Objective and research strategy

**Objective**

Simple and less expensive technique for a rapid anaerobic digestion of leaves

**Strategy**

- Biochemical methane potential (BMP) assay of: leaves and their active substances
- Identification of inhibitory factors of the leaves biodegradation
- Optimization of the leaves anaerobic digestion
- Bioreactors assay

**BMP assay**

- Biogas sampling and measurement
- Medium volume (150 ml)

Context

- Clean renewable energy (no CO₂ to atmosphere)
- Biofertilizers
- Vegetable solid wastes management

Results 1 and discussion

Leaves characteristics

<table>
<thead>
<tr>
<th>METHANE PRODUCTION</th>
<th>CASSAVA LEAVES</th>
<th>MANGO LEAVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS (g/l)</td>
<td>81.17</td>
<td>98.25</td>
</tr>
<tr>
<td>C/N</td>
<td>7.08</td>
<td>48.70</td>
</tr>
<tr>
<td>Mineral elements</td>
<td>1.430</td>
<td>9.73</td>
</tr>
<tr>
<td>Saponins</td>
<td>1.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Anthraquinones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water-soluble polyphenols</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

Methane production from 9.2g of leaves

- Cassava leaves: Yield: 0.100 L CH₄/g VS for 100 days
- Mango leaves: Yield: 0.001 L CH₄/g VS for 100 days

Ethanol and VFA analysis

- Cassava leaves: No VFAs accumulation
- Mango leaves: VFAs accumulation

Results 2 and discussion

Mixture of cassava leaves (75%) and mango leaves (25%) leads to C/N ratio of 9.3

Methane production from 9.7g of leaves mixture

- Yields: cassava leaves 0.121 L CH₄/g VS and mango leaves 0.114 L CH₄/g VS for 100 days

Ethanol and VFA analysis

- Cassava leaves: No VFAs accumulation
- Mango leaves: VFAs accumulation

Conclusions

Anaerobic co-digestion of both organic matter for the methane production enables:

- 1.2-fold higher yields for cassava leaves
- 114-fold higher yields for mango leaves (non-biodegradable alone)