

“Laboratory Triple-A” approach for rating pesticide residue laboratories participating in EUPTs

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Short communication

Laboratory Triple-A rating: A new approach to evaluate performance-underperformance of laboratories participating in EU proficiency tests for multi-residue analysis of pesticides in fruits and vegetables

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ABSTRACT

Since 2004, official laboratories analyzing pesticide residues in the EU classified, every year, into two groups or categories (A or B) taking into account the EU Proficiency Test for pesticide residues in fruits and vegetables (EUPFT). At least 90% of the pesticides present in the Test Item and reporting no false positives are included in the Category A, whereas all the others are included in the Category B. In this proposal, laboratories would be evaluated taking into account a three-dimensional (XYZ) classification, with three categories (A, B or C) within each dimension. Dimension X: scope; dimension Y: acceptable z-scores (dimension Z: false positives). The borderline criteria assigned to the laboratory, but those laboratories being in this category, the borderline criteria when they report none, one, or two false positives, the borderline criteria when they are assessed with the third dimension concept has been assessed with the Laboratory for Pesticides in Fruits and Vegetables (LRFV) assigned 17 analytes to three categories

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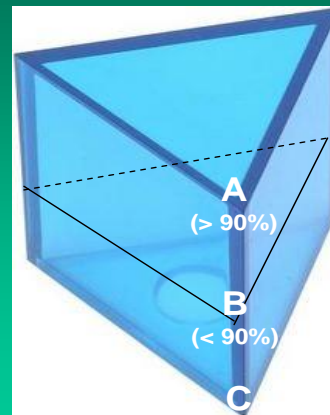
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A 3 dimensions (X Y Z) classification with 3 levels (A, B, C) each

False Positives: Z

Acceptable z-scores : Y

(0) A
(1) B
(> 1) C



A (> 90%)
B (< 90%)
C (< 50%)

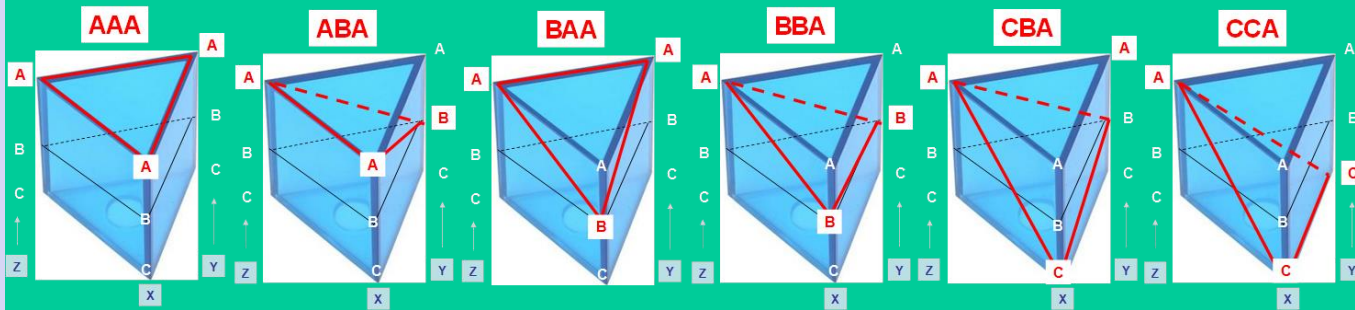
Scope: X

“Triple A”

AAA = GOOD

“Triple C”

CCC = INCOMPETENT



XYZ



X = Percentage of Analytes Detected (*quantified*)

related to the total number of compulsory analytes in the test item



Y = Percentage of ACCEPTABLE z-scores

related to the total number of compulsory analytes analyzed



Z = Number of False Positives



(X) Detected (*quantified*) Analytes

Percentages related to the number of (compulsory) analytes in the test item

A $\geq 90\%$

B $< 90\%$ but $\geq 50\%$

C $< 50\%$

(Y) ACCEPTABLE *z*-scores

Percentages related to the number of (compulsory) analytes analyzed

A $\geq 90\%$

B $< 90\%$ but $\geq 50\%$

C $< 50\%$

~~A~~

B $\geq 90\%$

C $< 90\%$



(Z) False Positives

A

NO false positives

B

ONE false positive

C

TWO or more false positives



Application of the 90% and 50% borderline criteria for dimensions “X” and “Y”

N*	90% N*	50% N*		N*	90% N*	50% N*
3	3	1		16	14	8
4	4	2		17	15	8
→ 5	4	2		18	16	9
6	5	3		19	17	9
7	6	3		20	18	10
8	7	4		21	19	10
9	8	4		22	20	11
10	9	5		23	21	11
11	10	5		24	22	12
12	11	6		25	22	12
13	12	6		26	23	13
14	13	7		27	24	13
15	13	7		28	25	14

* N = Number of compulsory analytes in the test item (dimensión “X”) or number of compulsory analytes analyzed by the laboratory (dimensions “Y”)



XYZ Classification of some Laboratories from the EUPT-FV13 Results

(19 pesticides in Mandarin)

	Detected	Analyzed (z-scores)	Acceptable z-scores	False Positives	X	Y	Z	SZ2
Lab057	19	19	18		A	A	A	2,14 A
Lab058	15	15	14		B	A	A	2,29 B
Lab059	18	18	18		A	A	A	0,71 A
Lab060	8	8	7		C	B	A	2,13 B
Lab061	19	19	19	1 F+	A	A	B	1,14 B
Lab062	12	12	10		B	B	A	2,93 B
Lab063	17	19	8		A	C	A	7,85 A

2 False Negatives

Old Category

XYZ Classification of the EUP (19 pesticides)

N*	90% N*	50% N*	N*	90% N*	50% N*
3	3	1	16	14	8
4	4	2	17	15	8
5	4	2	18	16	9
6	5	3	19	17	9
7	6	3	20	18	10
8	7	4	21	19	10
9	8	4	22	20	11
10	9	5	23	21	11
11	10	5	24	22	12
12	11	6	25	22	12
13	12	6	26	23	13
14	13	7	27	24	13
15	13	7	28	25	14

Detected
Analyzed (z-scores)
Acceptabl

Lab057	19	19	18		A	A	A	2,14	A
Lab058	15	15	14		B	A	A	2,29	B
Lab059	18	18	18		A	A	A	0,71	A
Lab060	8	8	7		C	B	A	2,13	B
Lab061	19	19	19	1 F+	A	A	B	1,14	B
Lab062	12	12	10		B	B	A	2,93	B
Lab063	17	19	8		A	C	A	7,85	A

2 False Negatives

Old Category



1 F+



EUPT-FV23*



18 Analytes

159 EU/EFTA Labs

					X	Y	Z
101	1 F+	17	18	17	A	A	B
103	1 F+	18	18	18	A	A	B
105	5 F+	6	16	5	C	C	C
107	1 F+	6	6	6	C	B	B
111		18	18	18	A	A	A
115	1 F+	13	14	8	B	B	B
119		17	17	15	A	A	A

Lab Code

False Positives

Detected

Analyzed

Acceptable z-scores



* In EUPT-FV23, Dicofol was considered FALSE POSITIVE, despite being reported by 13% of the EU/EFTA laboratories

EUPT-FV23*



18 Analytes

159 EU/EFTA Labs

		X	Y	Z
101	1 F+	17	18	17
103	1 F+	18	18	18
105	5 F+	6	16	5
107	1 F+	6	6	6
111		18	18	18
115	1 F+	13	14	8
119		17	17	15

Lab Code

False Positives

Detected

Analyzed

Acceptable z-scores

N*	90% N*	50% N*	N*	N*	90% N*	50% N*
3	3	1	16	14	8	
4	4	2	17	15	8	
5	4	2	18	16	9	
6	5	3	19	17	9	
7	6	3	20	18	10	
8	7	4	21	19	10	
9	8	4	22	20	11	
10	9	5	23	21	11	
11	10	5	24	22	12	
12	11	6	25	22	12	
13	12	6	26	23	13	
14	13	7	27	24	13	
15	13	7	28	25	14	

(X) Detected (quantified) Analytes
 Percentages related to the number of (compulsory) analytes in the test item

A ≥ 90%
 B < 90% but ≥ 50%
 C < 50%

(Y) ACCEPTABLE z-scores
 Percentages related to the number of (compulsory) analytes analyzed

A ≥ 90%
 B < 90% but ≥ 50%
 C < 50%

~~B ≥ 90%~~
~~C < 90%~~

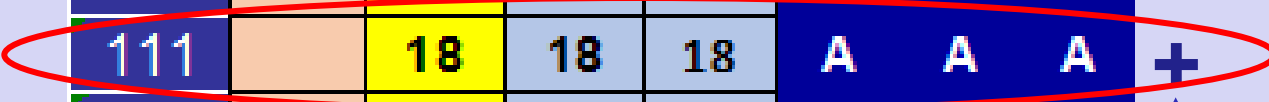
EUPT-FV23*



18 Analytes

159 EU/EFTA Labs

					X	Y	Z
101	1 F+	17	18	17	A	A	B
103	1 F+	18	18	18	A	A	B
105	5 F+	6	16	5	C	C	C
107	1 F+	6	6	6	C	B	B
111		18	18	18	A	A	A
115	1 F+	13	14	8	B	B	B
119		17	17	15	A	A	A



Lab Code
False Positives
Detected
Analyzed
Acceptable z-scores

AAA+ = New category for EXCELLENCE

EPRW 2024
(Poster PO-08)

AAA+ = Laboratories detecting 100% of the tested analytes with acceptable z-scores and reporting no false positives

EUPT-FV23*



18 Analytes

Lab Code	False Positives	Detected	Analyzed	Acceptable z-scores	X	Y	Z
101	1 F+	17	18	17	A	A	B
103	1 F+	18	18	18	A	A	B
105	5 F+	6	16	5	C	C	C
107	1 F+	6	6	6	C	B	B
111		18	18	18	A	A	A
115	1 F+	13	14	8	B	B	B
119		17	17	15	A	A	A

+

159 Labs

AAA+ 68 42,77%

A	A	A	105	66,04%
A	A	B	20	12,58%
A	A	C	2	1,26%
A	B	A	4	2,52%
A	B	B	1	0,63%
A	C	C	1	0,63%

B	A	A	8	5,03%
B	B	A	10	6,29%
B	B	B	2	1,26%
B	C	A	2	1,26%
C	B	A	1	0,63%
C	B	B	2	1,26%
C	C	C	1	0,63%

AAA + BAA + CBA = 71,7%

* In EUPT-FV23, 75.5 % of the laboratories would be classified as "AAA" (47.8 % as "AAA+") if Dicofol would have not been considered False Positive (13% of laboratories reported Dicofol, which was demonstrated not to be present in the test item).

EUPT-FV24



16 Analytes

155 EU/EFTA Labs

Lab Code

False Positives

Detected

Analyzed

Acceptable z-scores

X Y Z

Lab Code	False Positives	Detected	Analyzed	Acceptable z-scores	X	Y	Z
20		12	14	7	B	B	A
57		13	13	12	B	A	A
58		16	16	16	A	A	A
60		16	16	14	A	A	A
61	1 F+	14	14	14	A	A	B
64		7	7	7	C	B	A
169		4	16	3	C	C	A

+

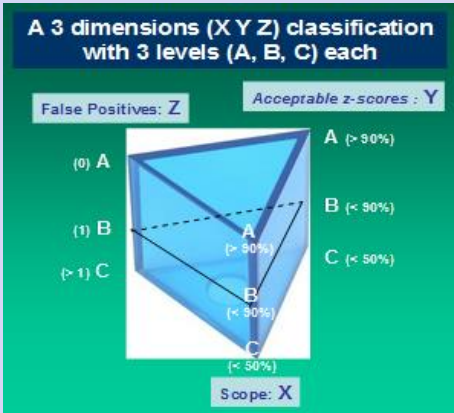
155 Labs

AAA+	76	49,03%
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A	A	A	116	74,84%
A	A	B	6	3,87%
A	B	A	4	2,58%
A	B	B	1	0,65%

B	A	A	13	8,39%
B	B	A	7	4,52%
C	B	A	6	3,87%
C	B	B	1	0,65%
C	C	A	1	0,65%

AAA + BAA + CBA = 87,1%



Many thanks for your attention!!!

