

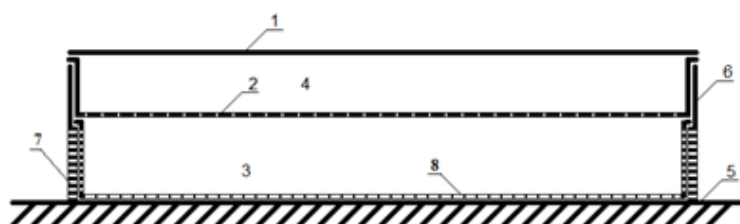
Biological waste as a source of low-temperature heat for hotbeds

A warm hotbed is a solution that allows to use the heat generated during composting of green biomass (e.g., post-production residues from plant production). The hotbed is proposed for farms, primarily dealing with horticultural production of vegetables under cover, such as in greenhouses.

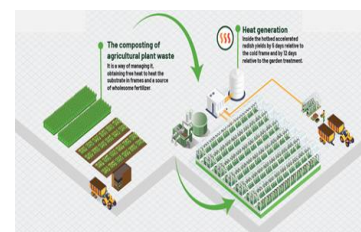
Heat is generated mainly during the thermophilic phase (although also a little during the mesophilic phase) of composting. In the proposed solution, the composting process takes place below the place where new seedlings are planted in the hotbed (Scheme 1). As a result, heat flows to the part where the plants are, heating the ground and accelerating the vegetation. The advantage of the proposed solution is the avoidance of any additional devices, power supply, and so on, as the process occurs spontaneously.

The soil heated by the heat coming from the compost (and the air from the ground) in the seedbed will accelerate the vegetation of plants in spring, and possibly extend the vegetation time of plants in autumn. This will make it possible to plant the plants for the heated hotbed earlier compared to the classic structure of the classic hotbed (without heat from composting – heated only by sun), or to cultivate plants for a longer period in the autumn.

Composting agricultural plant waste is a way to manage the waste while obtaining free heat to heat the substrate in frames. Composting also provides a source of wholesome fertilizer – humus, which can later be used as an organic fertilizer.



Scheme 1. Transparent cover; 2. Removable top shelf; 3. Composting space; 4. Arable space; 5. The ground; 6. Sides of the inspection; 7. Air vents in the lower part of the sides of the inspection; 8. Removable bottom shelf. Source: M. Neugebauer



Source: CBEO-UWM

KEY WORDS

Free heat, compost, vegetation, agricultural plant waste

COUNTRY

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ADDITIONAL INFORMATION

This Practice Abstract proposes a low-cost hotbed for vegetable production (Scheme 1). In this installation, 70 kg of biological waste composted inside the hotbed, generated 98.7 MJ of heat in the course of 41 days. Heat generation inside the hotbed accelerated radish yields by 5 days relative to the cold frame and by 12 days relative to the garden treatment.

The chemical composition of the obtained compost was consistent with the Polish Standards for organic fertilizers. The produced compost can be effectively used for gardening purposes.

The solution is addressed to farms with a horticultural profile and with a large amount of waste biomass, as the additional heat obtained from the waste improves the profitability of the production.



Photo: Plant height on May 6 - in warm and cold frame.

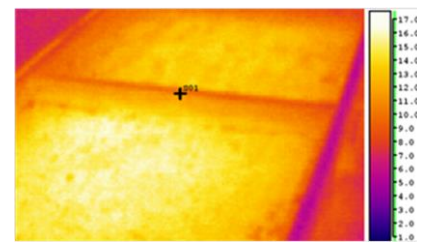


Photo: Thermal imaging photo of a warm and cold frame. The difference in ground temperature - about 5°C - can be seen between individual fields.

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ABOUT BRANCHES

BRANCHES is a H2020 "Coordination Support Action" project, that brings together 12 partners from 5 different countries. The overall objective of **BRANCHES** is to foster knowledge transfer and innovation in rural areas (agriculture and forestry), enhancing the viability and competitiveness of biomass supply chains and promoting innovative technologies, rural bioeconomy solutions and sustainable agricultural and forest management.



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