

A healthy and balanced diet becomes increasingly important to more and more people. Fish, for example, is considered to be very healthy due to the Omega-3 fatty acids it contains; these cannot be produced by the human organism and therefore need to be obtained through food. The popularity of fish is reflected in the figures published by Germany's Statistical Office: between 2012 and July 2014 there was an increase of 4.2% in aqua cultures in Germany alone. Like for all comestible goods, the analysis of nutritional values and substances is an essential part of the quality control of fish, with a focus on protein and fat analysis. Some parts of the fish are rather fatty; therefore a thorough homogenization of the sample is vital to obtain reliable analysis results. Moreover, fish is examined for pollutants such as heavy metals, carcinogenic polychlorinated biphenyls or pharmaceutical residues as part of consumer protection. These substances accumulate in fish and are therefore considered reliable indicators for water quality; with appropriate analysis methods even smallest traces of contamination, for example with polychlorinated biphenyls, can be reliably detected.

What's in the fish?

Effective size reduction by cutting

QUICK AND SIMPLE HOMOGENIZATION OF DRIED FISH

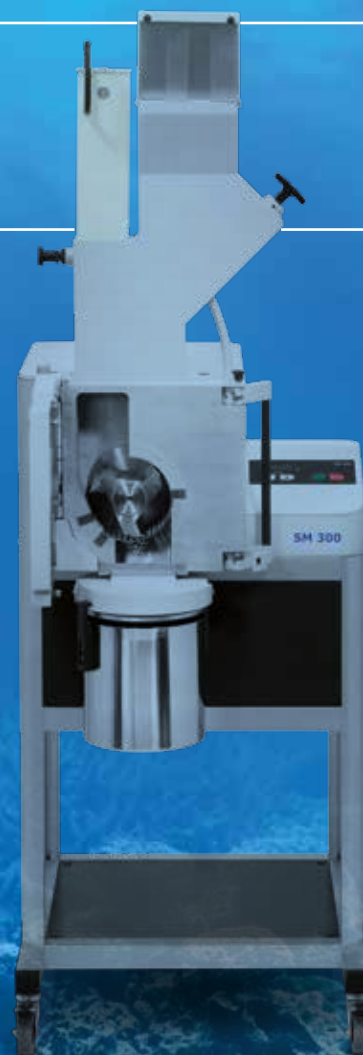
The homogenization of fish is a challenge; scales, skin and bones are fairly resistant to size reduction so that the sample still contains some larger pieces after grinding in most mills. A high fat content of the fish makes the process even more difficult, as fatty particles stick together to form large lumps which block the mill and keep the sample inhomogeneous. A knife mill like

the GRINDOMIX is suitable for successfully homogenizing fresh fish. Michael Schlachter of GMA (Gesellschaft für Marine Aquakultur mbH) addressed RETSCH to find a solution for **pulverizing freeze-dried fish**. For this type of fish the powerful cutting mill SM 300 proved to be the best option:

Sample	Freeze-dried fish (turbot, carp)
Feed quantity	125 g (= 4 fish of each type, pre-cut once or twice)
Speed	3,000 min ⁻¹
Grinding tools	V rotor, 1.0 mm bottom sieve, cyclone
Grinding time	< 2 min
Final fineness	< 1-2 mm

The mill's **V rotor** is recommended for use with fibrous and tough samples and cuts very effectively through the freeze-dried

fish. Its particular shape reduces the dead volume inside the grinding chamber and **promotes the quick discharge** of the



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Cutting Mill SM 100

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The versatile standard model for a wide range of application



Cutting Mill SM 300

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The high-performance powerful model processes even the most difficult samples



carp before



carp after

pulverized fish, thus accelerating the grinding process. Moreover, this rotor also cuts the major part of the scales which leads to a better homogenization of the sample. The use of a cyclone improves material discharge. The grinding process in the SM 300 is carried out without any noteworthy heat build-up so that the fatty parts of the fish don't block the bottom sieve and the sample is thoroughly homogenized. The mill is quickly cleaned thanks to the fold-back housing and the easily removable push fit rotor.

The SM 300 grinds up to 5 liters of sample material in one run. After grinding in the SM 300, the sample can be further pulverized in the ultra centrifugal mill ZM 200, if required. For the analysis of fish the fineness achieved in the SM 300 is sufficient. Although the freeze-dried fish had a high fat content, the homogenization process in the cutting mill yielded very good results thanks to the powerful drive, the cutting performance of the V rotor and the optimized material discharge achieved by using a cyclone.

- CUTTING MILL SM 300**
- ▶ Powerful size reduction thanks to 3 kW drive with high torque and RES technology
 - ▶ Perfect adaptation to application requirements by variable speed from 700 bis 3.000 min⁻¹
 - ▶ Optimum cutting effects thanks to double acting cutting bars
 - ▶ Quick and easy cleaning due to fold-back hopper, smooth surfaces and push-fit rotor
 - ▶ Max. rotor peripheral speed of 20.3 m/s
 - ▶ Defined final fineness due to bottom sieves with aperture sizes from 0.25 - 20 mm
 - ▶ Wide range of accessories including various hoppers, collection systems, rotors and sieves
 - ▶ Highest safety standards due to engine brake, central locking device, electronic safety check



PERFORMANCE DATA

CUTTING MILL SM 300

Applications:	size reduction
Feed material:	soft, medium-hard, tough, elastic, fibrous
Feed size*:	< 60 x 80 mm
Final fineness*:	< 0.25-20 mm

*depending on feed material and instrument configuration

TYPICAL SAMPLE MATERIALS

Bones, carrots, cocoa beans, coffee beans, corn, deep-frozen chicken legs, dried fruit and vegetables, freeze-dried fish, fruit skin, kohlrabi, nuts, pasta, plants, spices, tobacco, etc.