhomogeneous spatial distribution of sodium chloride

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^d Wageningen University, Agrotechnology & Food Sciences Group, Division of Human Nutrition, P.O. Box 8129, 6700 EV Wageningen, The Netherlands

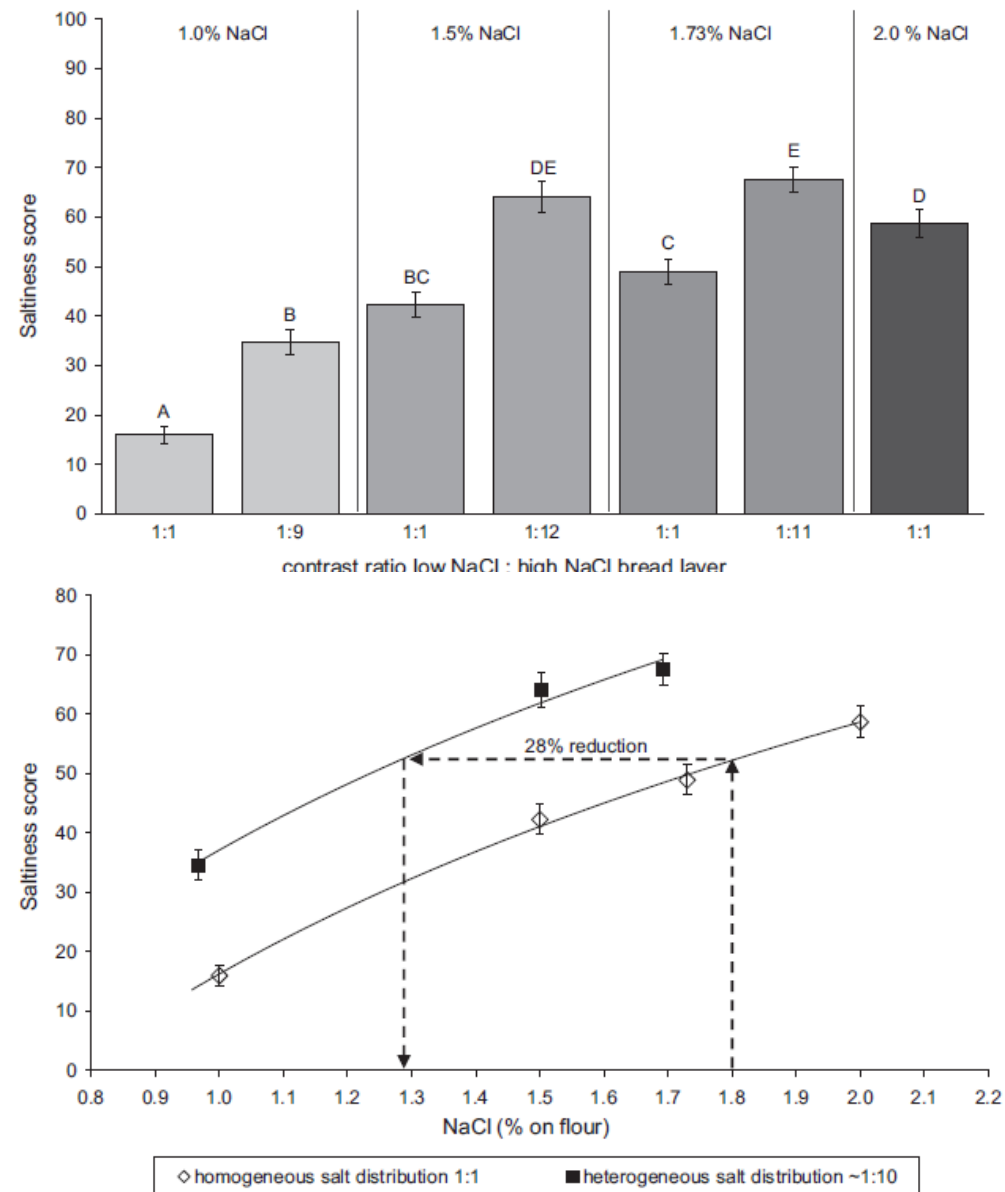


Objective:

To determine whether an inhomogeneous distribution of salt in bread can produce a greater salt intensity.

Mechanism of sodium reduction:

Inhomogeneity creates a sensory contrast, which prevents taste adaptation.



Dual Seasoning System for Snacks



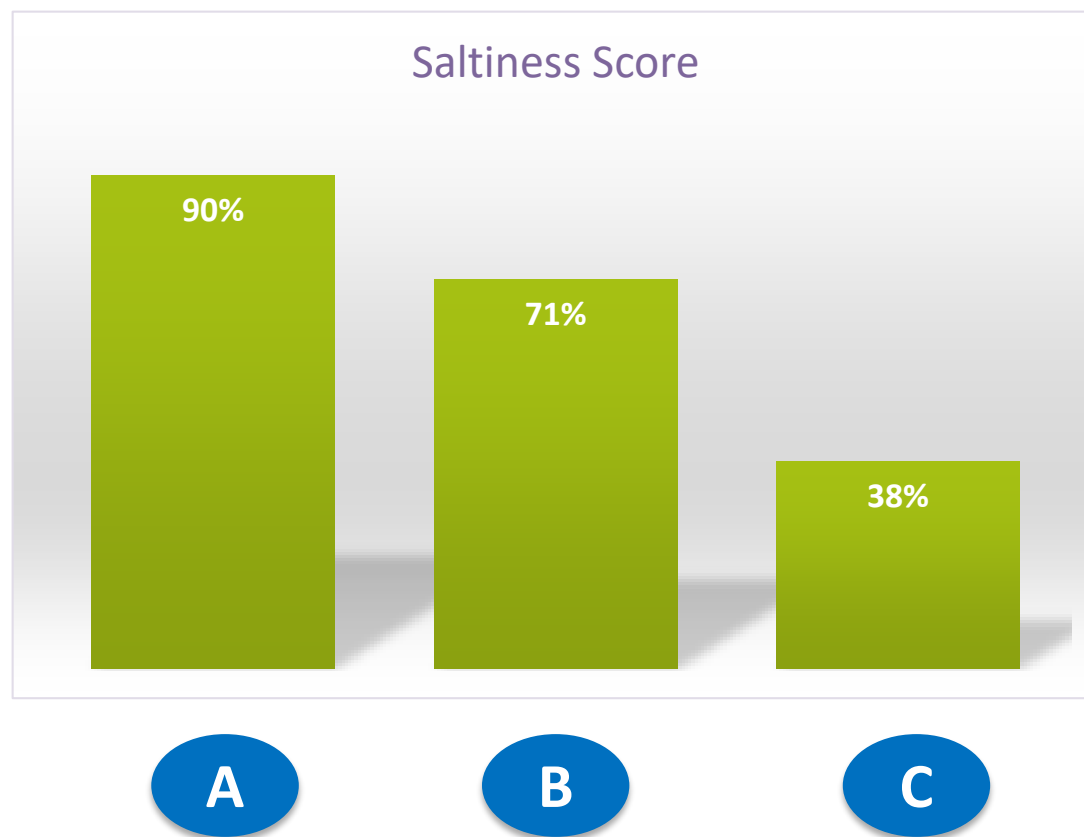
Raw Material	#1	#4	#5	#6	#7
Seasoning Base	62.1	62.1	62.1	62.1	62.1
Salt, superfine	22.3	33.5	11.2	37.9	6.7
Filler	15.6	4.5	26.8	0.0	31.2
Total	100.0	100.0	100.0	100.0	100.0

Ratio	NA	3.0	5.7
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Sensory panel asked to rank the products in order of saltiness.



Dual Seasoning System for Snacks





Contents lists available at [SciVerse ScienceDirect](#)

Food Research International

journal homepage: www.elsevier.com/locate/foodres



Heterogeneous salt distribution in hot snacks enhances saltiness without loss of acceptability

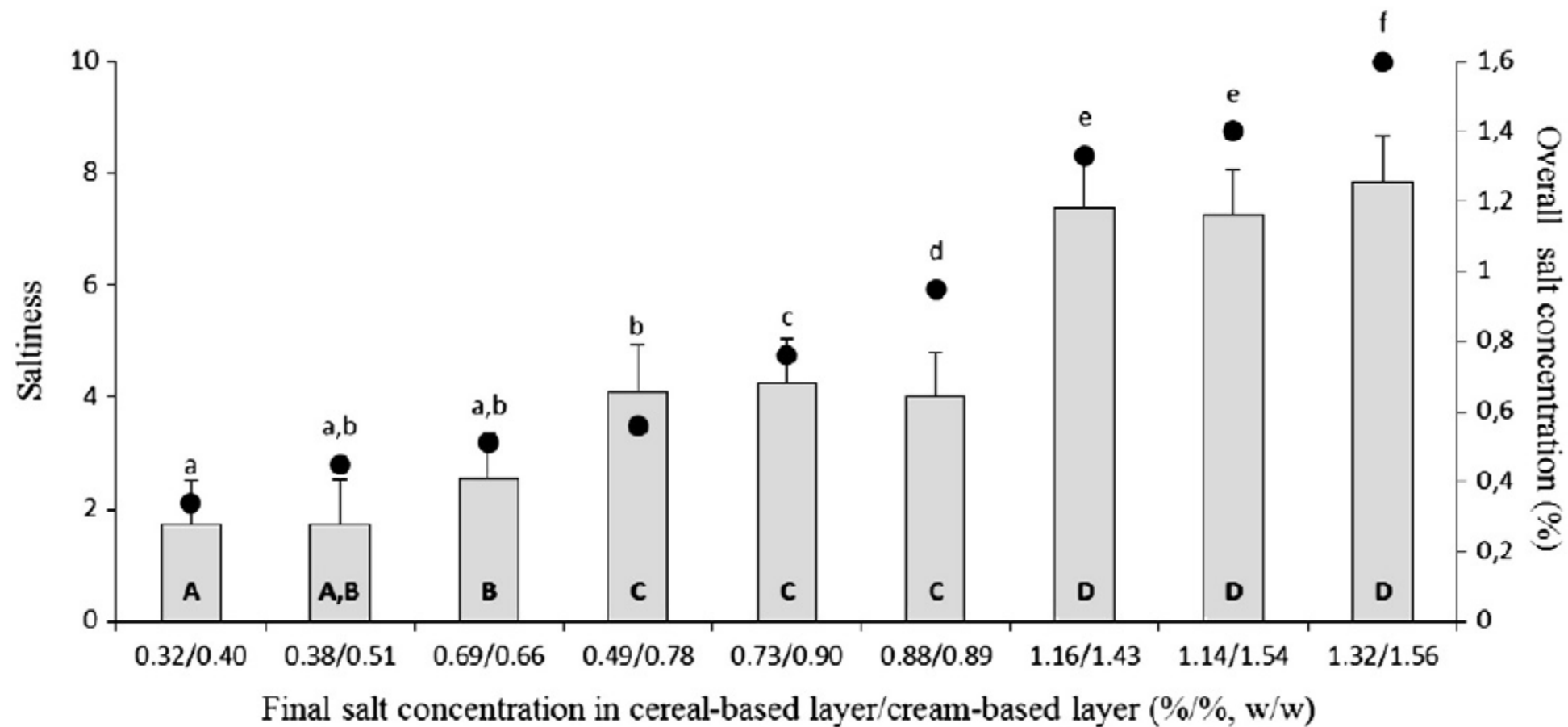
M. Emorine, C. Septier, T. Thomas-Danguin, C. Salles *

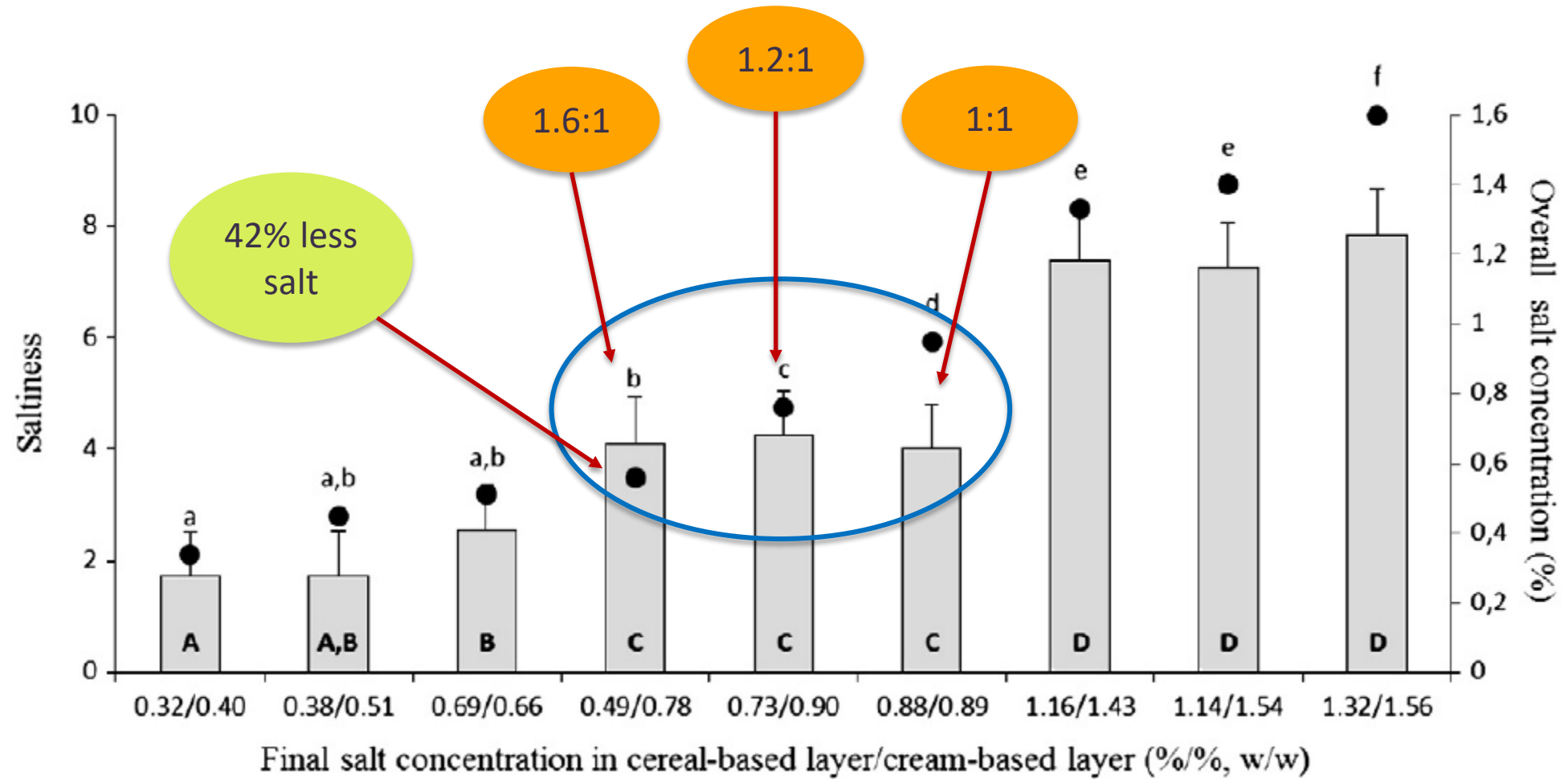
CNRS, UMR6265 Centre des Sciences du Goût et de l'Alimentation, F-21000 Dijon, France

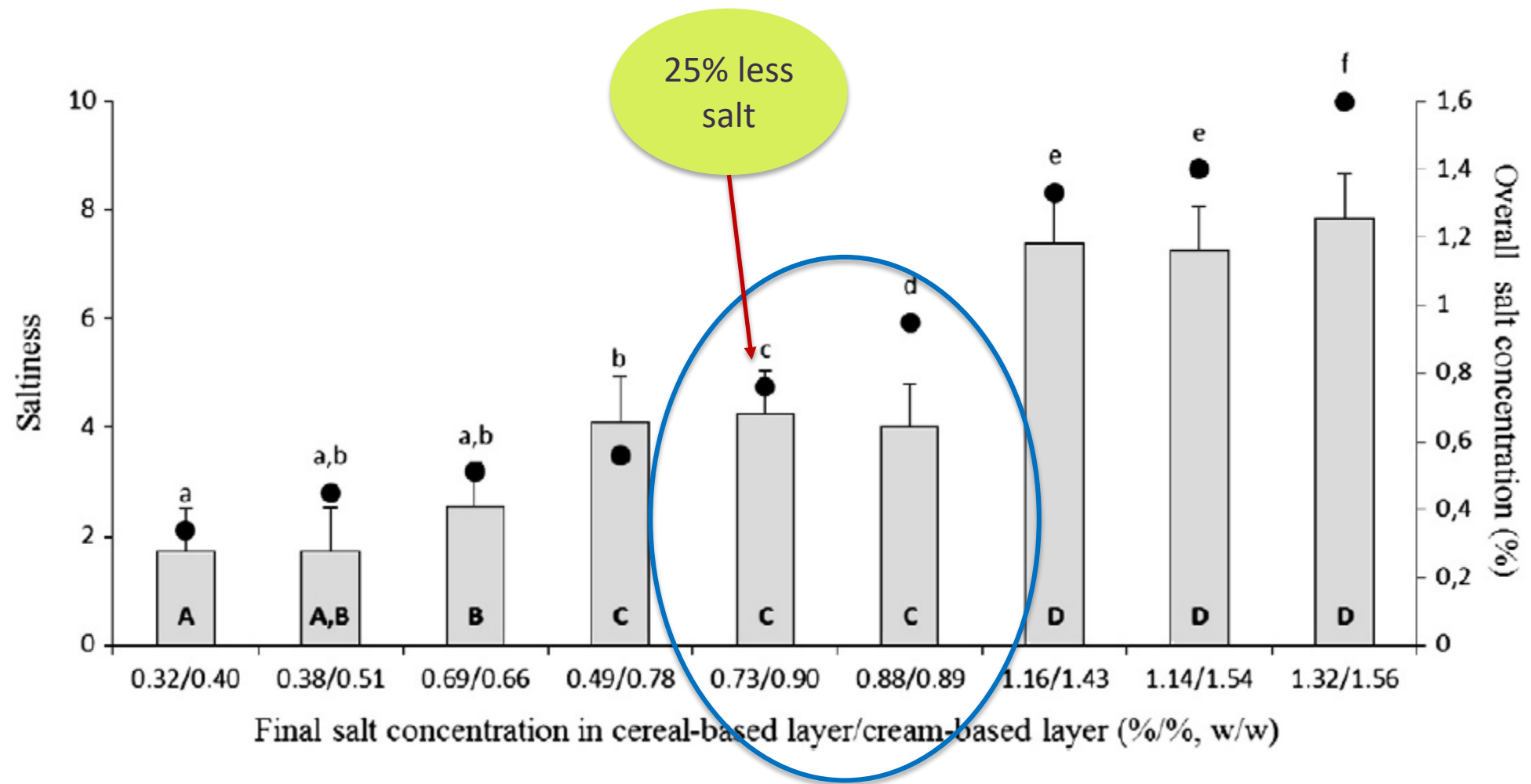
INRA, UMR1324 Centre des Sciences du Goût et de l'Alimentation, F-21000 Dijon, France

Université de Bourgogne, Centre des Sciences du Goût et de l'Alimentation F-21000 Dijon, France



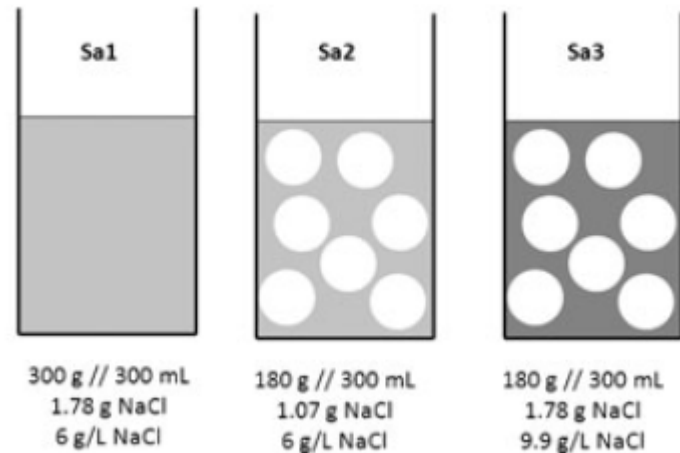






On the Effect of Tastant Excluded Fillers on Sweetness and Saltiness of a Model Food

S.M. GOH, B. LEROUX, C.A.G. GROENESCHILD, AND J.L.H.C. BUSCH

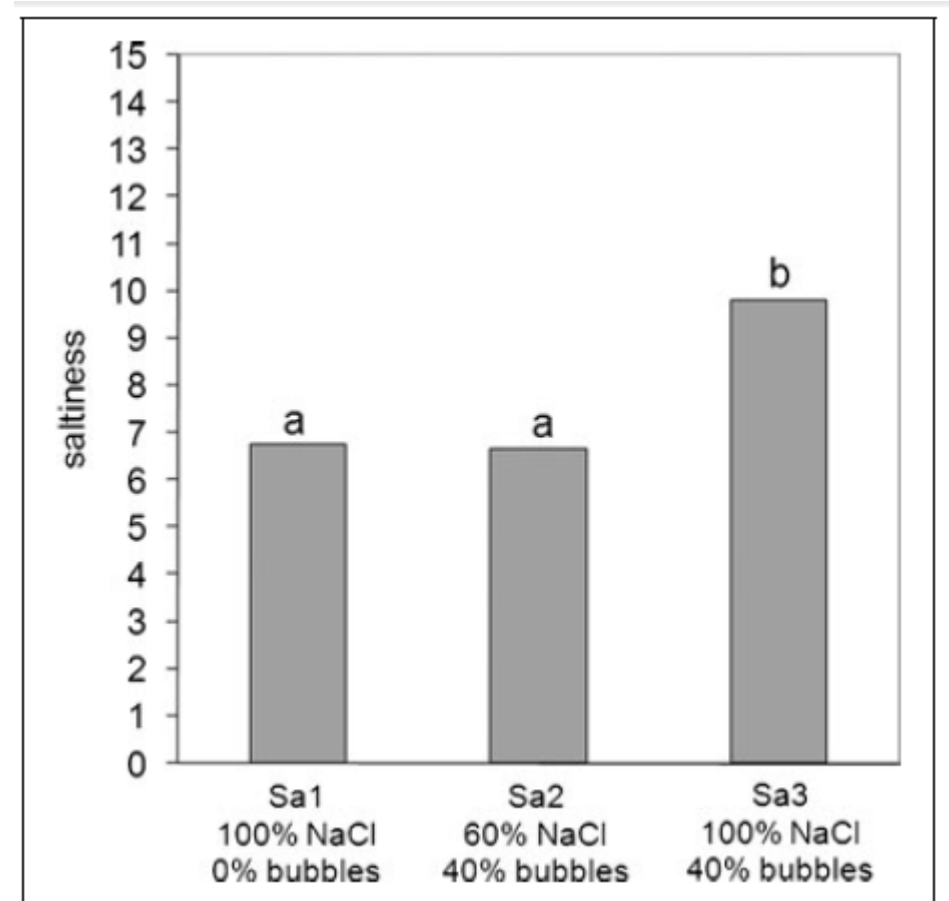


Objective:

To determine whether concentrating sodium in the aqueous phase leads to greater salt perception. (40% reduction)

Mechanism of sodium reduction:

Humans perceive concentration not amount.



Monosodium glutamate, disodium inosinate, disodium guanylate, lysine and taurine improve the sensory quality of fermented cooked sausages with 50% and 75% replacement of NaCl with KCl

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^b Instituto Federal do Triângulo Mineiro, CEP 38020-300, Uberaba, Minas Gerais, Brazil

^c Instituto de Tecnologia de Alimentos, CEP 13070-178, Campinas, São Paulo, Brazil

Objective:

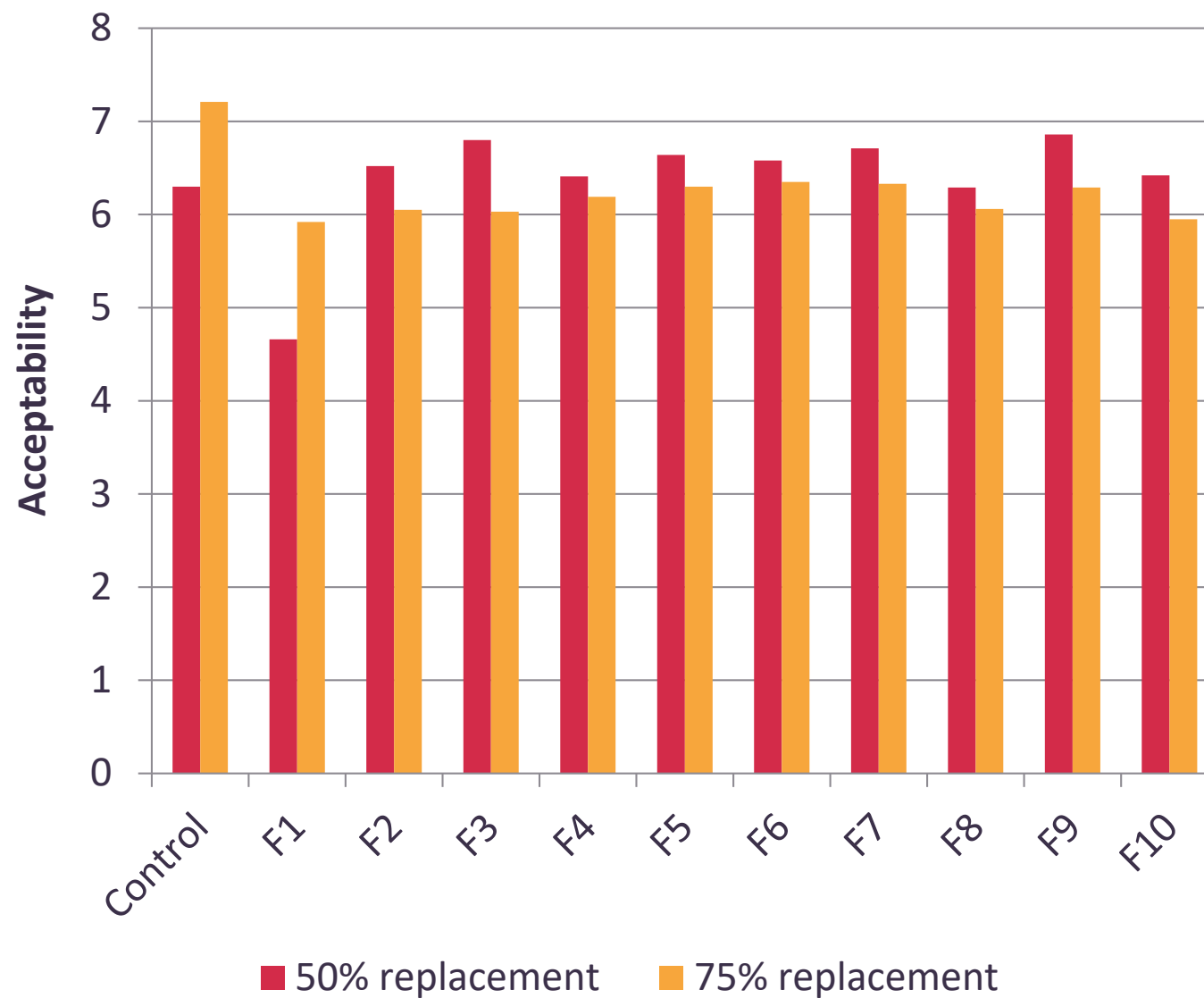
To determine whether it is possible to mask the bitter, metallic taste of KCl with substances that provide Umami (MSG, I+G, Lysine and Taurine).

Mechanism of sodium reduction:

Chemical replacement with KCl.

Negative side-effects of this replacement are mitigated by additional substances.





Control – 100% NaCl

F1 – KCl only

F2 – MSG

F3 – Lysine

F4 – Taurine

F5 – MSG and Lysine

F6 – MSG and Taurine

F7 – MSG and I+G

F8 – Lysine and Taurine

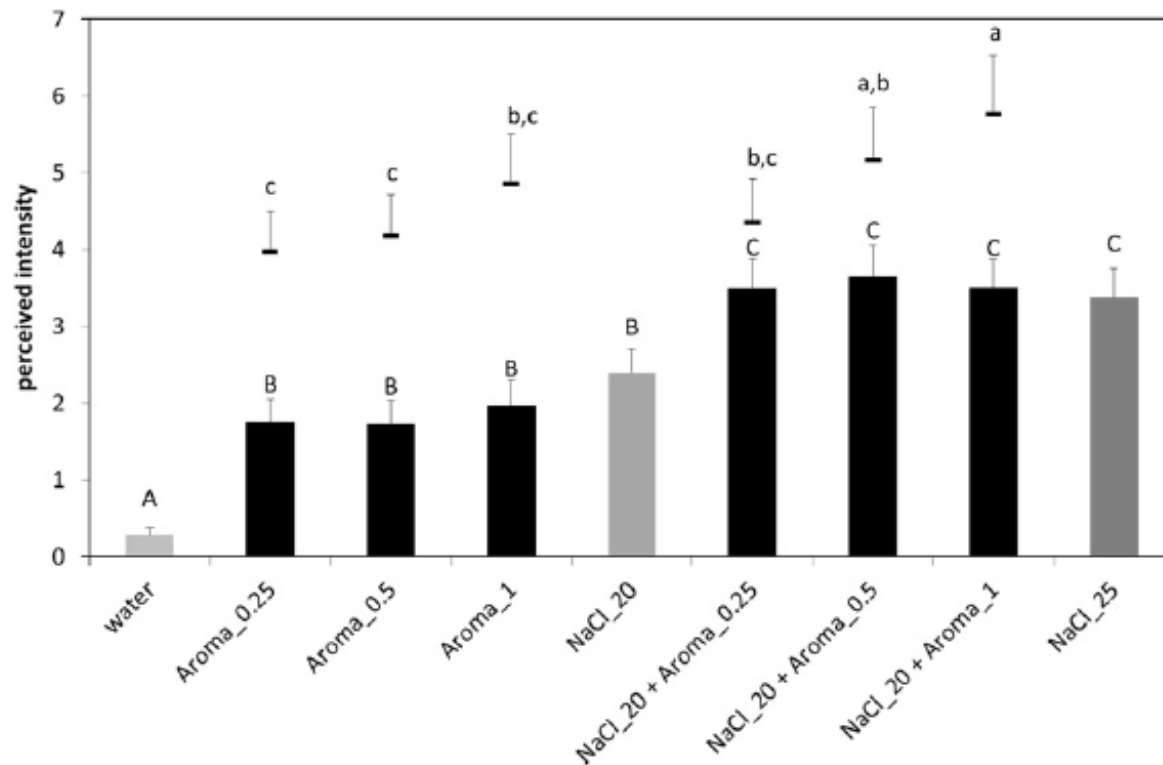
F9 – I+G and Lysine

F10 – I+G and Taurine

Enhancing salty taste through odour–taste–taste interactions: Influence of odour intensity and salty tastants' nature

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Centre des Sciences du Goût et de l'Alimentation, UMR6265 CNRS, UMR1324 INRA, Université de Bourgogne, F-21000 Dijon, France



Objective:

To determine whether an aroma with salty association can be used to enhance the salt perception of reduced salt solutions.

Mechanism of sodium reduction:

Cross-modal odour-taste interactions.



Leading to Better

TasteSenseTM

By Kerry

Enhancing Taste, Balancing Nutrition



Introducing Kerry's solutions to Salt reduction

TasteSense™
By Kerry

Enhancing Taste & Balancing Nutrition.



Codes	Name	Description	Declaration	Recommended RTC dosage
20449464	TasteSense SL Light Versatile	Medium salt taste, mild umami impact	Yeast Extract, or Natural Flavouring	0.2-0.3%
20449510	TasteSense SL Versatile	Medium salt taste, with initial umami impact	Yeast Extract, or Natural Flavouring	0.2-0.3%
20449165	TasteSense SL Veg	High intensity salt perception, boosts veg and allium notes	Natural Flavouring	0.2-0.3%
20449628	TasteSense SL Rich	High intensity saltiness, umami enhancement, stewed, cooked, savoury	Natural Flavouring	0.2-0.3%
20437436	TasteSense SL White Meat	High intensity saltiness, umami enhancement, white meat, sweet meats, boiled	Natural Flavouring	0.2-0.3%
20449238	TasteSense SL Grill	High intensity saltiness, umami enhancement, roast, smokey, grilled notes	Natural Flavouring	0.2-0.3%
20052653	Umamex 100LS	Delivers Umami taste, up front and lingering notes	Yeast Extract or Natural Flavouring	0.2-0.3%
20052660	Umamex SP	High intensity salt and Umami taste, Masking KCL bitterness	Yeast Extract, or Natural Flavouring	0.2-0.3%

Where can it be used?



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Thank You

TasteSense™
By Kerry