PRESS RELEASE

21 January 2026

Turning Waste into Growth: PYRAGRAF's Biochar and Wood Vinegar Boost Sustainable Farming

The PYRAGRAF project is helping farmers work smarter and greener. By transforming agricultural and forestry residues into biochar and wood vinegar, the project is tackling land degradation, improving soil health, and supporting food security across Europe.

In the frame of the project, our researchers from Hohenheim University, Ankara University and Portalegre Polytechnic University are exploring how these products can benefit crops and soils in real agricultural settings. The team is working on how factors such as *soil type*, *crop species*, *climate*, and *application methods* influence the effects of biochar and wood vinegar.

What we have discovered so far:

- Biochar improves soils and supports plants.
  Different biochars -from hemp, Miscanthus, olive pomace, pine, and eucalyptus- were tested in pot trials.
    - Hemp biochars exhibited approximately similar seed germination rate (c.a. 85%) when compared to their control samples. However, the average root length (c.a. 6 cm) of plants subjected to biochar application were slightly lower. This could be attributed to alkaline pH (c.a. 10) and the electrical conductivity (c.a. 100 µS/cm), which can influence nutrient availability and root sensitivity at the seedling stage.

Hemp biochar

    - For Miscanthus biochars, the germination rate was same (for 1 h pyrolysed biochars) and the average root length was approximately 20% higher when compared to the control.
    - Olive pomace biochars had a negative influence on average root lengths (c.a.50% lower) and exhibited phytotoxicity. The alkaline pH (c.a.11), high

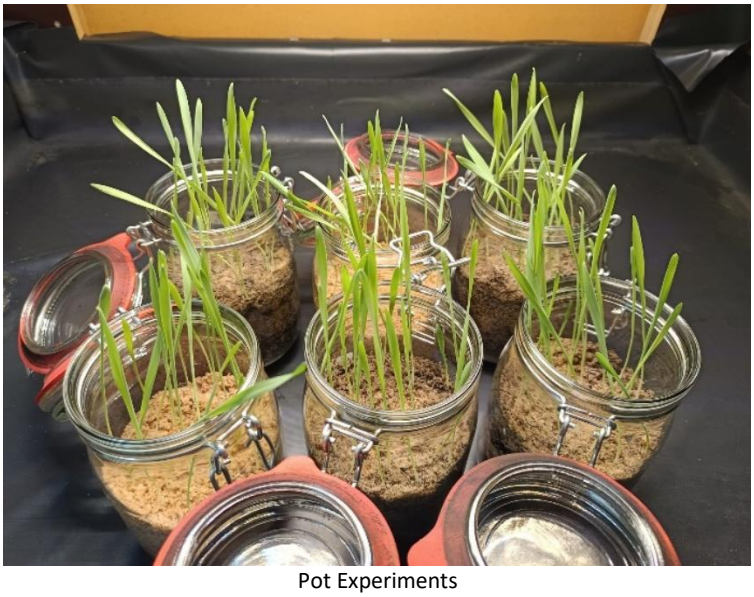
PYRAGRAF has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement no. 101114608

electrical conductivity (c.a.300 µS/cm) and concentration of heavy metals and polyaromatic hydrocarbons (PAH) could be the attributing factors for this negative effect.

- Amongst the forestry wastes, pine bark biochars showed similar average root lengths (c.a.10 cm), while eucalyptus bark biochars showed slightly higher average root lengths (c.a.10%).

- All biochars retained water well, helping soils stay moist. Hemp biochar performed particularly well, holding up to 4 grams of water per gram of biochar.
- Next steps
- Activating biochars with water-steam and CO_2 to enhance their performance. Meanwhile, wood vinegar tests are underway to control harmful bacteria on crops such as cucumbers.

This work is helping farmers understand how to use these natural products to restore degraded land, improve crop growth, and protect future harvests. By turning waste into valuable resources, PYRAGRAF is offering practical, sustainable solutions for a more resilient agricultural future.



Pot Experiments

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Visit project website to learn more

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