

CLEAN-UP AGROBIOMASS TECH: VALORIZATION OF AGRICULTURAL BIOMASS.

Circular Economy and eco-innovation.

Patent Number ES2606774



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I. ATHISA GROUP

Andaluza de Tratamientos de Higiene S.A (ATHISA) was founded in 1983. Since then, the company has grown with a specific goal: **to improve citizens' quality of life by providing “healthy services” through continuous innovation.** This conviction has defined both, the growth and the evolution of the group.

ATHISA currently has an international presence in 4 countries and a consolidated R&D department **working for preservation of the environment and public health.**



ATHISA has carried out improvements in the **Biomass Fuel Factory** located in Socuéllamos (Ciudad Real), having investigated and developed an innovative procedure that, combining the dry and wet route, gave rise to the **patented eco-innovation ES2606774** for the Cleaning and Valorization of the agrarian pruning and plantation removal.

PORTUGAL



SPAIN (Canary Island)

CATHISA
medio ambiente

PERU



SPAIN



TURKEY



MOROCCO



II. Agrobiomass recovery and valorization

The woody agricultural biomass produced annually by **pruning and plantation removal** is a residue with a **high calorific value**, that could provide a high added value in the regions where it is produced.

The **physico-chemical parameters** of these agricultural residues, such as the content of Chlorine, Nitrogen, Sulfur, calorific value, or moisture, are of a high quality, and represent a great advantage compared to other agricultural biomass, being similar to forest biomass.



II. Agrobiomass recovery and valorization

The main **conditioning factor** for the use of these woody agrobiomass for thermal or thermoelectric purposes is its **high ash content**, which is determined by the pruning and collection practices that farmers use.



Pruning and plantation removal collection practices provide a high percentage of contaminants, composed mainly of sandstones, stones, metals and plastics. This high percentage of contaminants, gives rise to an **ash content of 20%**, which makes its use unfeasible.

II. Agrobiomass recovery and valorization

Unit 1: High density elements separation

Equipped with a water filtration and decantation system, as well as a tilting system for unloading waste.

Unit 2: Cleaning of adhered particles

It is a rinsing system equipped with a water filtration and recovery system.



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Título: EQUIPO DE LIMPIEZA DE MADERA

Resumen:
Equipo de limpieza de madera por inmersión en agua, que comprende dos recipientes, uno mayor (2), y otro menor (3), donde el menor (3) anida dentro del mayor (2), y el menor (3), que se llena de agua, incorpora palas (5) que giran sobre ejes (6) movidos por motores eléctricos (7) que surgen y hacen avanzar la madera hacia la salida. Las palas (5) están articuladas. Los ejes (6) están fijados a la base superior del recipiente menor (3). Además se ha previsto una cinta transportadora (8), movida por motor eléctrico (7) y soportada en apoyos (9), que parte desde un punto situado por debajo del nivel del agua y acciende hacia el exterior. Los recipientes (2, 3) están unidos mediante braguera (4) de basculación del recipiente menor (3) para volcar su contenido.

FIG. 1

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II. Agrobiomass recovery and valorization

The technology **developed and patented by ATHISA** (ES2606774) allows reducing the **ash content below 3%**, with high production capacity and low cost, to achieve high quality biomass to be used in industrial boilers, District Heating and thermoelectric plants.

Combustion ash content
reduction below 3%

Clean vineyard pruning (example)

Parameter	Result
Moisture Content	12-25%
Ash Content	3%
Calorific Value (dry base)	5,02MW/Tm
Carbon Content	39,75%
Hydrogen Content	5,72%
Nitrogen Content	0,59%
Sulfure Content	0,03%
Chlorine Content	0,01%



II. Agrobiomass recovery and valorization

ATHISA BIOGENERACIÓN has commercialized vineyard prunings and plantation removals, in woodchips and pellet and baled format, being the highly efficient for combustion plants.



VINEYARD PRUNINGS: PELLET – BALED – WOODCHIPS; PLANTATION REMOVALS: WOODCHIPS



II. Agrobiomass recovery and valorization

The use of vineyard pruning as agricultural biomass for thermal and / or thermoelectric purposes provides a number of Economic, Environmental and Public Health values.

SOCIO-ECONOMIC VALUES: VINEYARD PRUNINGS AS A EXAMPLE

- The economic value of vineyard prunings for heating purposes has been calculated in **800M€ annually** in Spain, as this biomass could replace about 800 million liters of heating fuel.
- For Biomass Management Companies, the use of vineyard prunings, will produce a **cost reduction about 10-15€/Tm compared to forest biomass**.
- The Clean-up Agrobiomass Tech has a capacity of **50.000Tm/year**.
- This means an anual **economical saving of 500.000€-750.000€** for each Equipement.
- Use of vineyard prunings will produce **1.370 direct employments** in Spain, just for collection, in rural areas.

II. Agrobiomass recovery and valorization

ENVIRONMENTAL VALUES: VINEYARD PRUNINGS AS A EXAMPLE

The current practice of "Open burning" of vineyard prunings produces high environmental damage, due to **greenhouse gas (GHG) emissions**, contrary to the principles of Circular Economy and the mitigation objectives of Climate Change policies.

ENVIRONMENTAL VALUE (1)

Valorization of 50.000 tons of vineyard prunings will avoid the emission of **82.140 tons of CO₂ each year without any use.**

As published by Gancedo Alonso 2018, the main activity producing CO₂eq emissions in the wine production is the vineyard pruning open burning, that can be higher than 90% of total GHG.

ENVIRONMENTAL VALUE (2)

The use of 50.000 tons of vineyard prunings in heating boilers will produce **220.000 MW**, that replace about **18.644 tons** of heating fossil fuel.

Low Calorific Value (LCV) of valorized vineyard prunings (10% moisture content) is 4,4 MW/Tm.
LCV of heating fuel is 11,8 MW/Tm (Source: IDAE).

II. Agrobiomass recovery and valorization

PUBLIC HEALTH VALUE: VINEYARD PRUNINGS AS AN EXAMPLE

The practice of "**open burning**" also produces a series of **toxic pollutants** that are very toxic to human health. Recovery and combustion in controlled facilities will avoid contamination with these **toxic gases**. For each 50.000 Tm/year, the following emissions will be avoided:

Open burning toxic gases	Tons/year of emissions
NO _x	292 Tm/year
SO _x	73 Tm/year
CO	6.395 Tm/year
Organic Volatile Compounds	954 Tm/year



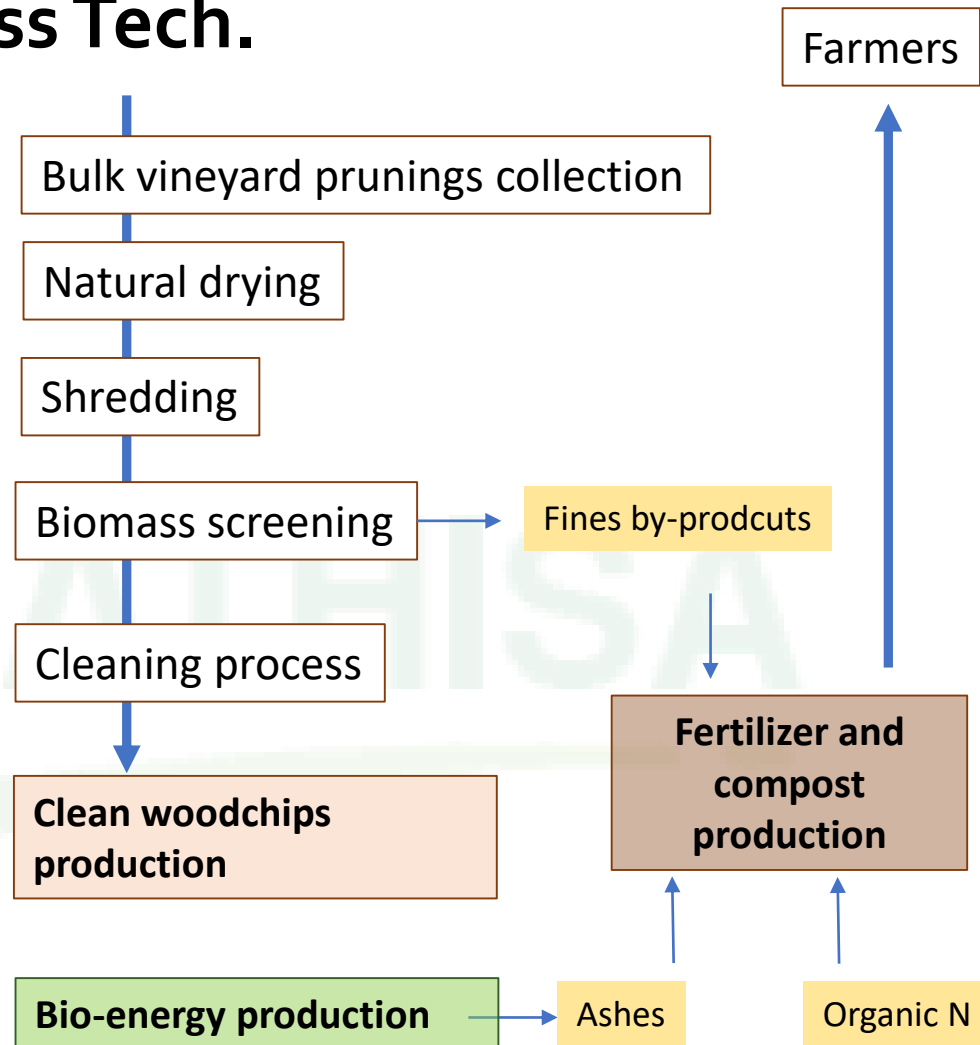
III. Clean-up Agrobiomass Tech.

CIRCULAR ECONOMY:

- 1) Fertilizers production based on **biomass ashes valorization**.
- 2) **Compost production** with biomass screening byproducts, containing sand and wood fines.

Other uses:

- Material recovery (celullose);
- Bio-stimulants,
- Compost (Life Sarmiento)
- Bio-fuels (BioSfera EU Project)



IV. Conclusions

- FIRST: The Clean-up Agrobiomass Tech, will make possible the use of **sustainable agro-biomass**, generating socio-economic value and sustainability, for at least 15 years of life of patent ES2606774.
- SECOND: **Increasing the value of agro-biomass by 50%**, making this business profitable enough to develop a logistic chain of supply.
- THIRD: The Clean-up Agrobiomass Tech will make possible the current **regulatory compliance**, especially the Waste Law 7/2022, the Climate Change Strategy, the Circular Economy Law, and the Air Quality Law 34/2007, make it possible to obtain benefits for Public Health and Environmental Benefits.