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Conti, Federica; Pedersen, Thomas Helmer; Toor, Saqib; Rosendahl, Lasse

*Publication date:*  
2019

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

### *Citation for published version (APA):*

Conti, F., Pedersen, T. H., Toor, S., & Rosendahl, L. (2019). *Effect of sub and supercritical water conditions on the conversion of organic wastes into biocrude through hydrothermal liquefaction*. Poster presented at 27th European Biomass Conference and Exhibition (EUBCE 2019), Lisbon, Portugal.

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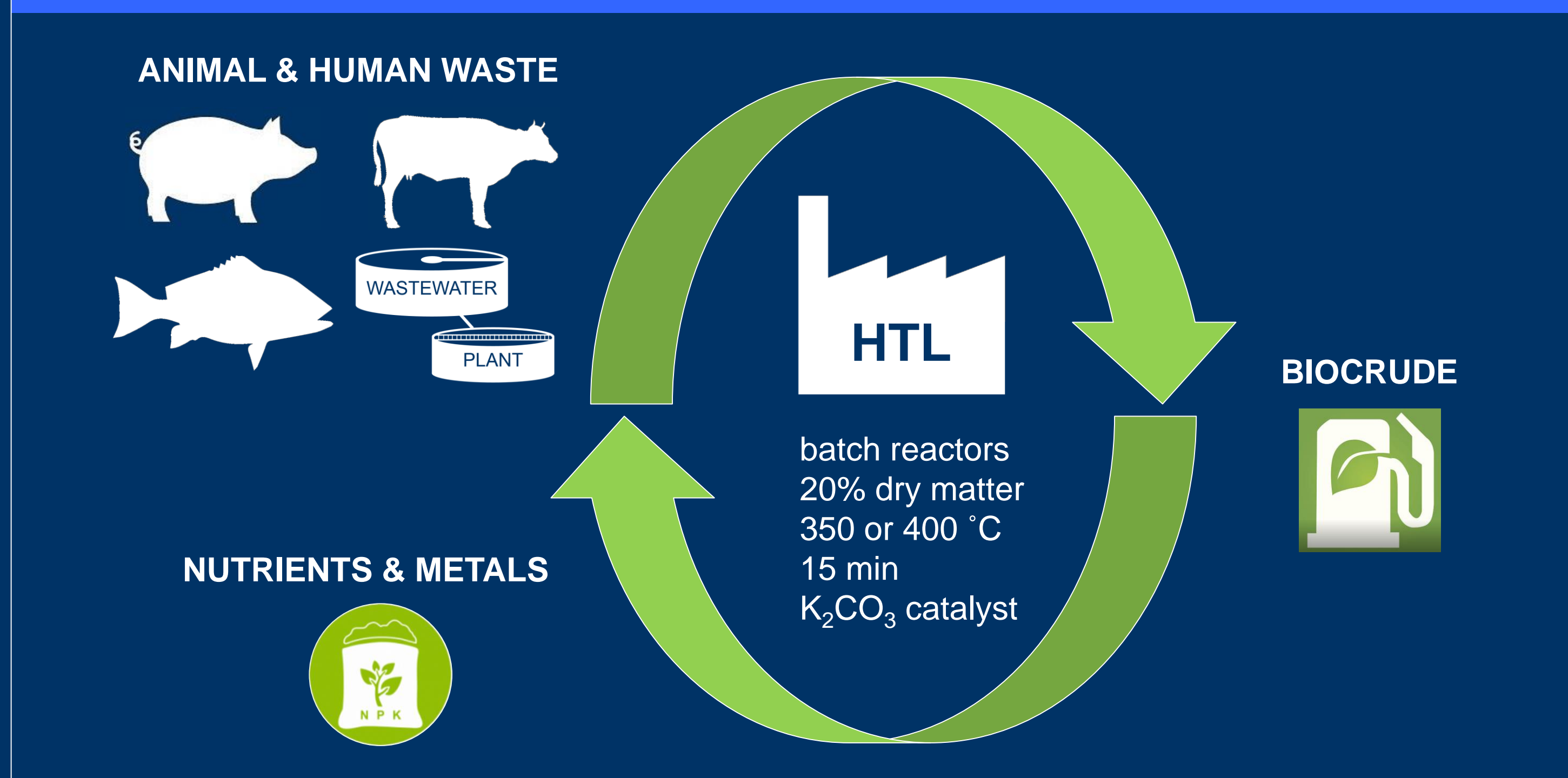
# Effect of sub and super critical water conditions on the conversion of organic wastes into biocrude through hydrothermal liquefaction

Federica Conti \*, Thomas H. Pedersen, Saqib S. Toor, Lasse A. Rosendahl

Aalborg University, Department of Energy Technology, Aalborg, Denmark

\* fco@et.aau.dk

## 1. FROM WASTES TO BIOCRUDE THROUGH HTL

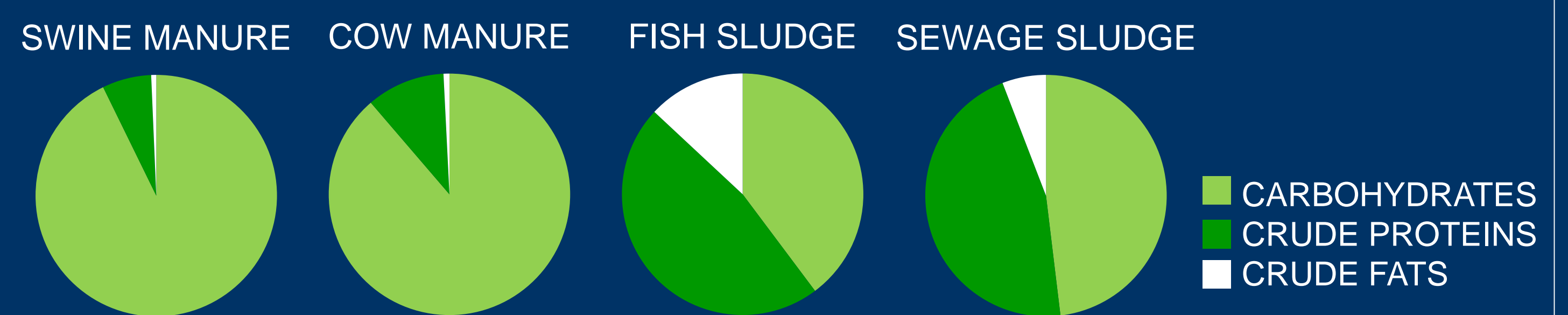


## 2. FEEDSTOCKS COMPOSITION

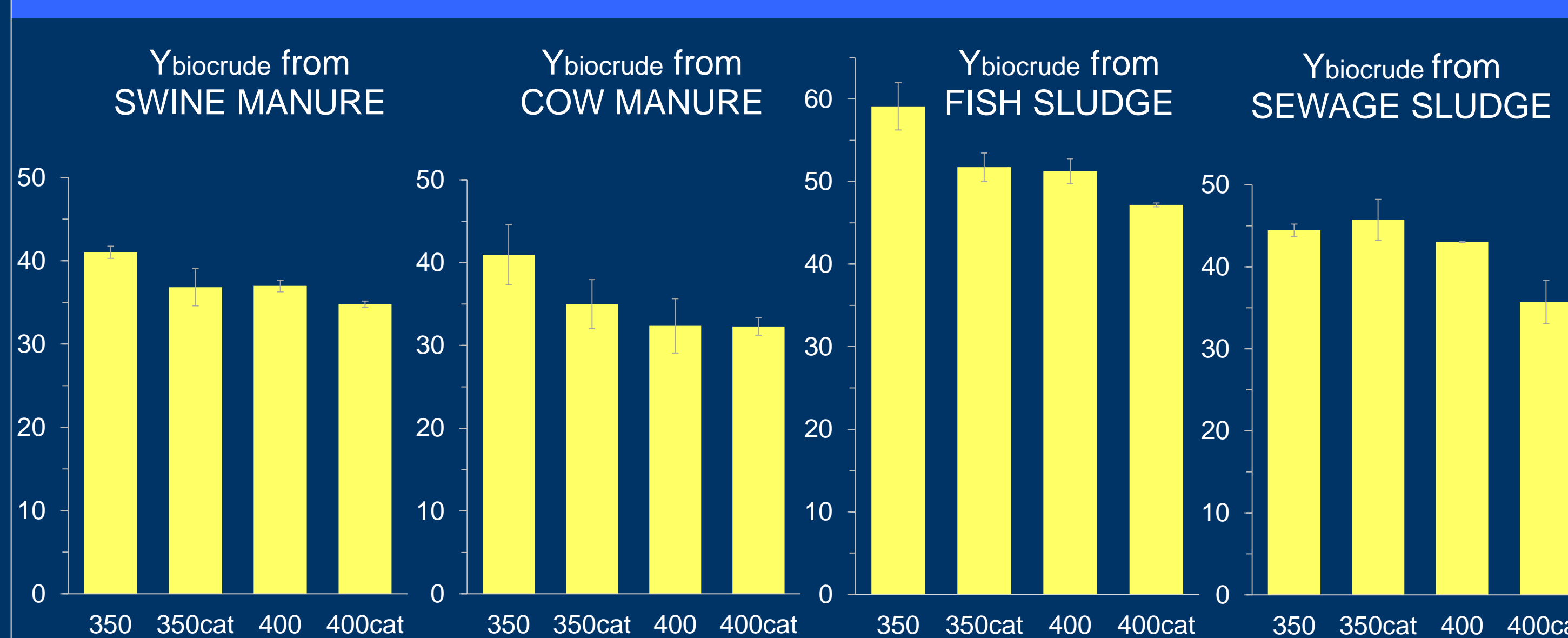
	MOISTURE (%)	ASH (%) db	C (%) daf	H (%) daf	N (%) daf	O* (%) daf	S** (%) db
SWINE MANURE	75.5	11.4	48.9	6.6	1.1	43.4	0.4
COW MANURE	63.0	6.6	49.6	6.6	1.7	42.1	0.3
FISH SLUDGE	5.6	22.1	53.5	8.1	7.6	30.8	0.4
SEWAGE SLUDGE	78.6	23.2	46.4	7.6	7.4	38.6	0.5

\* O = 100-C-H-N

\*\* S is measured by ICP



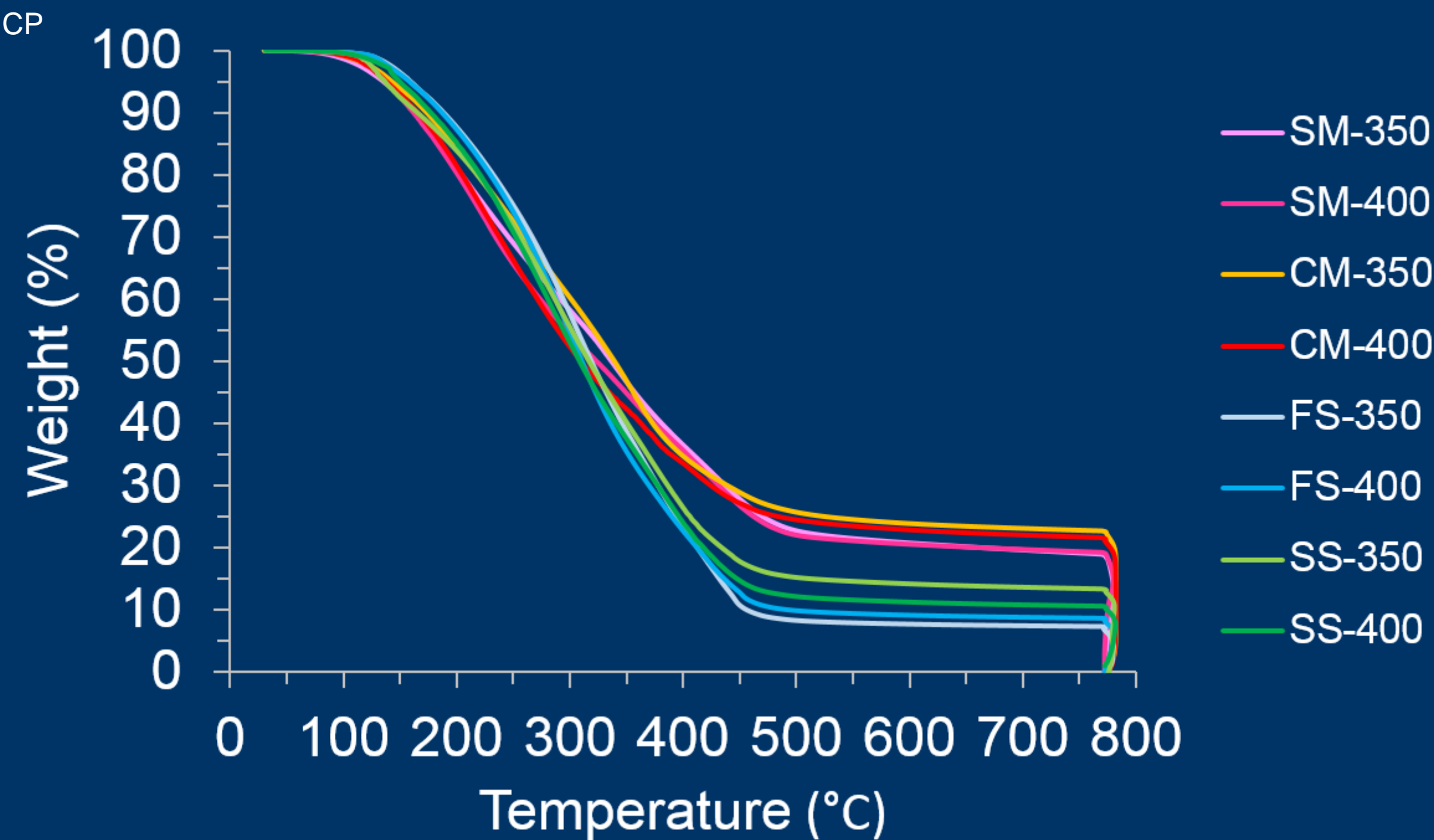
## 3. BIOCRUDE YIELDS AND QUALITY (d.a.f.)



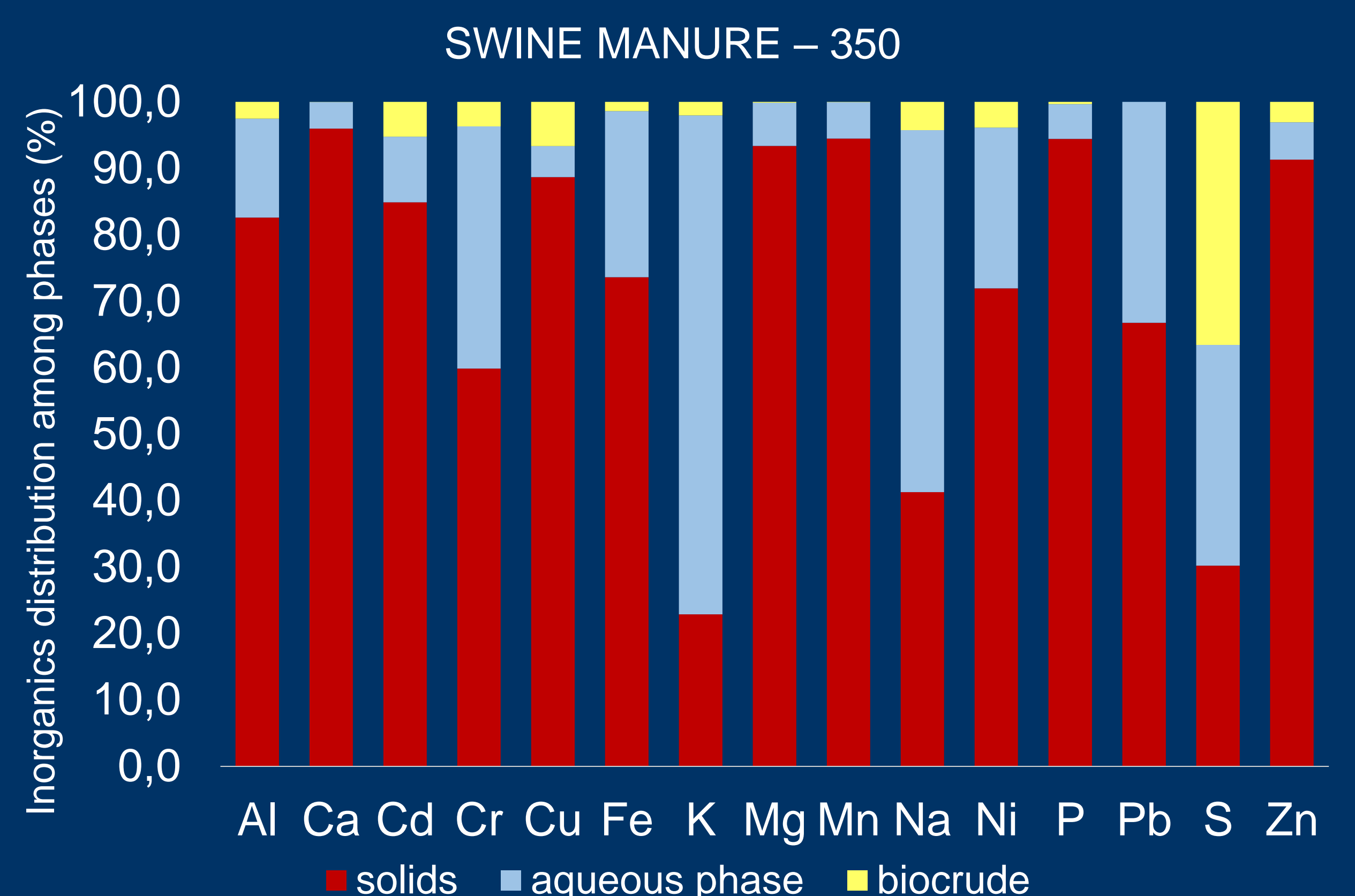
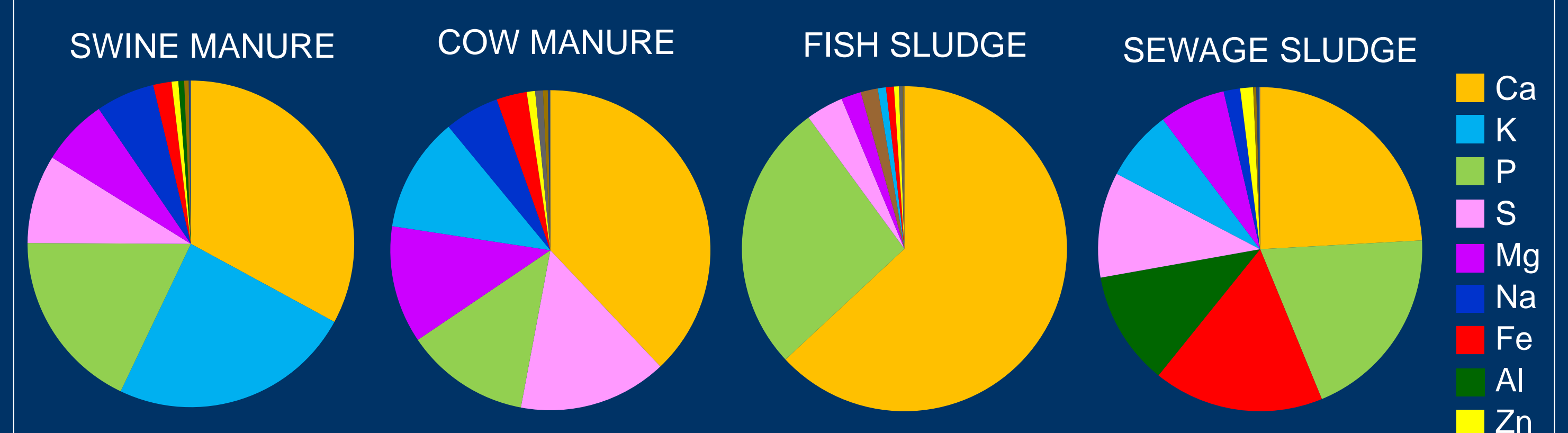
		BIOCRUDE						
		C (%)daf	H (%)daf	N (%)daf	O* (%)daf	S** (%)db	Crec (-)	Erec (-)
SWINE MANURE	350	66.3	7.7	2.5	23.5	0.5	55.6	62.1
	350 CAT	71.3	8.4	3.1	17.3	0.5	53.6	61.6
	400	70.9	8.4	3.1	17.7	0.6	53.6	61.5
	400 CAT	75.6	9.1	3.0	12.3	0.5	53.7	63.3
COW MANURE	350	64.5	9.4	2.0	24.2	0.4	53.2	66.5
	350 CAT	73.2	8.5	2.9	15.4	0.4	51.6	62.2
	400	71.6	8.2	2.6	17.6	0.5	46.7	55.6
	400 CAT	76.0	8.9	2.6	12.5	0.4	49.5	60.4
FISH SLUDGE	350	71.7	10.5	7.0	10.9	0.4	79.2	91.8
	350 CAT	72.6	10.6	7.1	9.7	0.4	70.2	81.4
	400	73.1	10.4	6.9	9.6	0.4	70.1	80.7
	400 CAT	74.0	10.2	7.2	8.7	0.3	65.2	74.5
SEWAGE SLUDGE	350	73.0	10.5	5.2	11.3	0.8	69.9	74.3
	350 CAT	73.3	10.9	5.0	10.8	0.7	72.2	77.7
	400	72.0	10.1	5.6	12.3	1.0	66.7	70.0
	400 CAT	73.1	10.9	5.5	10.6	0.7	56.2	60.4

\* O = 100-C-H-N

\*\* S is measured by ICP



## 4. INORGANICS IN THE FEEDSTOCK AND THEIR DISTRIBUTION AMONG HTL PRODUCTS



## 5. CONCLUSIONS

- Higher biocrude yields are achieved at subcritical conditions (350 °C) for all feedstock.
- Supercritical conditions (400 °C) and the addition of a catalyst (K<sub>2</sub>CO<sub>3</sub>) result in a better biocrude quality (lower oxygen content), especially for manure-derived biocrudes.
- Fish and sewage sludge biocrudes are lighter than manure-derived biocrudes (from TGA).
- Inorganics tend to distribute among HTL products in a similar manner for all feedstock and regardless from the processing conditions: most inorganics are recovered in the solids, K and Na are mainly in the aqueous phase, while S is found in all product phases.