BBioNets

Boosting the adoption of Bio-Based Technologies

Cross-Fertilisation Meetings

Bio-Based Practices on Farms & Forests

"Circular Approaches in Olive Groves"

From waste to resources: valorisation of agri-food by-products between animal husbandry and soil fertility

Paola Cassiano | APRE – Agency for the Promotion of European Research

Online, 26/02/2026

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thERBN project



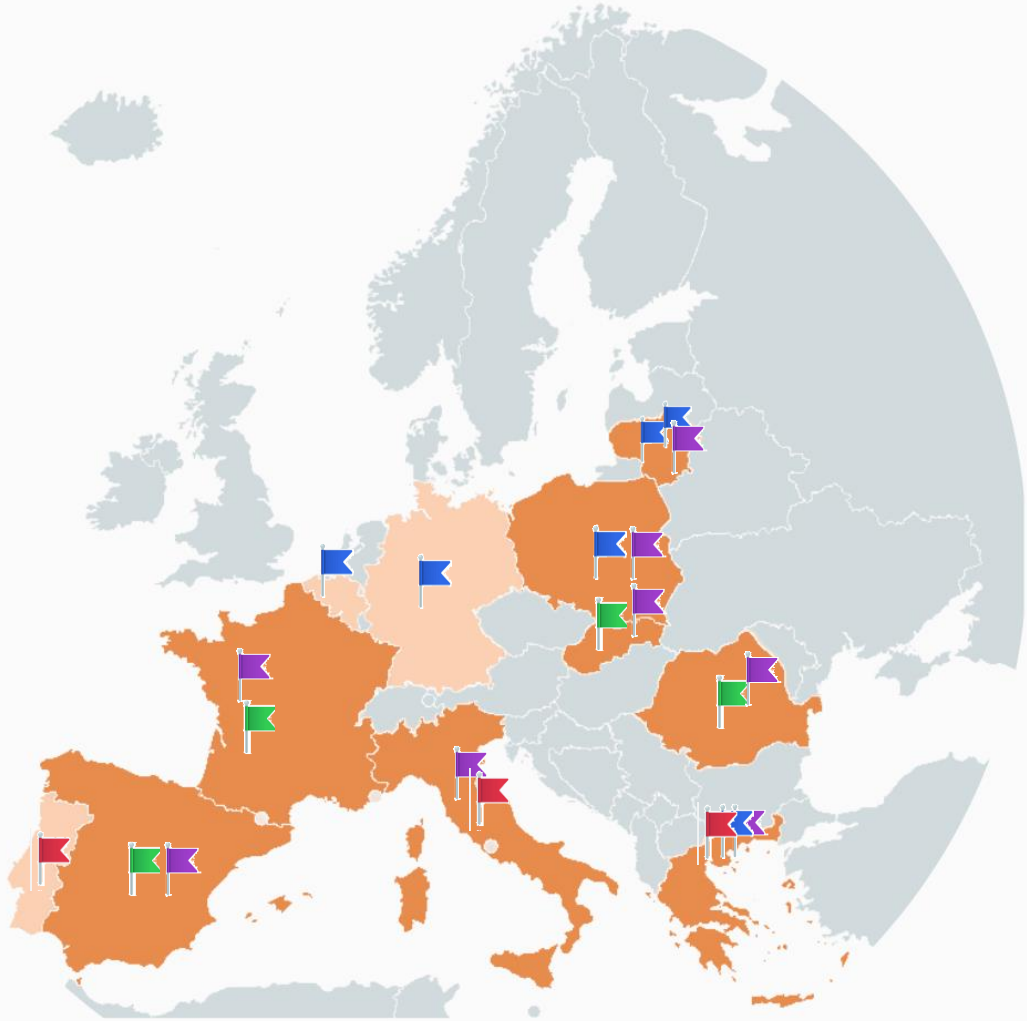
In a nutshell

A quick peek…

Full name	THEMATIC EUROPEAN RURAL BIOECONOMY NETWORK (thERBN)
Work programme	HORIZON-CL6-2024-GOVERNANCE-01-9
Type of Action	HORIZON-CSA
Start Date	1 January 2025
Duration	36 months
Budget	2,999,886.25€
Coordinator	GHENT UNIVERSITY
No of partners	20 (2 affiliates)

We are…

- 6 Research & Training
- 3 Consultants
- 4 Clusters
- 7 Practitioners +1



Partners

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Agenzia per la Promozione della Ricerca Europea





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Apre supports Italian participation in European Union research and innovation funding programmes through information, training and assistance services.

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Deafal is an Italian NGO that promotes Regenerative Organic Agriculture.
It works on international cooperation, technical training, and global citizenship education.

Problem & Solution

EU small-scale farmers and **foresters** face **challenges** in **adopting** sustainable, **circular bioeconomy** practices.



Establish an EU-wide network to share innovative, sustainable **circular bioeconomy solutions** with small farmers and foresters, enabling them to **overcome rural challenges** and effectively **apply existing solutions**.

Needs & solutions in the primary sector

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Urgent Needs: the starting point

Urgent needs are the primary challenges that farmers, livestock breeders, and foresters face in managing biological residues, by-products, and biomass.

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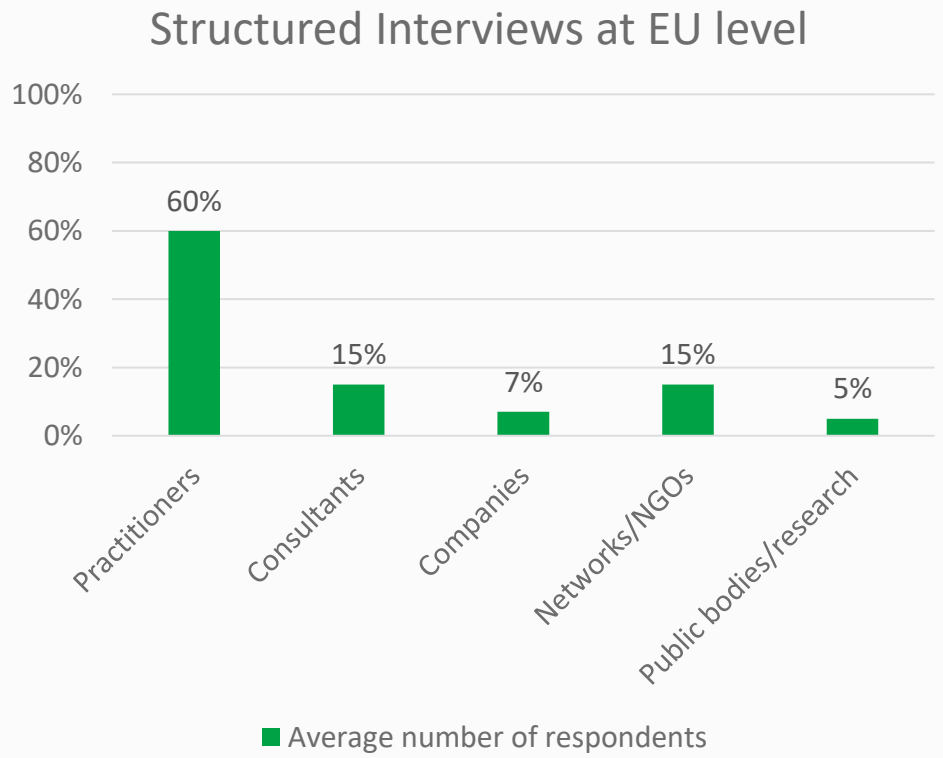
Urgent needs identification:

1) Structured interviews
2) Validation with AKIS

Final output:

- Consolidated and comparable national factsheets.
- Summary of recurring patterns, priorities and qualitative evidence.



Challenges and opportunities

Residues, by-products and biomass are key

Challenges:

- High operating costs
- Environmental impact (greenhouse gas emissions, pollution, waste)
- Logistical and regulatory complexities

Opportunities:

- Composting, biochar, fertilisers, soil improvers/conditioners
- Biogas, biofuels, nutrient extraction
- Bio-based raw materials

Identifying urgent needs allowed us to **understand where these opportunities are truly applicable** and **which solutions can have the greatest impact** in European agricultural and forestry contexts.

Olive groves sector in Italy

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Olive pomace



Urgent needs

By-products from olive oil processing and beer production

Olive pomace:

It is a by-product of olive oil production, made of olive pulp and pit fragments.

Currently used for biogas or oil extraction (low valorisation).

Challenging management, transportation and disposal due to:

- high moisture content
- high seasonality

Brewer's spent grain:

It is a by-product of beer production.

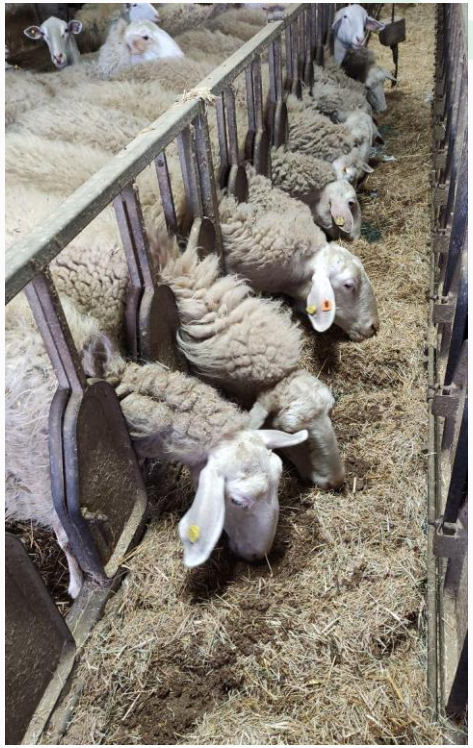
Currently employed as a low-value animal feed.

Suggested solution

Silage for sheep made from olive pomace and brewers' grains







Ingredients: olive pomace, brewers' grains, bran, cereal grains, molasses, yeast

Suggested solution

Silage for sheep made from olive pomace and brewers' grains

Process: separation of pomace from pits (reused for energy); drying of brewers' grains for preservation; mixing of pomace and brewers' grains and co-silage, with the brewers' grains absorbing moisture and promoting lactic fermentation.

Result: stable mixed silage, with balanced moisture content and complementary nutritional properties, suitable for feeding dairy and meat sheep.

Benefits:

- The resulting feed is safe, palatable, digestible and nutritionally balanced.
- It can replace commercial feed in sheep rations, reducing average costs by ~30% without compromising performance, milk production or lamb growth.
- Reduced disposal costs for oil mills and breweries.
- Lower environmental impact and lower feed-food competition compared to traditional concentrates.

Suggested solution

Silage for sheep made from olive pomace and brewers' grains

Innovation: combined use of pomace and spent grain through controlled co-silage, which is innovative compared to their separate use.

Target audience: small and medium-sized farms with existing silage facilities or low-tech substitutes, without the need for complex equipment.

In conclusion, this solution turns two waste management issues into productive and sustainable inputs.

Suggested solution

Silage for sheep made from olive pomace and brewers' grains








Training and Demo event on the farm with practitioners to disseminate the practice

Suggested solution

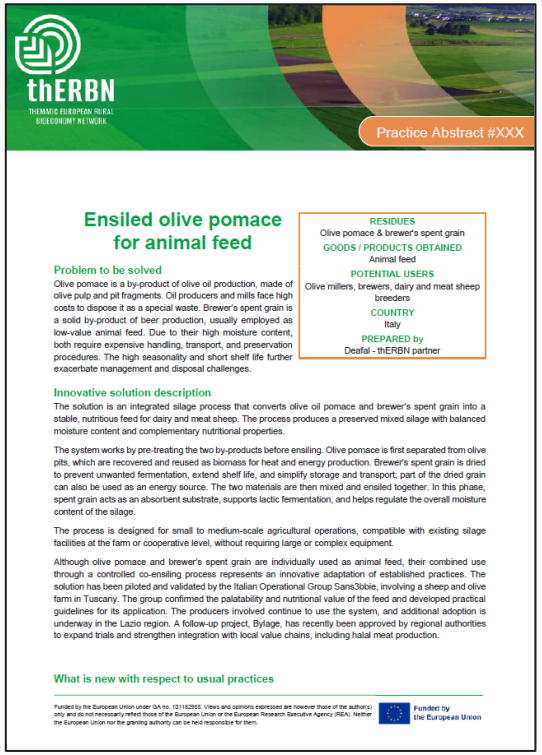
Silage for sheep made from olive pomace and brewers' grains



Informative video in which the farmer demonstrates and explains how he does it

Suggested solution

Silage for sheep made from olive pomace and brewers' grains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Practice Abstract #XXX

Ensiled olive pomace for animal feed

RESIDUES
Olive pomace & brewer's spent grain
GOODS / PRODUCTS OBTAINED
Animal feed
POTENTIAL USERS
Olive millers, brewers, dairy and meat sheep breeders
COUNTRY
Italy
PREPARED by
Deafal - thERBN partner

Problem to be solved

Olive pomace is a by-product of olive oil production, made of olive pulp and pit fragments. Oil producers and mills face high costs to dispose it as a special waste. Brewer's spent grain is a solid by-product of beer production, usually employed as low-value animal feed. Due to their high moisture content, both require expensive handling, transport, and preservation procedures. The high seasonality and short shelf life further exacerbate management and disposal challenges.

Innovative solution description

The solution is an integrated silage process that converts olive oil pomace and brewer's spent grain into a stable, nutritious feed for dairy and meat sheep. The process produces a preserved mixed silage with balanced moisture content and complementary nutritional properties.

The system works by pre-treating the two by-products before ensiling. Olive pomace is first separated from olive pits, which are recovered and reused as biomass for heat and energy production. Brewer's spent grain is dried to prevent unwanted fermentation, extend shelf life, and simplify storage and transport; part of the dried grain can also be used as an energy source. The two materials are then mixed and ensiled together. In this phase, spent grain acts as an absorbent substrate, supports lactic fermentation, and helps regulate the overall moisture content of the silage.

The process is designed for small to medium-scale agricultural operations, compatible with existing silage facilities at the farm or cooperative level, without requiring large or complex equipment.

Although olive pomace and brewer's spent grain are individually used as animal feed, their combined use through a controlled co-ensiling process represents an innovative adaptation of established practices. The solution has been piloted and validated by the Italian Operational Group Sans3bbie, involving a sheep and olive farm in Tuscany. The group confirmed the palatability and nutritional value of the feed and developed practical guidelines for its application. The producers involved continue to use the system, and additional adoption is underway in the Lazio region. A follow-up project, Bylage, has recently been approved by regional authorities to expand trials and strengthen integration with local value chains, including halal meat production.

What is new with respect to usual practices

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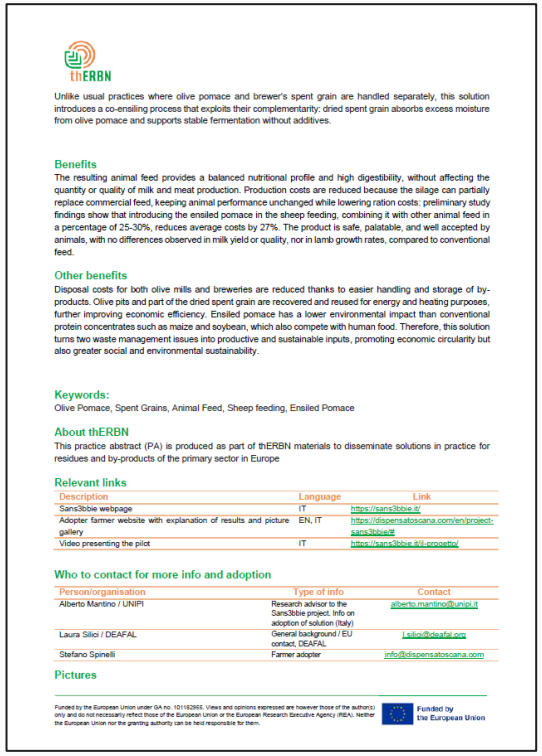
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Unlike usual practices where olive pomace and brewer's spent grain are handled separately, this solution introduces a co-ensiling process that exploits their complementarity: dried spent grain absorbs excess moisture from olive pomace and supports stable fermentation without additives.

Benefits

The resulting animal feed provides a balanced nutritional profile and high digestibility, without affecting the quantity or quality of milk and meat production. Production costs are reduced because the silage can partially replace commercial feed, keeping animal performance unchanged while lowering ration costs: preliminary study findings show that introducing the ensiled pomace in the sheep feeding, combining it with other animal feed in a percentage of 25-30%, reduces average costs by 27%. The product is safe, palatable, and well accepted by animals, with no differences observed in milk yield or quality, nor in lamb growth rates, compared to conventional feed.

Other benefits

Disposal costs for both olive mills and breweries are reduced thanks to easier handling and storage of by-products. Olive pits and part of the dried spent grain are recovered and reused for energy and heating purposes, further improving economic efficiency. Ensiled pomace has a lower environmental impact than conventional protein concentrates such as maize and soybean, which also compete with human food. Therefore, this solution turns two waste management issues into productive and sustainable inputs, promoting economic circularity but also greater social and environmental sustainability.

Keywords:
Olive Pomace, Spent Grains, Animal Feed, Sheep feeding, Ensiled Pomace

About thERBN

This practice abstract (PA) is produced as part of thERBN materials to disseminate solutions in practice for residues and by-products of the primary sector in Europe

Relevant links

Description	Language	Link
Sans3bbie webpage	IT	https://sans3bbie.it/
Adopter farmer website with explanation of results and picture gallery	EN, IT	https://dispensatoscana.com/en/project-sans3bbie/#
Video presenting the pilot	IT	https://sans3bbie.it/il-progetto/

Who to contact for more info and adoption

Person/organisation	Type of info	Contact
Alberto Mantino / UNIPI	Research advisor to the Sans3bbie project. Info on adoption of solution (Italy)	alberto.mantino@unipi.it
Laura Silici / DEAFAL	General background / EU contact, DEAFAL	l.silici@deafal.org
Stefano Spinelli	Farmer adopter	info@dispensatoscana.com

Pictures

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Practice abstract in English and Italian

Suggested solution

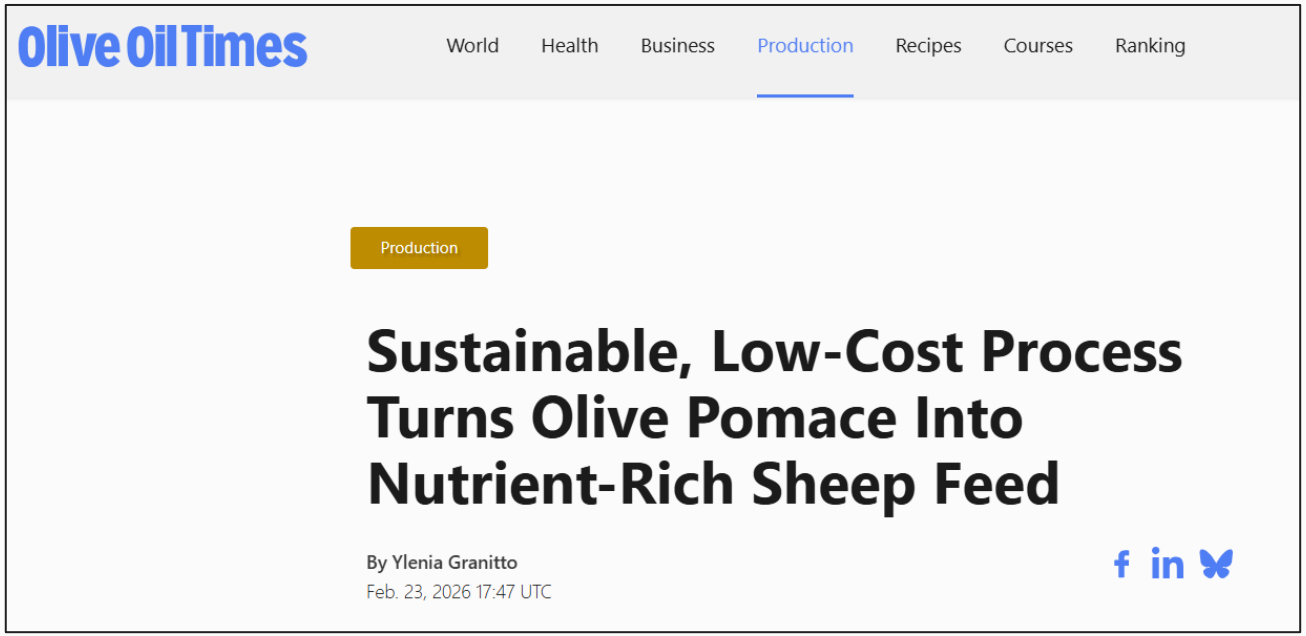
Silage for sheep made from olive pomace and brewers' grains



Testimonial podcast in English

Suggested solution

Silage for sheep made from olive pomace and brewers' grains



Informative article in a specialist online magazine

Olive pruning residues



Urgent needs

Olive pruning residues and grape pomace

Issues regarding olive pruning residues:

- Pruning waste is bulky and difficult to transport.
- Widespread mentality that considers waste to be ‘rubbish’ rather than a resource.
- Poor integration with other supply chains that could valorise this biomass.

Most popular solutions:

- Direct burning → CO_2 emissions and loss of useful resources.
- Burial in the soil.

Emerging solutions:

- Vermicompost

Grape pomace

It is a by-product of winemaking made of skins, seeds, and stalks. Often sold to produce grappa, it is rich in organic and mineral elements and can be used to create organic fertilisers.

Suggested solution

Vermicompost from grape pomace and green pruning residues

Vermicomposting uses **earthworms** to turn pruning residues and winemaking waste into a **high-value organic fertiliser.**

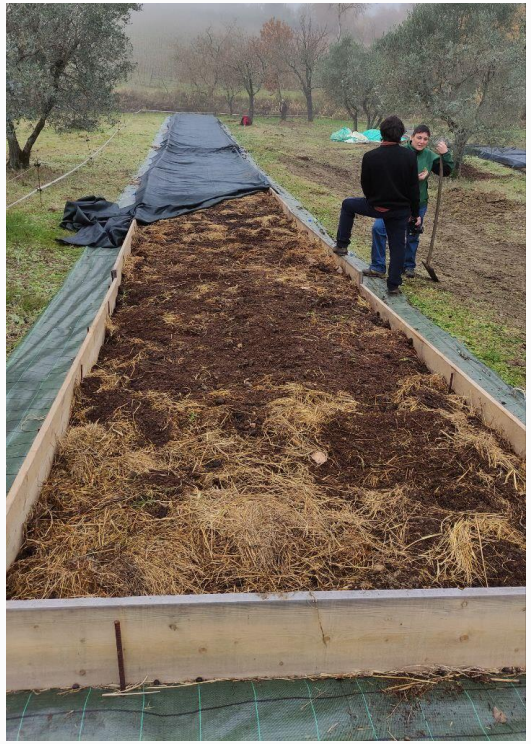
Pomace is mixed with **manure** and **straw**, then processed by worms and microbes into a stable, nutrient-rich vermicompost that **improves soil** fertility, structure, and water retention, **boosting crop performance.**

The process takes about **4-6 months** under controlled moisture, aeration, and temperature. Compared with conventional composting, it is **faster**, requires **no turning**, and produces a **more biologically active product** with **no risk of overuse** in the field.

In Italy, Podere La Marronaia successfully applies this method, producing around 25 tons of vermicompost annually. By reusing its own pomace, the winery improved soil health and reduced external fertiliser use, demonstrating a practical circular solution for winery residues.

Suggested solution

Vermicompost from grape pomace and green pruning residues






Ingredients: green waste from pruning olive trees and vines, grape pomace, manure, earthworm inoculum

Suggested solution

Vermicompost from grape pomace and green pruning residues





Grape pomace used for vermicomposting

Suggested solution

Vermicompost from grape pomace and green pruning residues





Bedding used for vermicomposting

Suggested solution

Vermicompost from grape pomace and green pruning residues





Detail of bedding

Suggested solution

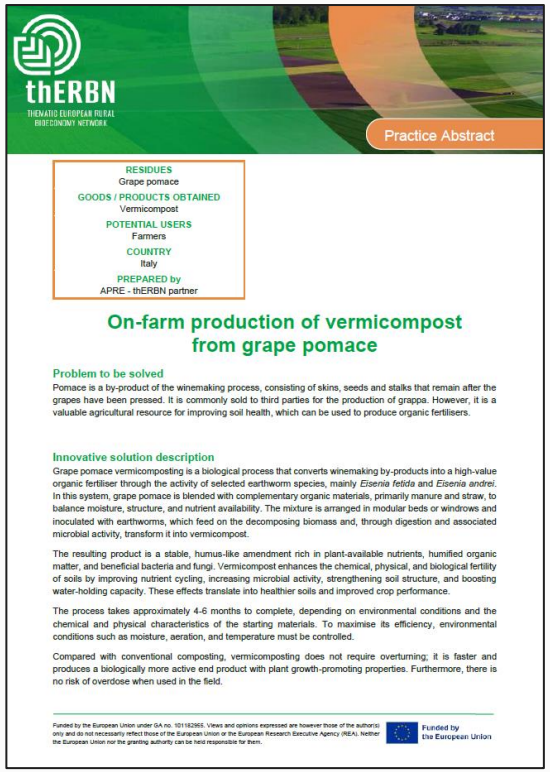
Vermicompost from grape pomace and green pruning residues



Informative video in which the farmers and the technician demonstrate and explain what they do

Suggested solution

Vermicompost from grape pomace and green pruning residues



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Practice Abstract

RESIDUES
Grape pomace
GOODS / PRODUCTS OBTAINED
Vermicompost
POTENTIAL USERS
Farmers
COUNTRY
Italy
PREPARED by
APRE - thERBN partner

On-farm production of vermicompost from grape pomace

Problem to be solved

Pomace is a by-product of the winemaking process, consisting of skins, seeds and stalks that remain after the grapes have been pressed. It is commonly sold to third parties for the production of grappa. However, it is a valuable agricultural resource for improving soil health, which can be used to produce organic fertilisers.

Innovative solution description

Grape pomace vermicomposting is a biological process that converts winemaking by-products into a high-value organic fertiliser through the activity of selected earthworm species, mainly *Eisenia fetida* and *Eisenia andrei*. In this system, grape pomace is blended with complementary organic materials, primarily manure and straw, to balance moisture, structure, and nutrient availability. The mixture is arranged in modular beds or windrows and inoculated with earthworms, which feed on the decomposing biomass and, through digestion and associated microbial activity, transform it into vermicompost.

The resulting product is a stable, humus-like amendment rich in plant-available nutrients, humified organic matter, and beneficial bacteria and fungi. Vermicompost enhances the chemical, physical, and biological fertility of soils by improving nutrient cycling, increasing microbial activity, strengthening soil structure, and boosting water-holding capacity. These effects translate into healthier soils and improved crop performance.

The process takes approximately 4-6 months to complete, depending on environmental conditions and the chemical and physical characteristics of the starting materials. To maximise its efficiency, environmental conditions such as moisture, aeration, and temperature must be controlled.

Compared with conventional composting, vermicomposting does not require overturning; it is faster and produces a biologically more active end product with plant growth-promoting properties. Furthermore, there is no risk of overdose when used in the field.

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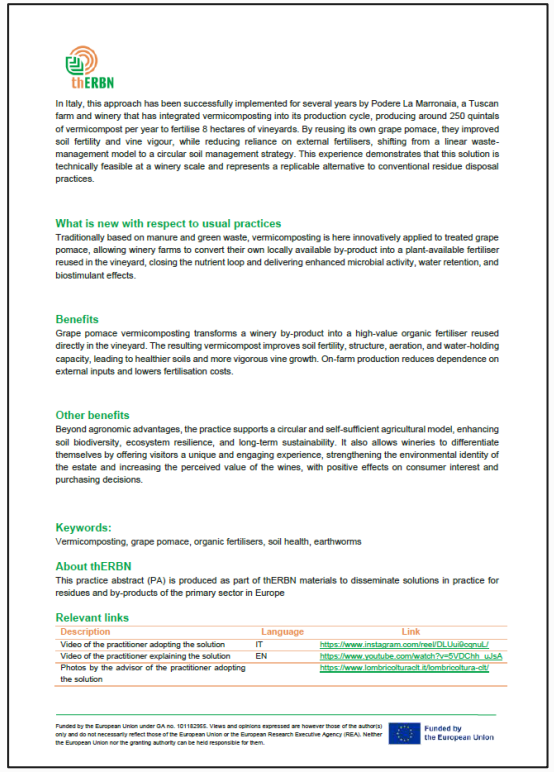

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In Italy, this approach has been successfully implemented for several years by Podere La Marronaia, a Tuscan farm and winery that has integrated vermicomposting into its production cycle, producing around 250 quintals of vermicompost per year to fertilise 8 hectares of vineyards. By reusing its own grape pomace, they improved soil fertility and vine vigour, while reducing reliance on external fertilisers, shifting from a linear waste-management model to a circular soil management strategy. This experience demonstrates that this solution is technically feasible at a winery scale and represents a replicable alternative to conventional residue disposal practices.

What is new with respect to usual practices

Traditionally based on manure and green waste, vermicomposting is here innovatively applied to treated grape pomace, allowing winery farms to convert their own locally available by-product into a plant-available fertiliser reused in the vineyard, closing the nutrient loop and delivering enhanced microbial activity, water retention, and biostimulant effects.

Benefits

Grape pomace vermicomposting transforms a winery by-product into a high-value organic fertiliser reused directly in the vineyard. The resulting vermicompost improves soil fertility, structure, aeration, and water-holding capacity, leading to healthier soils and more vigorous vine growth. On-farm production reduces dependence on external inputs and lowers fertilisation costs.

Other benefits

Beyond agronomic advantages, the practice supports a circular and self-sufficient agricultural model, enhancing soil biodiversity, ecosystem resilience, and long-term sustainability. It also allows wineries to differentiate themselves by offering visitors a unique and engaging experience, strengthening the environmental identity of the estate and increasing the perceived value of the wines, with positive effects on consumer interest and purchasing decisions.

Keywords:

Vermicomposting, grape pomace, organic fertilisers, soil health, earthworms

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Relevant links

Description	Language	Link
Video of the practitioner adopting the solution	IT	https://www.instagram.com/reel/DLUui6cgnuL/
Video of the practitioner explaining the solution	EN	https://www.youtube.com/watch?v=5VDChh_uJsA
Photos by the advisor of the practitioner adopting the solution		https://www.lombricolturaolt.it/lombricoltura-olt/

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Practice abstract in English and Italian

Suggested solution

Silage for sheep made from olive pomace and brewers' grains



Testimonial podcast in English

Suggested solution

Silage for sheep made from olive pomace and brewers' grains



Training and Demo event scheduled with practitioners to disseminate the practice

Are you an AKIS professional working in Italy?

Join our working group!

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Working group on Circular Bioconomy in Italy

Mission:
Provide a forum for discussion among AKIS organisations operating in Italy and practitioners in the agricultural, livestock and forestry sectors, to discuss needs and solutions for the circular bioeconomy (CB).

Activities:
- Co-design within the thERBN project activities
- Strategic positioning of the Primary Sector on CB
- Networking with other professionals involved in CB
- Provide policy advice

For further information and to join the working group: fusconi@apre.it



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THEMATIC EUROPEAN RURAL BIOECONOMY NETWORK

Thank you!

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