



Protein-enriched smoothies

MØREFORSKING

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PRO



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LIKE-A-PRO is a EU-funded project aiming to facilitate sustainable and healthy diets by mainstreaming alternative proteins and products, making them more available, accessible and acceptable.

Benefits of protein-enriched plant-based smoothies

Protein-enriched plant-based smoothies combine the convenience and sensory appeal of well-known ready-to-drink beverages with enhanced nutritional value.

They offer an opportunity to diversify protein sources while responding to growing demand for functional, plant-based and health-oriented products. Their known format makes them particularly attractive for introducing alternative proteins into everyday consumption.



Development challenges

Developing foods with alternative proteins requires balancing nutritional composition with taste, texture and production requirements. Different protein sources can introduce off-flavours or change how a product jellifies, holds moisture or behaves during preparation. Manufacturers must also achieve consistent quality parameters at large production scales while controlling costs.



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MØREFORSKING's solution

Within LIKE-A-PRO, MØREFORSKING developed and optimised plant-based strawberry smoothie formulations enriched with alternative proteins, including rapeseed and fava bean proteins. The formulations combined fruit-based matrices with stabilising ingredients and processing conditions to deliver nutritionally enhanced beverages with suitable viscosity, stability, safety and sensory performance.

Following laboratory optimisation, selected formulations were successfully produced in 100 kg pilot-scale batches using conventional homogenisation and thermal processing technologies, demonstrating their potential for further industrial scale-up. The developed solutions offer four key advantages:



Enhanced nutritional value and protein quality

The rapeseed-based smoothie provides 2.9 g protein and 2.0 g fibre per 100 ml, delivering over five times more protein than a conventional fruit smoothie benchmark at a similar energy level (51 versus 48 kcal/100 ml). It also presents a complete essential amino acid profile and relevant levels of calcium, folate and vitamin B12. The fava bean formulation achieved protein levels compatible with a "high protein" claim.



Functional stability and sensory performance

Optimised formulations, produced at the pilot scale, had a better protein dispersion, more controlled viscosity and reduced phase separation under refrigerated conditions. Physicochemical and microbiological stability were evaluated during storage tests lasting up to 42 days, while formulation adjustments supported acceptable flavour, viscosity and appearance.



Flexible integration of alternative proteins

The formulation approach suits different plant protein sources, as demonstrated with rapeseed and fava bean proteins. Protein-specific adjustments, including the addition of enzymes to increase the protein dispersion, enable the adaptation to different ingredient characteristics and functional beverage concepts.



Pilot-scale validation and industrial compatibility

Successful production in 100 kg batches using two-stage homogenisation and thermal processing confirms feasibility under industrially relevant conditions. Compatibility with conventional beverage technologies provides a foundation for further scale-up, although additional industrial-scale validation is required before commercial deployment.

MØREFORSKING's protein-enriched smoothies offer opportunities in the growing functional beverage market, particularly for ready-to-drink, plant-based and wellness-oriented products. Through a collaborative B2B approach combining formulation expertise, technical support and technology transfer, MØREFORSKING enables beverage manufacturers and brands to develop differentiated, protein-enriched products while reducing formulation complexity and supporting future industrial scale-up and commercialisation.

The developments achieved within the LIKE-A-PRO project demonstrate the feasibility of integrating alternative protein ingredients into scalable and consumer-relevant functional beverage applications. **By combining nutritional enhancement, sensory acceptability, and industrial compatibility, MØREFORSKING's protein-enriched smoothie concepts represent a promising approach for the next-generation of ready-to-drink beverages aligned with the current market and consumer trends.**

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