
Mold and Extraneous Matter in Black and White Pepper

Purpose: To determine the amount of mold and extraneous matter in black or white pepper.

Principle: Peppercorns are sampled, sifted by sieve and by hand for extraneous matter, and inspected visually for mold. Percent extraneous matter is calculated by mass ratio.

A. Apparatus:

1. A standard pepper sieve, (No. 9 1/2 round screen with a frame 18 to 22 inches in diameter and 2 3/4 inches in height. The bottom is a metal sheet perforated with round holes of 7/64 inch in diameter, with an average of 5 1/2 holes per linear inch. Screen only with standard pepper sieve obtainable from: McNichols Company, 5501 Gray Street, Tampa, Florida 33609 (813) 876-4100 or (800) 237-3820. U.S. Standard No. 8 sieve (0.0937 in. or 2.38 square mm opening) provide equivalent sieve opening.
2. Balances -- one with sensitivity to ± 0.01 g and one with sensitivity to ± 0.1 mg.
3. Beaker, 400 ml.
4. Tweezers.
5. Stereoscopic, Binocular, wide-field microscope (40-50x).

B. Reagents:

1. Petroleum ether (Note 1)

C. Preparation of Sample:

1. The number of samples drawn must be equal to the square root of the packages, bags, or containers in the lot, with maximum of 10 samples drawn.
2. The sample size shall be 3/4 to 1 pound (340 g to 454 g).
3. Each entire subsample must be analyzed.

D. Procedure:

1. To Determine Excreta, Insects, Mites, Psocids, Mold, and Percent Black Pepper in White Pepper:
 - a. Weigh each sub-sample to the nearest gram. Sprinkle and examine a small portion at a time, with a good light and against a white background into a standard pepper sieve. Pick out any bird, rodent, or other animal excreta. Separate

mammalian from non-mammalian excreta. Weigh to the nearest 0.1 mg and record. Do not remove other extraneous/foreign material at this time.

- b. Shake pepper sieve moderately back and forth, examine siftings collected on white background for live and dead insects and for excreta.
 - c. Accumulate the siftings.
 - d. Mix sub-sample of pepper on sieve and weight 50 g of aliquot into a pan. Hand-pick moldy peppercorns and weigh (Note 1). In case of white pepper, additionally hand pick for black peppercorns (with skin coat attached) and record. Each sub-sample is examined in sequence in a similar manner and the results are averaged.
2. Extraneous/Foreign Matter by Sifting:
 - a. Weigh to nearest 0.1 g the cumulated siftings and calculate the percentage by weight. Percent siftings must be determined after the removal of small berries that pass through the pepper sieve. (See Calculations)
 3. Extraneous/Foreign Matter by Hand Picking
 - a. Combine sufficient material from each sub-sample to give a composite sample of approximately 5 lbs. Mix composite well.
 - b. Form the composite into a pile shaped like a cone. Quarter the cone designating each quarter as A, B, C, or D in a clockwise sequence.
 - c. From two opposite quarters such as A & C, weigh 100 grams from each and hand pick for any sticks, stones, stems, foreign seeds, other extraneous matter, and make note of its nature. Set the hand-picked berries aside for determination of light berries by ASTA method 14.2.
 - d. Weigh the pickings and calculate. (See Calculations)

E. Calculations:

$$\% \text{ Extraneous/Foreign Matter by Sifting} = \frac{\text{Wt. of combined sifting (g)}}{\text{Combined wt. of sub-samples (g)}} \times 100$$

$$\% \text{ Extraneous/Foreign Matter by Hand Picking} = \frac{A \text{ (in grams)} + C \text{ (in grams)}}{2}$$

F. Statistics:

TBD

G. Notes:

1. Coating of peppercorns with exogenous oils has been used to mask visual detection and hide the presence of mold. If this practice is suspected, one should remove the oil from the sample before inspection. To remove the oil, soak 50 g of peppercorns

briefly in 100 ml petroleum ether, pour off the solvent and allow the peppercorns to dry. Continue with the visual inspection.

H. References:

Macroanalytical Procedures Manual 1984, Chapter 5.

I. Revision History

10/02/12 Moved instructions for light berries determination to a separate method. Specified use of hand-cleaned subsamples (end of step D.3.) for use in light berries determination to be in conformance with ISO standard 959-1 (Annex A). Added Note 1 and petroleum ether to reagent list for treatment to remove any added oil coatings from black pepper and facilitate visual detection of mold. Added Principle section.