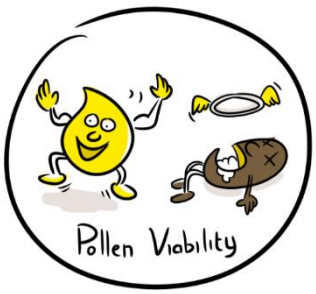
APPLICATION REVIEW

Corn Pollen Viability & Counting

The following comparison of the Ampha Z32 with traditional methods was conducted with FNPSMS, an interprofessional organization which gathers all the stakeholders in corn and sorghum seed production in France and Arvalis Institut du végétal, an applied agricultural research organization dedicated to crops in France.



Corn pollen viability plays a key role in successful breeding and seed production. The viability is influenced by factors such as genetics, time of the day, temperature, humidity and different stress factors. Therefore monitoring pollen viability is crucial to:

- Prevent seed loss due to insufficient fertilization
- Increase yield by maximizing female/male ratio
- Maximize the time available for making crosses

Pollen Viability

Until recently there was no alternative to *in vitro* corn pollen germination or pollen staining assays for determining the viability of corn pollen. However, these assays require optimized germination media and time to count sufficient pollen under a microscope to get a statistically relevant result.
Amphasys developed an instrument that allows rapid determination of pollen viability. Without the timing and resource constraints of germination assays, the Ampha Z32 makes routine pollen viability analysis of 100's of samples per day reality. This opens the door to significant gains in breeding and seed production research.

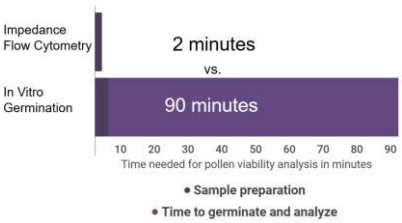


Figure 1: Time needed for pollen viability analysis by IFC and in vitro *germination compared.*

Viability by IFC vs. Germination

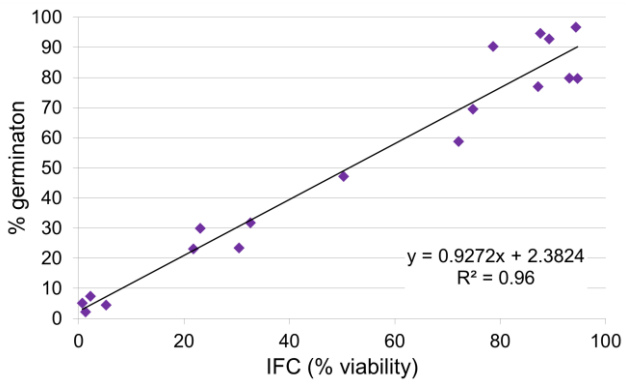


Figure 2: Pollen viability analysis with IFC and in vitro germination show an excellent correlation (R^2 = 0.96). While over 10'000 pollen per minute were analysed on the Ampha Z32, only 100 pollen could be counted in the same time with the germination assay. This high count results in a standard deviation of <1% for IFC.

Pollen Counting

Optimizing the female to male ratio in a corn seed production field can significantly increase seed yield. Having a better handle on the dispersion of viable pollen can certainly help the optimization of the number of females per hectare.
To ensure full seed set, sufficient pollination is required. Counting pollen as part of a pollen dispersion, pollen potential or pollen emission analysis is the standard method for calculating the number of males needed for optimal pollination.
Several of these methods rely on collecting the pollen in Isoton media for preservation and counting with a Coulter Counter.
The counting of Isoton suspended pollen was compared between the Ampha Z32 and the Coulter counter (Figure 3). First results confirm that besides providing viability data, the Ampha Z32 can also be used to rapidly count large amounts of pollen.

Pollen Count by Ampha Z32 vs. Coulter Counter

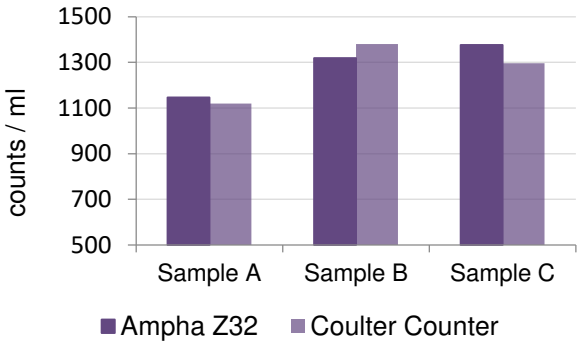


Figure 3: Coulter counter measurements compared with IFC values. The obtained values were within 2 – 6% from each other.

Screening For High Pollen Viability Allows:

- Rapid and informed selection of induction males
- Improvement of crossing efficiencies
- Maximization of the time available during the day for crosses

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