

## About Hot Water Seed Treatment

**Benefits of hot water seed treatment:** Some plant pathogens are able to penetrate and survive within the seed, out of reach of surface seed treatments. They include many bacterial pathogens of vegetables as well as fungi, oomycetes, and viruses. Tomato, pepper and brassicas are good candidates for hot water seed treatment because there are common bacterial and fungal diseases of these small seeded-crops that can be easily prevented. Even though pathogens do not survive well in soil once infected crop residues have decayed, they can be difficult to manage once established on a farm. Hot water seed treatment also has the beneficial effect of priming seeds resulting in faster germination than untreated seed. Hot water seed treatment is a valuable tool for preventing establishment of seed-borne diseases on the farm, or their reintroduction year after year.

**Deciding which seeds to treat:** To decide whether to use heat treatment, first determine the likelihood that seed-borne pathogens could be present based on the crop (see Table 1. for reference). Next, ask your seed supplier if the seed was produced in a way to minimize exposure to seed-borne pathogens and if the seed was tested for their presence. Find out if the seed has already been treated with hot water or if it has been primed (pre-soaked to promote earlier and more uniform germination), as treating again could adversely affect the seed.

**Treatment procedure and seed requirements:** The temperature of water for treating seed varies from 115 to 125°F, depending on the crop, and the treatment period varies from 10 to 60 minutes. Large-seeded crops (beans, cucurbits, peas, corn etc.) cannot be effectively disinfested with hot water treatment because the temperature required to heat the whole seed inside and out would kill the outer seed tissue and the seed will not germinate. Chemically-treated or pelleted and primed seed also cannot be hot water treated. Treating seed saved for more than one year or seed saved from a heavily infested field may inhibit germination. Treat no more seed than you think you will use in the course of a season, as hot water treated seed may not remain viable for as long as untreated seed. It is important to use the appropriate protocol for each crop to control pathogens without damaging the seed. While hot water seed treatment can be done effectively on a stovetop in a large pot with an accurate thermometer and careful temperature control, it is much better to use a precision water baths that provide an even, stable and accurate temperature.

**Table 1. Vegetable crops and seed borne pathogens control by hot water treatment.**

Crop	Diseases Controlled
Brassicas	Alternaria leaf spot, Bacterial leaf spot, Black leg, Black rot
Beet / Swiss Chard	Phoma/Canker, Downy Mildew, Cercospora leaf spot
Carrot	Alternaria leaf blight, Bacterial leaf blight, Cercospora leaf spot, Crater rot/foliar blight
Celery / Celeriac	Bacterial leaf spot, Cercospora leaf spot, Septoria leaf spot, Phoma crown and root rot
Eggplant	Anthracnose, Early blight, Phomopsis, Verticillium wilt
Lettuce	Anthracnose, Bacterial leaf spot, Lettuce mosaic virus, Septoria leaf spot, Verticillium wilt
Onion	Purple blotch, Stemphylium leaf blight, Basal Rot, Botrytis blight, Smudge, Black mold
Pepper	Anthracnose, Bacterial leaf spot, Cucumber mosaic virus, Pepper mild mosaic virus, Tobacco mosaic virus, Tomato mosaic virus
Parsley / Cilantro	Bacterial leaf blight, Alternaria leaf blight, Black rot, Cercosporoid leaf blight, Septoria blight
Spinach	Anthracnose, Cladosporium leaf spot, Cucumber mosaic virus, Downy mildew, Fusarium wilt, Stemphylium leaf spot, Verticillium wilt
Tomato	Alfalfa mosaic virus, Anthracnose, Bacterial canker, Bacterial speck, Bacterial spot, Cucumber mosaic virus, Early blight, Fusarium wilt, Leaf mold, Septoria leaf spot, Tomato mosaic virus, Verticillium wilt, Double virus streak



UMass Extension Vegetable Program  
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### **Hot Water Seed Treatment Liability Waiver**

The UMass Vegetable Program follows established and tested protocols for hot water treating each species and cultivar of vegetable seed to ensure the highest quality. Seed undergoes a pre-warming process in a controlled water bath at 100°F then is subjected to treatment in another aerated warming bath at 118-125°F for 15 to 30 minutes depending on the species. Seed is immediately air dried, carefully packaged and shipped back to the grower within 10 days. These protocols are proven to maintain or enhance seed germination if the appropriate seed (see page 1) is used, but we cannot guarantee that there will not be negative effects.

As a condition of submitting seed to the University of Massachusetts Extension Vegetable Program for hot water seed treatment, the undersigned acknowledges that he/she has been informed of the risks associated with the potential, possible loss of seed viability and hereby waives any and all rights to assert any claim against the University of Massachusetts Extension, for negligence or otherwise. The University of Massachusetts Extension shall not be liable for incidental or consequential damages or crop failure as a result of the use of this treated seed.

I HEREBY RELEASE FROM LIABILITY AND AGREE TO INDEMNIFY AND HOLD HARMLESS THE UNIVERSITY OF MASSACHUSETTS, ITS BOARD OF TRUSTEES, EMPLOYEES, AGENTS AND/OR VOLUNTEERS, FOR ANY LIABILITY IN CONNECTION WITH THE USE OF THIS HOT WATER TREATED SEED. THIS RELEASE IS FOR ANY AND ALL LIABILITY PROPERTY LOSSES OR DAMAGE OCCASIONED BY, OR IN CONNECTION WITH THE USE OF THIS HOT WATER TREATED SEED.

I have read this entire Document (pages 1-3), including the release portion (page 2), and I fully understand it and agree to be legally bound by this Document.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Print Name:** \_\_\_\_\_



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**Hot Water Seed Treatment Submission Form**

UMass Vegetable Program staff will treat seeds received via this mail-in service and return to the grower within **10 days** (longer if you are treating more than 13 oz. of seed). Contact us with any questions before mailing in your seed.

<b>Contact (include return address where the seed will be mailed)</b>
<b>Name:</b>
<b>Business Name:</b>
<b>Street or PO Box:</b>
<b>City, State, Zip:</b>
<b>Phone:</b>
<b>Email:</b>

**Fees:** Each variety or cultivar will cost **\$6 for each 0.1 -1oz<sup>1</sup>**. For example, 0.5oz of cherry tomato seed will cost \$6 and 1.6oz of plum tomato seed will cost \$12. An additional **\$5 for each 0.1 – 13oz of seed is charged for shipping.**

**Mailing Instructions:** Clearly label each variety or cultivar of seed to be treated in separate containers (e.g., seed packets, plastic jars, etc.) and enclose in a water resistant container such as a resealable plastic bag. Label the seed packets the same as you do on this form. Carefully place the seed in a **padded envelope** (or box if treating large amounts of seed) and mail to the address above with form on Page 3 completed and the liability waiver below signed. Include a check made out to **“UMass”** for the total treatment amount and shipping cost.

<b>Lab use only</b>	
Received:	Due:
Check#:	Cash:

Lab ID (leave blank)	Crop	Variety/Cultivar	Ounces	\$6 / 0.1 – 1oz
<b>Subtotal</b>			<b>oz</b>	<b>\$</b>
<b>Total (including \$5 shipping for each 0.1-13oz)</b>				<b>\$</b>