Designation: E 1395 – 90 (Reapproved 1997)ε1

Standard Test Method for Sensory Evaluation of Low Heat Chilies[1]

This standard is issued under the fixed designation E 1395; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

ε[1] NOTE—Sections 2 and 7 were corrected editorially in July 1998.

1. Scope

1.1 This test method describes standardized procedures for the sensory evaluation of heat in low heat chili peppers ranging from 200 to 2500 Scoville heat units.

1.2 This test method is intended as an alternative to the Scoville heat test (see ASTA Method 21.0 and ISO 3513), but results can be expressed in Scoville heat units (S.H.U.).

1.3 This test method does not apply for ground red pepper or oleoresin capsicums.

1.4 The values stated in SI units are to be regarded as the standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in Section 8.

2. Referenced Documents

2.1 *ASTM Standards:*

E 1083 Test Method for Sensory Evaluation of Red Pepper Heat[2]

2.2 *ASTA Standard:*

ASTA Method 21.0 Official Analytical Methods[3]

2.3 *ISO Standard:*

ISO 3513-1977 (E), Spices and Condiments—Chilies—Determination of Scoville Index[4]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *approaching strong heat—N*-vanillyl-*n*-nonamide, 1.30 ppm. This is 13.0 cm on the 15-cm line scale. It is unusual to see a ground red pepper stronger than this. But in the event that a pepper with more than expected heat is tested, there remains the last 2 cm on the 15-cm line scale.

3.1.2 *low heat chilies*—variety of red pepper (capsicum) containing less than 0.1 % capsaicin (less than 2500 Scoville heat units).

3.1.3 *moderate heat—N*-vanillyl-*n*-nonamide, 0.80 ppm. This is a“ moderate” amount of pepper heat. It reads 10 cm on the 15-cm line scale.

3.1.4 *rinse*—to purge the oral cavity with unsalted soda crackers and 20°C spring or distilled water by slowly chewing and swallowing the cracker, followed by swirling the water around in the mouth and swallowing. This procedure is repeated as often as is natural and comfortable for the panelist.

3.1.5 *Scoville heat units (S.H.U.)*—the commonly accepted unit for expressing heat levels in capsicum products (see ISO 3513 and Footnote 4). S.H.U. range from 0 to 1 500 000.

3.1.6 *slight heat—N*-vanillyl-*n*-nonamide, 0.40 ppm. This is a “slight” amount of pepper heat. It reads 5 cm on the 15-cm line scale.

3.1.7 *strong heat*—best defined by concept. Hotter than the 1.30 ppm *N*-vanillyl-*n*-nonamide sample. It reads 15 cm on the 15-cm line scale.

3.1.8 *threshold heat*—best defined by concept rather than by a standard dilution of *N*-vanillyl-*n*-nonamide. Threshold is that point where a panelist just barely senses burn and heat, or both. It reads 1.25 cm on the 15-cm line scale.

3.1.9 *zero heat—N*-vanillyl-*n*-nonamide, 0 ppm. No sensory heat. It reads 0 cm on the line scale.

4. Summary of Test Method

4.1 Ground low heat chili peppers are steeped in hot water with polysorbate-80 for 20 min, filtered, and the filtrate diluted in room temperature water. Trained panelists compare the heat in the pepper extract to a known concentration of a standard solution of synthetic capsaicin (*N*-vanillyl-*n*-nonamide) using a 15-cm line scale. The testing procedure is timed and takes 2 min for one test sample and 9 min for two test samples.[5]

[1] This test method is under the jurisdiction of ASTM Committee E-18 on Sensory Evaluation of Materials and Products and is the direct responsibility of mittee E18.06 on Food, Beverage, and Tobacco Evaluation.

Current edition approved Dec. 28, 1990. Published February 1991.

[2] *Annual Book of ASTM Standards*, Vol 15.07.

[3] Available from American Spice Trade Association, Box 1267, Englewood Cliffs, NJ 07632.

[4] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

[5] Gillette, M. H., Appel, C. E., and Lego, M., “A New Method for the Sensory Evaluation of Red Pepper Heat,” *Journal of Food and Science*, Vol 49, No. 4, 1984, p. 1028.

4.2 Panelists are screened for their accuracy and precision and trained to use the 15-cm line scale during two to three 15-min training sessions.

4.3 Standard general requirements for sensory testing are followed (see Test Method E 1083).

5. Significance and Use

5.1 This test method provides quick and accurate ratings for the sensory heat in low heat chilies ranging from 200 to 2500 Scoville heat units.

5.2 Sensory results from this test method correlate highly ($r^2 = 0.94$) with results from high-pressure liquid chromatography; making the two methods substitutable.[6]

6. Apparatus

6.1 *Magnetic Hot Plate Stirrers*, two.

6.2 *Beakers*, 600-mL, four.

6.3 *Small Beaker*, 50 to 100 mL.

6.4 *Analytical Balance*, capacity greater than 300 g, sensitive to 0.01 g.

6.5 *Volumetric Flasks*, 1000-mL, stoppered.

6.6 *Stopwatch*.

7. Reagents and Materials

7.1 *Coffee Filter Papers*, or low flavor qualitative filter paper.

7.2 *Medicine Cups*.

7.3 *Unsalted Soda Crackers*, unsalted tops.

7.4 *Water*, bottled, distilled, or deionized when available, or still spring water.

7.5 *Polysorbate-80*, food grade.

7.6 *Rating Forms*, 15-cm line scale anchored at 0 (none), 1.25 cm (threshold), 5 cm (slight), 10 cm (moderate), 15 cm (strong); see Appendix X1.

7.7 *N-vanillyl-n-nonamide*, available from Penta International.

8. Precautions

8.1 Pure *N*-vanillyl-*n*-nonamide will burn the eyes and skin upon direct contact. Gloves and caution must be used when handling *N*-vanillyl-*n*-nonamide in the crystalline form.

9. Calibration and Standardization of Panelists

9.1 Select ten to twelve panelists based on availability, attitude, and motivation of panelists. Screening for taste sensitivity is not necessary.

9.2 Prepare stock solution of *N*-vanillyl-*n*-nonamide (see 10.1.2).

9.3 Dilute the stock solution of *N*-vanillyl-*n*-nonamide to the following concentrations:

9.3.1 *N-vanillyl-n-nonamide*, 0 ppm—Add none of the stock solution to 200 mL of water.

9.3.2 *N-vanillyl-n-nonamide*, 0.40 ppm—Dilute 13.4 g of stock solution to 200 mL with water.

9.3.3 *N-vanillyl-n-nonamide*, 0.80 ppm—Dilute 26.8 g of the stock solution to 200 mL with water.

9.3.4 *N-vanillyl-n-nonamide*, 1.30 ppm—Dilute 43.3 g of the stock solution to 200 mL with water.

9.4 *Session 1 (15 min)*—Brief the panelists on the purpose of this test method. The purpose of the first session is to standardize their tongues and mouths to the reference standards with respect to the 15-cm line scale on the ballot (Fig. 1). Explain to the panelists that they may use any of the infinite number of points on the line scale to describe how hot a given sample is. Panelists will taste (see 10.2.3.1-10.2.3.3) the prepared coded standard dilutions, evaluate them critically, concentrating and memorizing their individual sensory heat levels. Panelists rinse well between samples with unsalted soda crackers and spring or distilled water for 2 min (they are timed). After the standards have been tasted, the correct rating for each reference standard is given. A new set of labeled standard dilutions is presented to the panelists to review. Definitions for "0,"" threshold," "slight," "moderate," "approaching strong," and "strong" are provided. Refer to 3.1.4-3.1.8..

9.5 *Session 2 (15 min)*—This session should follow the first training session by one to two days. During this session, the panelists will be both trained and tested. Explain to the panelists how they will be evaluating the actual red pepper test samples. Explain the entire tasting procedure as defined below:

9.5.1 Panelists are served 10-mL portions of each of two samples in coded medicine cups. The control (0.4 ppm *N*-vanillyl-*n*-nonamide) is always served first, coded "C." The test sample is served second, with a random two-letter code. Two sets of samples are evaluated per sitting. The tasting procedure is described in 10.2.3.

9.5.2 For this second training session, the panelists are served the "control" first, coded "C," then a test sample coded with a random two letter code. They will evaluate two sets of samples:

9.5.2.1 Control and 0.80 ppm *N*-vanillyl-*n*-nonamide.

9.5.2.2 Control and 0.40 ppm *N*-vanillyl-*n*-nonamide (the same as the control).

9.5.2.3 Do not tell the panelists what the test samples are. After learning the standard heat intensities during Session 1,

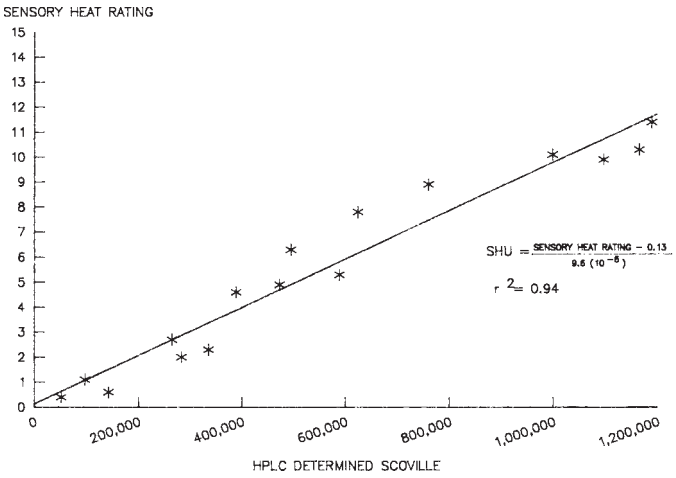

FIG. 1 Low Heat Chilies Sensory versus HPLC

[6] Hoffman, P. G., Salb, M. C., and Galetto, W. G., "Separation and Quantitation of Red Pepper Heat Principles by Reverse Phase HPLC," *Journal of Agricultural and Food Chemistry*, Vol 31, No. 6, October 1983, p. 1326.