Emerging science and innovation: Impact on food consumption and dietary pattern

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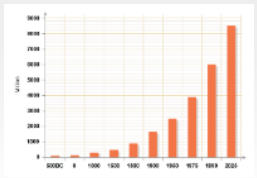
Agenda

- Background:
  - Socio-demographic trends
  - Nutritional Sciences Evolution
  - Consumer Trends
- Opportunities and Challenges
- Solutions and Impact
- Conclusions

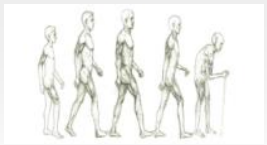
Socio-demographic trends influencing the food demand

Demographic and social changes



POPULATION GROWTH

URBANISATION



AGEING & HEALTH CONCERNS

POVERTY vs SUPER RICH

INFORMATION & DIGITAL

Impact on nutrition and food demand

FOOD SHORTAGE & NUTR. UNBALANCE

CHALLENGING SUPPLY CHAIN

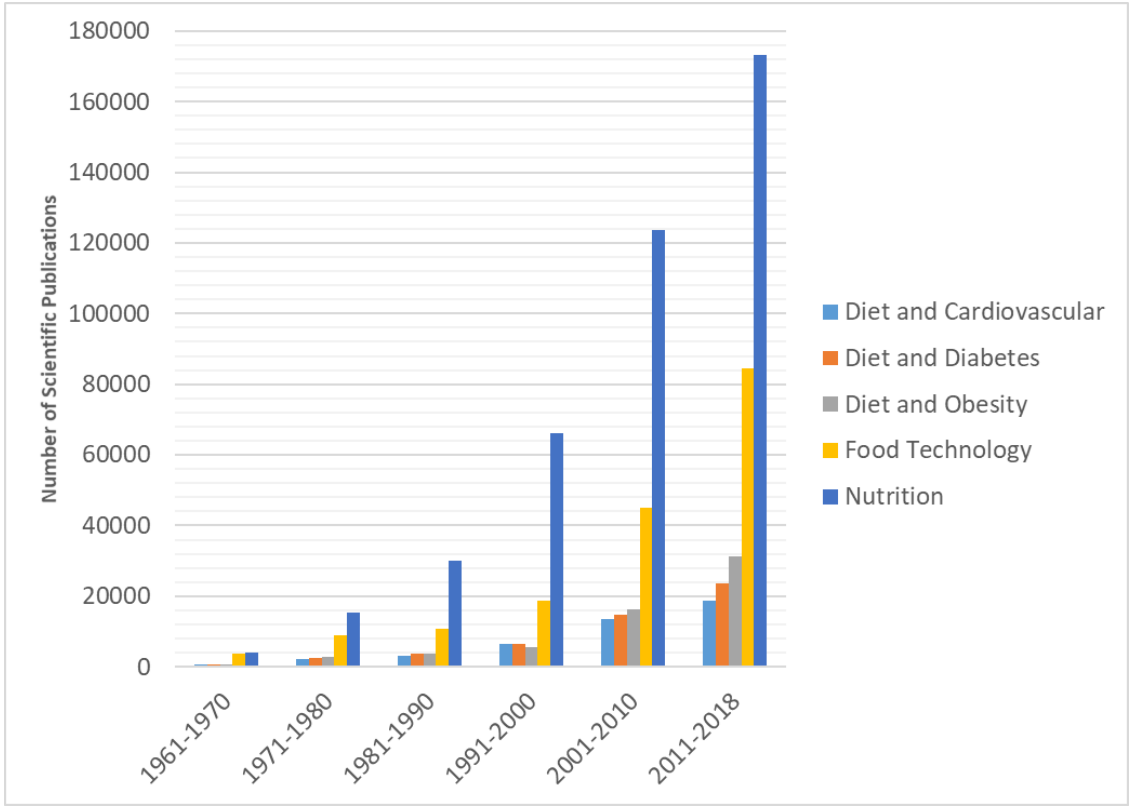
http://www.aihw.gov.au

PERSONALIZED DIET

IMPORTANCE OF AFFORDABILITY

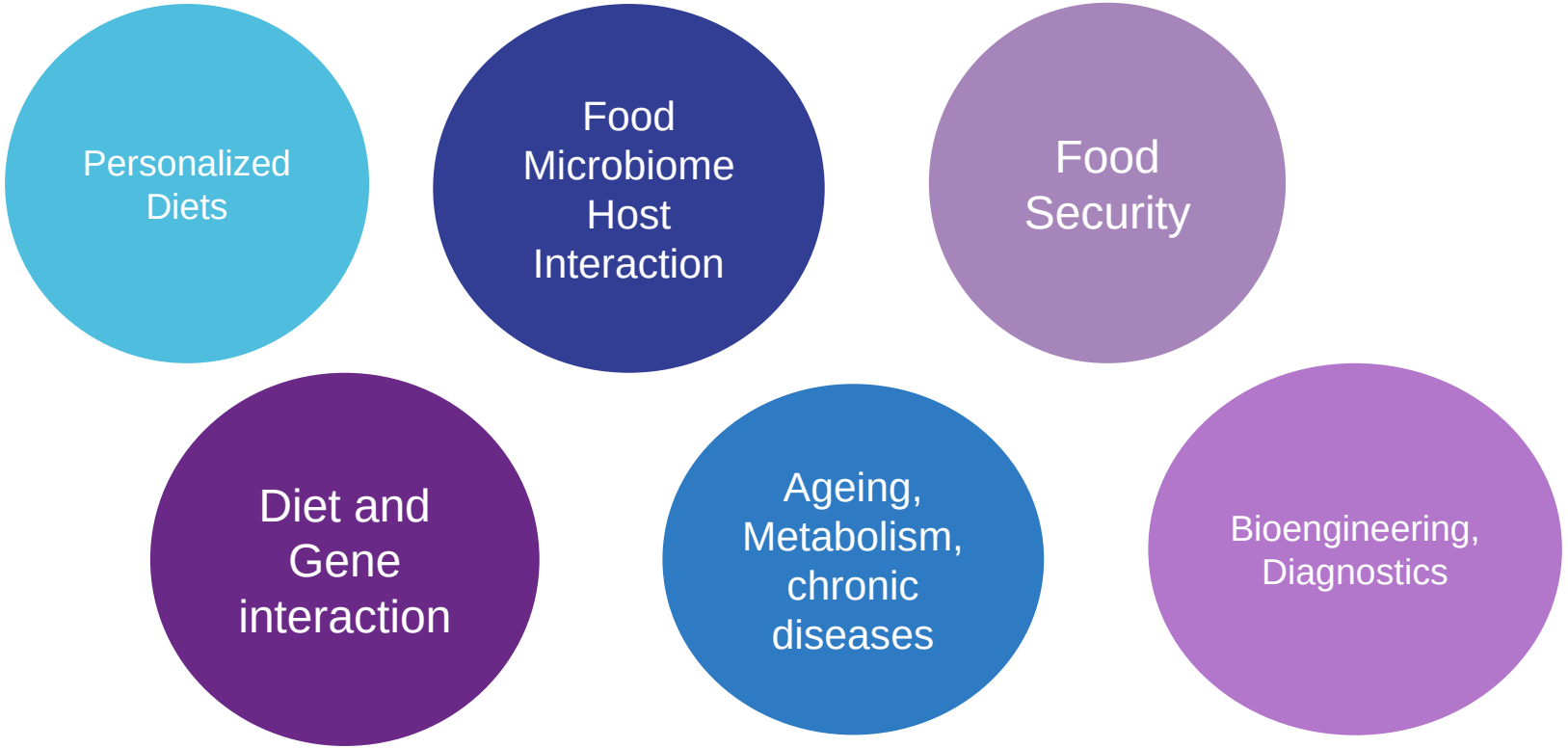
CHANGING CONSUMER BEHAV.

Explosion of Scientific Publications



Source: PubMed

Trends in Nutrition Science



Today Consumers have evolved

Moving from basic nutrition to functional benefits

Reduced sugar

High-protein

More veggies

Gut Health

Alertness, Energy

From I "think" it's right for me (feel better) moving to I "know" it's right for me

Gluten-free

Lactose-free

Vegans/Keto/Paleo

Personalized Nutrition

Home-testing kits let consumers take a proactive approach on their health

For a smarter gut

uBiome is a biotechnology company based in the US that offers consumers the opportunity to test their gut microbiome.

Personalized nutrition

Habit provides a personalized nutrition plan based on the results of at-home DNA and metabolism tests.

Precision supplementation

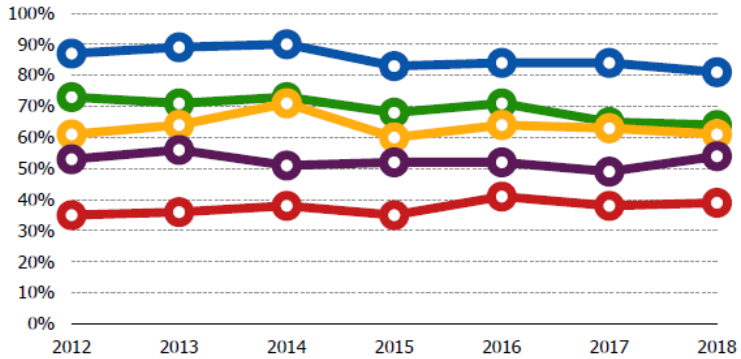
Omega Quant offers an Omega-3 blood test and provides consumers with actionable and personalized recommendations for EPA+DHA intakes.

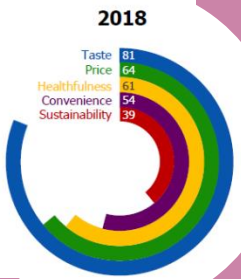
Ref. Mintel Insight report , 2018

Consumers care about the taste of the products they buy

Taste continues to have the greatest impact on the decision to buy food and beverages. Sustainability is up from 2015.

How much of an impact do the following have on your decision to buy foods and beverages?
(% Rating 4 to 5 on 5-point scale, from No Impact to A Great Impact)





Basis: 1,003 Americans aged from 18 to 80

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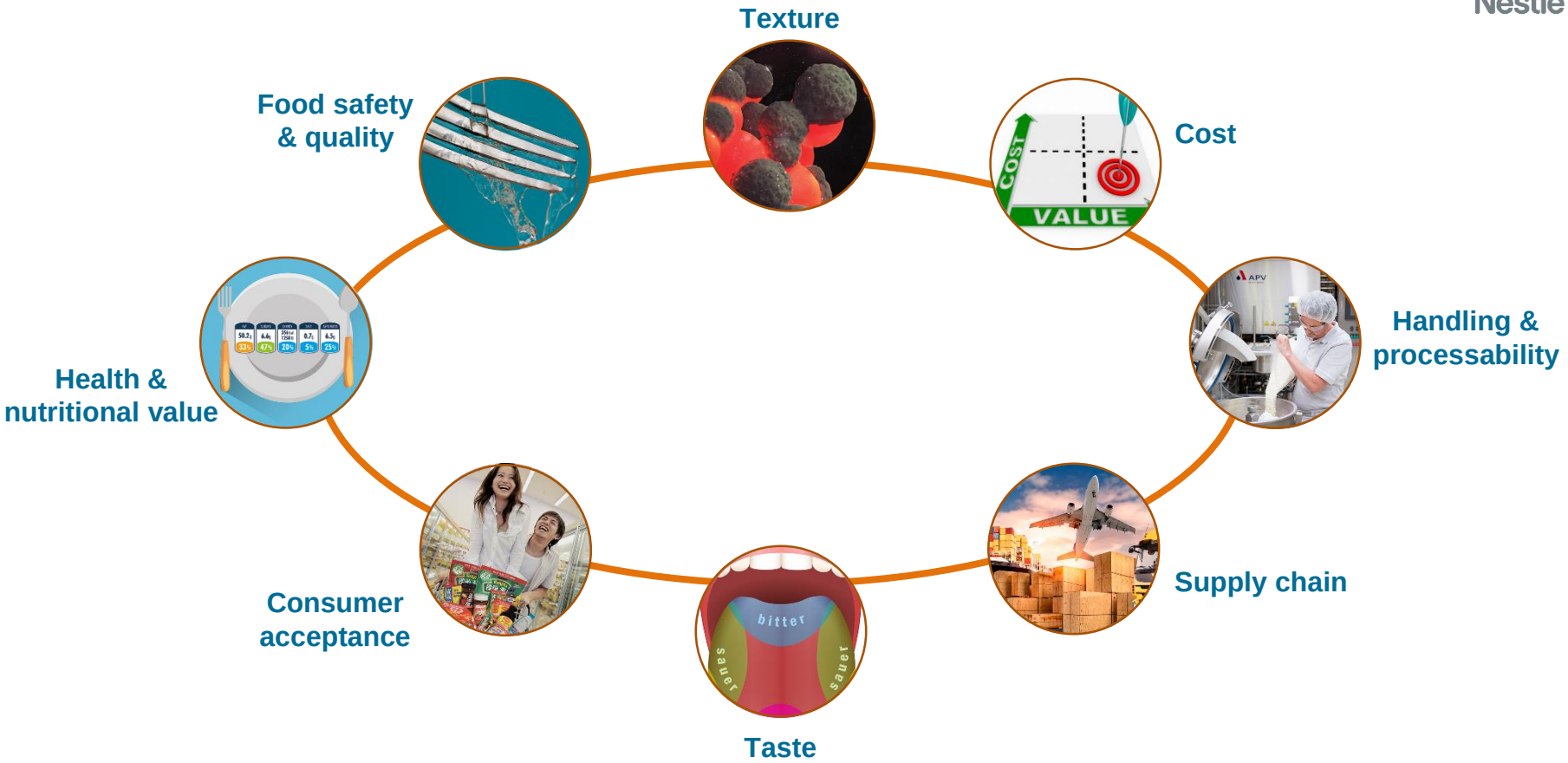
Nutrition: Challenges in (re)formulation



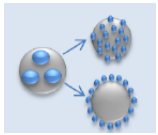
Meeting consumer expectations and public health needs: Example salt reduction

High

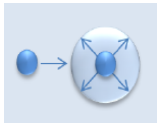
Sodium levels

Low

Plain salt reduction / Step reduction
Consumers adaptation to lower saltiness



Sodium redistribution in Food matrix
Maximizing salt release from the matrix to the taste buds



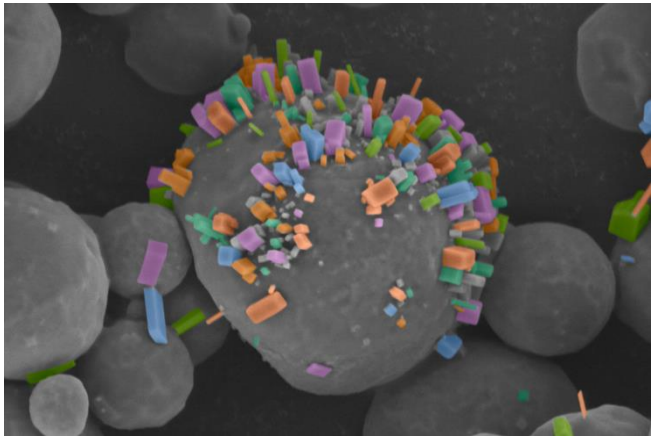
Ingredients to replace salt:
e.g. Potassium chloride based salts
Or modulate saltiness

Taste compensation by culinary expertise
e.g. with umami, acidity, herbs & spices

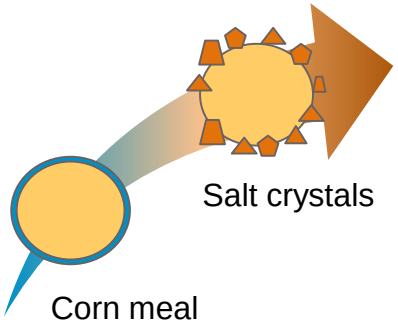
Optimizing Salt Distribution

Frozen Pizza

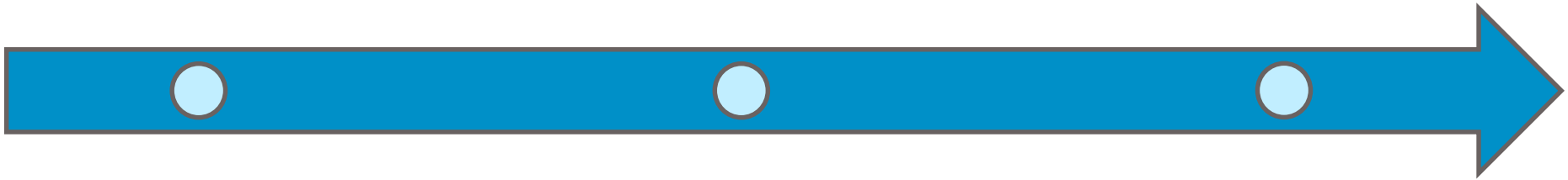
Salt-coated corn-meal



The artisanal touch of corn meal at the bottom of the crust is leveraged to maximize saltiness perception.



Sodium Reduction Journey Started in 2005



2005

Mandatory Policy

Reduce sodium in relevant products to help consumers achieve a daily sodium intake of 2’400 mg. By the end of 2012, more than 22% sodium reduction achieved (equivalent to 13’500 mT of salt) in culinary foods.

2013 – 2016

FORWARD COMMITMENTS

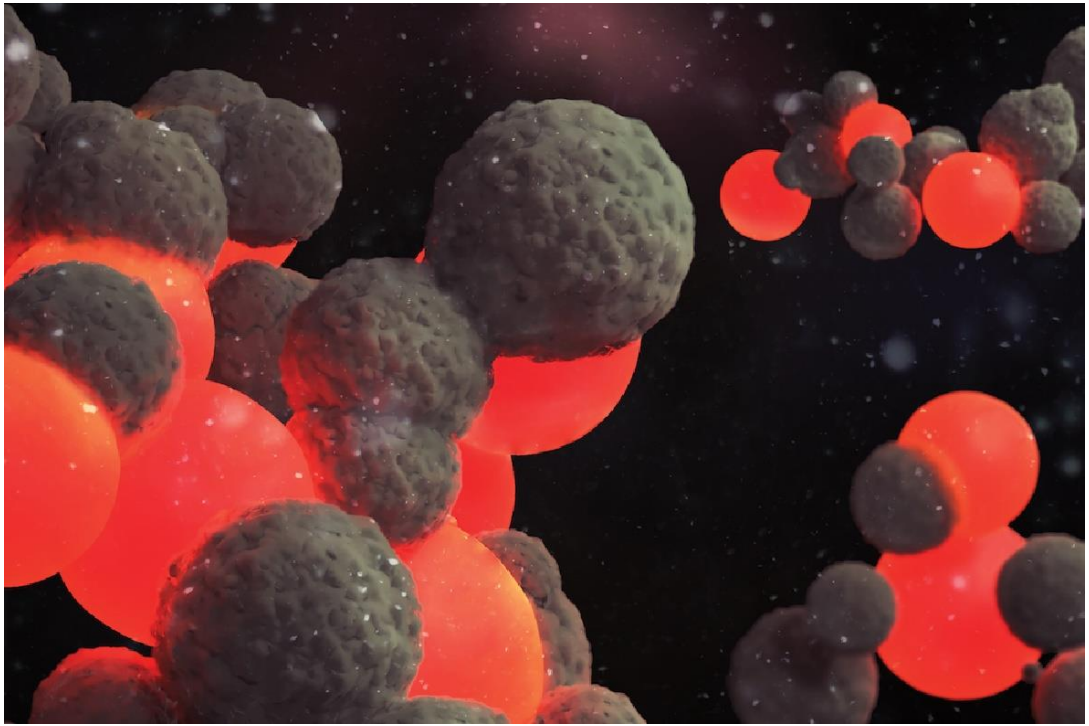
Pledge to further accelerate sodium reduction to help consumers achieve the WHO sodium goal of daily intake of 2’000 mg by 2025. Commitment to reduce sodium levels by at least 10% in products that are not aligned with our sodium targets based on 2’400 mg daily intake. More than 10% reduction achieved.

2017 – 2020

Commitment to reduce sodium levels by at least 10% in products that are not aligned with our sodium targets based on the WHO recommendation of 2’000 mg daily intake.

Reducing fat

Creating creaminess through protein aggregation



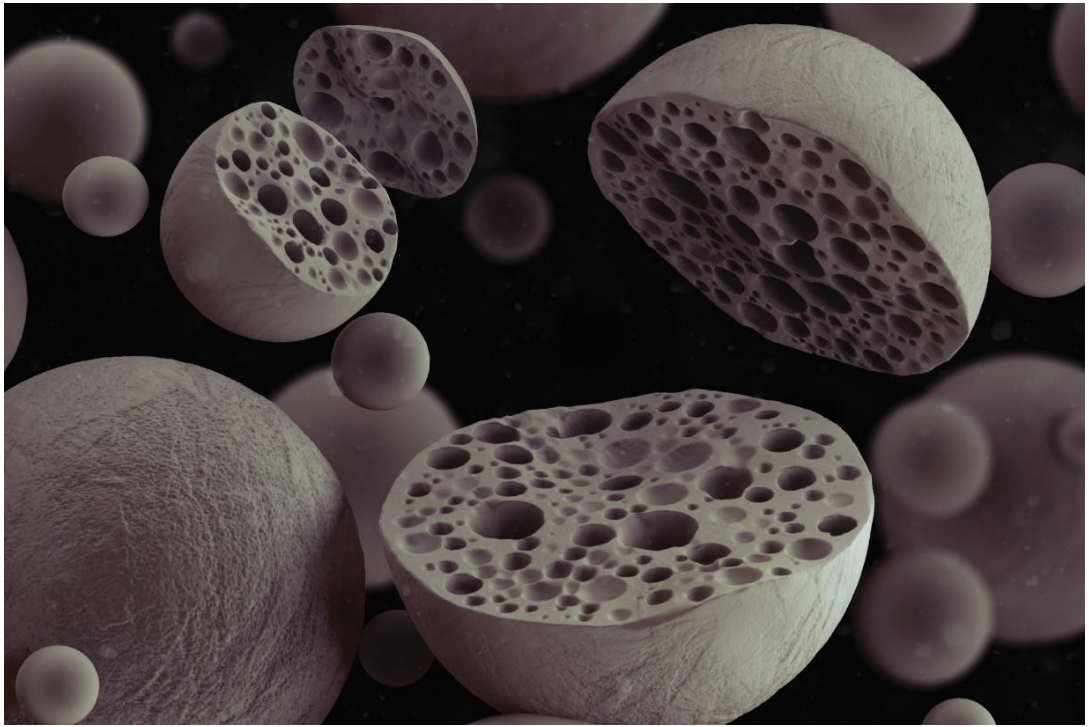
Aggregated dairy proteins

US
2016

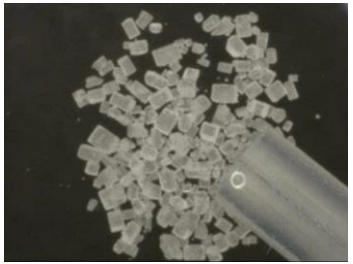
Controlled aggregation of dairy proteins provide a creamy mouthfeel similar to oil droplets. This allows to increase creaminess while simultaneously reducing the fat content.

Reducing sugar

Smart structuration of sugar for fast dissolution



Structured sugar molecules



UK 2018

Aerated sugar particles dissolve more quickly on your tongue and deliver the sweet sensation with significantly lower sucrose level.

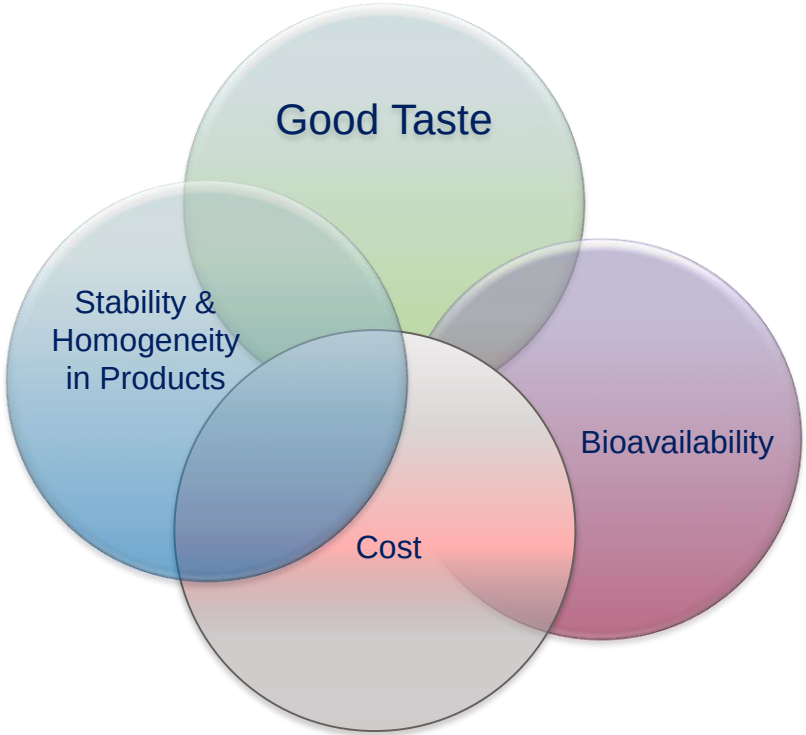
Meat alternatives

Delivering taste, texture and nutrition

Europe 2019

Providing natural vegan solutions through a combination of texturized plant proteins and vegetable fats.

The Challenge of Fortification



Technical Challenge: Color Stability in local preparations

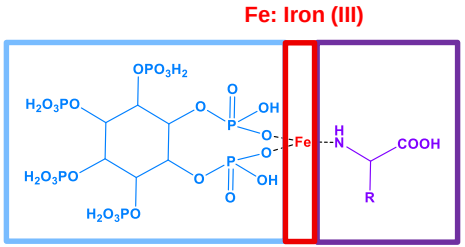
Highly reactive iron compounds in bouillon may lead to organoleptic constraints (e.g., color and taste)

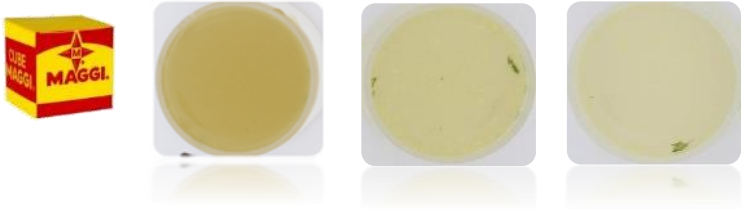
Not fortified | **Fortified with Ferrous Sulfate** | **Fortified with Ferric Pyrophosphate**

[1]Habeych et al. 2016. Food Res. Int. 88, 122-128

Stable Iron Fortificant – Collaboration with ETH Zürich

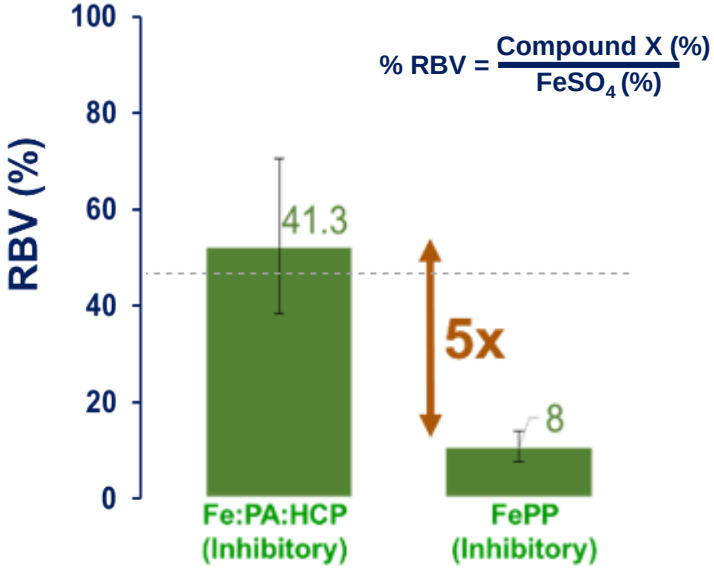
Stability





Relative Iron Bioavailability (RBV)

$$\% \text{ RBV} = \frac{\text{Compound X (\%)}}{\text{FeSO}_4\text{ (\%)}}$$



- New iron compound has **high stability** and **bioavailability 5x higher** than current fortificant with an inhibitory meal
- **>3x more** effective to reduce the Health and Economical burden (DALY) in Ivory Coast

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Health and economic impact of reducing public health sensitive nutrients

PREDICT FUTURE WITH MODEL

predictive modelling based on available data & evidence

Step 1 Nutrition epidemiology: link between public health sensitive nutrients and health outcomes

Step 2 Reformulation ⟹ Change intake

Tax, Marketing ban
Education, Limit availability, etc.

⇩

Step 3 Health & Economic Impact ⟹ Healthy years: QALYs

Healthcare costs $$$$

Step 1 Nutrition epidemiology: link between public health sensitive nutrients and health outcomes

Step 2 Reformulation ⟹ Change intake

The American Journal of CLINICAL NUTRITION

Modeled dietary impact of industry-wide food and beverage reformulations in the United States and France

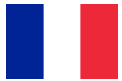
Mathilde Gressier,[1] Lisa Privet,[2] Kevin Clark Mathias,[1] Antonis Vlassopoulos,[1] Florent Vieux,[2] and Gabriel Masset[1]

[1]Nestlé Research Center, Lausanne, Switzerland; and [2]MS-Nutrition, Unité Mixte de Recherche, Nutrition, Obesity, and Thrombotic Risk Research Unit, Timone Medical School, Marseille, France

Potential changes in dietary intakes for the US and French population applying the Nestlé Nutritional Profiling System to the food supply

	Adults (≥18 y) (*n* = 5076)			Children and adolescents (4–17 y) (*n* = 2380)		
	Baseline	**Reformulation**	**Substitution**	**Baseline**	**Reformulation**	**Substitution**
Added sugars, g/d	77.6 ± 1.7 [a]	48.1 ± 0.98 [b]	41.7 ± 0.95 [c]	81.5 ± 2.03 [a]	50.6 ± 1.56 [b]	44.1 ± 1.41 [c]
Sodium, mg/d	3618 ± 26.2 [a]	3213 ± 25.23 [b]	3294 ± 30.33 [c]	3118 ± 78.0	2749 ± 60.79 [b]	2813 ± 67.33 [c]

Added sugars, g/d	45.4 ± 0.73 [a]	36.0 ± 0.52 [b]	41.1 ± 0.53 [c]	57.7 ± 0.71 [a]	43.2 ± 0.50 [b]	46.5 ± 0.53 [c]
Sodium, mg/d	3153 ± 24.4 [a]	2809 ± 21.7 [b]	2813 ± 21.8 [c]	2310 ± 21.6 [a]	2029 ± 19.0 [b]	2050 ± 19.6 [c]



Reformulation: nutrient content of foods and beverages adjusted to the NNPS standards (if they were not met)

Substitution: products not meeting the standards were replaced by the most nutritionally similar alternative meeting the standards from the same category

Step 3 Health & Economic Impact

European Journal of Clinical Nutrition (2016) **70,** 694–699

www.nature.com/ejcn

ORIGINAL ARTICLE

An assessment of the potential health impacts of food reformulation

P Leroy[1], V Réquillart[2], L-G Soler[1] and G Enderli[1]

BACKGROUND/OBJECTIVES: Policies focused on food quality are intended to facilitate healthy choices by consumers, even those who are not fully informed about the links between food consumption and health. The goal of this paper is to evaluate the potential impact of such a food reformulation scenario on health outcomes.
SUBJECTS/METHODS: We first created reformulation scenarios adapted to the French characteristics of foods. After computing the changes in the nutrient intakes of representative consumers, we determined the health effects of these changes. To do so, we used the DIETRON health assessment model, which calculates the number of deaths avoided by changes in food and nutrient intakes.
RESULTS: Depending on the reformulation scenario, the total impact of reformulation varies between 2408 and 3597 avoided deaths per year, which amounts to a 3.7–5.5% reduction in mortality linked to diseases considered in the DIETRON model. The impacts are much higher for men than for women and much higher for low-income categories than for high-income categories. These differences result from the differences in consumption patterns and initial disease prevalence among the various income categories.
CONCLUSIONS: Even without any changes in consumers' behaviors, realistic food reformulation may have significant health outcomes.

European Journal of Clinical Nutrition (2016) **70,** 694–699; doi:10.1038/ejcn.2015.201; published online 16 December 2015

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Conclusions

- Technological innovations and demographic trends influence strongly the food demand
- Nutrition, Health and Wellness has become an important driver for consumers' food choices, providing opportunities to improve diets towards recommended intakes
- Technology can provide solutions to some of the major public health concerns
- Reformulation can be an effective way to improve public health