

Potential to produce biogas from tannery waste

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**RESEARCH 2 PRACTICE
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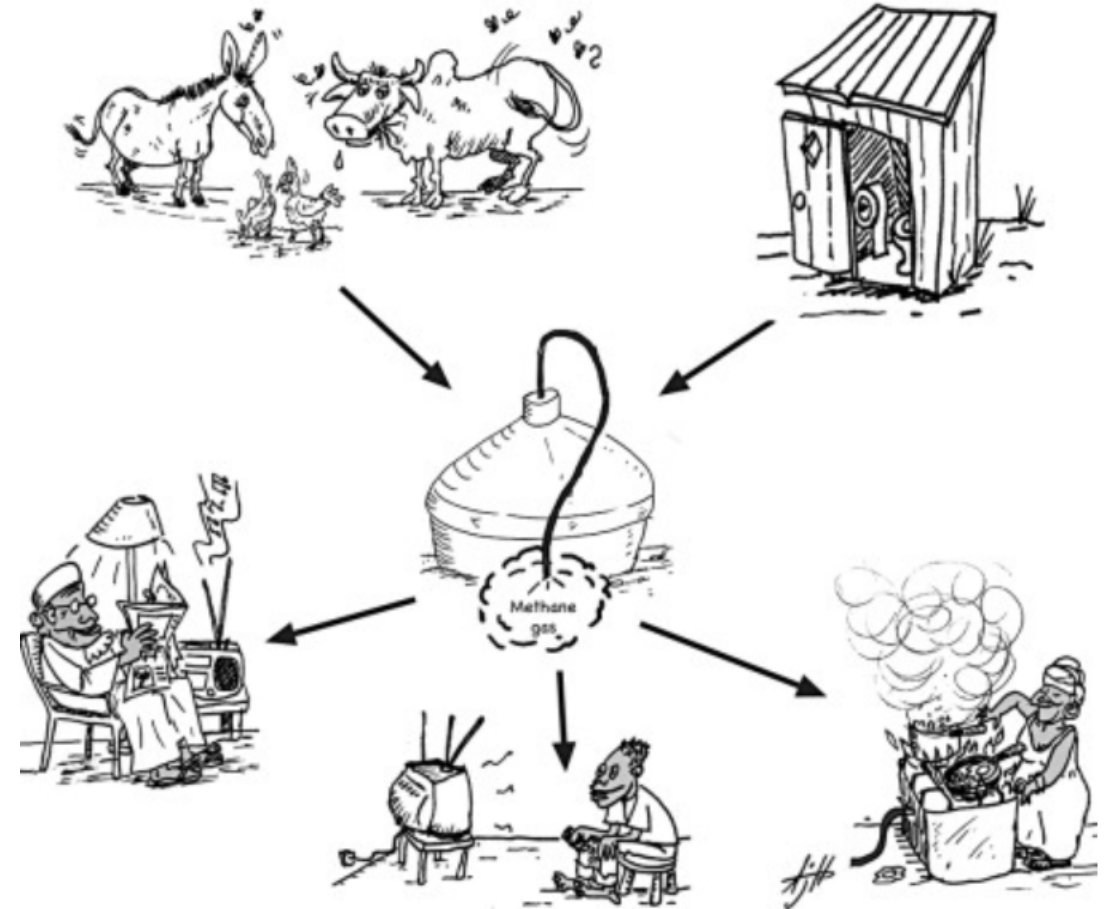


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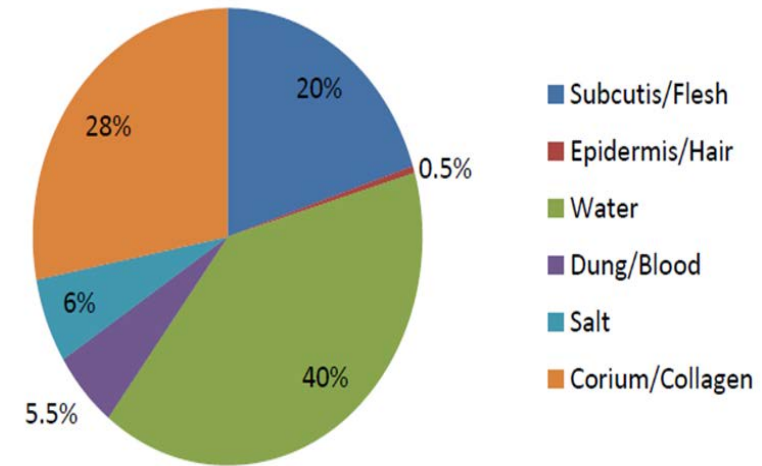
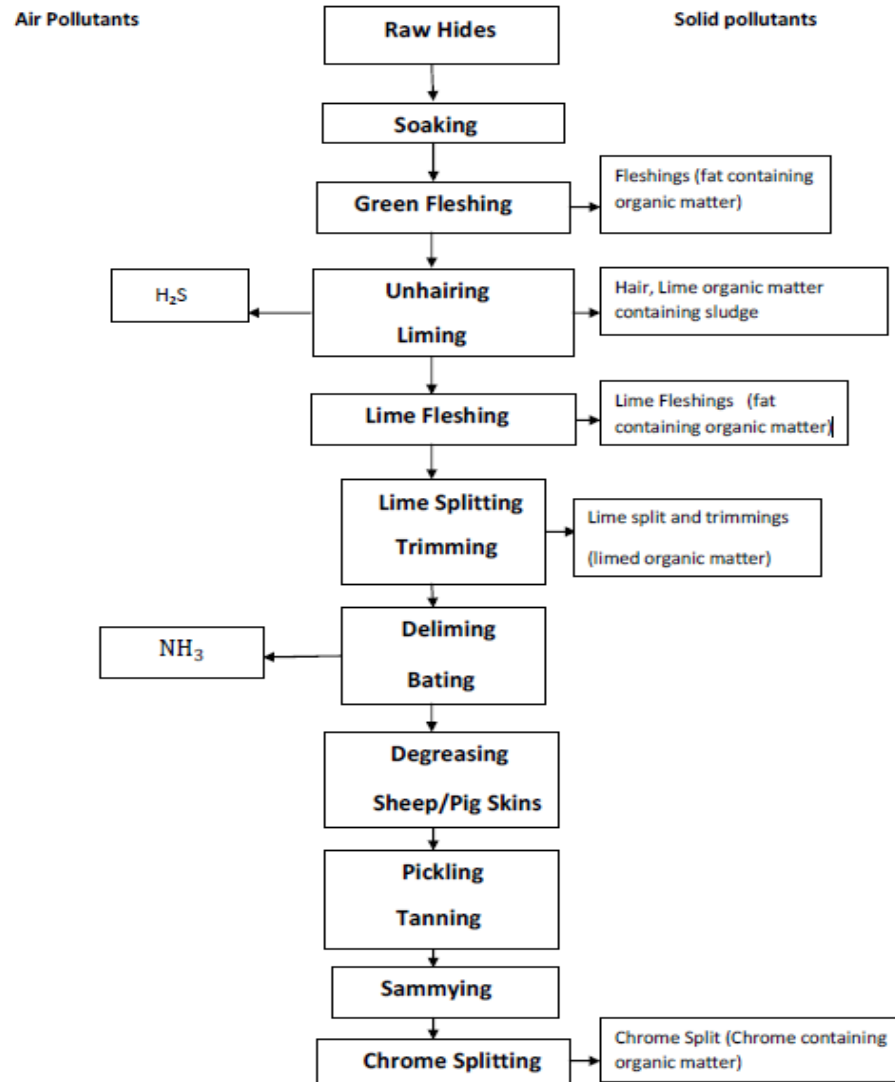


Introduction to tannery valorization to biogas

- Huge accumulation of tannery waste
- Environmental pollution
- Energy deficit
- Energy-Food Nexus
- Climate change effects

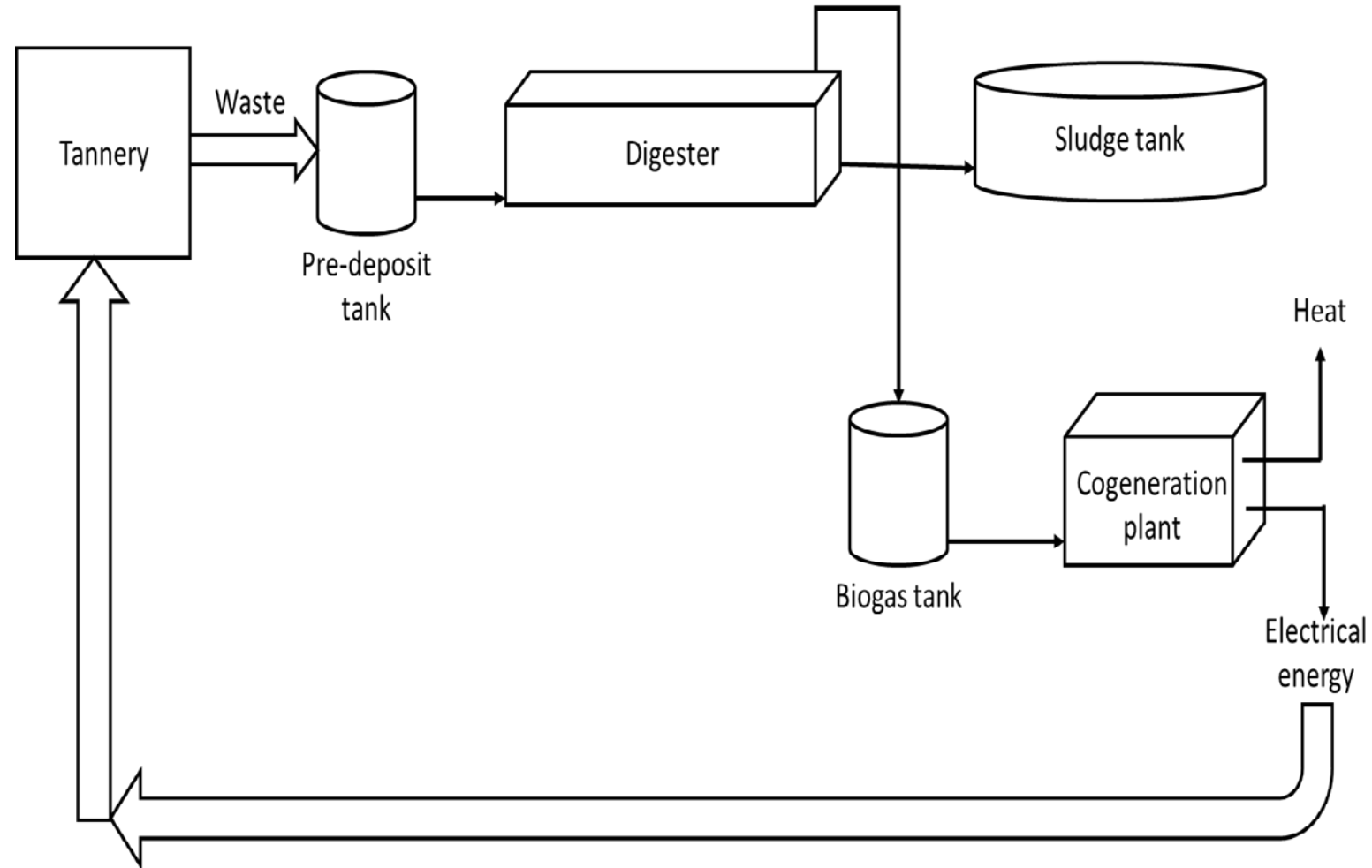


Waste generation in the tannery industry



The tannery waste highly biodegradable

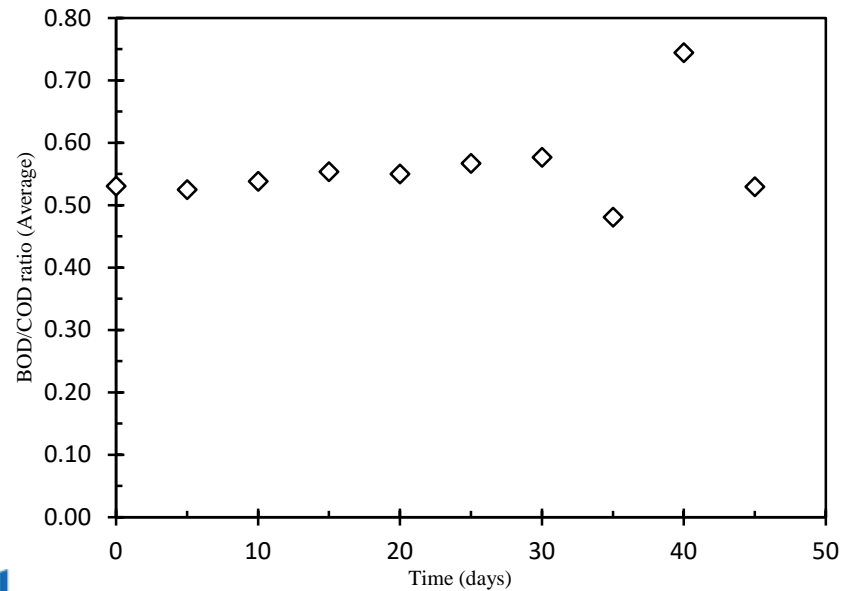
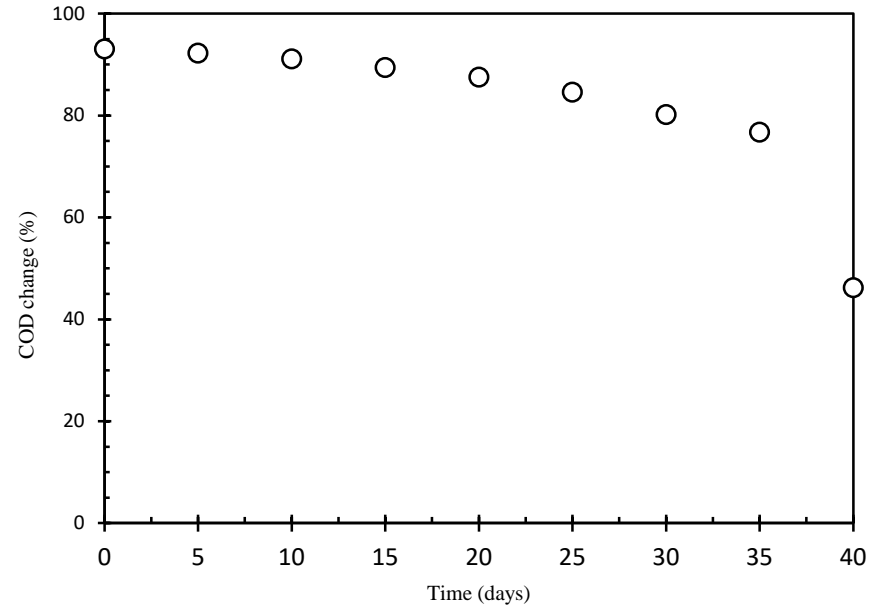
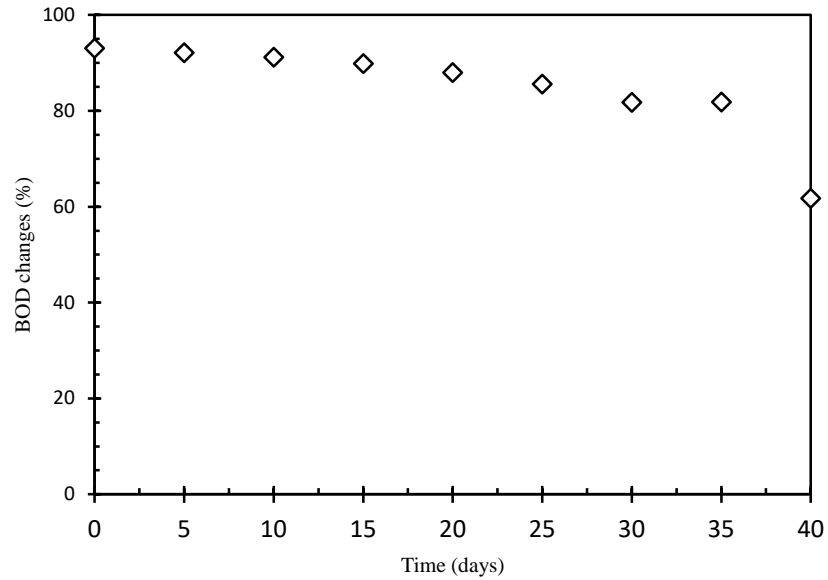
Intergrated process for tannery waste valorization



- Anaerobic digestion
- Bio catalysis
- 45 days retention period

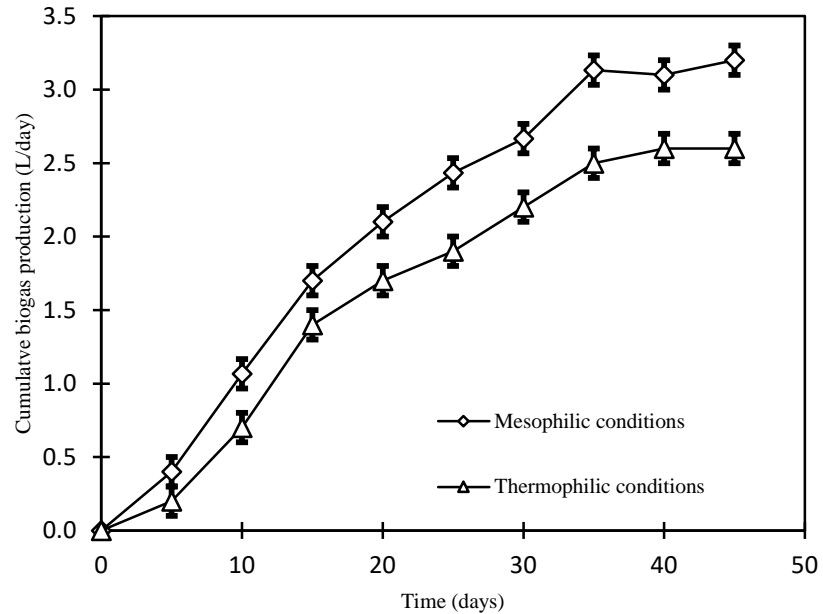
**Promotion of a circular economy
in the tannery industry**

Changes in tannery sludge physicochemical properties



**Tannery waste highly bio degradable
Ratios > 0.5**

Biogas production



Mesophilic conditions superior

Biogas component	Units	Composition
Bio methane	(%v/v)	55-65
Carbon dioxide	(%v/v)	35-40
Nitrogen	(%v/v)	<2
Oxygen	(%v/v)	<1
Hydrogen sulphide	ppm	600
Ammonia	ppm	100

Tannery digestate characteristics

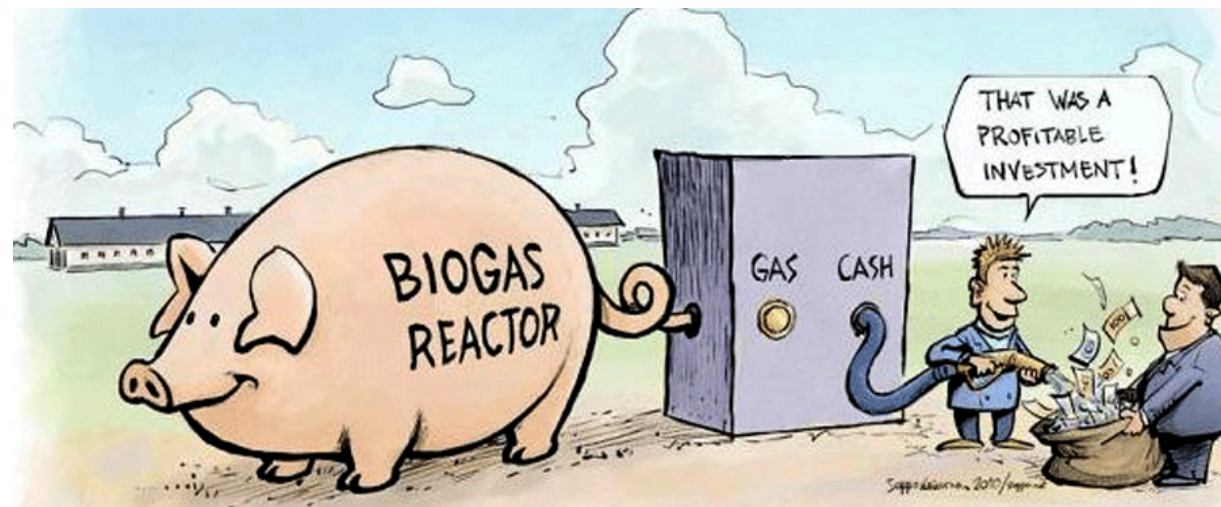
Parameter	Feedstock	Tannery sludge
pH	8.1±0.2	7.5±0.1
Chemical oxygen demand (COD)	9178±8 mg/L	637±8 mg/L
Biological oxygen demand (BOD)	4868±3 mg/L	337±15 mg/L
Total nitrogen (TKN)	6535±31 mg/L	532±8 mg/L
Moisture content (MC)	60±3%	40±2%



As researchers or practitioners what are the possible interactions/collaboration with practitioners resp. researchers to improve/upscale your activities

Collaborations/Interactions

- Valorization of biomass to energy products as research projects (biogas, briquettes, bio fuels)
- Scale up of technology to industrial scale
- Co-supervision and hosting of students in the BioEnergy Course





What are the potential aspects of the research that can be transformed into practice?

- **Energy generation for cooking, heating and electricity generation**
- **Application of the biogas technology to any biomass**
- **Utilization of digestate as biofertilizers**
- **Waste valorization**
- **Climate change mitigation**

