

Valorisation of digestate from low-tech digester treating coffee waste: A strategy for sustainability under a circular economy approach

Ph.D. Student in Environmental Engineering

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Juliana Jaramillo Hurtado
Colombia – Pereira
Eje cafetero



1989

2015

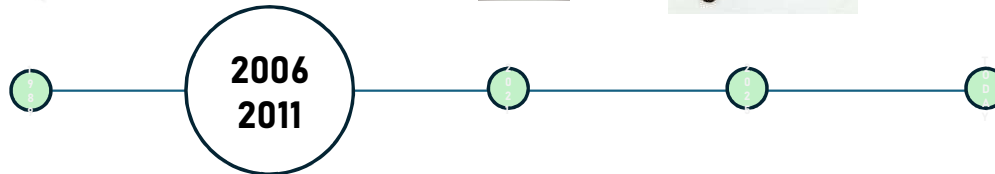
2017

2018

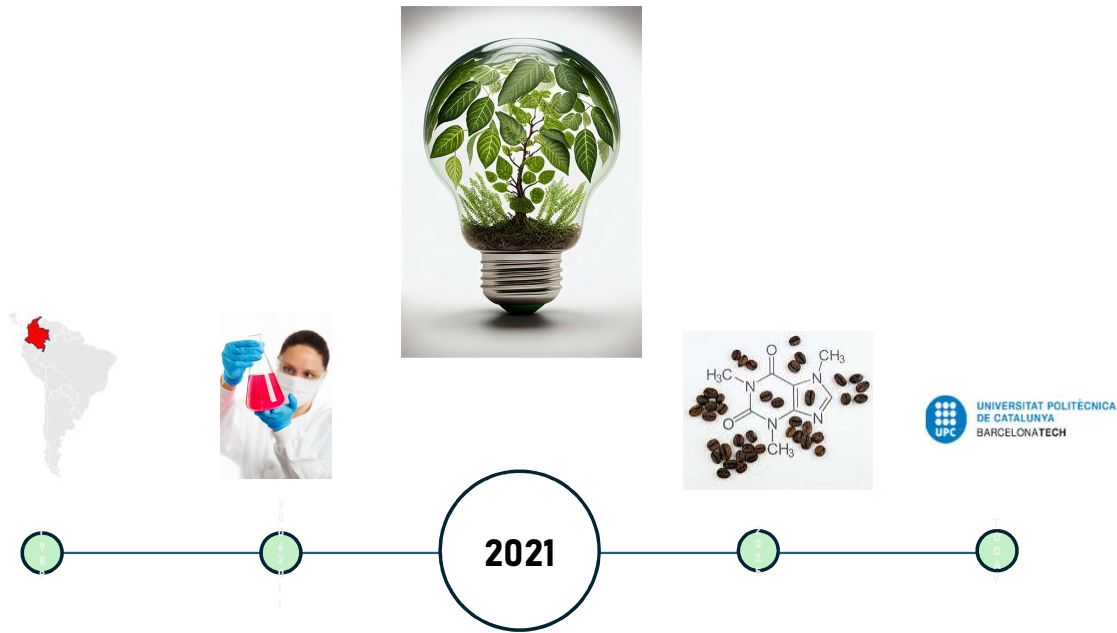
2019



Industrial Chemistry
Universidad Tecnológica de
Pereira - Colombia



Grupo de Investigación en
Agua y Saneamiento GIAS
M.Sc. Ecotechnology
Lecturer (2015 – 2025)





2025



M.Sc. Agribusiness of Coffee
SSEA - GIDA



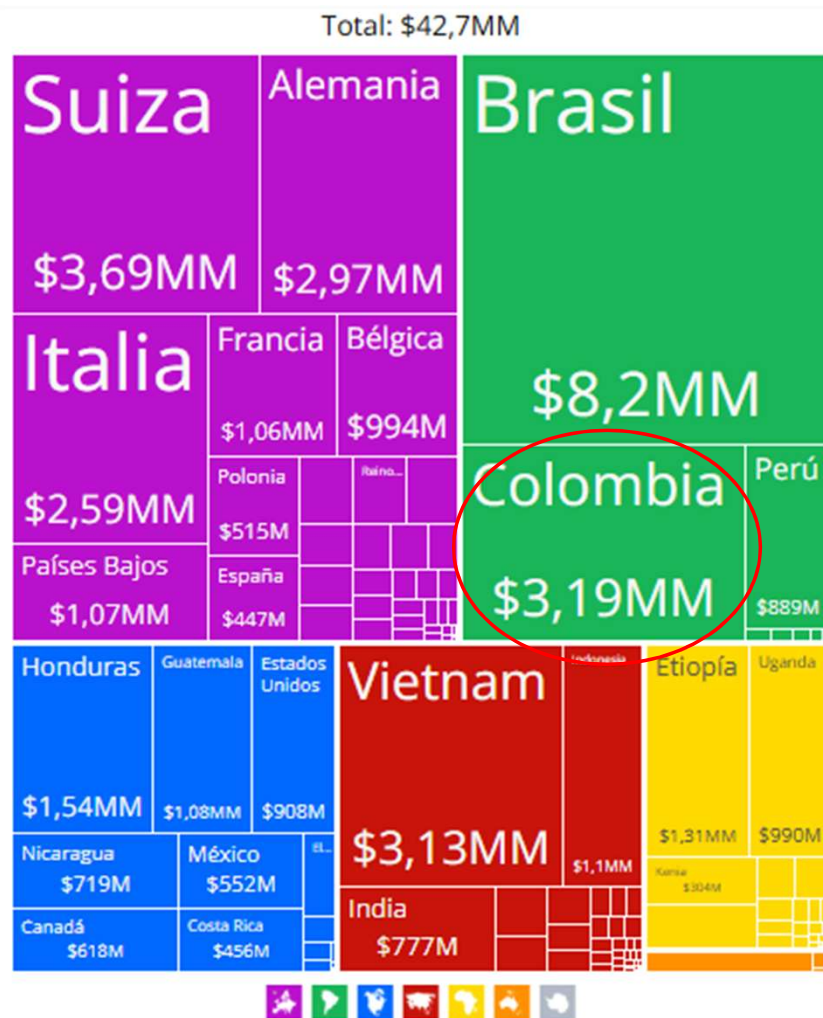
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TODAY

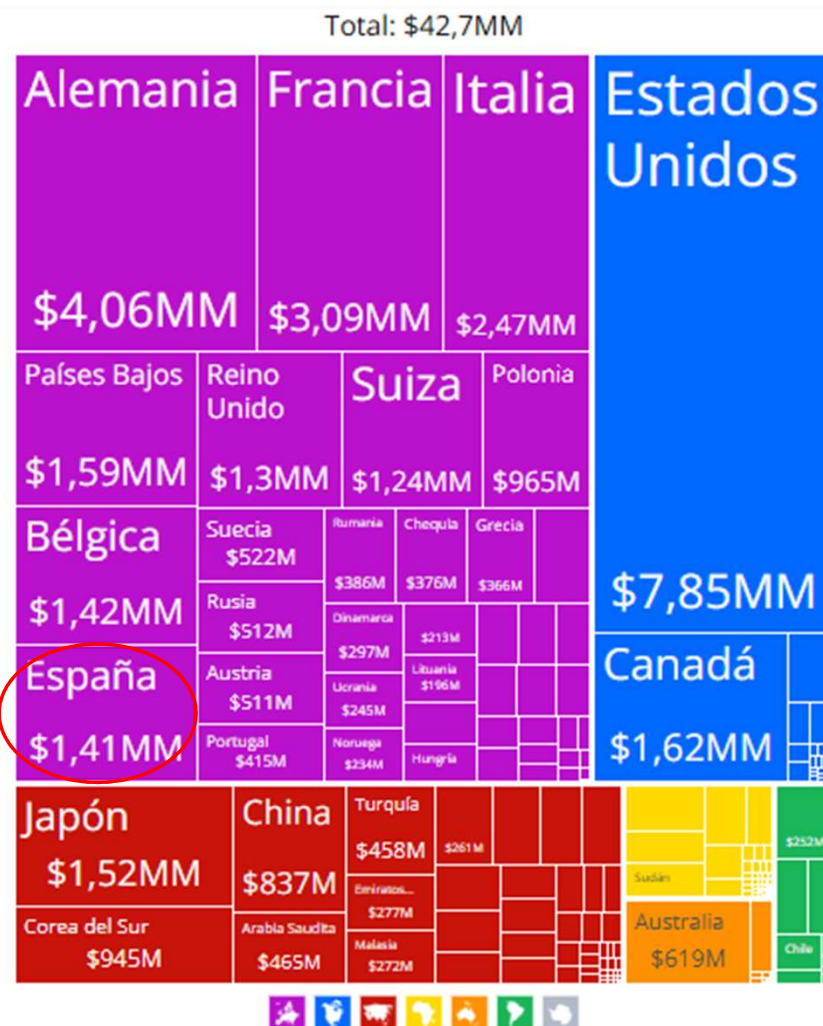


Ph.D student
Environmental Engineering
Joan Oró
GEMMA - UPC
2025

Coffee Exporters in 2023

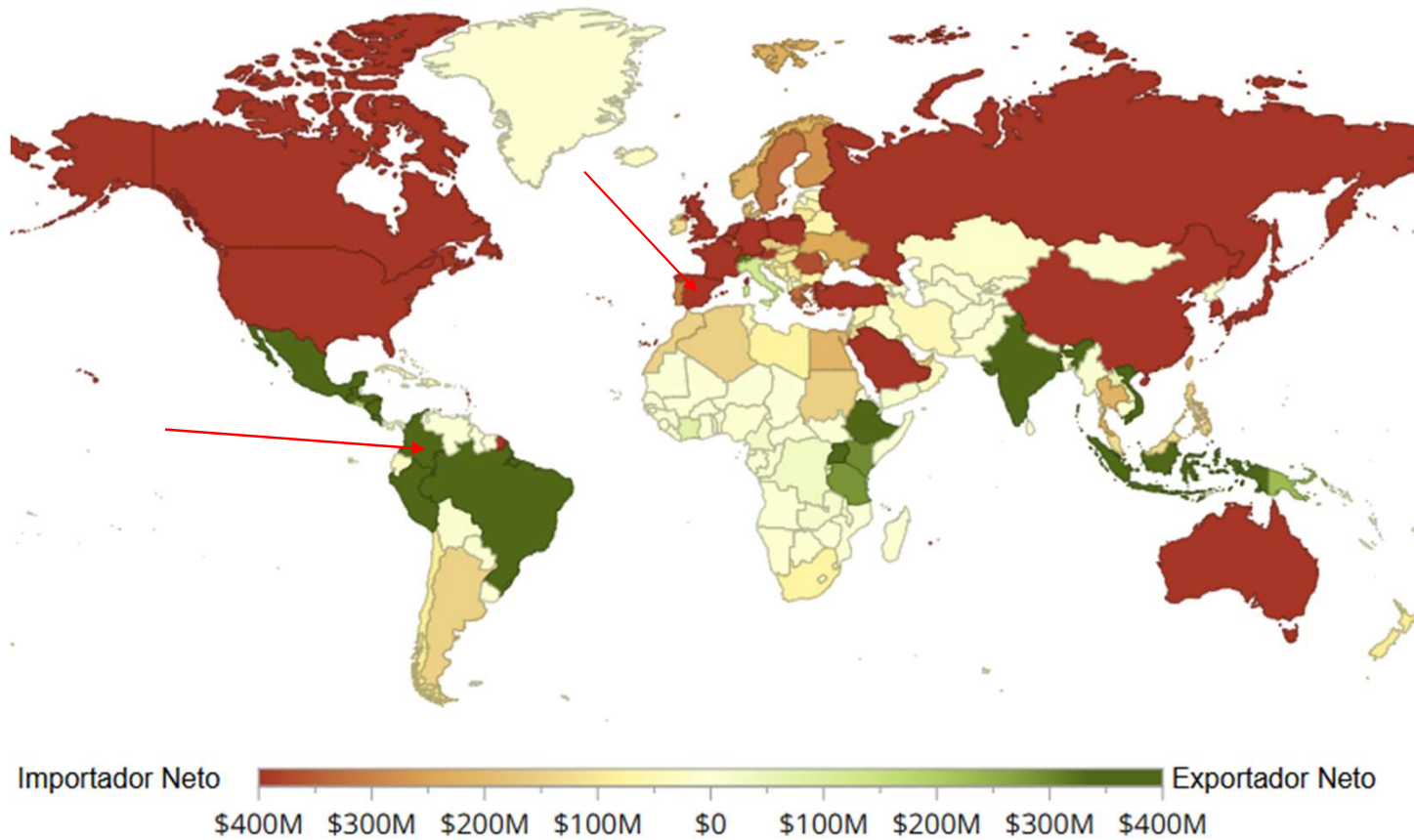


Coffee Importers in 2023

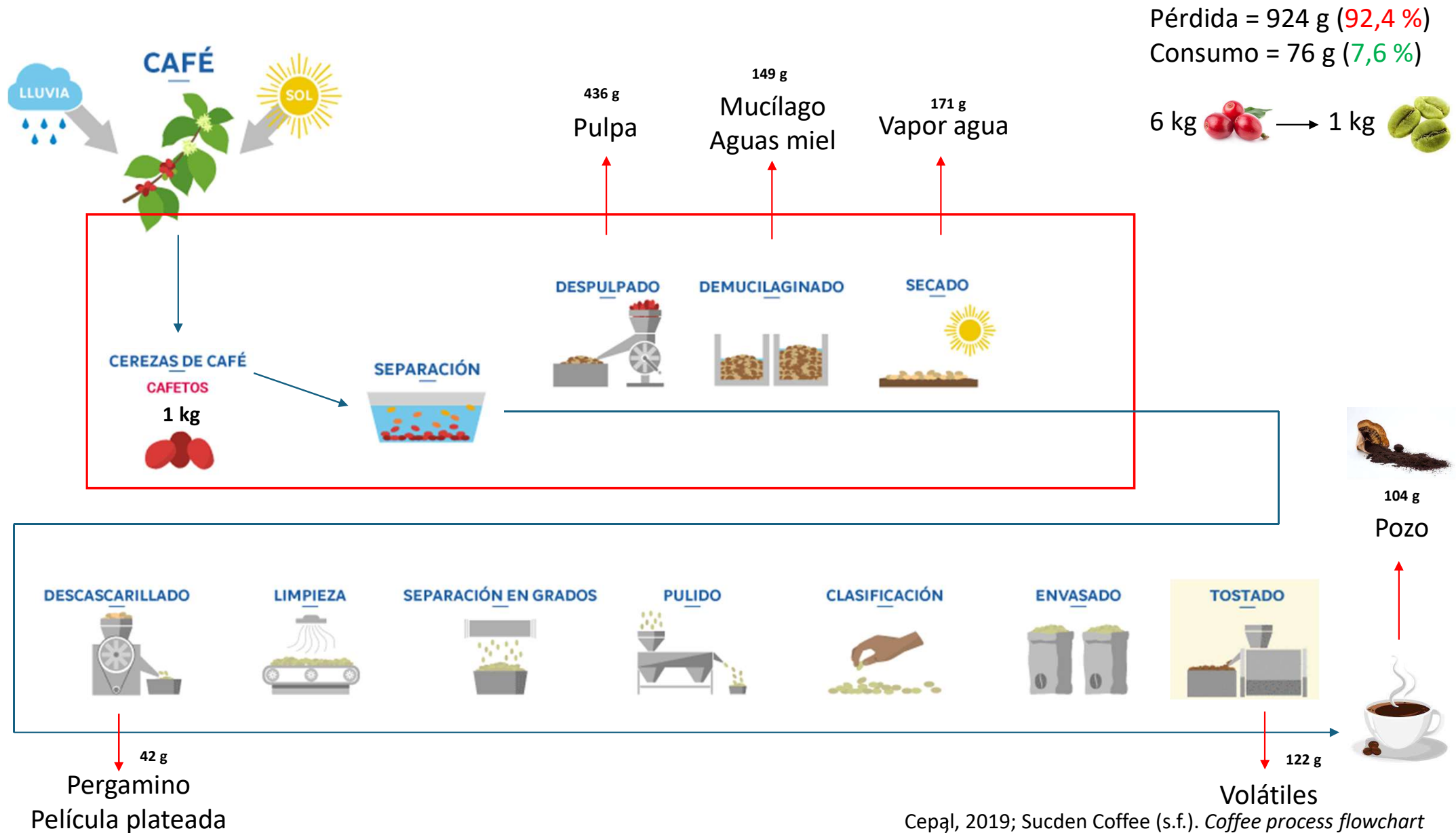


Fuente: (OEC, 2023)

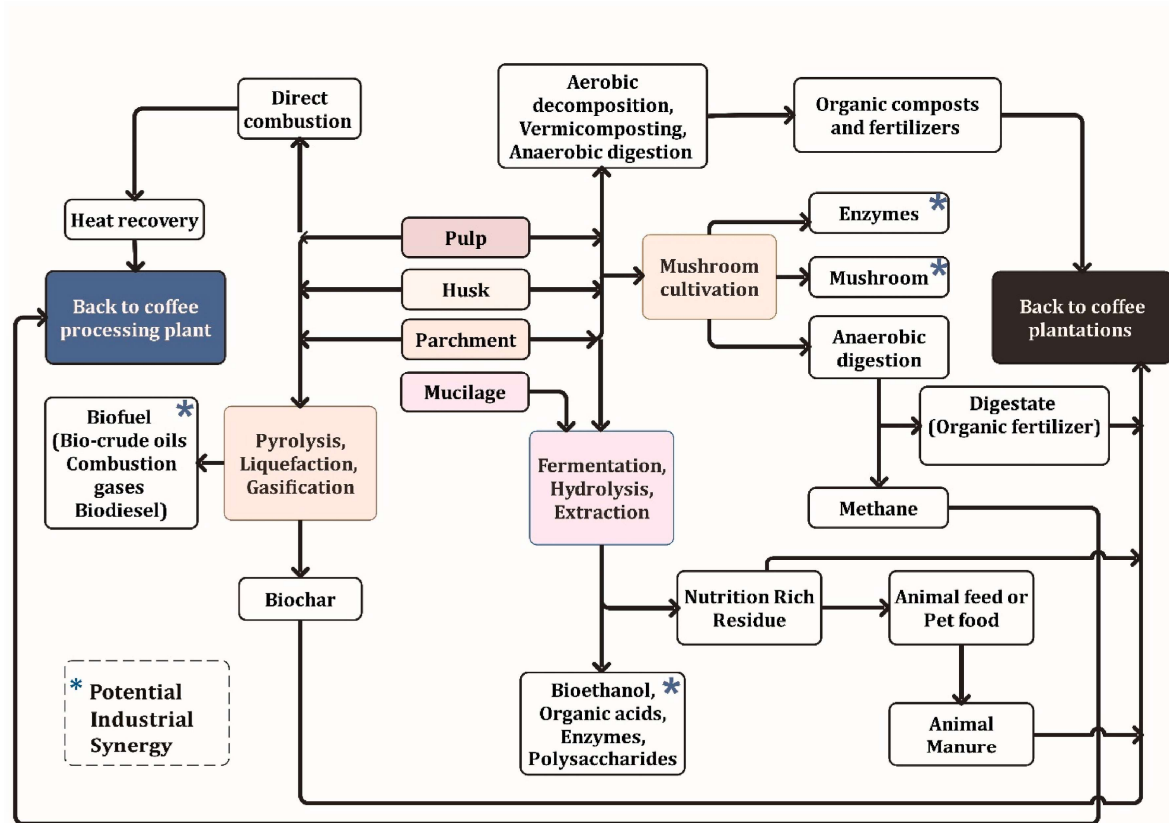
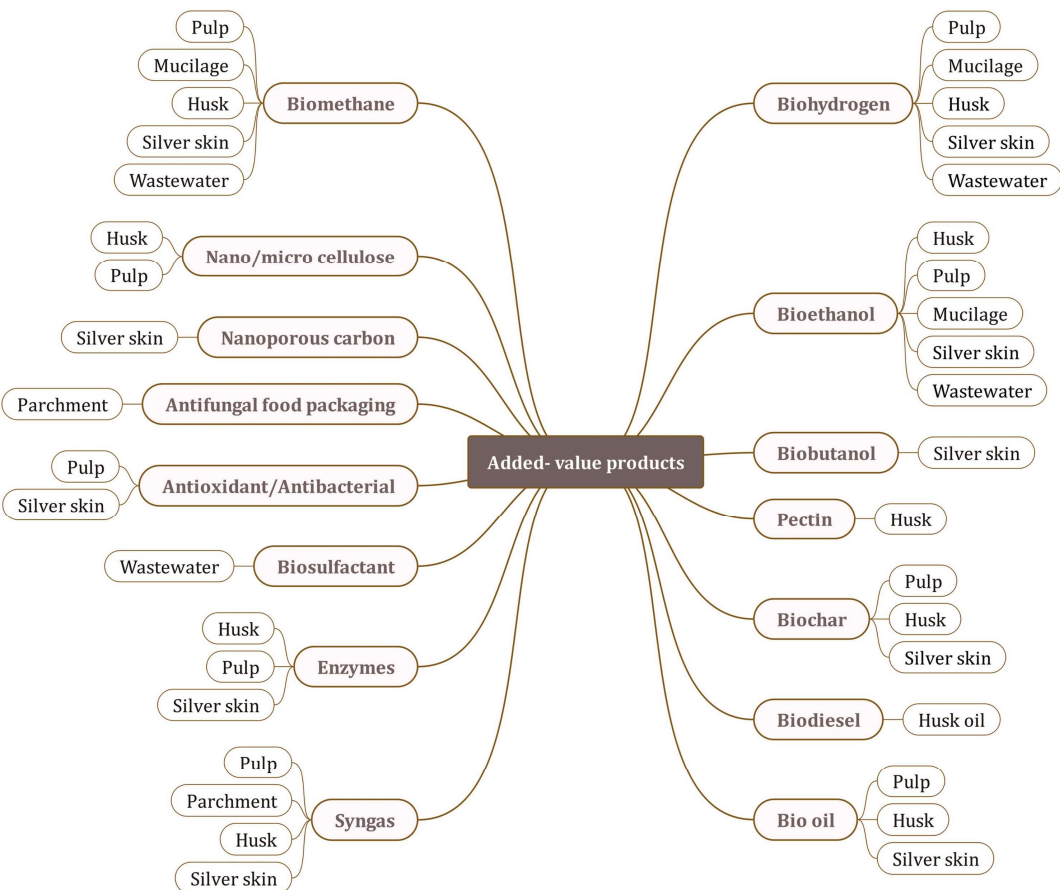
Global Coffee Trade Balance (2023)



Fuente: (OEC, 2023)



Cepal, 2019; Sucden Coffee (s.f.). *Coffee process flowchart*



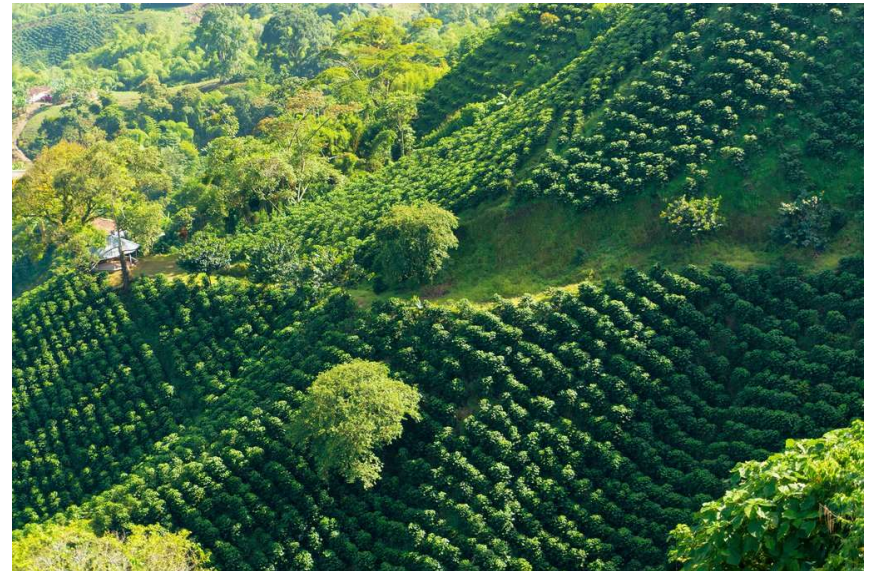
Coffee Growing in Colombia



Kimkim (2023). Best places to visit in Colombia's Coffee Region.



Hermanos Coffee Roasters (2023). Colombian Coffee Triangle: Major Coffee-Producing Regions.



WhereNext (2023). Filming in Colombia: The Coffee Triangle.



Association of Coffee
Growers
La Cuchilla de San Juan
Belén de Umbría
Risaralda



Harvest season

- Main harvest: September – December
- Secondary harvest (traviesa): April – June

Harvest season production
75 ton/day → **27 ton/day pulp**





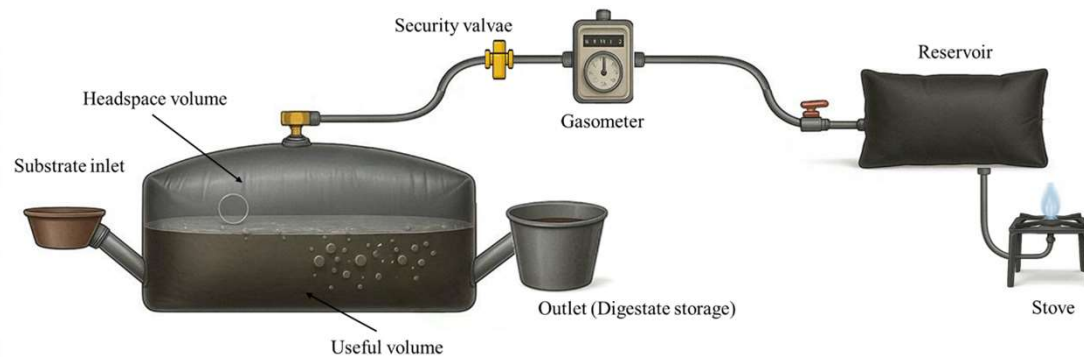
1% of the pulp goes to vermiculture
0,75 ton



75 ton/day → 11 ton/day mucilage

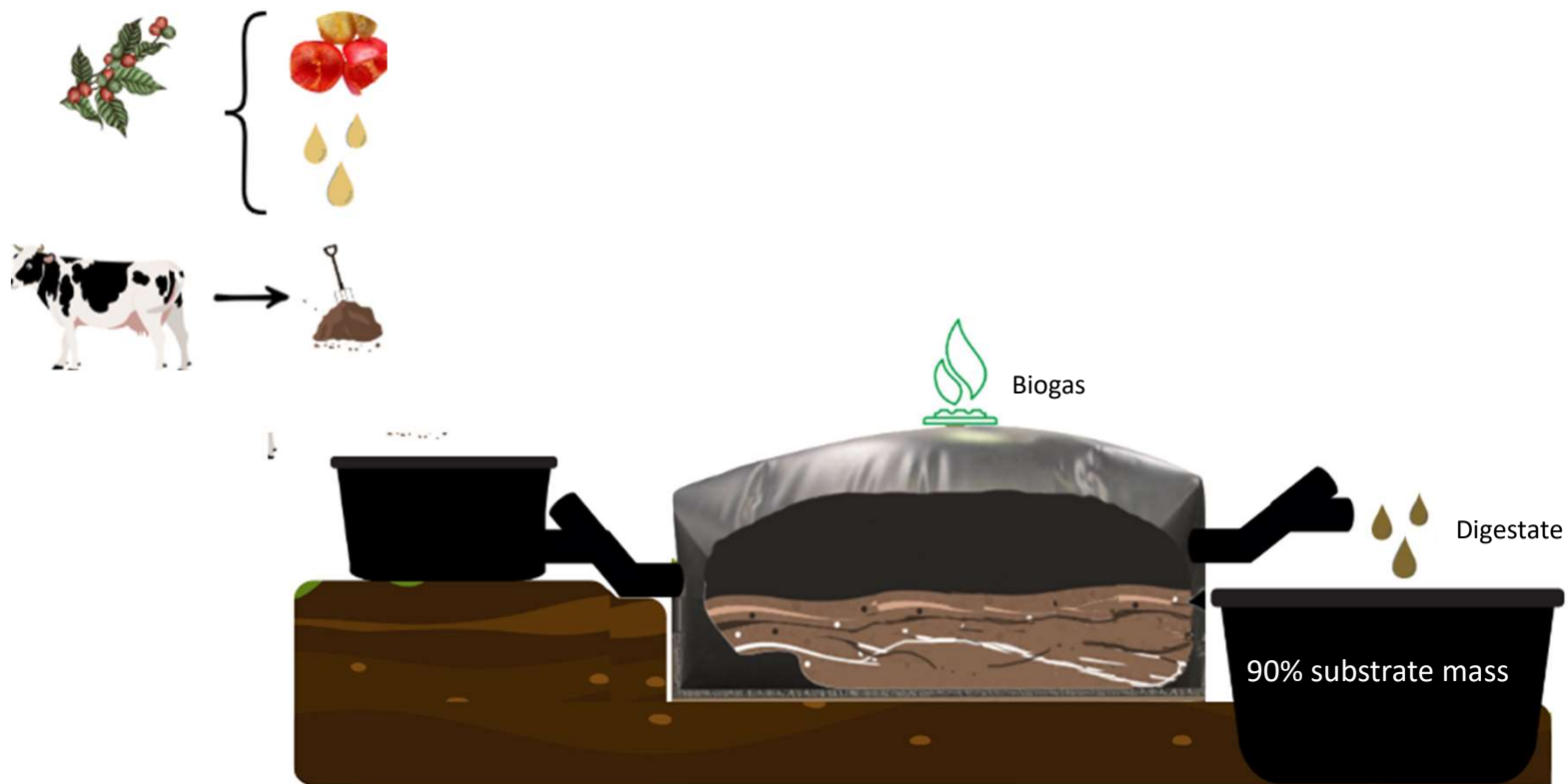
All the mucilage is discharged into a river.

Anaerobic digesters are the alternative for managing coffee waste (pulp and mucilage)

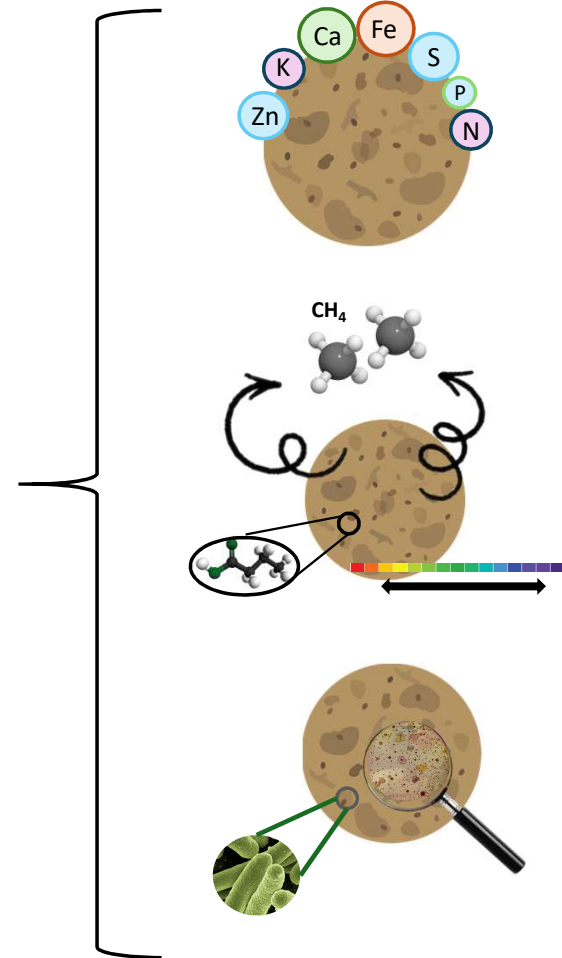


Ziegler-Rodriguez, K., et al. (2025)

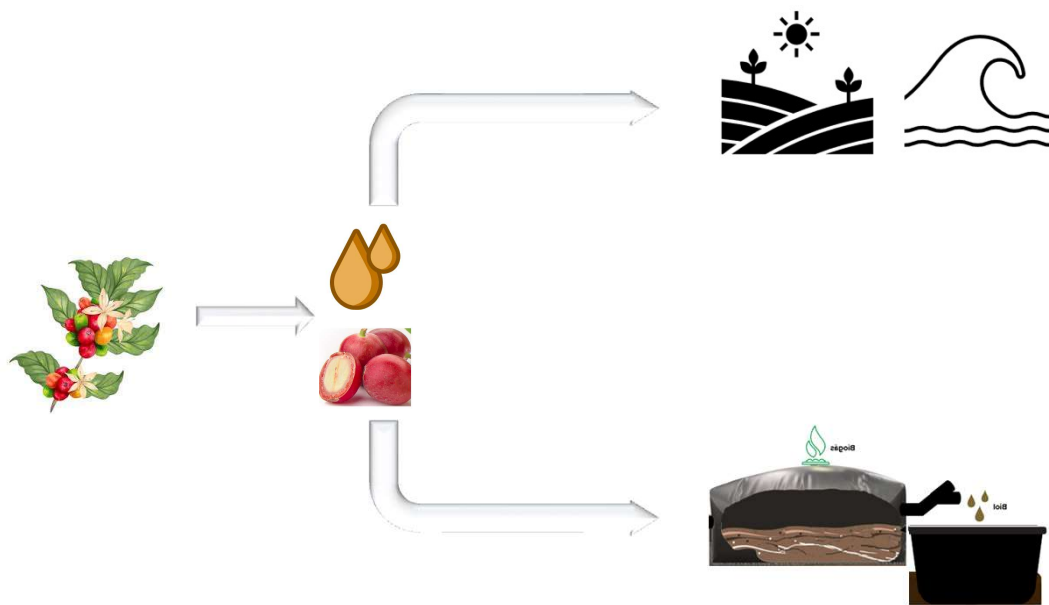




Tipología del digerido



Research



- X ☠ Environmental pollution
- X 💧 Eutrophication
- X 🌊 CH₄ and CO₂ emissions
- X 🌱 Soil degradation
- X 🦠 Aquatic toxicity
- X ❓ Proliferation of pathogens and unpleasant odors
- X 🔥 Greenhouse gas contribution and climate impact

✓ ♻ Biofertilizer

✓ 🌿 Soil amendments –

1 🌿 = 1 ton CO₂e
carbon credit avoided / removed

✓ 🌱 High-quality compost

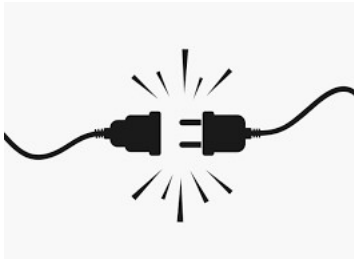
✓ 🧪 Value-added products or materials

✓ ⚡ Biochar

?



- **Leader in Life Cycle Assessment and Waste Management.**



- Headquartered in Colombia, but with a global perspective — I serve as the bridge between both contexts.



- This research provides key insights for the design of public policies in the Colombian coffee sector.

Thank you for your attention



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- Centre for Development Cooperation (CCD)
(CCD2025-B002)



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Group of Environmental Engineering
and Microbiology

- Technical University of Catalonia
(UPC)



- Universidad Industrial de Santander
(UIS) - Colombia

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