
Bulk Index/Bulk Density (Machine Method)

Purpose: To determine bulk index and bulk density. Do not confuse this measurement with analysis for weight percent light berries by ASTA Method 14.2. (Note 3)

Principle The volume of a known mass of sample is measured in a graduated cylinder after mechanical tapping to pack the sample. Bulk index is the inverse of bulk density.

A. Apparatus:

1. Nalgene Graduated cylinders, 250 mL, 500 mL, and 1000 mL capacity. (Note 1)
2. Stop watch.
3. Balance, ± 0.1 g at 100 g.
4. Bulk Index Machine:
 - . Consolidated Instruments Corp.
 - 8827 Kelso Drive
 - Baltimore, Maryland 21221
 - 410-391-9116

B. Reagents:

1. None.

C. Preparation of Sample:

1. Use as is.

D. Procedure:

1. Weigh 100 g of sample and place in graduated cylinder of appropriate size. Weigh 50g of parsley flakes or other bulky material exceeding 1000 mL volume. (Note 2)
2. Clamp cylinder in Bulk Index Machine and allow tapping to proceed for 60 seconds. Record volume to nearest 2 mL for 250, 5 mL for 500 or 10 mL for 1000 mL graduated cylinder.

E. Calculations:

$$\text{Bulk Index} = \frac{\text{Volume of Product (mL)}}{\text{Sample Weight (g)}} \times 100$$

$$\text{Bulk Density, g/mL} = \frac{\text{Sample Weight (g)}}{\text{Volume of Product (mL)}}$$

F. Statistics:

TBD

G. Notes:

1. Nalgene graduated cylinders with the following inside dimensions are recommended:

<u>Volume</u>	<u>Inside Diameter</u>	<u>Inside Height</u>
250 mL	1 3/8"	13"
500 mL	1 13/16"	14 1/2"
1000 mL	2 7/16"	16 1/2"

2. Loose bulk density can be determined by reading the volume in the graduated cylinder before tapping on the bulk index machine. For some materials, such as black pepper berries, loose bulk density might be more commonly reported than tap density (see ISO standard 959-1: 1998).
3. Bulk index/bulk density is a measurement of weight to volume (density) in a loose or tapped sample. It should not be confused with or used as an indication of percent light berries, which is a measure of the weight percentage of "low density" peppercorns in a sample.

H. References:

N/A

I. Revision History

- 01/24/13 Revised Note 2 with comment about use of loose bulk density for black pepper berries. Added Principle section. Added Note 3 to clarify difference between bulk density and percent light berries.