

## Indulgent, organic and palm fat free: innovative chocolate formulations

While palm fat scores with technological advantages, its reputation among consumers is not so great. That's why Swiss oil and fat refiner Nutriswiss is using a new process to develop palm oil free, organic-quality filling fats with optimized melting behaviour.

The creation of chocolate products is a complex scientific process, where attention to even the smallest of details is crucial. After all, it is the fine, melt-in-the-mouth, slightly cool mouthfeel that makes first-class chocolate products so irresistible. For fillings in pralines, bars, spreads and pastries, fat blends are used to achieve the right melting properties. Palm fat is ideal for this purpose thanks to its technical properties, but, despite its recognized certification, consumers do not like it for various reasons.

Swiss company Nutriswiss specializes in a wide variety of oil and fat components, and also develops tailor-made palm oil free solutions for challenging reformulations. Depending on the target product, the raw materials used and the desired declaration, its developers work with hydrogenating vegetable oils, and, if an organic label is required, a new multi-stage process is used.

### Fat components must be specifically selected

Palm oil is popular in the food industry because of its versatility and suitable technological properties. It can be used as an ingredient in various applications, including margarine, chocolate, biscuits, cakes and other baked goods. Compared to other vegetable fats, palm oil is solid even at room temperature, which provides the desired melt in chocolate fillings. However, consumers are increasingly paying attention to the ingredients used and labels such as "palm oil free".

Frank Möllering, Head of Research & Development at Nutriswiss, receives many corresponding enquiries

from manufacturers: "Palm-free filling fats, glaze masses and spreads are now among the most frequent requests we receive from customers. For us, the first step is to define the target specifications: Which texture is desired, what are the production processes, which raw materials can be used and which should be avoided, and should the product be positioned in the organic segment?"

The Nutriswiss team adheres to the highest possible quality standards, which is why it individually selects top-quality raw materials and modifies them using state-of-the-art processes. If palm oil is replaced by vegetable oils, this impacts taste as well as consistency and stability. For this reason, the Nutriswiss experts can develop individual recipes depending on the application category, which enables an optimized end product and also takes the manufacturing process into account.

The aim is to prevent the oily parts of the filling fat from migrating into the chocolate coating and forming fat products, filled and non-filled chocolate bars. A film can also form on nut nougat or hazelnut creams. To prevent this, the liquid components need to be fully integrated into the fat crystal lattice. In addition, the component must crystallize in the cooling tunnel during production. For a perfect, high-quality end result, the fat components must be specifically selected and processed accordingly so that the crystal structure is stable and still melts pleasantly on the tongue.



Kakaobutter kann Teil der palmfettfreien, bio-zertifizierten Lösung für Füllfette sein. (Bild: Shutterstock/New Africa) Cocoa butter can be part of the palm fat free, certified organic solution for filling fats. (Image: Shutterstock/New Africa)



Frank Möllering verantwortet bei Nutriswiss den Bereich Forschung und Entwicklung. (Bild: Nutriswiss) Frank Möllering is responsible for research and development at Nutriswiss. (Image: Nutriswiss)

One potential path to palm oil free filling fat is the use of fully hydrogenated seed oils, such as rapeseed or sunflower oil. In contrast to partially hydrogenated oils, as they were used a few years ago, these are practically free of trans fatty acids and are oxidation- and temperature-stable.

In order to achieve the optimal sensory solution during the reformulation process, the Nutriswiss R&D team compares the alternative solution with the original palm fat containing variant using DSC (Differential Scanning Calorimetry) analytics, among other methods, to achieve the best result. To ensure smooth production throughout all process steps, other indicators such as the solid fat content or the dropping point are also determined, and the manufacturer's plant set-up is taken into account.

### Full transparency about the origin of raw materials

Since the hydrogenation of oils does not conform to the requirements of organic certification, a different technology is needed for this segment. Here, a mixture of different vegetable oils and fats is used. Frank Möllering explains: "With the help of various process steps within a process sequence, we have succeeded in

restructuring the triglycerides. This results in new physical properties which mean the fat component in the filling mass provides a soft and creamy mouthfeel at the end."

Part of the raw material mixture can also be cocoa butter, for example. In higher dosages, such relatively compact fats can cause a bite that is too firm and also potentially waxy. In the Nutriswiss modification concept, a small proportion of these fats is sufficient to achieve optimal crystallisation. The matrix formed by the combination of the fatty acids binds the oils, resulting in a stable sensory and organoleptically appealing melting behaviour.

Meeting consumer demand for the substitution of palm fat in existing recipes is a challenge for manufacturers. A simple substitution is usually not possible if the familiar sensory properties and mouthfeel are to be maintained. However, with experience and technological know-how, the Nutriswiss team can help with the conversion. In addition, the company has its own procurement channels for high-quality raw materials from all over the world. This ensures full transparency with regard to the origin of the raw materials, from cocoa, illipe and shea butter to coconut oil as well as domestic oils from rapeseed or sunflower seeds.

## Market + Contacts

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