

Innovating with ingredients

The plant-based sector is a hotbed for innovation, and the pursuit of great-tasting, nutritious and clean label products has led manufacturers to seek out a variety of innovative ingredient sources to meet these growing demands. The Plant Base investigates.

While products such as meat and dairy alternatives are surging in popularity, many consumers have expressed concerns about the taste and texture of early products in this space.

This challenge was highlighted by Mary Lauerman, marketing manager at UK ingredients supplier Andina Ingham, which distributes a wide range of plant-based ingredients: "It's certainly true that today's flexitarian consumers will not compromise on taste and texture – there's no chance of a repeat purchase if the plant-based eating experience is not pretty much identical to the "real thing".

"Whilst this may be a given as far as the consumer is concerned – it's by no means straightforward for the manufacturer. Mimicking the texture and functionality of a meat product or a dairy product is difficult!"

Andina Ingham works closely with plant-based ingredients producer Planteneers, a division of German ingredients firm Hydrosol. Dorotea Pein, head of product management at Planteneers, highlighted that the number of protein sources being utilised by manufacturers is increasing as producers seek out new solutions that help them to address the taste and texture challenge.

"There has been a significant increase in new protein varieties from different sources. Soy protein in many formats has been the standard plant protein in the past and now we are talking about pea, sunflower, almond, oat, different beans and potatoes as protein sources.

"These sources stand only for around 2% of the possible plant sources. The other side of the coin is that we have new side streams that must be used in some way. If you extract the protein, other components of the plant – such as fibres, carbohydrates and so on – must be used otherwise it is not sustainable and also not worthwhile in the long term. There is more progress to be made and with all our knowledge and creativity – more ingredients to discover."

As hinted by Pein, we have only seen the tip of the iceberg with respect to ingredients utilised by companies in the plant-based sector. But several innovative ingredient solutions are beginning to grab the attention of both manufacturers and brands.



Fermented ingredients

In 2020, The Good Food Institute claimed that fermentation was 'the future of the alternative protein industry', and the rise of fermented ingredients is clearly having a major impact on the plant-based space.

A number of companies including Perfect Day, Legindairy, Solar Foods and Mycotechnology (to name but a few) are using fermentation to manufacture a variety of functional proteins for plant-based applications. These companies have produced viable dairy proteins by 'feeding' fungi with plant-based material in bioreactors.

Perfect Day's proteins, for example, have been used to produce vegan ice cream, milk, cheese and butter alternatives, offering a high-quality alternative to traditional dairy products without the involvement of animals. It will be interesting to see



Ryan Pandya and Perumal Gandhi, co-founders of Perfect Day



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whether fermented proteins offer a blueprint for high-quality plant-based products moving forward.

Hemp

An often misunderstood ingredient, hemp is derived from a strain of the Cannabis Sativa Plant which, in the past, was grown predominantly for use in industrial applications. However, hemp seeds can be used to produce a large array of edible products, from hemp-based protein powder to cheese and milk alternatives.

According to the United States Department of Agriculture, 30g of hemp seeds contain approximately 9.46g of protein – a similar protein content to soybeans. Notably, hemp seeds yield all ten necessary amino acids, are easily digestible and are high in fibre.

Examples of hemp products released by brands in the recent past include Once Again's Sunflower Hemp Butter, Elmhurst 1925's hemp creamer range and Good Hemp's Chilled Milk.

Microalgae

Interest in microalgae as a sustainable protein source has increased substantially in recent times, with food industry giants Nestlé and Unilever partnering with algae specialists such as Algenlity to explore the viability of microalgae in a variety of applications.

Microalgae is a vegan source of protein, healthy lipids and various micronutrients. It is said that the production of microalgae has a low carbon, land and water footprint, making it both a nutritious and environmentally friendly plant-based protein source.

The ingredient can reportedly be used in a variety of plant-based applications, as seen by French biotechnology company Algama who utilised the ingredient in an egg-free mayonnaise alternative, which is sold under The Good Spoon brand. Meanwhile, Singapore-based Sophie's BioNutrients has prototyped both a milk alternative product and seafood alternatives, such as 'crab cakes', using a microalgae-based flour concentrate.

Mycelium

Mycelium is a fungal solution that is gaining popularity as a meat alternative ingredient that can be used to replicate whole cuts of meat by reproducing the fleshy texture of these products.

In simple terms, mycelium is a multicellular organism and the vegetative part of a fungus, which grows into macrostructures. In nature, these root systems will lead to the creation of mushrooms.

However, several companies have discovered that mycelium can be used to create a wide variety of products if nurtured in a bioreactor, with companies able to adapt factors such as porosity, texture, strength, resilience, fibre orientation and more.

Firms such as Ecovative Design, Meati and Innomy have pioneered mycelium-based products and ingredients ranging from plant-based bacon alternatives to plant-based steaks and 'chicken' products. Ecovative has also developed bio packaging solutions, such as a styrofoam alternative from the ingredient; creating an environmentally friendly packaging material. ●