Qualitative algae drying for the food industry
Algae consumption is the new trend
Affordable solution for the shortage of essential nutrients
An open look at the future

Microalgae are small, plant-like organisms that float freely in water, also called phytoplankton. In the North Sea, a liter of seawater contains between one hundred thousand and one hundred million plankton algae. Algae are able to live with the aid of light as an energy source and the incorporation of inorganic substances. Thanks to their photosynthesis, they are largely responsible for life on earth. They produce about half of the oxygen in the atmosphere and consume a lot of carbon dioxide to grow. Moreover, life in the oceans, seas and lakes is highly depending on microalgae because they represent the beginning of the food chain.

Innovative production process
Algae in powders, tablets or capsules have long been used for animal feed, nutraceutical or cosmetic applications. But its use also increases in the food industry. In Asian bars it is very common to get algae chips with a beer. In the European food market, however, the cultivation of algae begins with the elimination of bacteria and fungi leaving you with pure algae. The algae are harvested at the peak of their nutritional value. Water is separated, after which remains a yogurt-like substance that can be processed in different ways. One possibility is to rapidly dry the algae paste with an industrial dryer. The result are bright green flakes that are then ground into powder. Algae powder can be used in many food products.

ANDRITZ Gouda drum dryer
The ne plus ultra of industrial drying

Algae paste is usually dried with an atmospheric double drum dryer, which is drum drying with an open machine at atmospheric pressure (normal air pressure). For more than a century, ANDRITZ Gouda has been specialized in food processing production lines based on the advanced drum drying technology.

Algae paste dries extremely fast
The drum dryer is a so-called thin-film contact dryer. A very thin layer of the product to be dried is applied to the outside of a rotating cylinder (drum). This drum is heated on the inside by steam. When in contact with the heated surface, the liquid evaporates very quickly from the thin product layer. Steam heating gives uniform temperature distribution over the drum surface and this results in a consistent product quality. Because of the continuous, indirect drying method and the short retention time of the product at high temperature, virtually no heat damage will occur. Also taste, smell and texture quality of the product are guaranteed.

The viscous algae paste dries extremely well under these conditions. For other types of dryers, the product should not be de-watered so far prior to the drying, so more water needs to be evaporated in the dryer. In case of drum drying, it is possible to first separate more water, mechanically in a centrifuge, so the drying process starts with a more concentrated product. Separating water mechanically is much cheaper than to evaporate it in a dryer. With evaporation, the energy consumption is much higher. Algae paste drying in a drum dryer is a highly efficient and high-quality production process.

And if that is not enough
An alternative process for algae drying makes use of a vacuum double drum dryer: The drums are placed in a vacuum tank and the drying takes place under strongly reduced pressure. Because of the vacuum the boiling point of water considerably decreases. In an atmospheric drum dryer, water evaporates at about 100 °C. In a vacuum dryer, it already occurs at 50 to 60 °C. When algae can be dried at lower temperatures, the product quality is even better. However, this process is more expensive than atmospheric drum drying, which is why it’s less popular.

Unique selling points
- Highly efficient drying process
- Particularly suitable for viscous materials
- Superior and constant product quality

The beginning and the end of the food chain
In the food industry, one of the hot topics is how we will feed mankind in the future. Because algae are abundantly available, they can provide an affordable solution for the imminent shortage of nutrients. Algae are rich in a number of these essential nutrients, such as proteins, antioxidants and omega-3 fatty acids. Qualitatively processed algae are ideal, nutritious additives for e.g. pasta, bread, crackers, soups, sauces and even sports drinks.
ANDRITZ Gouda

ANDRITZ Gouda has been implementing complete process solutions for the environmental, chemical, and food industries for over 100 years. As a machine manufacturer as well as process solutions expert, ANDRITZ Gouda is able to handle all of the stages involved in designing and building plants, including engineering, service, installation, and commissioning.

ANDRITZ Gouda, as part of the international ANDRITZ GROUP, has several pilot plants available to test new materials, generate design data, and provide representative product samples. The proven calculation model for scaling up to industrial size ensures successful application in full-scale processing.