



International Seed Testing Association

**What kind of performance data  
do I have to submit to ISTA and how  
does the performance data  
have to look like  
for the methods to be accepted  
in the “performance based approach”**

ISTA GMO TF  
K Remund

for Specified Trait  
Purity



# Outline

Quantitative data

data

grade

Purity of source seeds



# Quantitative data 3 levels of purity 9 blind samples

For each of 3 blind levels, 3 samples of 90 seeds

No same levels required for all labs

3 levels differing for each PDE submission

1. [80%, 90%] level in number of seeds (72 to 81 positive seeds)
2. [90%, 95%] level in number of seeds (82 to 85 positive seeds)
3. [95%, 100%] level in number of seeds (86 to 90 seeds spiked)



# Quantitative data sample results

		blind level 1	blind level 2	blind level 3
number of spiked seeds	sample 1			
number of spiked seeds	sample 2			
number of spiked seeds	sample 3			
result in % number of seeds	sample 1			
result in % number of seeds	sample 2			
result in % number of seeds	sample 3			



# Quantitative data grade

## Accuracy

Grade 1: all 9 samples have the accuracy within  $\pm 2\%$  of true value (inclusive of boundaries).

Grade 2: all nine samples have the accuracy within  $\pm 4\%$  of true value (inclusive of boundaries).

Grade 3: at least one sample has accuracy outside  $\pm 4\%$  of true value.

## Repeatability

Grade 1: Repeatability std-dev in % of the mean is 1% or below.

Grade 2: Repeatability std-dev in % of the mean is 3% or below.

Grade 3: Repeatability std-dev in % of the mean is above 3%.



# Grades

Grade 1: No problem is detected from the experiment

Grade 2: Improvement is possible

Grade 3: There is serious problem

The values that are used have been defined looking at the state of the art in seed testing.

If techniques/ laboratories improve, the values can be adapted to the current state of the art, each year



# Purity of source seeds

The samples used must be seeds.

If case checks are performed on flour, the ability to obtain **homogeneous and fine flour from seeds** is one of the key elements to obtain a result which is representative from the sample.

If case checks are performed on living plants the **percentage of germination shall be taken into account** to obtain enough plants.

Samples are prepared from 2 sources of seeds which shall be in principle 100% seeds with absence of specified trait(s) on one hand, and 100% seeds with the specified trait(s) on the other hand.



# Purity of source seeds

ISTA recommend a 400 seeds check for the source of seed with specified trait(s).

ISTA recommend an individual seed test check for the source of seed with specified trait(s) with no absence of trait as a result. In that case the lower bound of purity of the seeds with the trait(s) is 99.25% with 95% confidence.

There is no recommendation for the amount of seed to check for the seed source that do not contain the specified trait.

[We suggest that at least 300 seed be checked]



# Purity of source seeds

The fact that the 2 sources are pure enough shall be assessed by the laboratory.

This can be done by a check as recommended by ISTA, or by other means at the initiative of the laboratory.