# Agronomic Spotlight

Seminis grow forward

## Organic Vegetable Production

- The USDA National Organic Program develops and enforces uniform national standards for organically-produced agricultural products, including vegetables, sold in the United States.
- To help promote environmental stewardship and resource protection, organic production practices integrate cultural, mechanical, and biological elements.
- Organic regulations cover aspects of vegetable production from pre-planting to post-harvest operations.

### What is Organic Agriculture?

The concept of organic agriculture is the use of proactive, ecological management systems to promote and enhance biological diversity, to maintain and enhance soil fertility, to prevent soil erosion, and to promote human and animal health and preserve natural resources. The objectives of the National Organic Program (NOP) are accomplished through reliance on biological processes and the use of natural materials.[1,2]

The primary tenets of organic agriculture include the following:[3]

- Environmental stewardship through the promotion of ecological balance and the conservation of biodiversity
- Soil fertility and nutrient management based on protecting and improving soil health and the reliance on natural materials (cover crops, manure, compost)
- Pest management through the use of preventative measures and physical methods before using approved pesticides
- Limiting the use of synthetic fertilizers and pesticides

### USDA Certified Organic

The use of the term "organic" in relation to agricultural products is regulated in the United States by the United States Department of Agriculture (USDA). USDAs oversight of organic regulations was authorized in the Organic Foods Production Act of 1990. The associated regulations are process-based, following a product through planting, growing, handling, and processing until it is purchased by the consumer. Certain materials, processes, and methods are prohibited, including the use of irradiation, sewage sludge, and genetic engineering.[4] Regulations are developed and administered by the NOP within the USDA Agricultural Marketing Service. Any food, feed, feed input, or fiber product sold or labeled as organic in the U.S. must be produced in accordance with USDA organic rules and standards. The USDA NOP oversees certification, compliance, enforcement, and product labeling for all aspects of organic agriculture (Figure 1).[3,5]

### Certification of the Land


**Figure 1. The USDA organic seal can only be used on products that are certified through the USDA National Organic Porgram.**

The certification process includes certification of the land on which agricultural products are produced. No prohibited substances can have been applied to the land within the last 36 months for the land to be eligible for certification. This prohibition includes the planting of seeds treated with genetically altered rhizobacteria and fungicides such as captan and thiram. All other organic regulations must also be followed during this three-year period of transition to certification. Growers must carefully document all practices and applications to the field during the transition to achieve certification and must continue these practices and documentation to maintain certification.[3,6]

### Organic Production Practices

Organic soil fertility management practices are meant to feed the current year's crop, build soil organic matter, and improve soil tilth. These practices include the use of green manures, cover crops, animal manure, and approved organic fertilizers.[6]

The use of animal manure is strictly regulated in organic agriculture. Raw manure cannot be applied within 120 days of harvest if soil particles can come into contact with the edible portion of the harvested product (even through rain splash). If the soil cannot come into contact with the edible portion of the crop (e.g., sweet corn) then raw manure cannot be applied within 90 days of harvest. The NOP also regulates the production and use of compost. Approved compost can be applied until the day of harvest.[6]

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Weed management can be one of the most challenging aspects of an organic operation. Mulching and mechanical removal (tillage and hand weeding) are often the primary means of weed control in these systems. Additional strategies include cover crops, inter-seeding, and the use of flame-weeders before seedling emergence.[6]

There is a specified hierarchy for using pest management methods in organic production. Cultural controls (time of planting, variety selection, row covers, hand removal, etc.) need to be used first. If these methods are not sufficient, then natural inputs may be used. If these are not effective, then approved synthetic inputs can be used. For synthetic inputs, both the active and inert ingredients must be on the list of organically approved substances.

All seeds, transplants, and other propagation materials, including seeds for cover crops, green manures, and rotational crops, must be certified organic. If they are not, the grower must be able to prove that organic seeds were not available. Higher seed cost is not a valid reason for not using organic seed. The seeds and planting stock of GMO varieties and those treated with prohibited substances may not be used.[6]

## Allowed and Prohibited Substances

Organic rules and regulations generally allow for the use of natural substances and prohibit the use of synthetic substances, but there are exceptions with both categories. The National Organic Standards Board (NOB) maintains a list of allowed and prohibited substances based on the board's recommendations.[7] Examples of synthetic substances that are allowed include pheromones for insect management and animal vaccines. Natural substances that are not allowed include strychnine and arsenic. The list of allowed and prohibited substances can be found at https://www.ams.usda.gov/rules-regulations/organic/national-list.

## Growing Organic Vegetables

Growers of certified organic vegetables face specific challenges because their products are often purchased directly by consumers who have expectations of product appearance and pricing. Disease and pest management can be important in vegetable production to minimize blemishes and defects to meet market demand. Choosing varieties with disease or pest resistance can be essential when options for management are limited. Crop rotation, field selection, cover crops, and careful water management can also have substantial impacts on organic production systems.[5]

When using vegetable transplants, it is important to remember that seeds and transplants must be produced according to the NOP regulations. For example, potting mix that is used for transplant production must contain only components that are on the allowed substances list. No prohibited synthetic fertilizers, wetting agents, or fungicides can be present in the mixes.[6,8]

Nutrient management of the crop in the field must also adhere to the NOP regulations. No synthetic fertilizers can be used. Organic production relies more heavily on cover crops, compost, manure, and companion crops for nutrient management than is typical in conventional production systems. Crop rotation sequences can be particularly important when considering the nutrient demands of the various crops in the rotation. Careful rotation planning is especially important for vegetable producers who are planting many crop species belonging to several different plant families.[3]

Harvesting and post-harvest handling and processing must also be done in accordance with NOP regulations to maintain the integrity of the organic certification objectives. Care must be taken to prevent commingling with non-certified produce and the introduction of prohibited substances during sorting, cleaning, and packing operations.

**Sources:**

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[3] USDA AMS. Organic 101, fundamentals of organic agriculture. https://www.ams.usda.gov/services/organic-certification/is-it-an-option.
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[6] MOSES. 2012. Transitioning to organic vegetable production. MOSES Organic Fact Sheet. https://mosesorganic.org/farming/farming-topics/market/.
[7] McEvoy, M. 2020. Organic 101: Allowed and prohibited substances. USDA – National Organic Program. https://www.usda.gov/media/blog/2020/10/27/organic-101-allowed-and-prohibited-substances.
[8] 2015. Organic vegetable production. PennState Extension. https://extension.psu.edu/organic-vegetable-production.

Websites verified 2/4/202.

**For additional agronomic information, please contact your local seed representative.**

**Performance may vary** from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields. The recommendations in this article are based upon information obtained from the cited sources and should be used as a quick reference for information about vegetable production. The content of this article should not be substituted for the professional opinion of a producer, grower, agronomist, pathologist and similar professional dealing with vegetable crops.

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