

Soil Pasteurisation – a new job for solar cookers

The problem:

- ☛ Seedlings grow better in pasteurised potting compost because they face no competition or disease.
- ☛ But The Soil Association (UK) prohibits soil pasteurisation for registered organic growers because it is “too energy intensive”. (Soil Association, 2016)

A solution:

- ☛ Why not use a simple solar cooker, and sunlight, to pasteurise soil to make seed compost?

The effects of heating:

Growing plants can suffer from soil-borne pests and diseases, and competition from weeds. Conventional solutions involve the use of selective herbicides, fungicides, insecticides, mechanical weeding, and mulching.

In the modern era, since the 1930s, plant growers have experimented with heat-treatment of soil using solarisation, pasteurisation, and sterilisation (Katan et al, 1987). The chart below shows the temperature necessary to kill various pests, diseases, and competing weed seeds.

Mobile organisms, like garden worms, will escape if they have access to an escape route. Since we are processing small quantities, worms, if present, can be removed from each batch.

Temp.	Pathogen
46C	Water moulds (e.g. phytophthora)
49C	Nematodes
58C	Worms
60C	Most plant pathogenic bacteria
71C	Soil insects
82C	Most weed seeds
102C	A few resistant weed seeds
115C	Botulism

Source: Permacycle (2012)

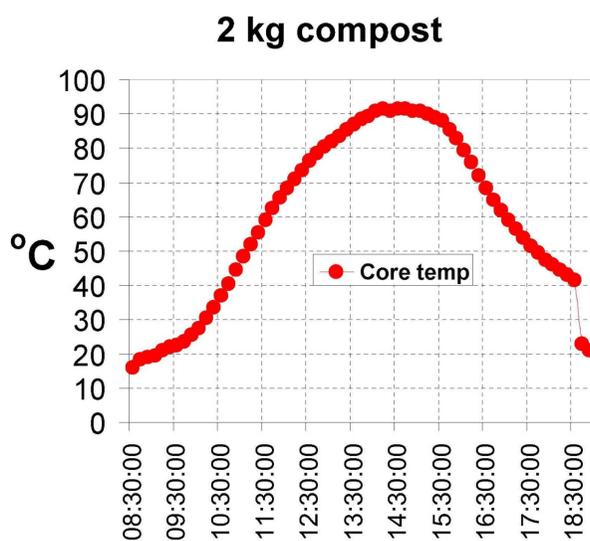


Method:

Various quantities of compost were placed in a variety of plastic containers inside a standard CookKit on sunny days during the Spring of 2014 in the UK. The temperature at the core of each pile was monitored using a thermo-couple attached to a data-logger. The most successful arrangement is pictured above. It uses a standard CookKit, a 5 litre PET bottle, a clear plastic bag, and 2 kg of compost. Data from the logger was assessed to judge whether sufficiently high temperatures had been reached (see the graph below). To test for viable weed seeds, the treated compost was placed in a pot alongside two pots of untreated compost (see the pictures below, to the left) and left for several months.

Results:

Six hours of full sunlight were sufficient to raise the temperature of the medium (at the centre of the pile) to over 90C. In the long term test, no weed seeds germinated in the treated seed compost, whereas weeds germinated and thrived in the two adjacent un-treated pots of the same compost.



Conclusions:

- ☛ It is possible to use simple panel cookers in the UK to pasteurise compost.
- ☛ A 2 kilogram batch of soil reaches a core temperature of over 90C in an unattended, south-facing CookKit, over the course of a sunny day in the UK (50degN).
- ☛ The sterilised compost contains no viable weed seeds.
- ☛ Using this method, gardeners could produce their own seed compost simply and cheaply.

References:

Katan, J., Grinstein, A., Greenberger, A., Yarden, O., & DeVay, J. E. (1987). *The first decade (1976-1986) of soil solarization (solar heating): A chronological bibliography*. *Phytoparasitica* 15(3), pp 229-255.

Permacycle (2012). *Create a garden sterilization area*.

<https://davesgarden.com/guides/articles/view/3631> Downloaded January 12th, 2018.

Soil Association (2016) Soil Association organic standards: farming and growing. <https://www.soilassociation.org/media/1220/farming-and-growing-v17-4-august-2016.pdf> Downloaded January 12th, 2018.

For further details, contact:

Stewart Maclachlan
stewartmaclachlan@yahoo.com
 Dave Oxford
daveoxford@metronet.co.uk