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2024 Chemical Unknown (Gas Lachrymator) Proficiency Test
FTS-24-CHEM2 Summary Report

The Submission Deadline for this test was September 27, 2024

The test was manufactured by FTS at the FTS Laboratory Facility (127 W. Grand River Avenue, Williamston, MI 48895) and all activities were coordinated by Rebecca Smith (rsmith@forsci.com), Proficiency Test Program Manager. Ms. Smith is also authorizing the release of this report. This is the summary report issued on 10/23/24. FTS considers all reports confidential and does not release information regarding participant's results without authorization from that participant.

Summary

Test results were received in 17 of 19 tests distributed (89% response rate). Of the 17 respondents:

8 of 17 (47%) reported that Item 1 and Item 2 could not have originated from the same lachrymator spray can.
3 of 17 (18%) reported, "My laboratory does not compare gas lachrymator compounds to determine if they could have come from the same source", as to whether Item 1 and Item 2 could have originated from the same lachrymator spray can.
3 of 17 (18%) reported "Inconclusive" as to whether Item 1 and Item 2 could have originated from the same lachrymator spray can.
2 of 17 (12%) reported that Item 1 and Item 2 could have originated from the same lachrymator spray can.
1 of 17 (5%) reported, "Gas lachrymator compound(s) were not detected on one or both items.", as to whether Item 1 and Item 2 could have originated from the same lachrymator spray can.

Item 1
16 of 17 (94%) reported that Item 1 contained capsaicin and dihydrocapsaicin/oleoresin capsicum (OC).
4 of 17 (24%) reported that Item 1 contained Nonivamide/PAVA (pelargonic acid vanillylamide) along with capsaicin and dihydrocapsaicin.
3 of 17 (18%) reported that Item 1 contained Nordiydrocapsaicin along with capsaicin and dihydrocapsaicin. One of these responses also reported N-vanillylnonanamide.
1 of 17 (5%) reported that Item 1 contained "Nonivamide and/or Nordihydrocapsaicin" along with capsaicin and dihydrocapsaicin.
1 of 17 (5%) reported "N/A".

Item 2
17 of 17 (100%) reported that Item 2 contained capsaicin and dihydrocapsaicin/oleoresin capsicum (OC).
4 of 17 (24%) reported that Item 2 contained Nonivamide/PAVA (pelargonic acid vanillylamide) along with capsaicin and dihydrocapsaicin.
3 of 17 (18%) reported that Item 2 contained Nordihydrocapsaicin along with capsaicin and dihydrocapsaicin. One of these responses also reported N-vanillylnonanamide.

1 of 17 (5%) reported that Item 2 contained “Nonivamide and/or Nordihydrocapsaicin” along with capsaicin and dihydrocapsaicin.

Assigned Value

Proficiency tests under ISO 17043:2023 are assessed via comparison of the participant result to the assigned value of a proficiency test item or items. For quantitative tests, FTS determines the assigned value based on statistical methods described in ISO 13528:2022. For qualitative tests, the FTS study coordinator determines the assigned value based on a number of factors, including product source information, internal and/or external pre-distribution laboratory analysis, and consensus of responses (consensus value).

Quality systems and laboratory reporting guidelines vary greatly from laboratory to laboratory, therefore participating laboratories and their accrediting bodies are responsible for the assessment of whether a reported result is an outlying result. For the convenience of subscribers FTS has highlighted, in yellow, any result that in the opinion of the FTS study coordinator may be inconsistent with the assigned value in the summary report.

For this proficiency test, the following assigned values are based on source information which was then confirmed by laboratory analysis:

Item 1: Lachrymator compounds (capsaicin, dihydrocapsaicin) present.
Item 2: Lachrymator compounds (capsaicin, dihydrocapsaicin) present.
Item 1/2 Comparison: Items 1 and 2 could not have originated from the same source.

Manufacturer’s Information

Item 1 was produced by spraying RUGER Red Pepper Defense Gel (Lot# X0002046099, UPC 2306360215) directly onto a Jiehuxi Disposable Face Mask (Lot# MK01-50-WH, UPC X002LJ7UZ7) and allowing it to dry overnight in the hood. The mask was sealed inside a labeled GLAD® quart-sized freezer bag. The item was further packaged into a labeled 6” x 9” manila envelope, sealed per FTS guidelines.

Item 2 was produced by collecting Mace® Guard Alaska Bear Spray (Lot# 48492, UPC4392500153) in a glass container. Approximately 1mL of the collected bear spray was applied onto a Jiehuxi Disposable Face Mask (Lot# MK01-50-WH, UPC X002LJ7UZ7) using a pipette and allowed to dry overnight in the hood. The mask was sealed inside a labeled GLAD® quart-sized freezer bag. The item was further packaged into a labeled 6” x 9” manila envelope, sealed per FTS guidelines.

Items with matching UTICs were packaged together inside a large manila envelope, sealed and labeled per FTS guidelines.

Pre-distribution QA/QC testing was performed on Items 1 and 2 and both showed the presence of gas lachrymator compounds via GC-MS and were differentiable via UV Fluorescence.

Please examine the submitted items to identify and compare any gas lachrymator compounds present.

Items Submitted

Item 1: Disposable face covering with a suspected self-defense spray stain.
Item 2: Disposable face covering with a suspected self-defense spray stain.

3) Indicate all methods used for analysis (select all that apply):

A) ☐ Macro/Microscopic Examinations
B) ☐ Chemical Spot Tests
C) ☐ GC/FID/TEA/ECD
D) ☐ GC/MS
E) ☐ IC
F) ☐ SEM/EDS
G) ☐ Thin Layer Chromatography
H) ☐ PLM
I) ☐ HPLC
J) ☐ IR/FTIR Analysis
K) ☐ ICP-MS
L) ☐ CE
M) ☐ XRD
N) ☐ XRF
O) ☐ HPLC/MS
P) ☐ DART TOF-MS
Q) ☐ UV Fluorescence
R) ☐ pH
S) ☐ Raman Spectroscopy
T) ☐ ICP-AES
U) ☐ Commercial Test Strips

UTIC	Webcode	Indicate all methods used for analysis (select all that apply)
p20241502	W061	GC/MS; Macro/Microscopic Examinations
p20241503	W061	GC/MS; UV Fluorescence
p20241504	W061	Macro/Microscopic Examinations; GC/MS
p20241505	W061	Macro/Microscopic Examinations; GC/MS; UV Fluorescence
p20241506	W061	Macro/Microscopic Examinations; GC/MS; UV Fluorescence
p20241507	W205	GC/MS
p20241508	W144	GC/MS
p20241509	W163	Macro/Microscopic Examinations; GC/MS
p20241510	W153	GC/MS; HPLC/MS
p20241511	W003	GC/MS; UV Fluorescence
p20241512	W110	Macro/Microscopic Examinations; GC/MS; UV Fluorescence
p20241513	W110	Macro/Microscopic Examinations; GC/MS; UV Fluorescence
p20241514	W027	Macro/Microscopic Examinations; GC/MS; UV Fluorescence
p20241515	W027	Macro/Microscopic Examinations; GC/MS
p20241518	W053	Macro/Microscopic Examinations; GC/MS
p20241519	W051	Macro/Microscopic Examinations; GC/MS
p20241520	W070	Macro/Microscopic Examinations; GC/MS; UV Fluorescence

4) Other methods used (if none, please enter "N/A"):

UTIC	Webcode	Other methods used (if none, please enter “N/A”)
p20241504	W061	Alternative light source
p20241505	W061	Hyper spectral imaging Polilight
p20241506	W061	Screening using shortwave and longwave UV light source.
p20241508	W144	QuEChERS
p20241518	W053	GC x GC - TOF - MS

5) Item 1

Were lachrymator compound(s) detected in Item 1?

A) ◯ Yes

B) ◯ No

C) ○ Inconclusive

6) What lachrymator compound(s) were detected in Item 1?

UTIC	Webcode	Item 1 Were lachrymator compound(s) detected in Item 1?	What lachrymator compound(s) were detected in Item 1?
p20241502	W061	Yes	Capsaicin Dihydrocapsaicin
p20241503	W061	Yes	capsaicin and dihydrocapsaicin (oleoresin capsicum)
p20241504	W061	Yes	Pelargonic acid vanillylamide (PAVA), capsaicin and dihydrocapsaicin
p20241505	W061	Yes	Capsaicin, dihyrdocapsaicin and low levels of nonivamide and/or nordihydrocapsaicin. We do not have a standard of nordihydrocapsicin and as such it was not possible to confirm the presence of nonivamide/nordihydrocapsaicin.
p20241506	W061	Yes	Capsaicin, dihydrocapsaicin and nonivamide.
p20241507	W205	Yes	Capsaicin and dihydrocapsaicin.
p20241508	W144	Yes	capsaicin and dihydrocapsaicin
p20241509	W163	Yes	Capsaicinoids (Capsaicin, Dihydrocapsaicin and PAVA).
p20241510	W153	Yes	Capsaicin (CAS:404-86-4) Dihydrocapsaicin (CAS:19408-84-5) Nordihydrocapsaicin (CAS:28789-35-7)
p20241511	W003	Yes	Capsaicin and Dihydrocapsaicin
p20241512	W110	Yes	Capsaicin and dihydrocapsaicin.
p20241513	W110	Yes	Capsaicin and dihydrocapsaicin were identified in Item 1.
p20241514	W027	Yes	Capsaicin Dihydrocapsaicin Nordihydrocapsaicin
p20241515	W027	No	N/A
p20241518	W053	Yes	Item 1 contains capsaicinoids as lachrymator compounds, among which capsaicine, dihydrocapsaicine, nonivamide and a few other related compounds. These are compounds found in spray cans of pepper spray.

UTIC	Webcode	Item 1 Were lachrymator compound(s) detected in Item 1?	What lachrymator compound(s) were detected in Item 1?
p20241519	W051	Yes	Nordihydrocapsaicin, N-Vanillylnonanamide, Capsaicin, Dihydrocapsaicin
p20241520	W070	Yes	Capsaicin and dihydrocapsaicin

7) Item 2

Were lachrymator compound(s) detected in Item 2?

A) ◯ Yes

B) ◯ No

C) ◯ Inconclusive

8) What lachrymator compound(s) were detected in Item 2?

UTIC	Webcode	Item 2 Were lachrymator compound(s) detected in Item 2?	What lachrymator compound(s) were detected on Item 2?
p20241502	W061	Yes	Capsaicin Dihydrocapsaicin
p20241503	W061	Yes	capsaicin and dihydrocapsaicin (oleoresin capsicum)
p20241504	W061	Yes	Pelargonic acid vanillylamide (PAVA), capsaicin and dihydrocapsaicin
p20241505	W061	Yes	Capsaicin, dihyrdocapsaicin and low levels of nonivamide and/or nordihydrocapsaicin. We do not have a standard of nordihydrocapsicin and as such it was not possible to confirm the presence of nonivamide/nordihydrocapsaicin.
p20241506	W061	Yes	Capsaicin, dihydrocapsaicin and nonivamide.
p20241507	W205	Yes	Capsaicin and dihydrocapsaicin.
p20241508	W144	Yes	capsaicin and dihydrocapsaicin

UTIC	Webcode	Item 2 Were lachrymator compound(s) detected in Item 2?	What lachrymator compound(s) were detected on Item 2?
p20241509	W163	Yes	Capsaicinoids (Capsaicin, Dihydrocapsaicin and PAVA).
p20241510	W153	Yes	Capsaicin (CAS:404-86-4) Dihydrocapsaicin (CAS:19408-84-5) Nordihydrocapsaicin (CAS:28789-35-7)
p20241511	W003	Yes	Capsaicin and Dihydrocapsaicin
p20241512	W110	Yes	Capsaicin and dihydrocapsaicin.
p20241513	W110	Yes	Capsaicin and dihydrocapsaicin were identified in Item 2.
p20241514	W027	Yes	Capsaicin Dihydrocapsaicin Nordihydrocapsaicin
p20241515	W027	Yes	Capsaicin and dihydrocapsaicin
p20241518	W053	Yes	Item 2 contains capsaicinoids as lachrymator compounds, among which capsaicine, dihydrocapsaicine, nonivamide and a few other related compounds. These are compounds found in spray cans of pepper spray.
p20241519	W051	Yes	Nordihydrocapsaicin, N-Vanillylnonanamide, Capsaicin, Dihydrocapsaicin
p20241520	W070	Yes	Capsaicin and dihydrocapsaicin

9) If gas lachrymator compound(s) are present on both Item 1 and Item 2, could they have originated from the same lachrymator spray can?

A) ○ Yes

B) ○ No

C) ○ Inconclusive

D) ○ Gas lachrymator compound(s) were not detected on one or both items.

E) ○ My laboratory does not compare gas lachrymator compounds to determine if they could have come from the same source.

UTIC	Webcode	If gas lachrymator compound(s) are present on both Item 1 and Item 2, could they have originated from the same lachrymator spray can?
p20241502	W061	Yes
p20241503	W061	No
p20241504	W061	No
p20241505	W061	My laboratory does not compare gas lachrymator compounds to determine if they could have come from the same source.
p20241506	W061	No
p20241507	W205	Inconclusive
p20241508	W144	My laboratory does not compare gas lachrymator compounds to determine if they could have come from the same source.
p20241509	W163	My laboratory does not compare gas lachrymator compounds to determine if they could have come from the same source.
p20241510	W153	Yes
p20241511	W003	No
p20241512	W110	No
p20241513	W110	No
p20241514	W027	Inconclusive
p20241515	W027	Gas lachrymator compound(s) were not detected on one or both items.
p20241518	W053	Inconclusive
p20241519	W051	No
p20241520	W070	No

10) How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court). In order to maintain confidentiality, please refrain from including identifying information specific to your laboratory.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20241502	W061	Item 1 comprised a security sealed paper envelop enclosing a plastic bag containing a face mask. Capsaicin and dihydrocapsaicin were detected on the face mask. Item 2 comprised a security sealed paper envelop enclosing a plastic bag containing a face mask. Capsaicin and dihydrocapsaicin were detected on the face mask. Capsaicin and dihydrocapsaicin are lachrymatory agents present in the extracts of hot peppers (oleoresin capsicum). Residues consistent with originating from Oleoresin Capsicum (OC) were detected on the face mask in Item 1 and Item 2.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20241503	W061	**Item 1** contained a white disposable face covering with an area stained bright, dark orange. The stain was found to contain oleoresin capsicum (OC). **Item 2** contained a white disposable face covering with an area stained pale orange. The stain was found to contain oleoresin capsicum (OC). Based on the visual and chemical properties examined, the stained areas of Item 1 and Item 2 were found to be different, and therefore could not have originated from a common source.
p20241504	W061	On the basis of the samples received and the examinations and testing conducted, I have formed the following opinions: 1. Pelargonic acid vanillylamide (PAVA), capsaicin and dihydrocapsaicin were detected in the stained areas on the disposable face mask for each of items 1 and 2. PAVA, capsaicin and dihydrocapsaicin are typically found in 'pepper' defence sprays. 2. I am able to exclude the proposition that the residues found in the stained areas of the face masks in each of items 1 and 2 could have originated from the same lachrymator spray can.
p20241505	W061	Item 1 and Item 2 were both found to contain capsaicin, dihydrocapsaicin and/or nonivamide/ nordihydrocapsaicin. These compounds are lachrymogenic agents, and are the active compounds commonly found in OC, or pepper-based, personal defence sprays.
p20241506	W061	I formed the opinion based on the techniques used that the two disposable face coverings (items 1 and 2) were both found to contain capsaicin, dihydrocapsaicin and nonivamide (also known as PAVA). Capsaicin, dihydrocapsaicin and nonivamide (PAVA) are lachrymatory agents known to be present in some oleoresin capsicum (OC) personal defense spray formulations. I also formed the opinion that the lachrymatory agent reisdues present on the two disposable face coverings (items 1 and 2) could not have originated from the same source.
p20241507	W205	Both item 1 and 2 contain capsaicin and dihydrocapsaicin.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20241508	W144	Object ID: [redacted] Identified in the Chain of Custody Ticket with Consecutive Number of the indication, Collection date (day/month/year), Time (24 hour format): "FTS-24-CHEM2 , Item 1, p20241508". (1) In the area that presents the orange stains of the received mask, the presence of capsaicin and dihydrocapsaicin was identified (See Note 5). Object ID: [redacted] Identified in the Chain of Custody Ticket with Consecutive Number of the indication, Collection date (day/month/year), Time (24 hour format): "FTS-24-CHEM2 , Item 1, p20241508". (2) In the area that presents the orange stains of the received mask, the presence of capsaicin and dihydrocapsaicin was identified (See Note 5). Note 5: Capsaicin and dihydrocapsaicin are oral, eye and respiratory tract irritants found in the fruits of plants of the Capsicum genus and in personal protection spray devices (Fung, et al, 1982).

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20241509	W163	Both Item 1 and Item 2 comprised a white-coloured, disposable type, face mask. Orange-coloured staining was present on the fabric of each mask. A small area of stained fabric and a small area of unstained fabric (to act as a control) were cut from both masks. These areas were extracted in a solvent (acetone) and analysed, alongside laboratory quality controls, for a range of lachrymatory substances: CN, CS, capsaicin, dihydrocapsaicin and PAVA. Analysis of the stained areas on both masks detected the presence of capsaicinoids (capsaicin, dihydrocapsaicin and PAVA). Capsaicinoids are the active components typically found in, and can be obtained from, the internal, fleshy parts of the fruit of chilli peppers, such as paprika and cayenne. Capsaicin and dihydrocapsaicin are powerful irritants and are typically the most abundant and pungent capsaicinoids obtained from the peppers. PAVA, also referred to as nonivamide, occurs naturally at low concentrations in peppers; PAVA can also be produced synthetically and thus is often referred to as 'synthetic capsaicin'. Capsaicinoids are ingredients in a range of commercially available products such as culinary oils and therapeutic topical ointments, but are also typically encountered in aerosols used as lachrymatory riot control agents/incapacitant sprays, commonly termed 'pepper sprays'. These substances are considered noxious, causing irritation and a burning sensation when they make contact with the eyes, soft tissues of the face and the mucous membranes of the mouth and nose. They can also cause coughing, a feeling of tightness in the chest and nausea.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20241510	W153	The analyses performed on samples from Item 1 and Item 2 lead us to the following conclusions: Stains on the disposable face covering (Item 1 and Item 2) contain Oleoresin Capsicum (OC), polyethyleneglycols and glycol ethers. OC is a riot control agent with lachrymator properties. As eye, skin and throat irritant, it is typically used in pepper defense spray canisters. It is also found in pepper oils. Glycols are additives generally used as viscous products. A chemical fingerprint characterized by the presence of OC and glycols is generally found in lachrymator products as pepper gel. No other specific compounds to lachrymator products have been found on items 1 and 2 (especially CS and CR). The chemical profiles of items 1 and 2 are indistinguishables. This leads us to support that a common pepper gel is a possible source for both stains on items 1 and 2. Nevertheless, no formal restriction to a unique common origin could be affirmed as the stains on items 1 and 2 could have come from another lachrymator product indistinguishable in chemical composition.
p20241511	W003	Items 1.1 and 2.1 were each found to contain the lachrymators capsaicin and dihydrocapsaicin. The stains on Items 1 and 2 did not originate from the same spray source.
p20241512	W110	Capsaicin and dihydrocapsaicin were identified in Item 1 and Item 2. These chemicals are active ingredients utilized in aerosol pepper spray devices. The stains on Item 1 and Item 2 could not have originated from the same source.
p20241513	W110	Capsaicin and dihydrocapsaicin were identified in the stained areas in Item 1 and Item 2. These chemicals are active ingredients utilized in aerosol pepper spray devices. The stained areas in Item 1 and Item 2 could not have originated from the same lachrymator spray can.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20241514	W027	Examinations: Visual examination, UV examination, solvent extraction, gas chromatography - mass spectrometry Information: The requested analysis was to examine the disposable masks (Items 1, 2) to identify and compare potential lachrymators on the masks. Both masks had orange-colored staining present. Results: Oleoresin capsicum (OC) compounds, including capsaicin, dihydrocapsaicin, and nordihydrocapsaicin, were identified in solvent extracts of the orange regions of Items 1 and 2. OC is a lachrymator that is present in some peppers and some defense sprays. No conclusions were drawn regarding the comparison of the lachrymators due to unknown histories of the masks and a lack of submitted reference samples (e.g., clean masks, defense sprays). Additional Remarks: The term "identified" is used when a compound is confirmed based upon comparison to a laboratory standard or reference material.
p20241515	W027	Information: Items 1 and 2, both disposable masks with orange/tan staining, were analyzed for the presence of lachrymators. Cuttings from both the stained and unstained portions of the masks were analyzed using GCMS. The unstained cuttings were used as controls. Results: No substances consistent with lachrymators were detected in Item 1. Capsaicin and dihydrocapsaicin, known components of some lachrymators, were identified as being present in Item 2. Both Identified compounds are also known to be present in peppers.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p20241518	W053	On both item 1 and item 2 a similar series of capsaicinoids has been found in combination with 2-(butoxyethoxy)ethanol as a solvent. Based on this, the gas lachrymator compounds could have originated from the same spray can, but these compounds are not very specific and other spray cans of pepper spray with this solvent could also be the source of the foreign material on either of the items as well. Some (relative) differences between Item 1 and 2 have also been observed based on compounds related to glycerin and fatty acids. It remains unclear if this difference comes from differences in the spray can used or that these compounds come from another source. Therefore we are inconclusive on whether the gas lachrymator compounds present on Items 1 and 2 could have originated from the same lachrymator spray can.
p20241519	W051	**FINDINGS** 1. "Item 1": A disposable face mask with some orange stains. 2. "Item 2": A disposable face mask with some faint orange stains. 3. Some of the orange stains from the exhibits marked "Item 1" and "Item 2" were analysed. a. They were found to be different from each other in terms of chemical composition. b. They were each analysed for the presence of capsaicinoids, and capsaicin, dihydrocapsaicin, N-vanillylnonanamide and nordihydrocapsaicin could be detected. 4. *Note: According to literature, capsaicin, dihydrocapsaicin, N-vanillylnonanamide and nordihydrocapsaicin can be used as active ingredients in lachrymators such as pepper sprays.* **CONCLUSION** 5. The analysed stains from the exhibits marked "Item 1" and "Item 2" did not originate from the same source.
p20241520	W070	Instrumental analysis of Item 1 and Item 2 revealed the presence of capsaicinoids, chemical irritants commonly found in pepper spray, and additional chemical components. The compounds identified in Item 1 were consistent with those found in Item 2. However, the two were found to be inconsistent with respect to physical properties (fluorescence). Therefore, the stains on Item 1 and Item 2 could not have originated from the same source.

11) How long did it take to complete this test (in hours)? Please report actual analytical hours only.

12) Did you find this test to be a fair test of the process of the examination and interpretation of chemical unknowns?

A) ◯ Yes

B) ◯ No

UTIC	Webcode	How long did it take to complete this test (in hours)? Please report actual analytical hours only.	Did you find this test to be a fair test of the process of the examination and interpretation of chemical unknowns?
p20241502	W061	4	Yes
p20241503	W061	9.5	Yes
p20241504	W061	6 hours	Yes
p20241505	W061	8	Yes
p20241506	W061	6 hours	Yes
p20241507	W205	2	Yes
p20241508	W144	10 hours	Yes
p20241509	W163	7.00hrs	Yes
p20241510	W153	2	Yes
p20241511	W003	8	Yes
p20241512	W110	8	Yes
p20241513	W110	2	Yes
p20241514	W027	16	Yes
p20241515	W027	4	Yes
p20241518	W053	10	No
p20241519	W051	32	Yes
p20241520	W070	10	Yes

13) How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.

Additionally, this question is a means to provide you with an opportunity to explain or include information about your findings or interpretation, as needed. In order to maintain confidentiality, please refrain from including identifying information specific to your laboratory.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20241502	W061	No changes recommended	
p20241505	W061	The laboratory is generally only requested to identify the active ingrediants in relation to case work. This is a result of the legislation in relation to gas lachrymator agents. <u>Notes based on limited comparison results.</u> Both exhibits were found to contain similar lachrymogenic agents, however differences were observed between the flouresence of the staining and chromatographic profiles obtained from each item and could possibly be attributed to the carrier. Thus from the analysis performed it is my opinion it is unlikely that the lachrymatory agents detected are from the same source, but without determining the homegeniety of the product upon dispering or comparison with original proprietry product/s and/or a database I am unable to confirm.	Thank you for clarifying your responses.
p20241508	W144	The test and format conform to what our laboratory does	

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p20241514	W027	Unless reference materials are supplied (e.g., clean control samples and reference defense sprays), comparisons of questioned samples are dubious and should not be included in proficiency tests, as the potential "right" answers can vary. If I were only going on the three identified lachrymators (as indicated by the test question), then I'd have one answer; if I include the appearances of the stains, the physical properties of the extracts, and the non-lachrymator compounds detected (even if it is known that some are in some defense sprays), then I'd have a different answer.	Thank you for clarifying your responses. FTS has distributed cannisters of sprays and/or samples of controls in previous PT designs. We try to change the substrate and test design year to year. FTS asks results to be worded in the same manner as one would according to their agency's SOPs. Results may vary between agencies if one agency, for example, does not include other characteristics (e.g. UV fluorescence) for their comparisons and only reports gas lachrymator compounds present.
p20241518	W053	In case work we rarely see stains of the spray used, definitely not as thick and easily visible as in the test. We would recommend to put less material on a coloured background, where the stain are less easily noticed.	Thank you for the suggestion! We try to offer a variety of substrates year to year.
p20241519	W051	A known self-defense spray provided would allow for simulation experiments and further investigations of the questioned samples.	Thank you for the suggestion. FTS has distributed PTs with cannisters in previous years and tries to offer a variety of substrates and PT designs year to year.
p20241520	W070	The only difference in these two samples appears to be fluorescence. Item 1 fluoresces a bright blue/white, while Item 2 fluoresces a faint orange.	Thank you for clarifying your results.