

Homogenization of candy or sweets for porcine DNA testing using the Omni Bead Ruptor Elite bead mill homogenizer.

Summary

Both Halal and Kosher standards forbid the consumption of products of porcine origin - including all foods, cosmetics and personal care products.

Pork-based additives are more common than you might think- gelatin and other gelling agents are used in many processes as stabilizers, binders, thickeners, emulsifiers, and foaming agents. Gelatin, specifically, is found in foods like jellies, ice-cream sweets or confectionary, cookies, and cakes, as well as in pharmaceuticals including capsules, tablets, lozenges, and creams or topical/transdermal medicines. Gelatine is made from the protein collagen. Collagens can be extracted from the skin, bones, and connective tissues of many animals [1, 2].

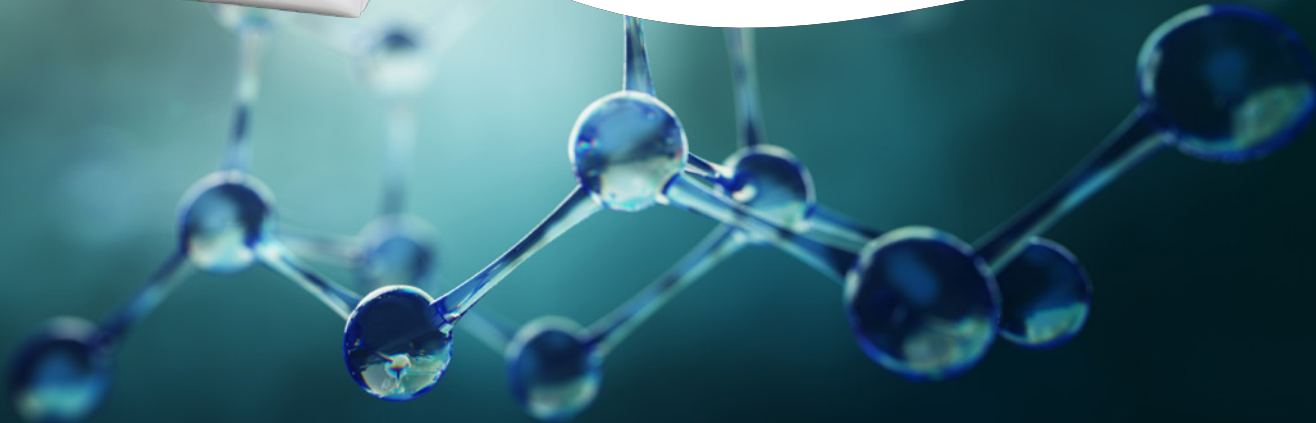
Porcine-derived collagen can be detected by extracting DNA prior to analysis using real-time PCR based genetic testing or peptide LC-MS/MS methods. Prior to DNA extraction, samples must be homogenized and fully dissolved. The traditional method for homogenizing a food sample is by hand, using a mortar and pestle. Only one sample at a time is milled, and the mortar and pestle must be thoroughly cleaned with hazardous reagents to ensure that there is no carryover between samples.

For research use only. Not for use in diagnostic procedures.

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Omni Bead Ruptor Elite (PN 19-042E)



The Omni Bead Ruptor Elite™ bead mill homogenizer provides a high-throughput homogenization alternative. It is capable of processing 24 samples simultaneously, or up to 960 samples per hour. The system imparts high force on samples that results in a complete homogenate, suitable for further sample preparation and downstream analyses. Marshmallows, taffy, and gummy bears are sample matrices that are particularly challenging due to their sugary, chewy, sticky, or gummy consistencies.

The Omni Bead Ruptor Elite bead mill homogenizer completely dissociates a variety of confectionary treats, including marshmallows and chewy, taffy candy, in as little as 60 seconds. Samples can be further prepared for porcine DNA analysis using the Tissue DNA Purification Kit or a similar DNA extraction kit.

Materials and methods

Materials

- Omni Bead Ruptor Elite bead mill homogenizer (Cat # 19-042E)
- Bead Ruptor Elite 2 mL Tube Carriage (Cat # 19-373)
- Hard tissue Homogenizing Mix 2.8 mm Ceramic (2 mL) (Cat # 19-628)

Procedure

Weigh approximately 100 mg of marshmallow, White Rabbit taffy, or other candy/food samples and place in 2 mL Hard Tissue Homogenization tubes (Cat # 19-628). Add 500 µL of deionized water or other non-foaming diluents or buffers. Process using the Omni Bead Ruptor Elite bead mill homogenizer with 2 mL Tube Carriage, speed 5 m/s, 2 x 30 second cycles, with 10 second dwell time (Table 1).

Table 1: Sweets/candy sample homogenization summary

Sample type	Mass	Bead kit	Optional diluent	Speed (m/s)	Time (sec)	Cycles	Dwell time (sec)
Marshmallow, taffy or other elastic confectionary	10 - 100 mg	19-628	0.5 mL	5.0	30	2	10
Marshmallow, taffy or other elastic confectionary	100 - 500 mg	19-628	0.5 - 1.0 mL	5.0	30	2	10

Results

The tubes containing the gummy samples were run on the Omni Bead Ruptor Elite bead mill homogenizer using a pre-filled Hard Tissue Homogenization Kit (Cat # 19-628), at a speed setting of 5 m/s for 2 x 30 s cycles, with 10 second dwell.

Using 2 mL reinforced homogenization tubes on the Omni Bead Ruptor Elite bead mill homogenizer, wet milling of the sticky, chewy candy samples produced a complete homogenate ready for pipetting or automated liquid handling. Deionized water and PBS were suitable diluents. The protocol is compatible with a wide variety of non-foaming, aqueous diluents, including lysis buffers of commercial DNA extraction kits.



| Figure 1: Images of sample before and after homogenization

Conclusions

The Omni Bead Ruptor Elite bead mill homogenizer is fit for purpose for high-speed, high-throughput homogenization of difficult to process, gummy or chewy candy samples, allowing up to 960 marshmallow samples that can be processed in less than one hour. The system ensures there is no sample carryover and reduces the use of hazardous cleaning solvents. Semi-automated sample homogenization with the Omni Bead Ruptor bead mill homogenizer produces a sample in standard 2 mL tube format that is ready for further sample preparation using manual techniques or even liquid handling robotics or automation. Compared to traditional mortar & pestle grinding methods, the Omni Bead Ruptor Elite bead mill homogenizer provides a more effective solution which is at least 5x more efficient than manual methods. Compared to basic bead beater and vortex mill systems, the Omni Bead Ruptor Elite bead mill homogenizer is robust and reliable. The ergonomic, front load design and zero maintenance motor are robust and reliable.

References

1. J Jaswir, Irwandi & Mirghani, Mohamed & Salleh, Hamzah & Ramli, Noriah & Octavianti, Fitri & Hendri, Ridar. (2016). An Overview of the Current Analytical Methods for Halal Testing. 10.1007/978-981-10-1452-9_27.
2. Bailey, L. (2014). Food News International, Did You Know: How Halal food testing is done? <https://foodnewsinternational.com/2014/08/01/did-you-know-how-halal-food-testing-is-done/>

