

Policy Brief

Plant Production

FiBL

Efficient Seed Extraction in Organic Tomato Cultivation



Foto: Patricia Schwitter, FiBL

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Tomato is a special case among vegetables, as its seeds can only be extracted from the pulp after a fermentation step. In order to optimise this working process, various harvesting frequencies and extraction timepoints were tested at the Research Institute of Organic Agriculture FiBL.

The availability of organic seed has come into focus, as derogations to use conventional, untreated seeds for organic cultivation will be only possible in the EU until 2036. In order to optimise organic seed production in tomatoes and develop strategies that serve both small and large seed producers, we investigated the influence of harvest frequencies, extraction timepoints and storage of tomatoes on the yield and quality of organic tomato seeds.

Special processing steps

Compared to other vegetables, tomato seed production differs in some special processing steps. For example, the seeds are fermented in the pulp for three days before they can be separated from it through repeated rinsing.

Seed extraction can be carried out continuously in parallel to harvesting. However, this necessitates a large number of extractions and is therefore very labour-intensive. The fruits can be also left longer on the plant and extracted all at once. This come with a higher risk of loss, as the probability of infections increases with a longer hanging time. Cold storage would allow seed production to be integrated into a regular harvest, where harvest at the optimal time would reduce the proportion of waste, and pooled stored fruits reduce the number of seed extractions.



Left: Crushed tomatoes in buckets, stirred regularly during three days of fermentation at 26°C. Fermentation facilitates the separation of the seeds from the pulp. Right: Extracted and dried tomato seeds. Photos: Patricia Schwitter, FiBL

Higher seed yield in regularly harvested tomatoes

In order to determine the effect of fruit ripeness and harvest time on seed quantity and quality, the seed yield of frequently harvested tomatoes was compared with that of tomatoes with more spaced harvests. Moreover, we tested whether cold storage of harvested fruits had an effect on the seeds. For the trial, a total of eight tomato genotypes were tested and three seed extractions were carried out, each three weeks apart.

The different harvesting methods had no influence on the thousand kernel weight (TKW) and the germination rate. The total seed yield was higher in the regularly harvested tomatoes, as they not only produced more fruit, but also had significantly less waste. The cold storage of fruits for up to three weeks had no effect on the germination rates.

The TKW was the highest at the beginning of the season and decreased during the season. The first extraction yielded fewer seeds than the last. The TKW had no effect on the germination rate. Most seeds were produced mid-season, in correlation with the highest fruit yield.

Harvest for seed production: continuous or every three weeks

In summary, harvesting for seed production can be either continuous with the tomatoes stored for a pooled extraction or can be done every three weeks and extracted after removing infected fruits. This study can help small as well as large seed producers in their organic seed multiplication strategy.

Conclusions:

- Different harvest frequencies have no influence on seed yield per fruit and seed germination rate. Harvesting every three weeks produced less seed (g/m^2) overall than regular harvesting due to the higher proportion of rejected fruit, and a higher fruit yield in regularly harvested plants.
- In general, tomatoes can be stored in a cool place for two to three weeks before seed extraction without affecting seed quality.
- Parallel production of fruits and seeds can be facilitated by cold storage of fruit, as labour-intensive seed extractions can be combined.

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