

# Laser technology sorting method can improve *Capsicum* pepper seed quality

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The high cost of vegetable crop seeds—hybrids in particular—has led growers to seek out new precision seeding and transplant production systems. The quality of vegetable seed lots can be affected by a variety of pre-storage and post-storage factors, so finding ways to improve seedling emergence percentages and uniformity is critically important for producers. A new study from scientists in Turkey and The Netherlands (*HortScience*, August 2013) showed that chlorophyll fluorescence (CF) can be used successfully to improve quality in *Capsicum* pepper seed lots.

According to the authors of the study, peppers' (*Capsicum annuum* L.) habit of nonsynchronous seed production means that pepper fruits that are produced from different flowering times mature at different periods, thus resulting in different quality seeds. "Pepper seed lots may consist of a mixture of less mature and fully mature seeds as a result of differences in flowering times," they explained, adding that this wide variation in a single lot can reduce overall seed quality. "Less mature seeds germinate more slowly and produce smaller seedlings, whereas mature seeds emerge faster and produce larger seedlings. This variation in seed maturity ultimately results in variations in plant growth and development."

The research team set out to find a way to separate out less mature seeds in order to enhance the overall quality of pepper seed lots using a method called chlorophyll fluorescence, which has been used successfully to detect and sort other types of seeds. The nondestructive

technique uses laser technology, narrow optical bandwidth filters, and detection of chlorophyll in the seed coat to measure the resulting chlorophyll fluorescence (CF) and link it with the quality of the seeds. Chlorophyll fluorescence has been found to be effective for sorting cabbage, tomato, barley, carrot, and pepper seeds.

The researchers evaluated four different *Capsicum* cultivars at four fruit harvest dates: orange (immature), bright red (half mature), dark red (mature), and dark red and soft (over mature). Seeds were either sorted or non-sorted after harvesting, and standard laboratory germination, seedling emergence, and controlled deterioration tests were conducted. Results showed that chlorophyll fluorescence sorting significantly increased laboratory germination, seedling emergence, and seed vigor. The scientists found that maximum improvements were obtained from [seeds](#) harvested from half-mature and mature stages.

"While previous studies evaluated seed quality solely based on laboratory germination tests conducted under optimum germination conditions, our work tested the effect of CF sorting not only on laboratory germination, but also on emergence and physiological aging as indicators of seed vigor," said corresponding author Burcu Begüm Kenanoglu. "The results showed that CF sorting affects germination and seed vigor. In our work, CF worked on the four cultivars examined, and this shows that the method may be well suited for *Capsicum annuum*. Chlorophyll fluorescence has the potential to upgrade [seed quality](#) in pepper lots as a nondestructive sorting technology."

**More information:** [hortsci.ashspublications.org/content/48/8/965.abstract](https://hortsci.ashspublications.org/content/48/8/965.abstract)

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