

# Bio-methane potential of by-products from cassava starch processing

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## Focus

Aim of the study was to examine the bio-methane potential of cassava root peels and cassava pulp.

### Special focus:

- Essential micro nutrient content
- Influence of protective wax layer and residual starch content

## Methods

- Micro nutrient content and C/N ratio of cassava root peels (1A) and cassava pulp (1B) was determined.



Fig. 1A



Fig. 1B

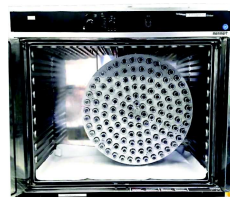


Fig. 1C

- Peels were classified:
  - P1= starch / no wax
  - P2= no starch / wax
  - P3= no starch / no wax
- Specific methane yield was measured with Hohenheim Biogas Yield Test (1C) following standard VDI 4630.

## Results

Content of essential micro nutrients per kg total solids (TS) in cassava peel and cassava pulp are shown in the following table.

	C/N	Co	Cu	Mo	Ni	Se	Fe	Mn
		mg·kg TS <sup>-1</sup>						
Peel	39:1	0.50	3.0	0.30	4.60	< 0.05	500	46.9
Pulp	124:1	<0.05	73.1	<0.05	1.02	<0.05	11.50	3.33
Min. <sup>1</sup>	10:1	0.4	10	1	3	0.2	1500	100

<sup>1</sup>Oechsner, H (2011). Biogas in der Landwirtschaft - Stand und Perspektiven, KTBL-Schrift 488

Content of micro nutrients is lower compared to the minimum level required for a stable nutrient supply of bio-methane bacteria population. C/N ratio of root peels is within the range recommended for biogas substrates. For pulp C/N ratio is broad, showing need for increased attentiveness if utilized as substrate.

Single substrate bio-methane yields for peels and pulp are displayed in Fig. 2.

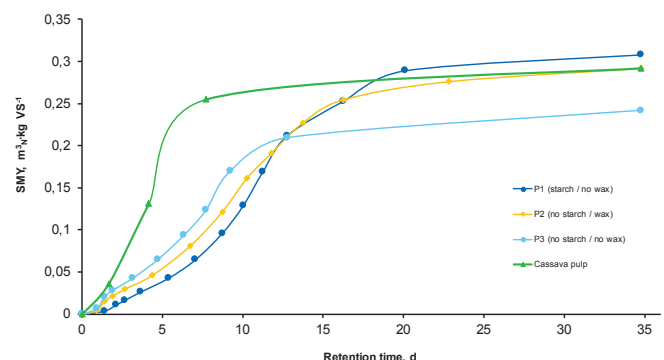


Fig. 2: Specific methane yield (SMY) per kg volatile solids (VS) within test period (35 d).

Sample	SMY, m <sup>3</sup> <sub>N</sub> · kg VS <sup>-1</sup>
Pulp	0.29
P1	0.31
P2	0.29
P3	0.24

## Conclusions

- Content of essential micro nutrients shows the necessity of co-digestion of cassava by-products
- Specific CH<sub>4</sub> yields of investigated cassava products are equal to cattle and pig manure
- Utilization of cassava by-products for bio-methane generation can increase use efficiency of cassava starch process chain