

## Edible oils and fats

# Oil for the World

**Selecting the right oil for food ingredient applications can be challenging, especially in terms of quality assurance. Whether the end product is confectionery, a bakery item or even French fries, almost every recipe requires the addition of oil or fat. Luckily, Swiss company Nutriswiss AG, which specializes in refining premium edible oils, knows how to reconcile the industry's requirements for high-quality oils with ecological and economic goals.**

Whatever your innovation or application, no matter how unusual it may be, the right raw material is available on the global market. When it comes to the quality of crude oil, however, the situation is not quite so simple. In fact, it's worse than most purchasing departments and consumers think. "Almost all crude oils are contaminated," says Michel Burla, Managing Director of Nutriswiss. "Unfortunately, there are almost no exceptions, unless you are directly involved in aspects such as cultivation and transport. As such, we specialize in supplying our customers with high-purity oils that we can modify according to individual applications." Although being one of the smallest refineries in Europe, Nutriswiss not only offers the most commonly used varieties of oil, such as rapeseed, sunflower, coconut and palm, but also specialty hemp and algae versions.

Special refining processes can be tested in Nutriswiss' own laboratory to determine the optimum process parameters (Copyright: 123RF/lightpoet).



## Imperfect by nature

The properties of these oils are as varied as the plants from which they're pressed. By nature, oils generally confer properties that are undesirable in the end product. As such, various process steps are needed to remove color, strong flavors and any accompanying substances or provide (heat) stability. Neutralization, bleaching and deodorization considerably improve their sensory profile. Native oils are usually not stable enough for industrial processing and are also not available in sufficient quantities.

## The destination determines the refining route

Exactly how the profile of an oil is modified or even whether a special blend is developed depends on the specific application. For the industrial or artisanal production of sponge cake products and other bakery products,



Michel Burla, Managing Director at Nutriswiss  
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for example, Nutriswiss produces refined, hardened or fractionated bakery fats and margarines with a low trans fatty acid content. They are specifically crystallized and — depending on the type of dough and desired processing properties — highly plastic or homogenous. In the chocolate industry, by contrast, lauric and non-lauric fats with precisely defined crystallization properties and specific strengths are in demand.

"There is no single oil that's suitable for every application," explains Michel Burla. "If you think of Swiss chocolate, for instance, it should only melt in the mouth. But, in baked goods, the fat content should make them flaky. Frozen goods and ice cream should be creamy, and crystallization and the formation of trans fatty acids must be avoided."

Nutriswiss is a market leader when it comes to the gentle, low-temperature processing of oils and is able to achieve what many other refineries cannot, such as handle small batches, modify problematic oils and purify extremely contaminated raw materials. The optimized, high quality, sensorially perfect oils that are produced can then be used in cosmetics and the pharmaceutical sector.

## Consumer-oriented oil trends

As consumers have become more aware of healthy fatty acids and oil-soluble vitamins, products such as omega-3-containing linseed or hemp oil are now popular. At the same time, the ethical sourcing of raw materials is now a key concern, particularly

relating to tropical oils such as palm. Its industrial success is based on properties that are otherwise only available in hydrogenated oils — a long shelf life, heat-resistance, tasteless and solid at room temperature — making it ideal for the manufacture of spreadable products.

Also high on the ecological agenda are cultivation conditions and the environmental consequences of resource-intensive farming. With these important drivers in mind, a nutritionally and economically interesting alternative is rapeseed oil. Its ratio of omega-6 to omega-3 fatty acids is almost perfect and less than 5:1. And, compared with other vegetable oils, it has a very low potential for the formation of MCPD and glycidol esters, which is particularly advantageous when used for frying. In addition, it is also stable to oxidation: if it comes into contact with oxygen during prolonged storage, comparatively few triglyceride monohydroperoxides, aldehydes and ketones are formed.

Replacing palm oil and palm oil fractions in confectionery, bakery products (especially puff pastry), spreads, marinade oils or popular nut nougat creams is a demanding task. In addition to pure rapeseed oil, completely hardened rapeseed oil and, if necessary, additional coconut fat must be used. Modern processes saturate almost all unsaturated fatty acids and the trans fatty acid content drops below 1%. Michel Burla comments: "There are alternatives for palm oil. We offer them and our customers use them. Perhaps the greatest challenge is getting chocolate to melt properly. We often work with a combination of cocoa butter and other oils, but this is sometimes only cost-effective with branded products."

### Supply chain is key

Transportation, whether thousands of nautical miles or just a few road kilometers, always presents a contamination risk for crude oil. Pollutants are generally non-polar substances that accumulate within the crude oil. For example, mineral oil saturated hydrocarbons

(MOSH) and mineral oil aromatic hydrocarbons (MOAH) may have been transferred to the foodstuff during processing and packaging. So-called basic environmental burdens, such as exhaust gases or emissions from industrial plant, are also potential sources of spoilage. In addition, loading processes can be problematic: contact can occur with foreign material in the pipes, containers and/or with polluted ambient air. Usually each kilo is reloaded or pumped six times on average during transport. Nutriswiss minimizes the risk of contamination by using its own tracked food-grade containers. They are loaded after the harvest, sealed and only opened when they reach the refinery.

Of course, quality control begins much earlier, at the cultivation stage. It is a known fact that conventional farming usually uses pesticides that dissolve in the oil. To remove them, high temperatures are required, which in turn favors the formation of other contaminants (trans fatty acids, chlorine-fatty acid esters such as 3-MCPD). The challenge lies in implementing an efficient and, at the same time, gentle purification process that causes as little process contamination as possible.

### New plant technology for problem cases

Laboratory technology is becoming more precise and public awareness of harmful substances in oils is increasing. Stricter legal limits could be on the horizon, such as those coming into effect for 3-MCPD in the EU for infant foods in January 2021. Here, manufacturers must comply with demanding specifications regarding phthalates, glycidyl fatty acid esters and pesticides. Nutriswiss is already prepared for more stringent legislation and now offers customers a new process technology based on short path distillation (SPD). It's a particularly gentle thermal separation process and has already been established in the fish oil sector.

The plant concept allows contaminants to be removed without generating new ones. Plus, the fine vacuum range in the new plant prevents the



Swiss chocolate owes its delicate melt properties to tailor-made fat components (Copyright: 123RF/Brenda Carson).

formation of process contaminants such as 3-MCPD or glycidyl fatty acid esters and, at the same time, completely removes plasticizers such as DEHP. The gentle process protects micronutrients, such as tocopherol (vitamin E) and carotenoids, and can be used to maximize the yield of valuable omega-3 fatty acids (DHA and EPA) in the production of fish oil.

### Equipped for the future

Processors and users of edible oils and fats are facing new challenges: pollutant detection limits are constantly decreasing, knowledge about the benefits of oils is growing and companies and consumers alike are looking for more sustainability. In the contract refining of contaminated crude oils, Nutriswiss is setting new standards. Whether it's the EU limit for trans fats or other pollutants, a comprehensive key data profile is drawn up for each oil before, during and after processing, with each step and procedure being documented in detail. Michel Burla concludes: "When I look at the documentation and compare the values of the end products with those of the delivered goods, I'm sometimes lost for words. Above all, I am very proud of my employees and the knowledge they bring to the industry. For today and tomorrow, Nutriswiss is dedicated to providing the industry with the highest quality oils, ethically sourced, for the applications and end products of the future."

