
Extraneous Matter in Spices (Excluding Black and White Pepper)

Purpose: To determine the amount of extraneous matter in spices (excluding black and white pepper).

Principle: Spices are sampled, sorted, examined visually and analyzed by mass or number count for level of extraneous matter and moldy/defiled/infested product.

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 with sensitivity of ± 0.01 g for sample and ± 0.1 mg for excreta.
3. Tweezers.
4. Binocular, wide-field microscope (40-50x).

B. Reagents

None required.

C. Preparation of Sample

1. The number of samples drawn must be equal to the square root of the package, bags or containers in the lot with a maximum of ten samples drawn.
2. The sample size shall be 3/4 to 1 pound for high density items. These include: Cassia, Cinnamon (Seychelle), Nutmeg (Whole and Broken), Ginger, Cloves, Allspice/Pimento, Turmeric, Celery Seed, Poppy Seed, Sesame Seed, Caraway Seed, Cardamom Seed, Anise Seed, Coriander Seed, Cumin Seed, Dill Seed, and Fennel Seed.
3. The sample size shall be 1/2 to 3/4 of a pound for low density items. These include: Chillies, Capsicums, Mace, Sage, Oregano Leaves, Basil Leaves, Laurel Leaves, Thyme Leaves, Rosemary Leaves, Tarragon Leaves, Marjoram Leaves and Savory Leaves.
4. Regardless of sample size, the entire subsample must be analyzed.

D. Procedure

1. Whole and Broken Nutmegs:

Whole Nutmegs:

- a. Weigh and shake each subsample on the sieve. Examine siftings for live and dead insects, extraneous matter and mammalian or other excreta.
- b. Select at random 100 Nutmegs from each subsample. Cut the Nutmegs in half longitudinally. Examine the cut surfaces of each Nutmeg for evidence of insects or insect damage and presence of mold filaments. Report as rejects Nutmegs containing insects or insect parts, insect excreta, insect channeling, and those showing mold filaments on 25% or more of the cut surface of each. (Note 3) Check borderline or doubtful specimens using magnification. Report results for Insect Defiled/Infested and for Mold separately for each subsample in % by count and average.

Broken Nutmegs:

- a. Weigh and shake each subsample on the sieve. Examine siftings for live and dead insects, extraneous matter. (Note 1)
- b. Mix thoroughly, weigh out 50 grams of each subsample and examine the surfaces of the Nutmegs for evidence of insects or insect damage and presence of mold filaments. Report as rejects Nutmegs containing insects or insect parts, excreta, insect channeling, and those showing mold filaments on 25% or more of the cut surface of each. (Note 3) Check borderline or doubtful specimens using magnification. Report results of each subsample in % by weight and average. Results of Insect Defiled/Infested and Mold can be combined in the case of Broken Nutmegs. (Note 1)

2. Chillies:

- a. The individual subsample is weighed, shaken from the bag, a small portion at a time, with a good light, on the sieve with white paper beneath. As the chillies are discharged on the sieve, they are examined for extraneous/foreign matter, mammalian, or other excreta. (Note 1)
- b. When the entire sample is on the sieve, it is shaken back and forth a few times. The siftings on the white paper are also examined for live and dead insects, mammalian, or other excreta.
- c. The sample is mixed and a 25 gram portion for chillies up to 2 1/2 inches in length or 100 gram portion for chillies over 2 1/2 inches in length is taken at random for examination of mold or insect defiled/infested chillies. (Note 3) The chillies are broken and examined inside. Moldy chillies (mold exceeding 1/4 of its area or with aggregate area > 1 cm²) or insect defiled/infested pods are weighed and % by weight determined.
- d. Each sample representing the lot is done in sequence in this manner.

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3. Basil, Marjoram, Oregano (Note 2), Rosemary Leaves, Savory, Tarragon, and Thyme:
 - a. The individual subsamples are weighed. Each subsample is shaken from the bag, a small portion at a time on white paper, with good light.
 - b. As the sample is discharged and spread out on the paper, examine and pick out live and dead insects, mammalian and other excreta, mold and insect defiled/infested pieces. (Note 1 and Note 3)
 - c. Report by count (Whole Insects) or by weight (Mammalian Excreta. Other Excreta, Mold and Insect Defiled/Infested Pieces) on the Certificates of Analysis.
 - d. Extraneous/Foreign Matter is defined as everything foreign to the product itself and includes, but is not restricted to: stones, dirt, wire, string, stems, sticks, nontoxic foreign seeds and hair and other plant materials, e.g. foreign leaves. (Note 5)
 - e. From a composite of the subsamples weigh out and hand pick 100 grams of sample for extraneous/foreign matter.
 - f. Record results in percent by weight.

 4. Anise Seed, Caraway Seed, Celery Seed, Cloves, Coriander, Cumin Seed, Dill Seed, Fennel Seed, Mace (siftings), Poppy Seed, Sesame Seed, Hulled Sesame Seed:
 - a. The individual subsamples are weighed. Each subsample is shaken from the bag, a small portion at a time on white paper, with good light.
 - b. As the sample is discharged and spread out on the paper, examine and pick out live and dead insects, mammalian or other excreta, mold and insect defiled/infested pieces. (Note 1, Note 3)
 - c. Report by count (Whole Insects) or by weight (Mammalian Excreta. Other Excreta, Mold and Insect Defiled/Infested Pieces).
 - d. Extraneous/Foreign Matter is defined as everything foreign to the product itself and includes, but is not restricted to: stones, dirt, wire, string, stems, sticks, nontoxic foreign seeds and hair.
 - e. From a composite of the subsamples weigh out and hand pick 50 grams of sample for extraneous/foreign matter.
 - f. Record results in percent by weight.

 5. Allspice/Pimento, Whole Cardamom, Broken Cassia, Madagascar and Seychelle Cinnamon, Ginger, Laurel Leaves, Mace (whole), Sage, Turmeric (Note 4, Note 5):
 - a. The individual subsample is weighed, shaken from the bag, a small portion at a time, with a good light, on the sieve with white paper beneath. As the sample is discharged on the sieve, examine for extraneous/foreign matter, mammalian, or other excreta.
 - b. When the entire sample is on the sieve, it is shaken back and forth a few times. The siftings on the white paper are also examined for live and dead insects, mammalian, or other excreta. (Note 1)
 - c. Examine entire sample for mold or insect defiled/infested pieces. (Note 3)
 - d. Report by count (Whole Insects) or by weight in milligrams (Mammalian Excreta, Other Excreta).
 - e. Each sample representing the lot is done in sequence in this manner.

6. Cassia Sticks or Vera AA Cassia:
 - a. Break each stick separately from the entire subsample into pieces with a hammer or weight.
 - b. Examine the pieces for mold or insect defiled/infested pieces. (Note 3)
 - c. The entire stick is considered in the calculations where evidence of contamination is found.
 - d. Report results of each subsample in % by weight in milligrams.

E. Calculations

1.
$$\text{Excreta mg/lb} = \frac{\text{Weight Excreta (mg)} \times 454\text{g}}{\text{Weight of Product (g)} \quad 1 \text{ lb.}}$$
2.
$$\% \text{ Moldy/Insect Defiled/Infested Product} = \frac{\text{Weight Reject Product (g)}}{\text{Weight Product (g)}} \times 100$$
3.
$$\% \text{ Siftings} = \frac{\text{Weight Siftings (g)}}{\text{Weight Product (g)}} \times 100$$
4.
$$\% \text{ Extraneous Matter} = \frac{\text{Weight Extraneous Matter (g)}}{\text{Weight Product (g)}} \times 100$$

F. Statistics

TBD

G. Notes

1. Calculate the average milligrams of mammalian excreta and the average milligrams of other excreta across all of the subsamples analyzed and report each value separately, and as mg/lb (see Calculations).
2. In the case of Oregano, analysis for the presence of Sumac must be performed (See Method 26.0). However, if the samples are marked "Product of Mexico", analysis for the presence of Sumac shall not be mandatory.
3. Classification of Mold and Insect Defiled - Insect Defiled -- Any product material exhibiting definite evidence of insect feeding or webbing.

Mold -- any material bearing mold, visible to the naked eye, exceeding 1/4 of its area and confirmed by the presence of mycelial filaments and spores when examined with the aid of a microscope (40X magnification or less).

4. In the case of Sage and Bay leaves only, a separate column will be used on the Certificate of Analysis to report "Stems." This information will be for economic purposes only and will not represent a pass/fail criteria.

5. The definitions of extraneous plant material/stem:

SAGE - If any pithy plant material exceeds one (1) millimeter in diameter at any point on its contiguous body, the attached leaves are stripped and if the length exceeds twelve and a half (12.5) millimeters, the remaining material is defined as a stem. In addition, if any pithy plant material exceeds two (2) millimeters in diameter at any point, it is considered to be a stem regardless of its length. That material is to be weighed and the total weight of stems reported as a percentage.

BAY (LAUREL) LEAVES - If any pithy plant material, excluding the "bud," exceeds one (1) millimeter in diameter at any point on its contiguous body, the attached leaves are stripped and if the length exceeds twelve and a half (12.5) millimeters, the remaining material is defined as a stem. In addition, if any pithy plant material exceeds two (2) millimeters in diameter at any point, it is considered to be a stem regardless of its length. That material is to be weighed and the total weight of stems reported as a percentage.

ROSEMARY and SAVORY - The analyst establishes an average size of the leaves in a particular lot. Any pithy plant material other than the leaves exceeding that size/dimension is defined as extraneous matter.

THYME - If any pithy plant material exceeds the suggested length of twelve and a half (12.5) millimeters (1/2"), it is defined as extraneous matter.

CLOVES - If a stem attached to a clove is greater in length than the clove itself, it shall be broken off and counted as a clove stem.

OREGANO - If any pithy plant material exceeds one (1) millimeter in diameter at any point on its contiguous body, the attached leaves are stripped and if the length exceeds twelve and a half (12.5) millimeters (1/2"), the remaining material is defined as extraneous matter. In addition, if any pithy plant material exceeds two (2) millimeters in diameter at any point, it is considered to be extraneous matter regardless of its length.

SWEET BASIL - If any pithy plant material exceeds one (1) millimeter in diameter at any point on its contiguous body, the attached leaves are stripped and if the length exceeds twelve and a half (12.5) millimeters (1/2"), the remaining material is defined as extraneous matter. In addition, if any pithy plant material exceeds two (2) millimeters in diameter at any point, it is considered to be extraneous matter regardless of its length.

H. References

Macroanalytical Procedures Manual (MPM) 1984, Chapter V.

I. Revision History

4/26/14 Added aggregate area limit to mold on chillies to be consistent with directions in ASTA Cleanliness Specifications. Specified balance precision for measurement of excreta. Added Principle section and updated formatting to comply with current ASTA method layout.