

Delivering taste and texture in food and beverages



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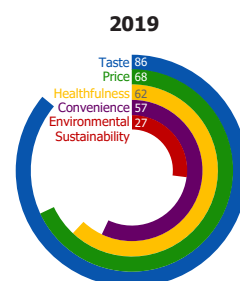
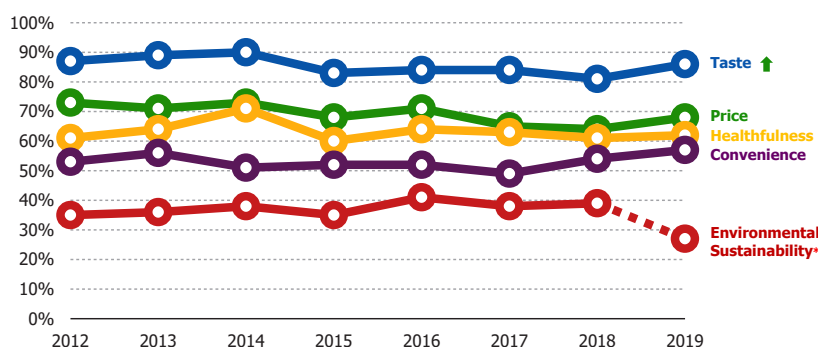
Introduction

Taste is the number one purchase driver of foods and beverages,¹ but it must fit with consumers' other demands, including health, value for money, product quality, shelf life and attractive appearance. Meanwhile, taste overlaps strongly with texture, as mouthfeel and the way foods are broken down in the mouth can exert an enormous influence over how taste is perceived.²

Taste and Price Remain Top Drivers

Taste is more important to older consumers while price is more important to younger ones; the importance of taste has increased since 2018

Purchase Drivers Over Time
(% 4-5 Impact out of 5)



Q8: How much of an impact do the following have on your decision to buy foods and beverages? (n=1,012)

*Prior to 2019, Environmental Sustainability was asked simply as Sustainability

Source: IFIC Foundation 2019 Food and Health Survey¹

This report gives an overview of which flavours are on the rise in both foods and beverages, as well as how companies are tackling taste and textural challenges in products with reduced salt, sugar and saturated fat. The growing market for such foods gradually has steered manufacturers, researchers and ingredient suppliers to find solutions to common problems, so there is less compromise on either taste or texture in finished products.

Textural expectations and taste preferences vary between regions and countries. This has led many companies to launch different varieties of products in different global markets, even for flagship brands.³ The flavour trends in this report concentrate mainly on Europe, but many of the taste and texture solutions discussed apply globally, particularly for healthier product development.

Natural flavour trends across categories

Naturally sourced flavours have become increasingly important, and a growing number of companies has moved to remove artificial flavours from their products, including market leaders like Nestlé⁴ and Danone⁵.

A 2016 Nielsen survey found that about three-quarters of global consumers were worried about the effect of artificial ingredients on their health⁶ - and artificial flavours topped their concerns, with 62% of respondents saying they aimed to avoid them.

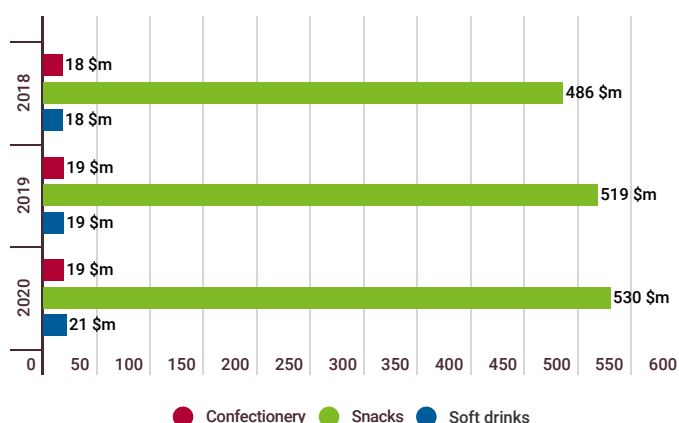
According to the Netherlands' CBI, the Centre for the Promotion of Imports from developing countries:

*"Natural flavours are in high demand in the European market partly because of their relatively low costs and rising consumer demand for natural products. They have become mainstream in some European countries, partly because of the burgeoning organic food market and rising demand for processed foods."*⁷

The latest data from Foodtrending shows significant growth of the market in Europe for natural flavours, industrial seasonings and flavouring materials – all of which are considered natural flavours. The market is still expected to grow throughout 2020.⁸

Seasonings: Mixtures and blends of herbs, spices. Used widely in snacks, meals, and meat products. Europe, as defined.

Industrial seasoning, herbs & spices



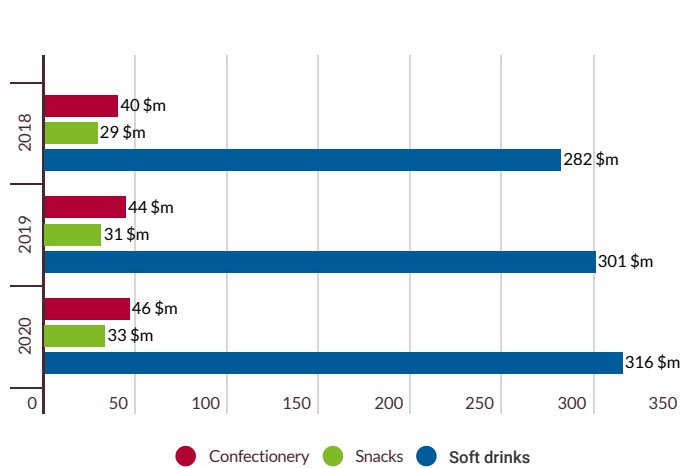
FLAVOURS (NATURAL)	CAGR 2018 - 2020
Confectionery	3.7%
Snacks	4.4%
Soft drinks	9.5%

NOTES:
 Industrial food ingredients only.
 Usage via retail and foodservice channels excluded, except where in the form of an industrially-manufactured food product.
 Zeros = little discernable usage.
 Values converted at average exchange rates.
 All numbers rounded

Source: Foodtrending 2020⁹

Natural flavours: Flavouring substances from plant or raw materials.
Predominately used in soft drinks and dairy products. Europe, as defined.

Natural flavours



FLAVOURS (NATURAL)	CAGR 2018 - 2020
Confectionery	7.2%
Snacks	6.1%
Soft drinks	6.0%

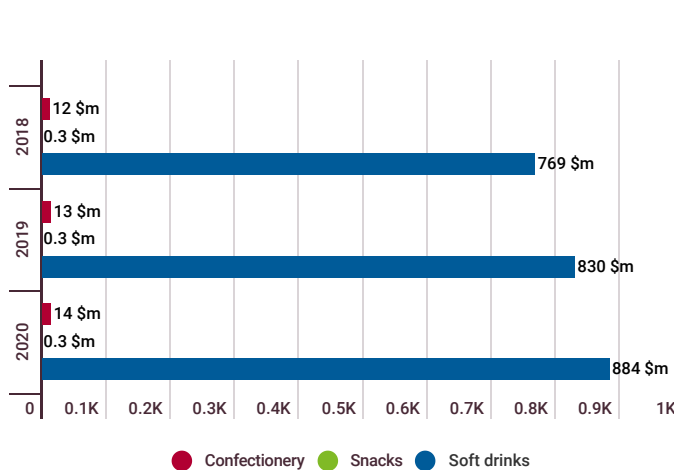
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 Zeros = little discernable usage.
 Values converted at average exchange rates.
 All numbers rounded

Source: Foodtrending 2020⁹

Flavour materials: Juices, extracts, powders, and concentrates.
Europe, as defined.

Flavouring materials



FLAVOURS (NATURAL)	CAGR 2018 - 2020
Confectionery	6.5%
Snacks	9.5%
Soft drinks	7.2%

NOTES:

Industrial food ingredients only.
 Usage via retail and foodservice channels excluded, except where in the form of an industrially-manufactured food product.
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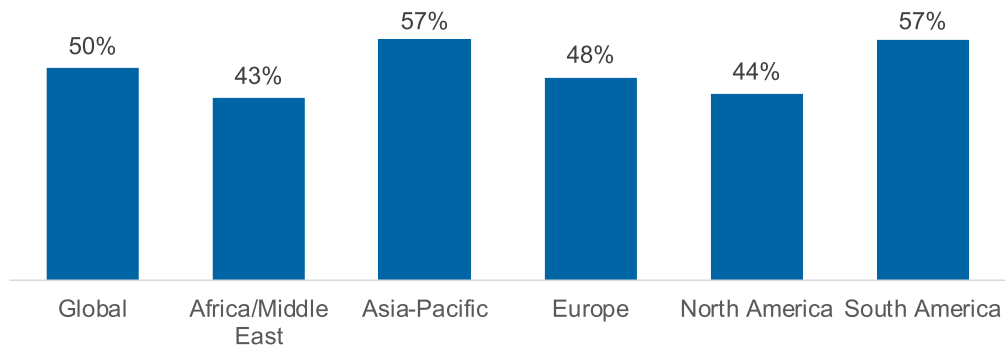
Source: Foodtrending 2020⁹

Unusual flavour and texture combinations

Research conducted by FMCG Gurus showed that consumers across the globe claim to be experimental in their flavour and texture choices. Results show that 48% of European consumers are interested in unusual flavours and 42% in unusual textures.¹⁰

I like grocery products with new and unusual flavours

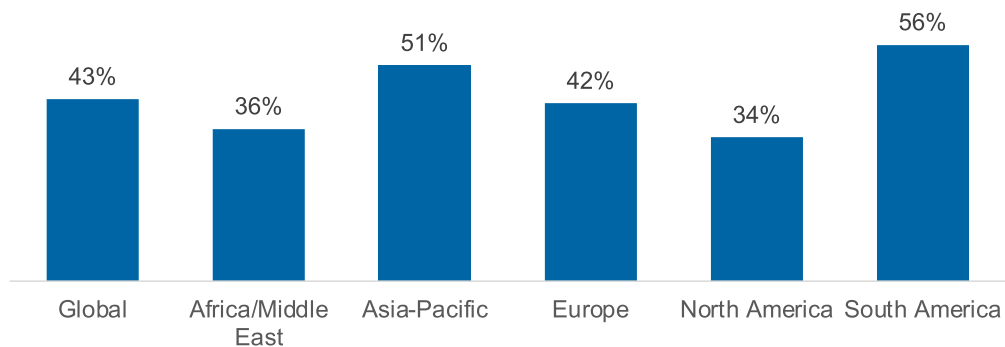
Respondents who agree or strongly agree



Source: FMCG Gurus¹⁰

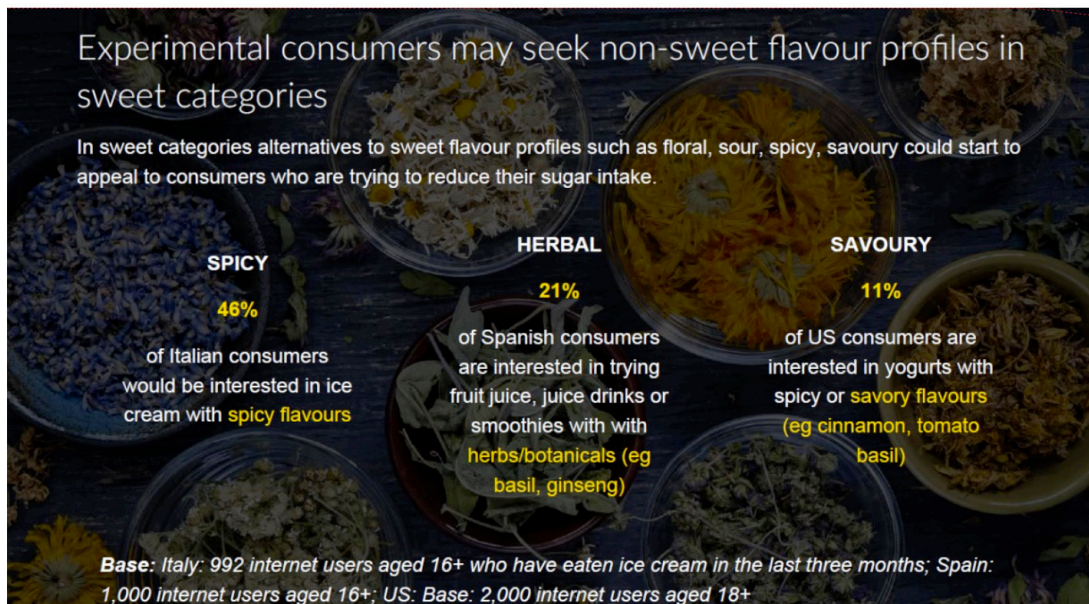
I like food and drink products with new and unusual textures

Respondents who agree or strongly agree



Source: FMCG Gurus¹⁰

As an example of this, according to Mintel, experimental consumers are increasingly looking for savoury flavours in predominantly sweet categories.



Source: Mintel GNPD¹¹

Floral flavours and herbs have come to the fore over the past five years as well, expanding beyond teas and soft drinks into other categories. Flavours like elderflower, basil, wildflowers and orange blossom were already becoming more common in beverages and are now appearing in products as diverse as cheeses, smoked salmon, beer and chocolate.



French Goat's Milk Fresh Cheese with Flowers and Herbs

Source: Mintel GNPD¹²



Gravlax Salmon with Flower Mix

Source: Mintel GNPD¹³

Hybrid concepts in beverages

For beverages, a shift away from sugary flavours gradually is redefining the soft drinks category,¹⁴ giving rise to florals, botanicals¹⁵ and even savoury flavours, especially as an increasing number of consumers has become interested in non-alcoholic drinks specifically intended for adults,¹⁶ choosing to limit their alcohol intake or avoid alcohol completely.

A recent analysis from Innova Market Insights found the fastest growing beverage categories in recent years included several from Asia that are now taking off globally. New matcha tea drinks have grown 49% a year from 2013 to 2018, for instance, while apple cider vinegar and kombucha grew by 21% a year during the same period.¹⁷

Hybrid drinks – those that combine different beverage categories – also have risen in popularity, according to Innova,¹⁸ often bringing new textural concepts to the beverage category. Perhaps unsurprisingly, Coca-Cola is a leader in the sector, with its Smoobucha drink in the United States, a combination of smoothie and kombucha, released in March 2019, and a range of more established hybrids, like Vitaminwater and Core Power, a dairy-based range of sports recovery drinks.

PepsiCo also has released various hybrid beverages, including an oat-based breakfast drink under its Quaker brand in Latin America, and Tropolis, a squeezable liquid fruit drink/snack for children in the US. Recently, both beverage giants also have released coffee/cola hybrid drinks¹⁹, and Innova has highlighted hybrid drinks as one of its top ten trends for 2020.



Source: foodbev.com²⁰

Reflecting on developments in the soft drinks market, Lu Ann Williams, Director of Innovation at Innova Market Insights, said:

“Category definitions are blurring all the time.”²¹

Balancing taste and texture in healthier food and beverages

Salt reduction

For several years, there was decline in the number of new products making reduced salt claims in Europe, according to Mintel figures,²² even as salt intakes fell in many countries across the region due to a combination of regulation and public health recommendations.²³ Manufacturers were cutting salt in their products even if they chose not to highlight the fact on product packaging. Speaking at the 2019 Fi Europe Conference, Professor Kathy Groves, a senior consultant in food microscopy at RSSL, explained that:

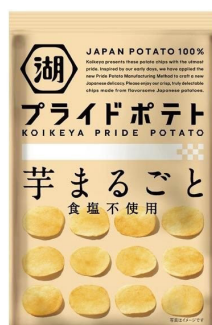
*"Lower salt is associated in the consumer's mind with lower taste, which is not so good."*²⁴

However, companies have since come up with ways to highlight the lower salt content of their products while also playing up their flavour – and low salt claims have either remained stable or gradually started to rise again over the past few years.²⁵ Professor Kathy Groves said:

*"Salt has a very distinctive taste. It's essential for your physiology, so every animal is predisposed to have a liking for salt and search it out. As well as the saltiness taste, it does enhance the taste of other ingredients when it's there, and it also acts as a bitter blocker."*²⁴

Over the past decade or so, manufacturers have been able to access a growing toolbox of ingredients to improve the taste of low-salt products. One of the most common solutions has been to switch sodium chloride for potassium chloride, but it tends to have a slightly metallic taste. Suppliers have come up with various ways to tackle this, including adding carriers like rice flour or wheat flour to help mask the flavour.²⁶

Other approaches include boosting flavour with herbs and spices, or playing up umami taste with ingredients like tomato, seaweed and mushroom extracts.



No salt potato chips

Koikeya Pride Potato No Salt Potato
Chips are low/no salt kombu seaweed
flavoured chips (Japan)

Source: Mintel GDN²⁷

"People are really trying quite hard in the industry to reduce the salt and maintain the quality to keep the consumer happy, and it isn't easy,"²⁴ Groves told delegates at the 2019 Fi Europe Conference, adding that sodium has a lot of different functions in food products beyond taste.

"It does affect the behaviour of other ingredients in the foods. It will affect texture, staleness or shelf life. Snack expansion is hugely affected by the level of salt, and viscosity in soups and sauces."²⁴

She suggested that there were three main ways in which food manufacturers tended to approach salt reduction: using alternative ingredients (like potassium chloride or taste enhancers); changing the size and shape of the salt; and understanding salt's functionality to manipulate how it works in a product. Groves said that:

"If you can understand the functionality of what salt is doing in your product then you can try and do that a different way. And I would say this, wouldn't I, but the answer to understanding that functionality is to use science."²⁴

In bread, for example, she suggested manufacturers could use a layered dough with salt-containing and no-salt areas to make a product that consumers find difficult to distinguish from a full-salt variety. However, bread and other baked goods are particularly challenging from a textural perspective, as salt affects yeast function, gluten development and helps prevent staling.²⁸ Groves added:

"There is no one clear replacement ingredient and choosing them is difficult and time consuming. (...) Restructuring does offer the potential to reduce the level of salt and keep the quality of the product."²⁴

This approach applies to a whole range of foods. Water in oil in water (WOW) emulsions, for instance, were developed to reduce fat in mayonnaises and sauces, but Groves suggested they could be used to compartmentalise salt, too.



Groves said:

"If you put the salt only in the continuous final water phase and not in the water that's inside the oil droplets, you get both the taste of salt in the sauce or soup without the level of salt that you would have in a normal product. You have to think smart...My plea is, understand what the ingredients are doing in that product, but also in the process to make that product." ²⁴

She said this offers the key to effective salt reduction that also maintains a clean label and good quality in terms of both taste and texture.

Sugar reduction

The market for lower sugar foods and drinks is rising strongly, with low sugar claims up 17% since 2014, according to Innova Market Insights.²⁹ In Europe, 9% of all newly launched foods and drinks carried a sugar-related claim in 2018, such as low sugar, reduced sugar or sugar free, up from 6% in 2014.³⁰



Source: Mintel GNPD³¹

Many manufacturers are using traditional sweeteners to cut sugar, and sucralose has seen a particular surge in interest, now used in 19% of new foods and drinks with a sugar-related claim. According to Innova soft drinks are still the biggest category for such claims, but others are growing fast, in sports nutrition and dairy in particular.³²

New sports nutrition products with a sugar-related claim were up 56% from 2014 to 2018, while those in the dairy category were up 32% in the same period.³³ Other fast-growing categories include sauces and seasonings, snacks, and desserts and ice cream.

However, sugar reduction often poses challenges that go well beyond sweetness alone. Among its many functions, sugar contributes to the structure and browning of cakes and other baked goods, aroma, caramelisation, and other textural elements in a range of products from breakfast cereals to chocolate, including crispness, stickiness, and how fat is distributed.³⁴ Sweeteners used to replace sugar vary in their relative sweetness, but they also differ in how quickly or slowly sweetness is released, which can have a major effect on flavour.³⁵

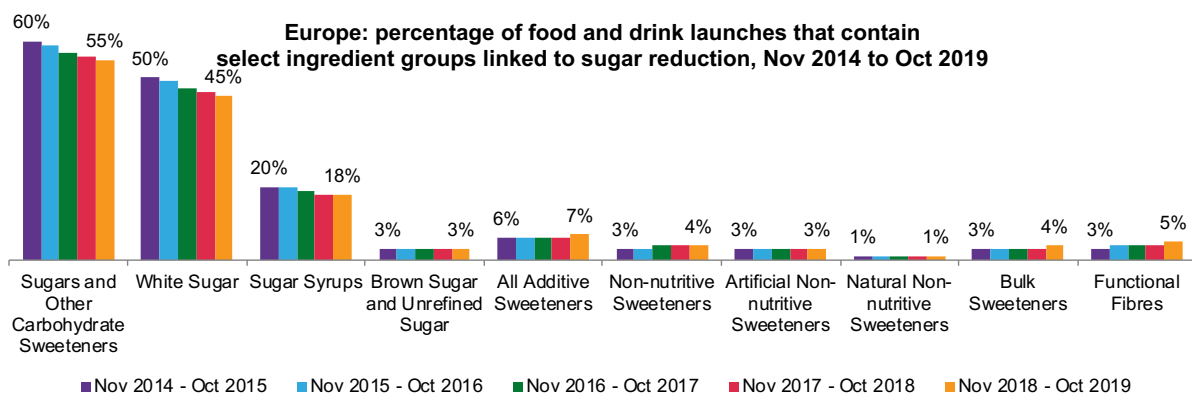
New technologies aim to address these challenges, such as Nestlé's hollow sugar crystals, which dissolve on the tongue more quickly than ordinary sugar, allowing the same perception of sweetness with less sugar by volume.³⁶ Its Milkybar Wowsomes chocolate brand is made with the technology, and has 30% less sugar than comparable bars.³⁷

The textural challenges linked to industry efforts to cut sugar have given hydrocolloid suppliers a particular boost, and there has been a 27% annual increase in the number of foods and beverages launched globally with hydrocolloids and a no added sugar claim.³⁸

Fibres and starches are other options to help with texture in reduced sugar products. They not only can help in bringing sweet flavour to the product but foremost help in stabilising texture. Chicory root works both as sweetener but also bulking agent. Another example is acacia gum having a wide range of texturizing properties as well as stabilizing effects by reducing water activity.³⁹

In Europe sugar is declining while sweeteners and fibres grow

Example: in the 12 months ending Oct 2019 5% of European food and drink launches contained a functional fibre, up from 3% in the 12 months ending Oct 2015.



Source: Fi Europe Conference 2019, Presentation by Emma Schofield, Mintel ⁴⁰

In treat and indulgence categories, sugar reduction is no longer limited to diet or smaller, niche brands



Contains chicory fibre
Mr. Kipling Angel Slices
with 30% less sugar

Includes a higher percentage of wheat flour and vegetable oils than the original variant, and also includes chicory fibre. UK



Contains soluble maize fibre
Cadbury Dairy Milk Reduced Sugar Milk Chocolate

Contains soluble maize fibre, features a 'no artificial sweeteners' claim. UK

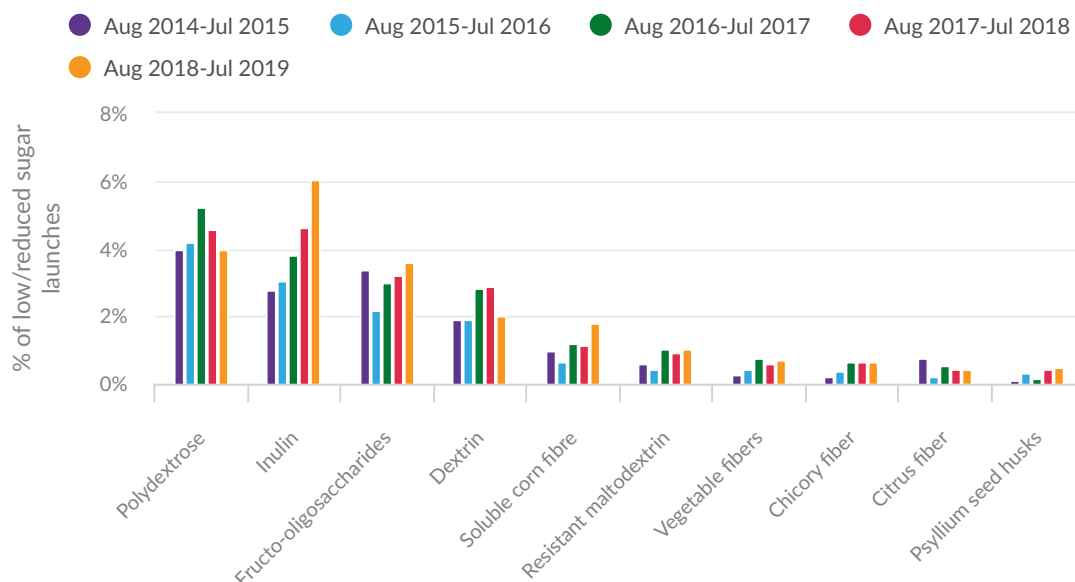


Contains dextrin maize fibre Rowntrees Fruit Pastilles with 30% less sugar

Free from artificial sweeteners, colours, preservatives and flavours. UK

Source: FI Europe Conference 2019, Presentation by Emma Schofield, Mintel⁴⁰

Global: functional fiber ingredients used in low/reduced sugar food/drink launches, by year, Aug 2014-Jul 2019



Source: Mintel GNPD⁴¹

What is clear is that sugar reduction remains a top goal for food manufacturers and consumers alike⁴² – and there is still no one-size-fits-all solution to retaining both taste and texture.

Fat reduction

Cutting fat in foods has taken a back seat to sugar over the past few years, as fat's image has shifted away from being nearly universally 'bad'.⁴³ Consumers increasingly are aware of the importance of 'good fats' in their diets, particularly mono- and poly-unsaturated fats for cardiovascular health, and omega-3s for heart and brain health, among other potential benefits.⁴⁴

However, there are still foods that are preferred when they are lower in fat, notably in the dairy sector, even as full-fat versions have seen a resurgence.⁴⁵ After all, fat is still a high calorie macronutrient – with nine calories per gram compared to four calories per gram for carbohydrates and protein – and with high obesity rates, many consumers are looking for ways to reduce their caloric intake.⁴⁶



Source: Mintel GNPD⁴⁹

In ice cream and desserts, a new wave of creamy low-fat brands has come to the fore, with Halo Top doing particularly well, becoming the top selling ice cream brand in US grocery stores in 2017, surpassing previous favourites like Ben & Jerry's and Häagen-Dazs.⁴⁷ It uses skim milk powder and less cream than many other brands – as well as milk protein concentrate, carob gum and guar gum – to reduce the fat content from about 7 grams in standard ice cream to about 2 grams.⁴⁸

The textural problems that come with products that are low in trans- or saturated fats – whether dairy, bakery, confectionery, snacks, or meat and meat substitutes – sometimes are not a problem if the least healthy fats are replaced with healthier mono- or polyunsaturated ones. Plenty of new products are calling out such fats on the front of packaging, including avocado, olive and sunflower oils, for example.⁵⁰ However, in order to produce truly low-fat products, other options include diluting the fat by whipping air or water into the fat matrix,⁵¹ or using hydrocolloids, starches and fibres to provide something of the mouth-coating texture of fats and oils.

Dr Mark Auty, Research Principal, Food Microstructure, RSSL is a researcher who advocates examining how the microstructure of foods affects the texture and flavour of foods. He suggests that by changing the conditions in dairy foods like cheese or yoghurt, it may be possible to reduce fat content without affecting the taste and texture.⁵²

Dr Mark Auty told delegates at the 2019 Fi Europe Conference:

*"By simply changing the pH of a material you can control the way that fat is released, so you might be able to reduce the amount of fat, but as long as it is hitting the mouth in the same way, you will still have that flavour, because a lot of the flavour compounds will be in the fat phase. To a certain degree you can control that."*⁵²

Taste and texture in meat alternatives

For manufacturers of meat alternatives, sourcing suitable plant-based ingredients is just the first step. Texture has been a particular hurdle for those looking to make meat-like products, but advances in processing and extrusion technology have led to plant-based substitutes with a similar fibrous texture to chicken.

While it may be possible to produce a desired texture with just one plant protein, blending proteins together could optimise the textural profile.⁵³ This has been Impossible Foods' approach, for example, which uses a blend of proteins from soy and potato, along with hydrocolloids for a more meaty texture.⁵⁴ Dr Mark Auty, Research Principal, Food Microstructure, RSSL said:

*"In meat alternatives, we are trying to mimic the taste and the texture of meat. (...) There is more than one way of creating the same perceived texture, but it is more about understanding better how your product is made, particularly the distribution and interplay between different ingredients."*⁵⁵

Understanding the microstructure of meat could still be used as a starting point to inform development of more meat-like textures. Dr Auty added:

*"In meat, connective tissue and fat are important for chewiness, controlled flavour release and a moist mouthfeel. While there is more than one way to make a burger, microstructure can tell you a lot. To see how well-dispersed your ingredients are, their particle size and shape, there's no better way than looking at them under the microscope."*⁵⁵

Until recently the meat alternative category has been dominated by soy, pea, and mycoprotein Quorn. Now, though, there is demand for more diverse plant-based sources with a high protein content and full amino acid profile. Established companies and start-ups are investigating the likes of fava beans⁵⁶, micro algae⁵⁷, Laetiporous mushrooms⁵⁸, sugar beet foliage⁵⁹, and Mankai duckweed⁶⁰, to name but a few. A Swedish start-up called Mycorena is also preparing to launch a new fungus-based mycoprotein, one of the first challengers to Quorn in Europe.⁶¹

Another struggle related to taste is masking the off-notes in taste that can occur with plant-based proteins. This can be a long and frustrating process, as the addition of a new ingredient can mask one off-note but exacerbate another. NIZO Food Research has found, for example, enzymes that can degrade hexanol, one of the key compounds responsible for undesirable flavour and aroma in soy and pea proteins.⁶²



Source: Mintel GNPD⁶⁴

Among the best known meat alternative brands to hit the market so far are the Impossible Burger and the Beyond Burger. Both replicate beef. UK company THIS recently secured £4.7 million in seed funding to scale up production of its bacon and chicken analogues —mainly from pea and soy protein.⁶³

Key takeaways

- Natural flavours have become increasingly important to European consumers
- Taste preferences are moving away from sweetness in both foods and beverages, toward savoury, spicy and more complex flavours
- Restructuring products and ingredients can help address both taste and textural issues in foods with reduced salt
- Texture and mouthfeel are crucial for consumer acceptance in reduced sugar products, but often are side-lined in the quest for comparable sweetness
- Changing pH or ingredient distribution could help improve texture in reduced fat products
- Understanding the exact function of salt, sugar or fat in a food or beverage is likely to give clues to the best possible replacement solutions
- Delivering taste and texture has been a particular hurdle for meat-like products

The information provided here was compiled with due care and up to date to the best of our knowledge on publication.



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