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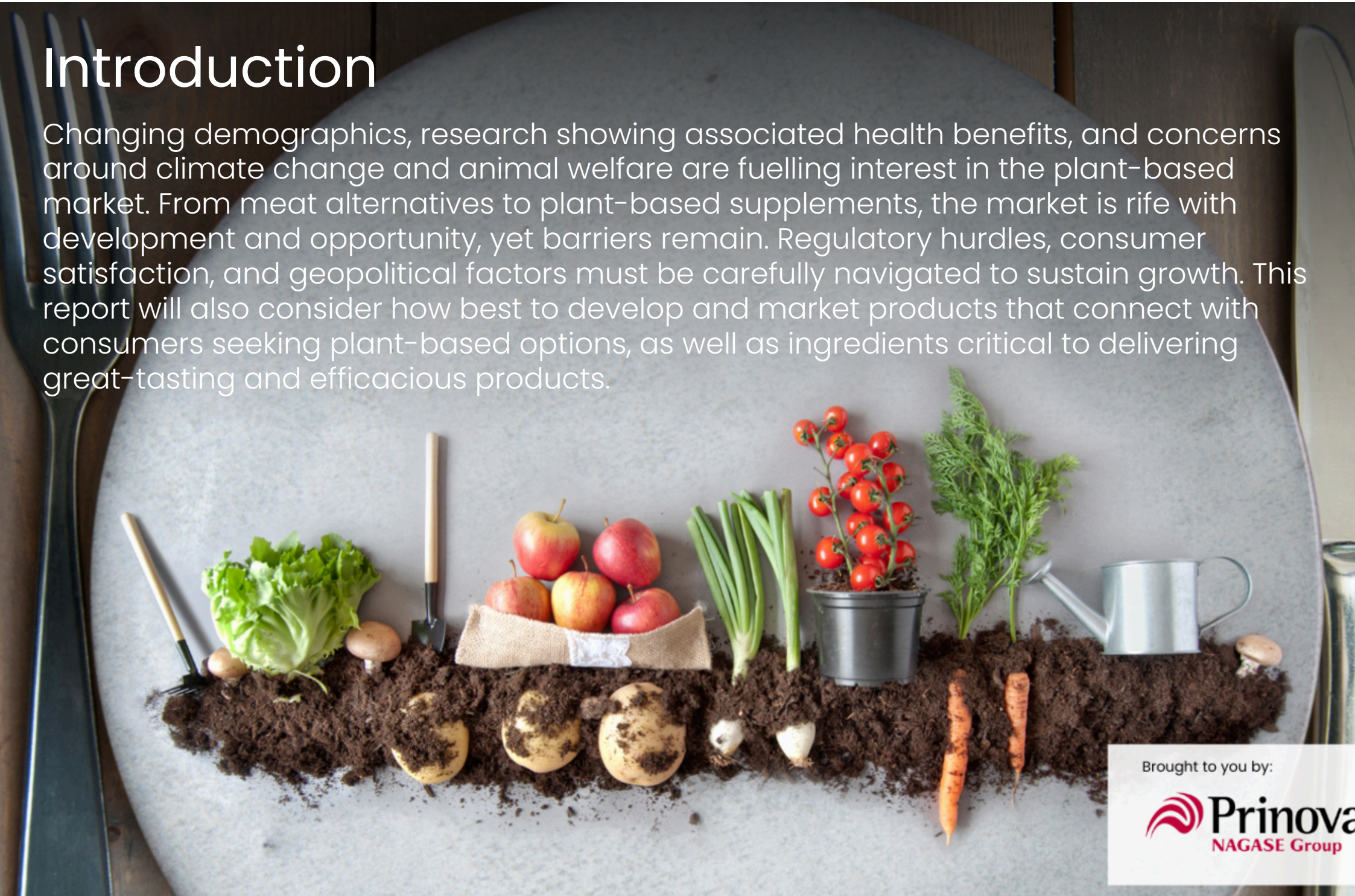
Plant-based nutrition in 2022

Introduction

Changing demographics, research showing associated health benefits, and concerns around climate change and animal welfare are fuelling interest in the plant-based market. From meat alternatives to plant-based supplements, the market is rife with development and opportunity, yet barriers remain. Regulatory hurdles, consumer satisfaction, and geopolitical factors must be carefully navigated to sustain growth. This report will also consider how best to develop and market products that connect with consumers seeking plant-based options, as well as ingredients critical to delivering great-tasting and efficacious products.



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Market overview, consumer demographics, and growth

In 2021, Bloomberg Intelligence predicted that the global plant-based foods market could be valued at more than $162 billion in 2030, an increase of $132.6bn from 2020.

Meanwhile, Mintel – a global market research firm – has shown that UK-specific sales of meat-free products have experienced extraordinary growth, rising from £582 million in 2014 to £816m in 2019 (40%). By 2024, the UK market is expected to reach £1.1bn.

In Europe, EU-funded project Smart Protein analysed retail data from 11 countries and found a 49% increase in sales revenue from 2018-2020, amounting to €3.6bn, with Germany accounting for the largest share.

A survey by FMCG Gurus detailing a broad consensus of consumers turning to dairy alternatives found that 52%, 57%, and 50% of consumers in the APAC, South American, and Middle East and African markets, respectively, said they are turning towards them. Interestingly, only 34% of European consumers said so.

Consumer interest

While the number of vegetarians and vegans is relatively small, Euromonitor notes that "flexitarian" consumers have been driving growth, with those actively trying to reduce meat intake globally at 23%, with climate change, sustainability, and health being primary drivers.

In the UK, a study conducted by the London School of Hygiene and Tropical Medicine with the University of Oxford concluded that the proportion of people eating and drinking plant-based alternatives nearly doubled between 2008-2011 and 2017-2019.

More than 15,000 people were analysed using consumption data from the National Diet and Nutrition Survey, with generation Y (11- to 23-year-olds) and millennials (25- to 40-year-olds) accounting for most growth. Interestingly, women were 46% more likely to report plant-based eating habits.

Despite a clear bias towards younger generations, studies have shown an opportunity for consumption among older demographics. For example, older consumers' readiness to accept alternative proteins was highest when it came to plant-based products compared to options such as cultured meat, with green eating behaviour and higher educational attainment as facilitators.

> “It is crucial [that brands] understand which consumer segment [to address]
>
> Aurore de Monclin, managing partner at the Healthy Marketing Team

Should brands looking to target older consumers focus on overall green eating habits and education? Susan Gafsen, founder and CEO of Pep & Lekker, a high-fibre baked snack company, thinks so, citing educational aspects.

She notes a correlation between education and plant-based diets, with consumers from more traditional areas – including rural regions with elderly consumers – not opting for plant-based foods, even if the price is right.

That said, couples in their forties and fifties – perhaps because they were “young” when plant-based nutrition started to gain traction – are interested and looking to improve health and welfare, despite this general reluctance, she says.

Rachel Yarcony, founder and CEOof myAir, a personalised nutrition startup that tailors plant-based products to consumer profiles, agrees, citing consumers “across the board” as potential customers.

Additionally, Yarcony highlights that plant-based products and alternatives are often expensive, creating a burden for low-income families and those

in developing countries, something Gafsen says is heightened by the cost-of-living crisis. Again, education is key.

And while processed, convenient meat replacements may be more expensive, researchers at the University of Oxford revealed that in countries such as the US, UK, Australia, and western Europe, more plant-based diets are cheaper (using food prices from the World Bank's International Comparison Program and not taking into account processed meat replacements).

Aurore de Monclin, managing partner at the Healthy Marketing Team, a food marketing and product development consultancy, says not all consumers are the same, and "it is crucial [that brands] understand which consumer segment [to address]". For example, a large portion will be driven by "climate anxiety", health, or animal welfare. Brands need to realise that consumers want to know how they are contributing to a cause, ensuring they feel positive about their choice.

She says on one hand, there is the activist market driven by ethical beliefs, prepared to compromise on taste and texture, and on the other, those who expect alternative products to be just as good as their meat-derived counterparts, being primarily driven by health.

Moreover, the pandemic has heightened concerns around food safety and health, adding to de Monclin's second category of consumers.

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Ingredients, taste, texture, and research

While common plant-based ingredients are well established, an abundance of other ingredients hold untapped potential.

For example, de Monclin says there has been a rise in locally grown ingredients – specifically fava beans, lupin, and chickpeas – but that there is also interest in novel nuts and pulses such as Bambara groundnuts, a nutrient-dense leguminous crop, which can be seen in milk alternatives like BamNut in Singapore.

Likewise, Gafsen notes that chicory root fibre has been a key ingredient for natural cereals and snacks, providing sweetness and fibre.

A common theme among contributors, according to Carole Bingley, technical specialist at Reading Scientific Services Ltd (RSSL), a British food science consultancy, is that many plant-based products have been criticised for long ingredient lists or for being "ultra-processed", resulting in the development of products with fewer, more recognisable ingredients.

Dr Kirsten Brandt, a senior lecturer at the Human Nutrition Research Centre, based at Newcastle University, warns that the present "ultra-processed" definitions are unclear and inconsistent, not based on science, and not ready for use in marketing.

Regarding taste and texture, Bingley notes algal developments as promising, with nutritional, functional, and sustainable potential.

Specifically, white algal flour has made waves, enabling algae to be used across a broad range of products. Additionally, several companies are beginning to

focus on fats and oils through fermentation, which has enabled a shift away from those such as palm and coconut oils while claiming to result in a more similar melt- and mouthfeel to animal fats through a sustainable platform.

Likewise, companies are pioneering new technologies to aid the development of taste and texture.

For example, Motif FoodWorks has worked with the University of Guelph to develop a plant-based cheese that stretches and melts using prolamin technology – which uses corn protein, high in proline amino acids – to enable cheese-like qualities.

Similarly, Motif FoodWorks is developing plant-based alternatives with marbleised, healthier fats through extrudable fat technology, which mimics animal fat in plant-based meats, allowing a more similar texture.

Julie Impérato, marketing manager at Nexira, further highlights natural hydrocolloids – such as pectin, locust bean gum and carrageenan – selected for their unique texturising, stabilising, and emulsifying properties as ingredients with high potential for texturising foods.

Thinking holistically, Yarcony and Impérato are also proponents of botanicals and adaptogens, noting that they are instrumental to market success for many products across all major segments of the market.

Importantly, they can give “sensory-appealing characteristics and natural transparency in terms of product labelling”.

Yarcony specifically highlights the high demand for myAir’s adaptogen-infused bars, which include ingredients like sage, hops, and valerian.

These work synergistically to exert specific stress-countering effects such as sharpening focus, reducing anxiety, or supporting relaxation.

Research advancements

Brandt also highlights some early-stage research: the anti-cancer properties of carrots and other related foods, largely due to their polyacetylene content. Noting some yet-to-be released research, she says a systematic review shows that carrot consumption is still consistently associated with reduced cancer incidence in prospective studies, despite the harmful effect of high intakes of carotenoids such as beta-carotene.

Brandt states three distinct consequences for the industry. Firstly, there will be opportunities to develop new products with stronger evidence for its desired claim over most other foods and supplements.

Secondly, opportunities to challenge principles of current health claims will arise, particularly the distinction between health claims and medical claims which may have ramifications for other products.

> “It will pull away the last remaining rug [from] under the concept of beta-carotene and similar antioxidants as being responsible for the health benefits of fruit and vegetables
>
> Dr Kirsten Brandt, senior lecturer at Newcastle University

And lastly, she adds, “it will pull away the last remaining rug [from] under the concept of beta-carotene and similar antioxidants as being responsible for the health benefits of fruit and vegetables, having a negative effect on the corresponding industry”.

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The impact of climate change

According to a 2021 study, the food system accounts for 34% of global greenhouse gas emissions, with double coming from animal-based foods. And, as Gafsen says, the single most impactful change an individual can make is to reduce meat consumption.

That said, climate change still has two primary ramifications for the plant-based sector.

On one hand, the industry is concerned with its prevention, a factor many consumers consider. And on the other, it also constrains the industry through its impact on production and increased unpredictability.

The two are interlinked, with the former impacting the latter

significantly. According to research going as far back as 2007, roughly 30% of yearly fluctuations in tonnes of crops grown per hectare were caused by climate change.

Consequently, yield growth for maize, wheat, and other crops have been in decline due to severe weather, droughts, and extreme heat.

The UN Foundation reported that, in absence of effective adaptation, global yields could decline by up to 30% by 2050, having severe implications for regions around the world.

Moreover, along with those in rich countries experiencing food issues, price inflation, and potential supply chain issues, those in countries already engulfed in conflict, pollution, deforestation, and famine are likely to suffer most.

Do supplement shoppers care about carbon certification?

This has implications for the plant-based industry, despite its good intentions of mitigating against it.

Firstly, rising temperatures will have a profound impact on production reliability, as noted by the Intergovernmental Panel on Climate Change, meaning companies may experience sporadic periods of low profits due to less-than-optimal temperatures for growing crops.

Secondly, increased rainfall can result in land degradation, making soil less productive and nutrient-dense.

And lastly, rising sea levels can result in saltwater intrusions and flooding, which can be extremely damaging to crops.

To assess the relative impact on production capabilities, researchers at NASA Ames Research Center and Northeastern University assessed the weather impact on crop yield using maize as an example, giving an indication of potential effects on other crops, such as legumes and botanicals.

The results showed a high degree of susceptibility of crop yield to extreme weather, and that information contained in extreme weather indices – such as heat wave index, longest dry and wet spell, and summer days – were found to be equal to, or greater than, those

contained in the mean weather indices, a relative measure of weather conditions.

Thus, making an argument for their inclusion as predictors in crop yield monitoring due the significant impacts of extreme weather on production.

So, achieving carbon-neutral production strategies should be a key concern for not just industries with larger footprints – such animal-derived food production – but all producers.

Naturally, plant-based food and supplement producers have a head start, with lower footprints due to the nature of their products. But still, producing food in and of itself is usually carbon-intensive and brands should continue looking for innovative ways to make products more sustainable while promoting plant-based diets to capture new consumers.

For example, Gafsen highlights achieving BCorp certification as one way to become more sustainable. This provides an accountability mechanism for brands whereby a stringent process is taken to measure companies' social and environmental impacts.

Additionally, considering net-zero goals and international treaties such as the Paris Agreement, states are now considering legislation which calls for government-sanctioned projects to support decarbonisation, placing potential legal burdens on companies.

New study exposes the UK's current and future micronutrient insecurity

Regulatory and legal considerations

In the European Union (EU), the European Food Safety Authority's (EFSA) novel foods process remains largely the same. However, with the advent of Brexit, the UK – having initially retained EU law – has indicated a potential shift in the novel foods regime in a recent policy paper.

Notably, the report indicates that the UK wants to review "novel foods regulation to support innovation" to create a transparent and effective system for – mainly – the sustainable protein sector.

Whether this includes fully plant-based ingredients other than cultured meat remains unclear. However, one would think that making the EFSA's application process less arduous would be a priority

for all ingredients involved in the process.

Additionally, when asked about other regulatory considerations in the UK, Gafsen highlights that the new HFSS (high in fat, salt, or sugar) nutrient profiling guidelines, designed to prevent the promotion of products high in sugar, fat, and salt, were drafted before the increased interest in plant-based products. Consequently, this means they do not recognise the nutritional value of products such as seeds.

As such, some healthy plant-based products will remain expensive to consumers – which is somewhat contradictory to the nature of the proposed legislation in the first place. Regulators should consider this, taking into account different types of fat, sugar, and salt, recognising that some are far more harmful than others.

Meanwhile, in the EU, a prospective law restricting the use of dairy-like terminology and other marketing terms was scrapped in 2021, largely due to significant opposition from consumers and suppliers.

Under the proposed legislation, an abundance of potential

names would have been prohibited, limiting the effectiveness of marketing strategies for plant-based products.

However, despite this small win, the proposed legislation follows a trend against plant-based companies and legislation restricting the use of marketing terms, going against the sustainability policies the EU has adopted, such as the Farm to Fork Strategy.

For example, in 2017, the European Court of Justice in Case C-422/16 against TofuTown, concerning Regulation No 1308/2013, cemented that terms such as “milk” and “yogurt” cannot be used on plant-based alternatives. Similarly, France recently announced a ban on the use of terms traditionally used to describe meat products, like “sausage” or “steak”, with the justification being to “avoid confusion”.

Interestingly, France is considered one of the largest producers of meat in the EU, indicating that policymakers are likely to face pressure from meat lobbyists worried about the decline of animal product sales, a trend seen across the globe.

Fortunately for French plant-based companies, by way of judicial intervention, the Conseil d’Etat – France’s highest administrative court – ordered a reprieve at the request of Protéines France, citing not enough time to make appropriate changes in the plant-based sector.

Outside the EU, Turkey has gone further and banned vegan dairy products that give the impression of cheese (Article 9/3 of the Turkish Food Codex Regulation), effectively banning the production of vegan cheese.

However, the decision has been challenged as unconstitutional by the Vegan Association of Turkey, which is claiming in a current lawsuit that the ruling violates freedom of choice and consumer rights.

Feeding a growing global population with alternative proteins

Geopolitical barriers: The war in Ukraine

Geopolitics can impact the nutrition industry in several different ways. Through conflict, trade wars, vested interests, and domestic politics, price inflation, limited crop supply, trade tariffs increases, and food insecurity can occur instantaneously, leaving brands unequipped to deal with the consequences.

And while much of the geopolitical landscape appears all too distant from the plant-based sector, the war in Ukraine has amplified the need for geopolitical monitoring to mitigate the harsh realities of such events. Not only does the war have catastrophic effects for those directly involved, but many businesses and individuals around the world too, including the plant-based sector.

For example, the war has majorly disrupted supply chains: 14% of global corn exports, 15% of barley exports, 14% of rapeseed exports, and 51% of sunflower-based vegetable exports come out of Ukraine. This means brands are lacking fundamental ingredients for products, forcing them to slow production or substitute ingredients at a higher cost.

De Monclin says that the current geopolitical environment and probable recessionary period will have extremely negative effects, primarily due to costs going up, rather than down, in a sector already plagued by a "high-cost" stigma.

Likewise, Gafsen says it has negatively impacted Pep & Lekker, forcing it to swap rice flour for chickpea flour due to issues with flour supply chains generally. And even then, chickpea flour is also experiencing heavy delays.

Consequently, this has a knock-on effect for manufacturers, placing pressure on other departments such as labelling which are then required to change ingredient lists and nutritional values.

To contextualise, ProVeg International recently published a survey stating that 61% of respondents were experiencing a shortage of ingredients along with higher prices for those they can access. Further, 69% said it was also harder to recruit skilled workers, impacting capacity and increasing delays.

The war in Ukraine has highlighted our dependency on global supply chains. Accordingly, brands should monitor global events more closely while increasing visibility within supply chains – particularly those more complex – and consistently evaluate areas of sensitivity to prepare for worst-case scenarios. Increasing supply of local resources may also benefit companies in terms of both stability and sustainability.

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Industry Experts - Q&A

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Prinova NAGASE Group

Q&A

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1How would you define the term 'plant-based nutrition' as it relates specifically to the nutraceutical market, and how do you serve this category?

Unlike vegan diets, plant-based diets do not necessarily eliminate all animal products but rather focus on consuming primarily plant-derived products. While non-vegans will find 100% plant-based products appealing, they will also be attracted to plant-based ingredients on the label of non-vegan foods, which create a health halo around the products. Prinova offers a wealth of knowledge and experience in the plant-based sector. We can provide vegan friendly versions of many of our ingredients, including amino acids, proteins, and hydrocolloids, in addition to our specialist premixes.

2 What unique plant-based ingredient(s) do you offer, and can you speak to the traceability and sustainability story behind them?

Prinova offers a selection of plant-based branded ingredients that can help food and beverage brands stay ahead of consumer trends. A good example is Aquamin™, a range of marine products rich in highly bioactive minerals such as calcium, magnesium, and 72 other trace elements. Aquamin™ is derived from algae which are harvested in the North Atlantic under an extensive sustainability program supported by the Icelandic Marine Institute. Backed by 15 years of research and over 40 scientific publications, the 100% natural, plant-based and clean Aquamin™ range is suitable for many food and supplement applications.

3 How do you define your company's point of differentiation and advantages in the market?

Prinova is one of the world's largest distributors of functional ingredients and a supplier of integrated solutions such as custom nutrient premixes. We offer a broad portfolio of over 2,000 ingredients and have market-leading positions in key categories. Prinova's inventory of amino acids, vitamins, sweeteners, and plant-based proteins is the largest one in the world. Sourcing expertise is the cornerstone of our business. We have established trusted ingredient supply chains over decades that allow us to ensure quality, accountability, and reliability. Our global reach

and strong relationships with local markets give us real-time insights on the availability of ingredients and market trends.

4 What questions should product formulators and ingredient buyers ask when sourcing plant-based ingredients to ensure they are getting quality, efficacious offerings?

When it comes to plant-based ingredients, quality and safety are essential. Traceability must be exemplary, and regulatory documents available. As plant-based products are subject to seasonality and weather, buyers should be advised on the best time to purchase and stock up. At Prinova, we rigorously check, validate, and monitor all our ingredients and suppliers. We are fully committed to transparency. Our global reach and strong relationships with suppliers give us real-time information on ingredient availability, market trends, and regulatory requirements. If formulators need support to overcome taste and texture challenges, our experts finetune the formulation until the desired sensory response is achieved. As a single partner offering ingredients, development services, and market expertise, Prinova adds value at every stage of a product's life cycle, from concept to completion.

Yes! Plant-based functional drinks can unlock category value, here's how.

The plant-based trend has been enjoying spectacular momentum in recent years. Concerns about animal welfare and the environment, as well as the COVID-19 pandemic, have fuelled huge demand for plant-based foods and beverages, leading to...

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Plant-based Nutrition - Panel Discussion

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Biographies

Our expert contributors

Aurore de Monclin, managing partner, the Healthy Marketing Team

With over 15 years of experience in healthy marketing and having worked in more than 20 countries, from the US to Kazakhstan, Aurore brings a global perspective and expertise, enabling brands to better understand customers' health needs to develop better, targeted brands, quickly to market. Furthermore, having led brand positioning and innovation projects for medical nutrition, food, beverage, and ingredient clients, she has cross-sectoral expertise, aiding her clients' understanding of the market.

She developed a passion for nutrition, health, and wellness as an innovation manager at Nestlé, working on strategic initiatives to deliver the company's Health and Wellness Ambition for the UK market. Aurore holds a masters degree in food science management and marketing from the leading global food institute Agro Paristech.

Susan Gafsen, founder, Pep & Lekker

Susan, a former lawyer, set up Pep & Lekker when struggling to find nutritious food for her vegan son. Pep & Lekker's baked seed snacks are made using 14 all-natural, allergy-free kitchen cupboard ingredients and are low in sugar, high in fibre, a source of protein, vegan, and gluten free. Mindful of sustainability, there is no palm oil, and the snacks are sold in recyclable packaging.

Carole Bingley, technical specialist, Reading Scientific Services Ltd

Carole is a technical specialist working in the product and ingredient innovation team at Reading Scientific Services Ltd (RSSL). During her time with RSSL, she has undertaken both ingredient evaluation and product development projects for food manufacturers and ingredient suppliers across a wide range of food categories. Recent projects include development of dairy alternatives, vegan meat and fish alternatives based on plant proteins, and a range of vegetable-based sauces, dips, and cheese alternatives. Carole has also worked extensively on sugar reduction, evaluating both high-potency sweeteners and bulking agents in beverages, confectionery, and baked goods.

Julie Impérato, marketing manager, Nexira

Post food science and marketing studies, Julie worked for FMCG companies for several years, joining Nexira in 2016. Julie has been working in the food industry for almost 20 years. She is passionate about food, from farm to fork, and about nutrition.

Dr Kirsten Brandt, senior lecturer, Human Nutrition Research Centre, Newcastle University

Kirsten originally trained in plant biochemistry and her research focuses on links between agricultural methods, plant chemistry, food quality, and health of humans and animals. In particular, she is interested in the multidisciplinary aspects, where information from one subject area can be used to improve the understanding of processes and mechanisms in another area.

Presently an important part of her work is to co-ordinate efforts to increase the impact and application of food and nutrition science at Newcastle University, linking a range of research groups with specialised expertise in food-related areas, such as human nutrition, consumer science, and agronomy. The objectives are to enhance the impact and exploitation of the research and training activities in industry and society, and to facilitate the creation and success of multidisciplinary research projects.

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