Improvement in Analytical Performance from Participation in EU Proficiency Test on Cereals and Feed

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INTRODUCTION

The aim of the European Commission Proficiency Tests (EUPTs) is to monitor the performance of the pesticide residue analysis done by EU laboratories, to get information on quality, accuracy and comparability of data reported to European Commission and to provide support to underperforming laboratories.

Close to 160 National Reference laboratories (NRLs) and Official Control laboratories (OCLs) from EU and EFTA member states has participated in the 16 EUPTs from 2007 to 2022. According to Regulation (EC) No 396/2005, Article 28, all laboratories analysing samples for the official control on pesticide residues is obliged to participate in the EUPT organised EURLs.

MATERIAL AND METHODS

The EUPTs consist of a qualitative and a quantitative part. The participants are requested to analyse for >150 compounds from a target list and detect and quantify the pesticide residues present in the test items. All results and method information has been reported online. The target list is based on the pesticides included in the EU multi annual control programme, MACP.

All test items used have been based on cereal/feedstuff grown and treated in the field with a mixture of pesticide formulations. Untreated crops were grown together with sprayed crops and used as blank material. The raw materials except for two EUPTs (rice) were grown in Denmark.

Consensus assigned values X were calculated as Algoritm A mean and were in the range of 0.03-11.2 mg/kg. Target standard deviation σ was set as Fit For Purpose RSD (FPS)of 25%.
z scores were calculated as: $z = (x-X) / \sigma$

To evaluate the whole multimethod a combined z scores (AZ2) were calculated for so called Category A laboratories, which were able to analyse for at least 90% of the compounds on the target list and detect and quantify at least 90% of the pesticide residues in the test items.
AZ^2 scores were calculated as: $AZ^2 = \sum z^2 / n$, where n is the number of results.

RESULTS
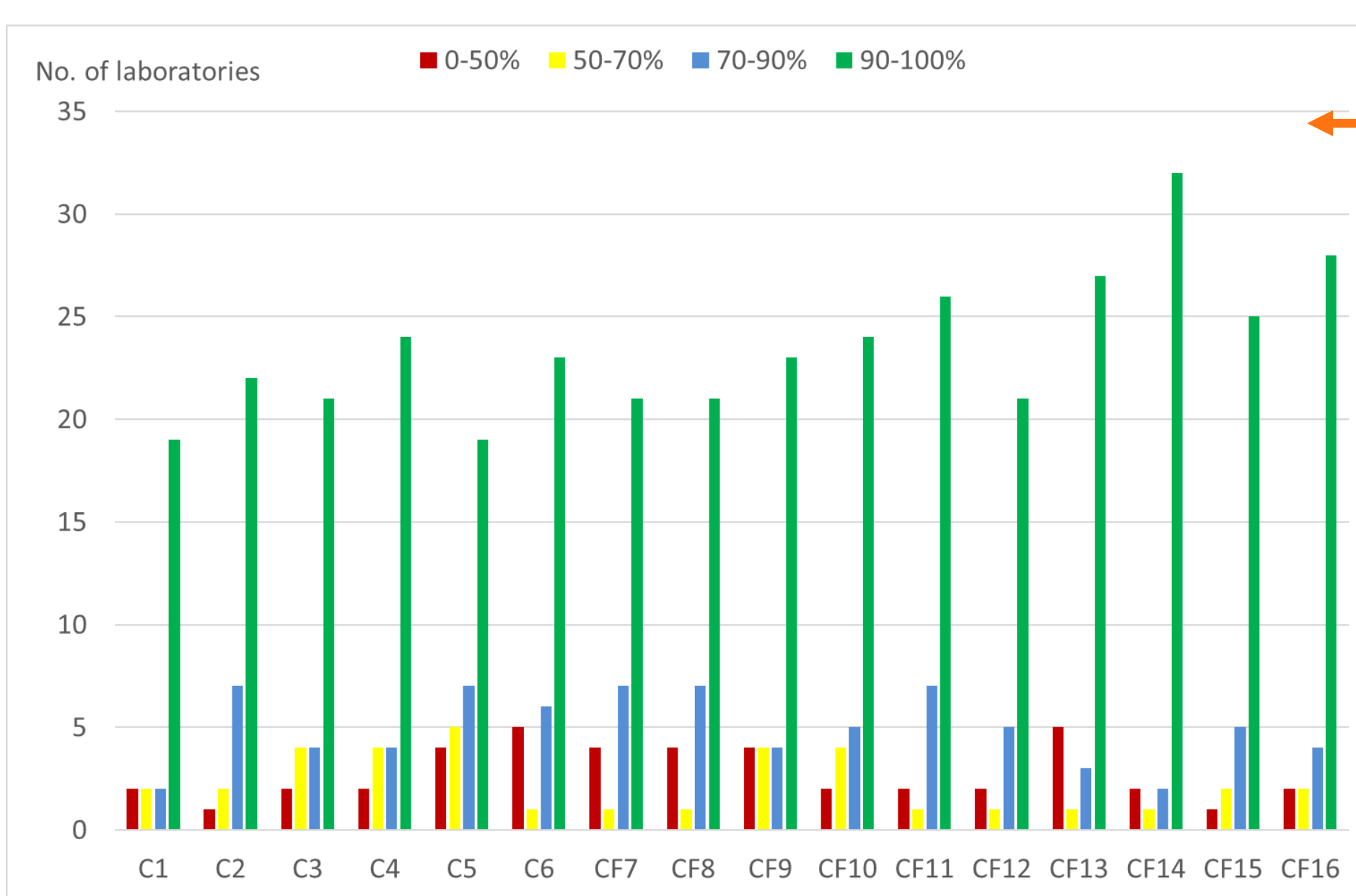
Scope coverage for the NRLs.

Scope coverage: The list of pesticides to be analysed has increased from 33 to 172. Despite of this, the scope coverage has increased especially for the OCLs. On average, 70% of NRLs and 48% of OCLs covered more than 90% of the pesticides on the compulsory target list.

However, still a couple of NRLs and 20 OCL are only able to analyse up to 50% of the mandatory pesticides, and thereby not fulfilling the requirement of the MACP.
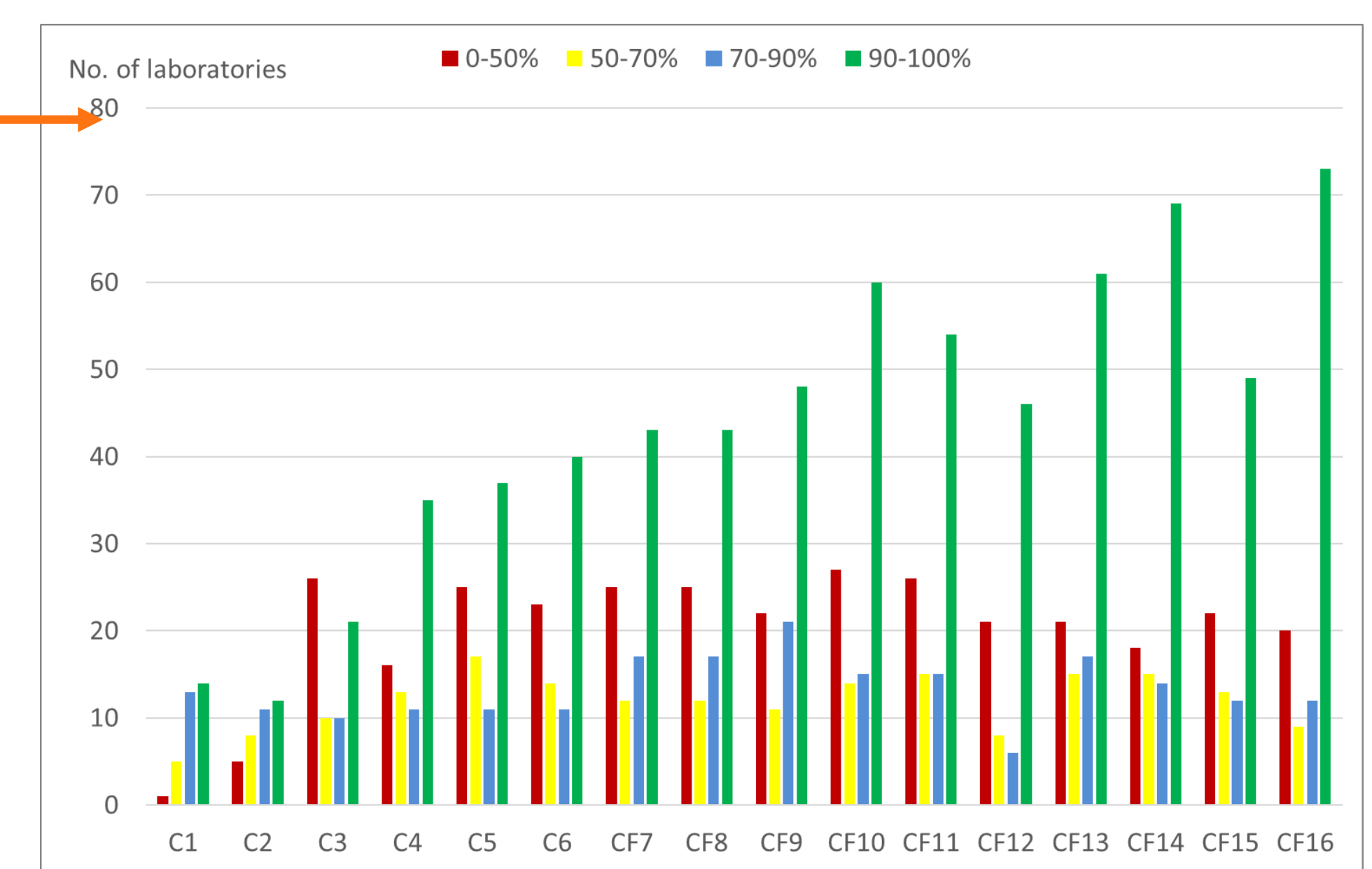

Scope coverage for the OCLs.
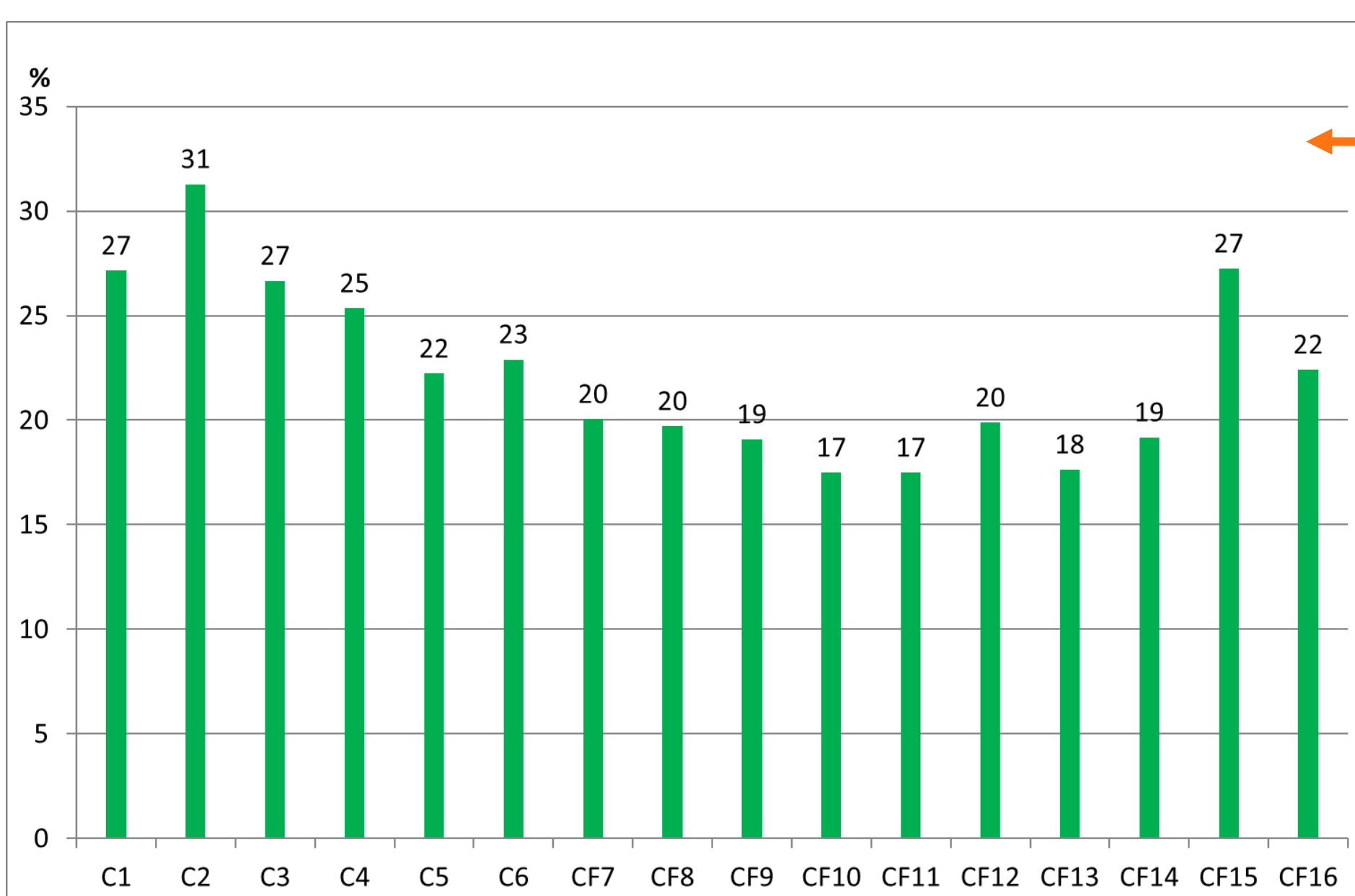
Average Alg A standard deviations.

Standard deviation: To be able to follow the trend in the performance the algorithm A standard deviation (Alg A-RSD) was. After a clear decrease in Alg A-RSD to 17% an increase was seen. This was mainly due to more difficult test item matrices.

Classification: More than 60% of the NRLs full filled the criteria as Category A laboratory, while this was only the case for approximately 40% of the OCLs. However, a significant improvement has been seen during the last 5 PTs.
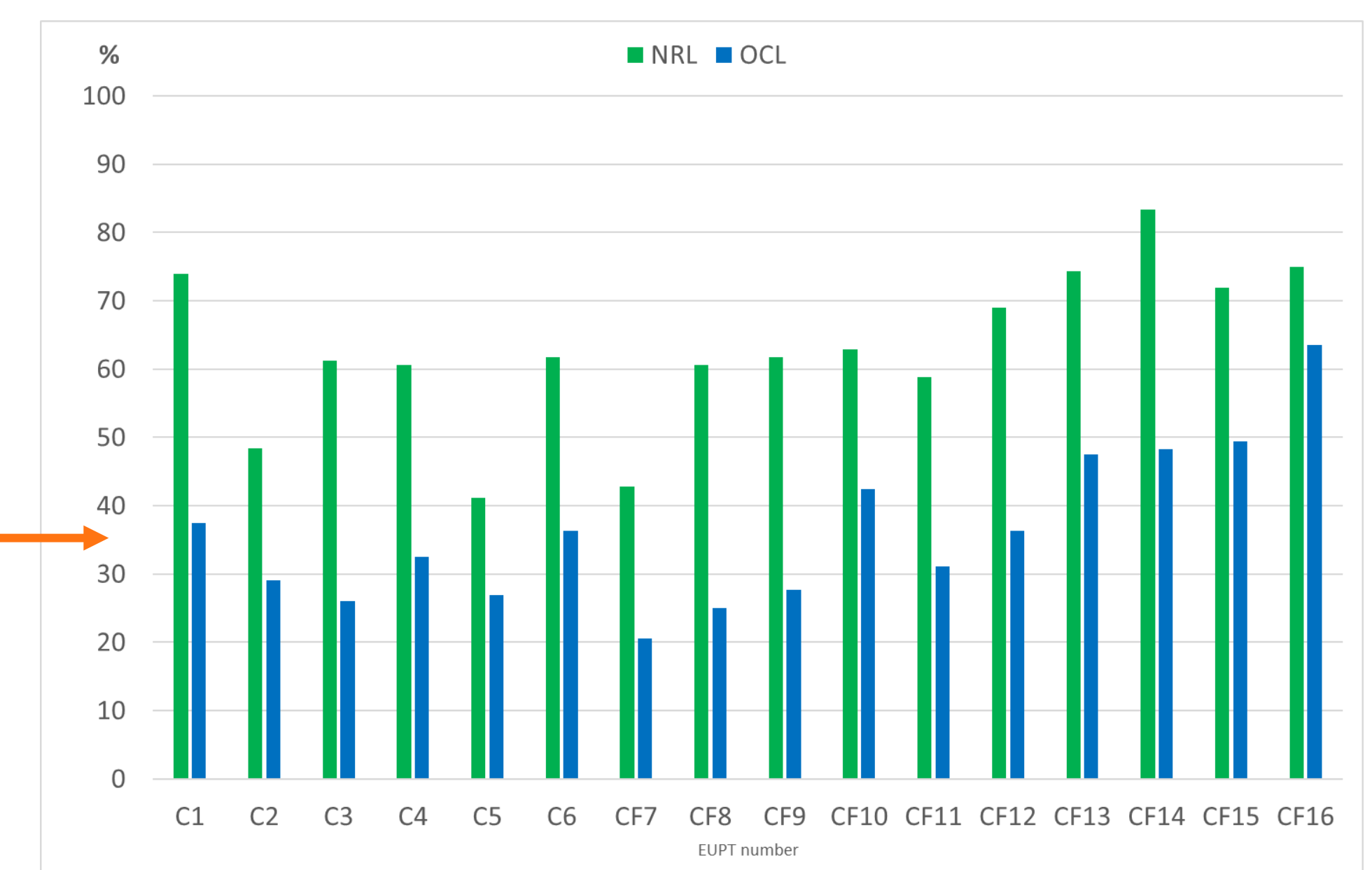
Percentage of NRLs and OCLs in Category A.
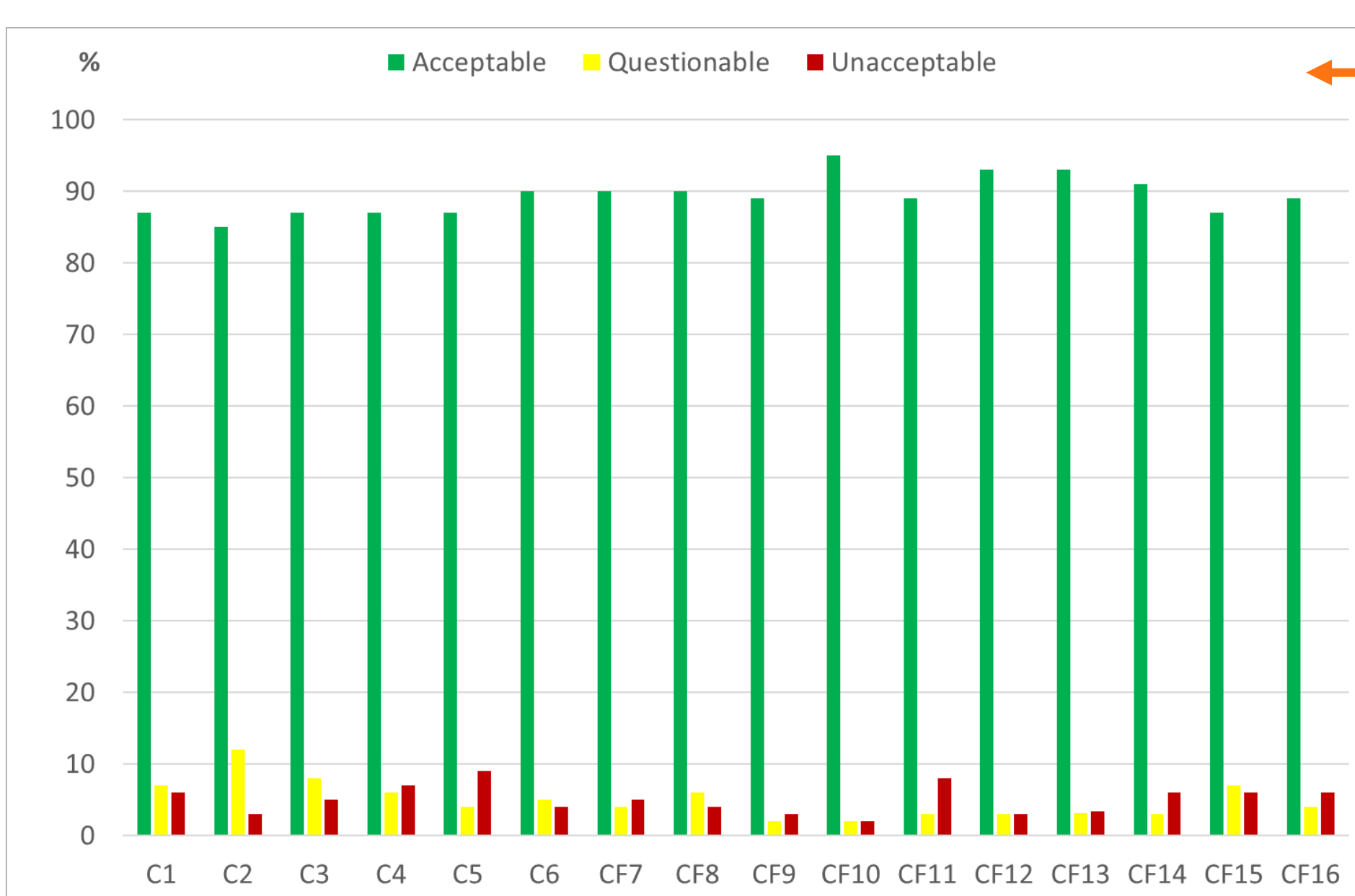
Acceptable, questionable and unacceptable z scores.

Z scores: Acceptable, questionable and unacceptable z scores has in average been 90%, 5% and 5%, respectively, with the highest percentage of acceptable z scores in CF10 (95%)

AZ^2: The evaluation of the laboratories based on the AZ^2 are as follow:

$AZ^2 \leq 2.0$	Good
$2.0 < AZ^2 < 3.0$	Satisfactory
$AZ^2 \geq 3.0$	Unsatisfactory

Laboratories evaluated as Good has increased to >90% except from the last two PTs where the test items were rapeseed cake and barley with husk.
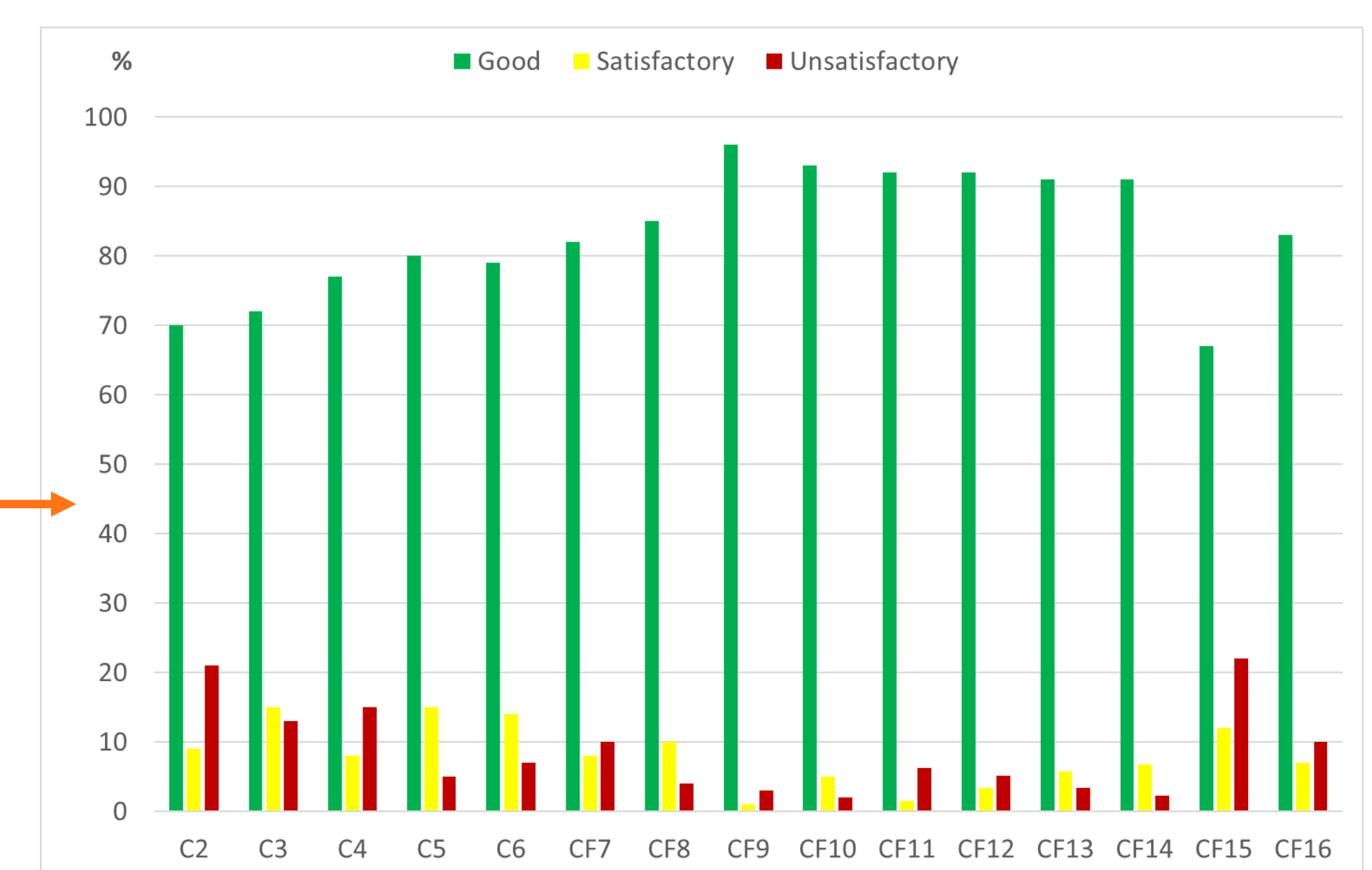
AZ^2 evaluation of the Category A laboratories (%)

CONCLUSIONS

Close to 160 laboratories have participated in the EUPTs on cereals and feedstuff organized by the EURL-CF for from 2007-2022. The target pesticide list has continually been updated throughout the years and include now more than 169 pesticides. Despite this the scope coverage has increased.

The overall results show that the comparability of the monitoring data reported to the EU Commission has improved. However, there is still room for improvement and the EURLs therefore will continue to provide guidance and training to the NRLs and OfLs with the aim of improving their performance.