

New Knife Mill Sets Standards - The GM 300 Produces Homogeneous Samples Within Seconds

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Retsch's knife mill GRINDOMIX GM 300 is ideal for the gentle size reduction and homogenisation of food and feed. It processes sample volumes of up to 4,500ml quickly and reproducibly. With its four sharp and robust blades and a powerful drive with temporary peaks of up to 3kW it is ideally suited to homogenise substances with a high water, oil or fat content as well as dry, soft, medium-hard and fibrous products.

The so-called QuEChERS method ('quick, easy, cheap, effective, rugged and safe') has been developed to make sample preparation to pesticide analysis more efficient. Serial tests have proved that the analysis results obtained with the QuEChERS method can easily bear comparison with more common methods, such as DFG S19.

For a test according to QuEChERS, 10g of homogenised sample material are extracted with 10ml acetonitrile. After that the organic phase is dried and tested for pesticides with chromatographic analysis. To guarantee reproducible analysis results, it is essential to completely homogenise the sample. Food often occurs in rather inhomogeneous forms (such as, fruit, flesh, peel, pit), and the 10g have to be representative of the entire initial material.

To make sure the sample preparation is reproducible, the homogenisation process needs to be carried out with a laboratory mill. Care must be taken that the sample is not warmed during the grinding process, as pesticides are partly volatile substances. This effect can be avoided by cooling the sample with dry ice, for example. Moreover, a finer grind size and greater homogeneity are obtained with frozen material because the embrittlement improves the breaking properties of the sample. Therefore, it is recommendable to grind food samples mixed with dry ice at -80°C.

Retsch's knife mill GRINDOMIX GM 300 is ideally suited for this process. The sample material is mixed with about twice the amount of dry ice. After the mixture has thoroughly cooled down, it is put into the stainless steel grinding container of the GM 300 and ground. To let overpressure escape, the patented gravity lid is used. The lid reduces the grinding chamber volume to the size required for homogenising the sample thoroughly.

The GM 300 covers a wide range of applications including fruit, vegetables, sausages, meat, fish, cheese or frozen food as well as pellets, spices and seeds. It processes substances with a high water, oil or fat content as quickly and reliably as dry, soft, medium-hard and fibrous products.

The mill was designed with a special focus on simple and convenient operation. The handling of the GRINDOMIX GM 300 is exceptionally comfortable and safe. The grinding container and knife are easily attached without tools. When the set grinding time is over, the motor automatically stops and the grinding container can be removed. Thus, the GRINDOMIX, unlike many commercial household mixers, allows the filling and emptying of the container outside the mill. This also makes cleaning the GM 300 very simple and helps to avoid cross-contamination by possible sample residues. Moreover, all parts of the GM 300, which come into contact with the sample material are autoclaveable.



Figure 1. The GM 300 allows for grinding up to 4.5 l of sample quickly and reproducibly



Figure 2. Grinding a wine gum mixture with dry ice in the GM 300

Grinding entire packaging units

The company Eurofins has built a global network of laboratories and competence centers for food and feed analyses. Their range of services includes simple chemical and microbiological tests, nutritive analyses, trace analyses of residues and contaminants, biomolecular methods, allergen analyses, analyses of authenticity and origin and many more. Retsch mills form an important part of the sample preparation work at Eurofins laboratories. In Hamburg, Germany, the lab is equipped with two GRINDOMIX knife mills, one ultra centrifugal mill and one cutting mill from Retsch.

"We achieve very good results for the size reduction and homogenization of foodstuffs with the GRINDOMIX GM 200", said Matthias Nickel, Team Leader Sample Preparation at Eurofins GfA GmbH, the competence centre for POPs, dioxins, PCB, BFR, PFC in Hamburg. "However, the packaging units are often too big for the GM 200. We are happy that Retsch has now bridged this gap with the new GM 300."

Whereas the container of the GM 200 has a volume of 1,000ml, the GM 300 offers a volume of 5,000ml, so that common retail quantities (for example, 2,500g french fries, a whole pizza, salad or cabbage) can be processed in one run.

"For ultra trace analyses of organic contaminants stainless steel jars, as available for the GM 300, are an essential accessory", explained Nickel. "The innovative pre-grinding which is effected by the breaking bar of the knife in the reverse mode accelerates sample preparation of hard feeds such as sugar beet pellets. Due to the fact that we process a great number of different samples every day, quick and easy cleaning of the mills is of utmost importance for us", added Matthias Nickel. "We are highly satisfied with this feature of the GM 300 – all parts can be easily removed and cleaned in the dish washer or autoclaved."



Figure 3. All parts coming into contact with the sample are autoclaveable