Drosophila melanogaster protein and DNA extractions using the Omni Bead Ruptor Elite bead mill homogenizer.

Summary

Drosophila melanogaster is a commonly used organism in many research studies. A reliable method for protein and nucleic acid extraction is a critical step toward understanding the molecular processes that occur in *Drosophila*. This study demonstrates a fast and efficient method of extracting proteins and DNA from *Drosophila* using the Bead Ruptor Elite™ bead mill homogenizer.

Materials and methods

- Omni Bead Ruptor Elite bead mill homogenizer (Cat # 19-042E)
- Omni Bead Ruptor Elite 2 mL Tube Carriage (Cat # 19-373)
- Omni Bead Ruptor Elite 48 Position 2 mL Tube Carriage and Finger Plate (Cat # 19-378)
- 2 mL Soft Tissue Homogenizing Mix 1.4 mm Ceramic (Cat # 19-627)

For protein extractions, 30 mg to 50 mg of whole *Drosophila melanogaster* were placed into 2 mL polypropylene screw cap tubes containing 1.4 mm ceramic beads (Cat # 19-627) along with one milliliter of 50 mM Tris-HCl, pH 7.6. The samples were placed in a 2 mL tube carriage (Cat # 19-010) and disrupted in the Omni Bead Ruptor Elite bead mill homogenizer for 30 seconds at 6.45 m/s. One milliliter of the homogenate was placed in a fresh 1.5 mL microtube and centrifuged at 12,000 rpm for 10 minutes.

Omni Bead Ruptor Elite bead mill homogenizer

The supernatant was removed and placed into clean 1.5 mL microtubes. 10 µL of each protein extract was mixed with 10 µL of Laemmli sample buffer and incubated at 90 °C for 5 min. Proteins were then separated by electrophoresis on a 4-20 % Tris Glycine SDS PAGE gel at 200 V for 30 minutes. Protein concentrations were analyzed at 280 nm using a Nanodrop spectrophotometer.

For DNA extractions, 30 mg of whole *Drosophila melanogaster* were placed into 2 mL reinforced tubes with 1.4 mm ceramic beads. 220 µL of commercially available tissue lysis buffer was added to the tube and samples were disrupted on the Omni Bead Ruptor Elite bead mill homogenizer at 6 m/s for 30 seconds. The entire homogenate was transferred to a clean 1.5 mL microtube. DNA was extracted using a commercially-available tissue DNA extraction kit. DNA concentrations were analyzed using a Nanodrop spectrophotometer.

Results

Homogenization of *Drosophila melanogaster* can be difficult and time consuming. The use of bead mill homogenization significantly decreases the effort and time needed for homogenization. The versatility of the Omni Bead Ruptor Elite bead mill homogenizer allows for homogenization of a wide variety of sample types in throughputs up to forty-eight 2 mL samples processed simultaneously.

Herein, we examined the extraction efficiency of the Omni Bead Ruptor Elite bead mill homogenizer for homogenization of *Drosophila melanogaster*. Both DNA and protein extractions were performed. The average protein concentration from a 30 mg sample and 50 mg sample of *Drosophila* was 16.7 mg/mL and 18.1 mg/mL respectively. The average DNA concentration from a 30 mg sample of *Drosophila* was 344 ng/µL. A_{260}/A_{280} values and electrophoresis analysis revealed a high degree of genomic DNA integrity with little DNA shearing (Figure 1). Protein extraction efficiency was further evaluated by gel electrophoresis in four replicates. Lane to lane variation was minimal and abundant proteins were observed over a high molecular weight range.

Conclusion

The effectiveness of the Omni Bead Ruptor Elite bead mill homogenizer in homogenizing small organisms such as *Drosophila melanogaster* was demonstrated. Complete homogenization was achieved in thirty seconds with high analyte yields.

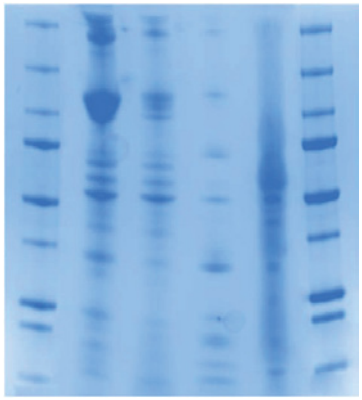

Figure 1: *Drosophila* protein extracts analyzed by SDS PAGE. Lane 1: Protein ladder. Lane 2-3: 30 mg of *Drosophila* homogenate. Lane 4-5: 50 mg of *Drosophila* homogenate. Lane 6: Protein ladder

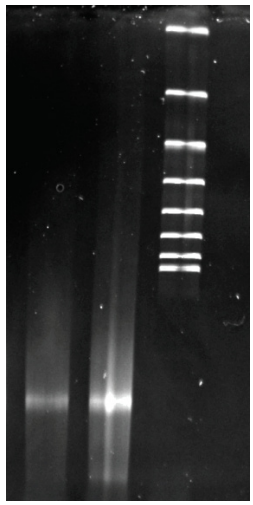

Figure 2: *Drosophila* genomic DNA analyzed by 5 % polyacrylamide gel. Lane 1,2: DNA from *Drosophila*. Lane 3: 100 bp DNA ladder.

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