6875 FREEZER/MILL®

Tissue Homogenization Cell Lysis

Mixing & Blending

APPLICATION NOTE

Preparation of Rice Husks for the Analysis of Their Contents

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For a very large number of the global population (approximately 50%) rice is the primary foodstuff. People in Asia and Africa virtually exist only on rice. As a result of this there are incredibly large rice crop areas especially in Asia.

Health Aspect

However, almost everywhere the rice is eaten as white rice (polished), i.e. the bran and the germ are removed. It has been known for a long time that this can cause deficiency diseases, especially avitaminose (Beri-Beri). As well as the vitamins B1, B2, B3 and K the husks also contain important minerals (calcium, magnesium, selenium, zinc). Therefore the husks can be considered as a resource. For the purpose of content analysis the rice husks were ground and homogenized in the Freezer/Mill®, using the large grinding vials.

Cool Grinding

The Freezer/Mill has a magnetically driven impactor. This impactor is inserted into the vial along with the sample to be ground, this assembly is then placed into the coil assembly within the mill, which is lowered into the liquid nitrogen bath. Grinding is accomplished by alternating the magnetic field in the coil assembly forcing the impactor into the end caps. The most important aspect for a successful grinding procedure is the sufficient cooling of the milling material to ensure brittleness of the sample. To this end the filled vial is inserted into the opening of the coil assembly and immersed into a liquid nitrogen bath. For brittleness the sample was left in the nitrogen bath for approximately 12 minutes. Subsequently the sample was ground for three minutes, then after waiting for one minute to renew good brittleness, it was ground again. All in all three of these cycles were performed, which corresponds to a grinding time of nine minutes. For this kind of grinding program approximately eight grams of starting material was used.

Results

All in all very good homogenizations of the rice husks were obtained. This was shown by the fineness of the resulting powder (analytical fineness) on the one hand and the analysis results which exhibited good reproducibility on the other hand.

Outlook

The Freezer/Mill has proved to be very suitable for milling and blending of slightly brittle yet flexible plant parts for analysis. With the Freezer/Mill this can be done in units of a few grams. The low temperature causes brittleness of the material and any generated heat, which would have impeded effective grinding, is avoided.

- APPLICATION NOTE SP006: Milling / Blending (Homogenizing)
- APPARATUS: **Freezer/Mill®**
- APPLICATION: Plant Parts

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