

THE PLANT-BASED PROTEIN REVOLUTION

AS PLANT PROTEINS CONTINUE TO GAIN RAPID ATTENTION THROUGH CONSUMER DEMAND, FUTURA INGREDIENTS OFFERS A RANGE OF PROTEIN SELECTIONS AND A WIDE RANGE OF EMULSIFIERS AND TEXTURISING SYSTEMS TO ENSURE A SEAMLESS APPLICATION PROCESS FOR PLANT PROTEIN-BASED BEVERAGES. BY **KHOO KIM CHING**, PRODUCT & APPLICATION INNOVATION SENIOR TECHNOLOGIST, AND **DR CHEAH HAN SERN**, TECHNOLOGY MANAGER, FUTURA INGREDIENTS.

PROTEIN, an essential part of our daily diet, is one of the most important nutrients in any biological structure and imperative for the formation of cells, tissues and organ growth. Further, protein is also important for building and supporting muscle maintenance. Research shows that protein has a more rapid effect on hormones which directly affects appetite, and therefore, could help increase satiety after a meal.

Generally, protein can be derived from both animal and plant sources. In the recent past, animal protein captured a dominant portion of the market share as compared to plant protein. However, plant protein in the current market is expected to witness incremental growth as consumers' perception about food products have changed—and changed rapidly. On one hand, consumers perceive plant proteins as the healthier and safer option compared to animal proteins, yet we

still see that raising and killing of animals for food remains to be an ongoing debate and challenge. But this is very quickly changing as the modern consumer is concerned with their contribution as an individual to the environment.

Climate change and sustainability seems to be one of the driving factors for the need of plant protein. As we know, animal agriculture is one of the largest contributors to greenhouse gas (GHG) emissions. Research conducted by Gidon Eshel et. al., (published in Environmental Science and Technology, July 2016), found that replacing beef with plants would reduce the emission of greenhouse gas significantly, as most greenhouse gas emissions result from methane released from enteric fermentation, partially from animal manure, and loss of carbon stored in forests and soils due to deforestation.





The nutritional quality of a protein-rich diet is determined by the ability of the protein to meet the amino acid requirements of the human body. One of the most used methods for calculating protein quality is the Protein Digestibility-Corrected Amino Acid Score (PDCAAS). It is based on both the amino acid requirements of human body and their overall digestibility. Dairy milk is undoubtedly one of the best sources of protein, as proven with Protein Digestibility-Corrected Amino Acid Score (PDCAAS). However, the setback for dairy milk is that some people are allergic or are lactose intolerant, hence milk replacements or plant protein beverages have become the new go-to product.

Plant protein beverages were initially produced for those who have allergic reactions to milk protein or are intolerant to lactose. However, due to the consumers' shift in mindset, plant protein beverages are witnessing more growth than predicted. Consumers perceive plant proteins to be the healthier and a more sustainable source of protein with good amino acid profile. Other driving factors for the increasing demand in plant protein beverages are the rise of veganism as a lifestyle and the increase in the

consumer's awareness of the importance of protein in weight loss diet.

Having said that, not all plant proteins are allergen-free, taking for example, soy. Only selected plant protein sources, such as pea protein, rice protein and pumpkin seed proteins, have been proven to be allergen-free.

The plus point to this is that these proteins are commercially widely available, affordable in price and have an acceptable flavour profile. This in itself will help with a positive growth prospect within the pea protein and rice protein for the beverage category in the near future.

However, for plant protein beverages to be nutritional, functional and of appropriate texture, it requires some additional fortification of other ingredients. Plant proteins are of a different format as compared to dairy protein, and because of this, there are number of technical challenges when producing plant protein beverages such as:

- Poor emulsion stability
- Phase separation
- Sedimentation
- Taste and flavour

Futura Ingredients addresses these challenges with the addition of Ekölite VITA Series and Ekölite KREM Texturising Systems as the solution to perfecting the formulation in plant protein beverages.

EMULSION STABILITY

The oil phase in plant protein beverages is essential as it imparts a characteristic mouthfeel. For a healthier formulation, polyunsaturated oil like sunflower oil is preferred.

As polyunsaturated oils are liquid at room temperature and thus easily separated, emulsifiers need to be added to promote emulsion stability in the beverage.

VISUAL APPEAL

Unlike cow's milk, plant protein breaks down easily after heating, contributing to phase separation and sedimentation. Aligning the appearance to flavour and texture is critical. It is imperative to use stabilisers to help thicken and stabilise the emulsion by creating a network that is needed to suspend the protein particles.



TEXTURE & TASTE

Adding plant protein to beverages will have organoleptic sensory challenges. It often contributes to a bitter and beany after taste. Plant proteins are more rigid and less flexible, resulting in some form of grittiness as well. Futura Ingredients suggests the addition of Ekölite KREM 307 ND to create a smoother and velvety formulation.

As plant proteins in beverages continue to gain rapid attention and grow through consumer demand, Futura Ingredients offers a range of Ekölite VITA Protein selections and a wide range of emulsifiers and texturising systems like the Ekölite KREM 307 ND in this application. **APFI**

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