



Soil Solarization

University of California Cooperative Extension
Stanislaus County

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Soil solarization is the process of covering and heating the soil to kill weeds. It is an effective, non-chemical alternative that helps eliminate nematodes, weed seeds and seedlings, and disease-causing organisms (plant pathogens) in the top 4-12 inches of the soil.

TIMING

Soil solarization is done during periods of high temperatures. In the Central Valley, it can be done from late May through September. The hottest temperatures in California normally occur around July 15.

PREPARATION

Cultivate and remove weeds. Then, level the soil and remove large clods and rocks that can puncture the plastic.

The addition of organic amendments such as animal manures will reduce treatment duration considerably.

MATERIALS

Transparent sheets of UV-inhibiting plastic that are 1.5 to 2 mil thick are the best choice. Soil temperatures under this plastic can reach up to 165°F at the surface.

These materials can be found at nurseries, hardware stores or lumber yards. They are sometimes called “drop

cloths” and used to catch paint drippings.

LAYING THE PLASTIC

Irrigate the soil until it is saturated. This will help weed seeds sprout, making them more vulnerable to high temperatures.

Plastic should be applied as smoothly and tightly as possible to the soil surface. It should be done immediately after irrigation is complete.

Use long strips to cover beds or large pieces to completely cover an area. Gardeners who have trouble with nematodes should solarize their entire garden.

DURATION OF TREATMENT

Many pathogens are killed after only 2 weeks, but for best control, 4-6 weeks of sunny weather with minimal cloud cover is recommended.

Bury the edges of the plastic sheets in the soil to ensure plastic does come loose. People and animals should be discouraged from walking on the plastic, as holes or tears will limit the effectiveness of solarization. Heavy tape can be used to patch holes.

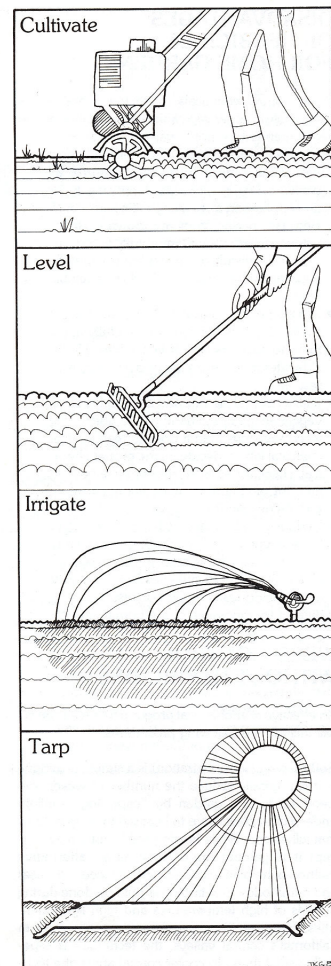
After solarization, your garden is ready for planting. Do not cultivate again, as tilling to a depth of more than 2 inches

can bring up weed seeds that were not killed.

PLASTIC

If handled carefully, UV-treated plastics that are thicker than 4 mils may be used for more than one season.

EFFECTIVENESS-PLANT



PATHOGENS

Most important pathogens such as those that cause *Verticillium* wilt, *Phytophthora* root rot and

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some *Fusarium* wilts are controlled.

EFFECTIVENESS-NEMATODES

Nematodes can recolonize an area quickly, so gardeners with this pest should solarize yearly. Nematodes that survive deep in the soil may still exist and damage crops with deep root systems. However, for most shallow rooted vegetables, solarization is an effective control.

EFFECTIVENESS-WEEDS

Annual weeds are more effectively controlled than perennials. Buried underground, rhizomes of perennials may resprout after solarization. Controlling purslane and crabgrass can be difficult. Bermudagrass and johnsongrass rhizomes may be controlled if they were not buried too deeply. Yellow nutsedge is only partially controlled, and purple nutsedge is not significantly controlled.

OTHER BENEFITS OF SOIL SOLARIZATION

The heating of the soil through this process also encourages the breakdown of organic materials in the soil. Important nutrients such as nitrogen, calcium, magnesium and potassium become more readily available for plants.

Elmore, C. L., Stapleton, J. J., Bell, C. E., & DeVay, J. E. (1997). *Soil solarization*. Oakland: University of California Ag & Nat Res.

Hesketh, K. A., & Elmore, C. L. (n.d.). *Vegetable plantings without weeds*. Oakland: University of California Ag & Nat Res.

Klunk, S. (2005, August 10). *Madera farmer praises the benefits of soil solarization*. Retrieved September 10, 2008, from <http://news.ucanr.org/storyshow.cfm?story=699&printver=yes>

AUTHOR

Anne Schellman; UCCE Stanislaus County, 3800 Cornucopia Way Ste. A, Modesto, CA 95358.
e-mail: aschellman@ucdavis.edu

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BIBLIOGRAPHY