

## Seaweed for cows:

What is the potential for methane reduction and digestibility of seaweed and seaweed products for cattle?

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Innovationsfonden

# MAB<sup>4</sup> (and more)



- *In vitro* fermentation research to investigate:
  - The effect of intact seaweeds and seaweed products on methane production
  - The effect of intact seaweeds and seaweed products rumen degradation

# *In vitro* studies: Gas production is an indication of microbial activity

## Inputs:

### - Inoculum



### - Basal Feeds with different CHO/protein composition



Silage Sukker beet pulp Other feeds

### - +/- feed additives



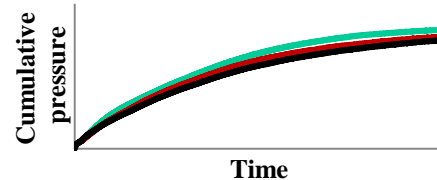
## Fermenting : 48 hours



Triplicates/quadruplicates

## Outputs:

- Accumulated gas production
- Gas composition (GC: methane)



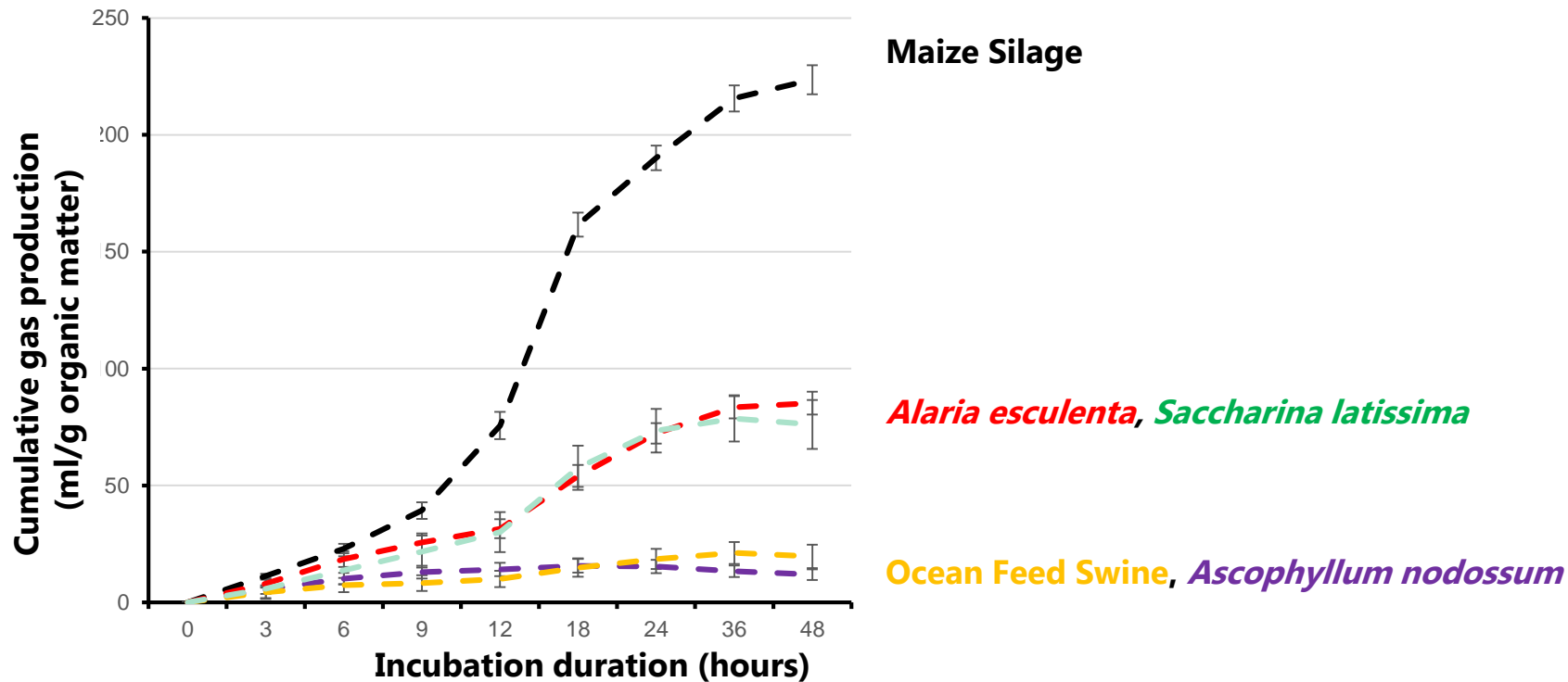
- Undegraded feed /degradation



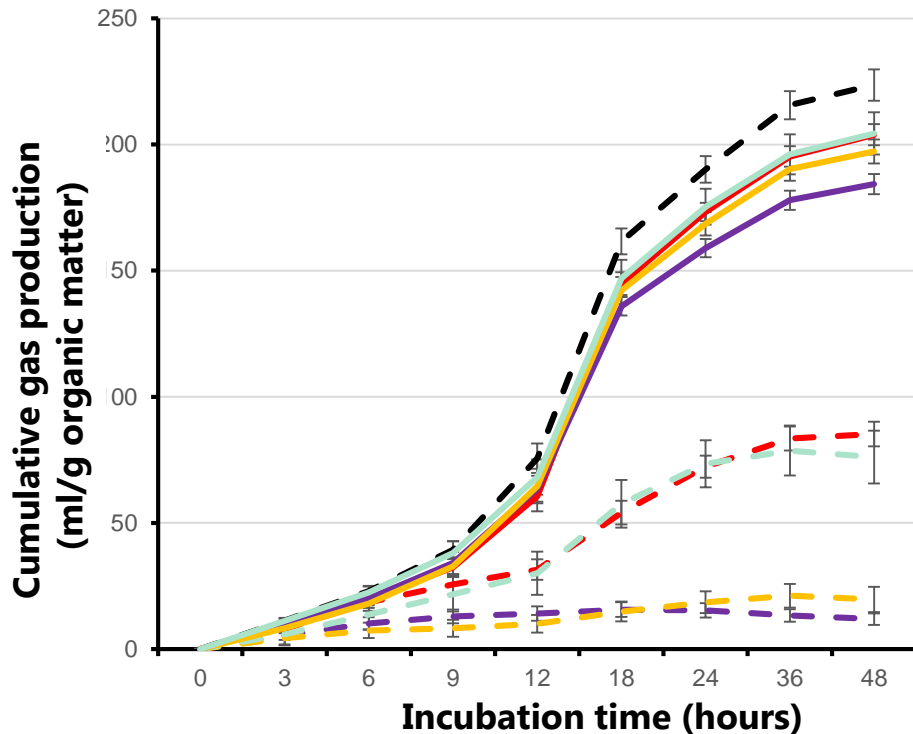
- (Products of fermentation (GC: SCFA))
- (Microbiota profiles -> DTU)



# Rumen fermentability of macroalgae compared to maize silage



# Effect of macroalga on fermentability of maize silage



**Maize Silage (MS)**

**MS+AE/OFS/SL**

**MS+AN**

Maize silage + macroalga

—

Pure MS or macroalga

- - -

**Alaria esculenta, Saccharina latissima**

**Ocean Feed Swine, Ascophyllum nodosum**

# Reduction of methane emission from rumen fermentation when used as a supplement

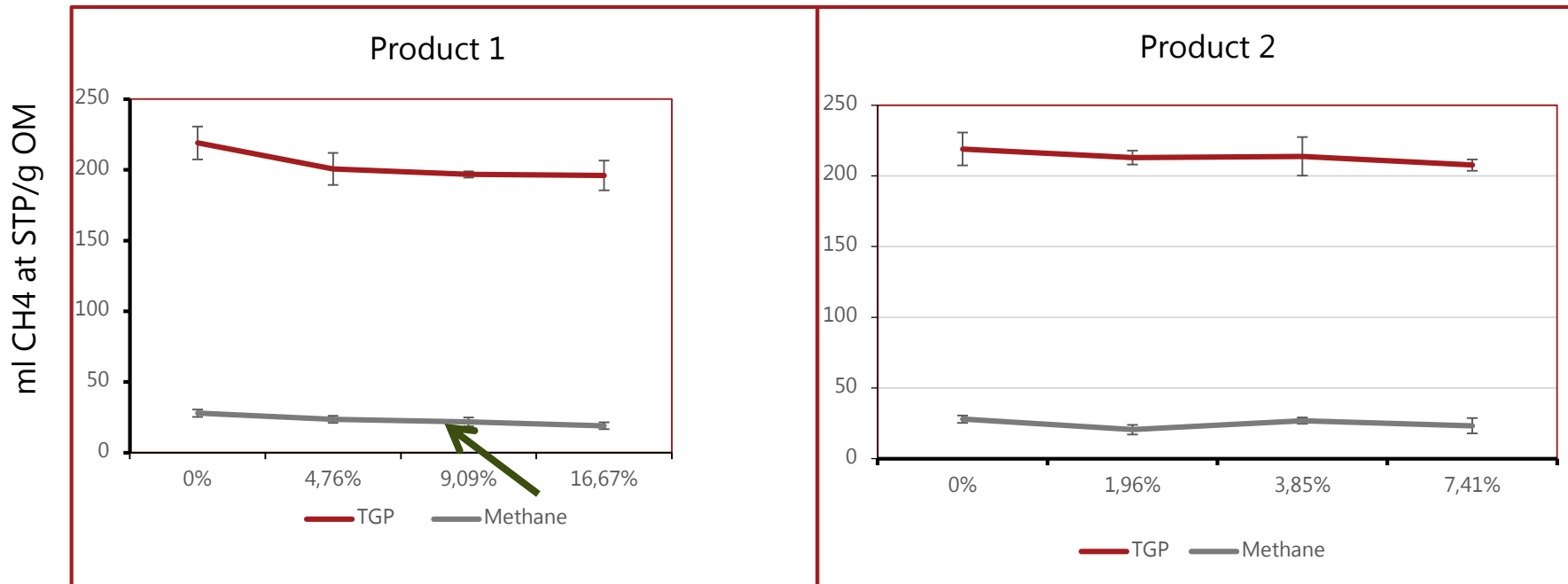


Basal feed :	Additive:	Reduction (%)
Maize silage	<i>Alaria esculenta</i>	18.8
	<i>Ascophyllum nodosum</i>	20.8
	Ocean Feed Swine	19.8
	<i>Saccharina latissima</i>	19.8
Sugar Beet pulp	Ocean Feed Swine	6.1
	<i>Saccharina latissima</i>	10.8

## Nordic makroalge species:

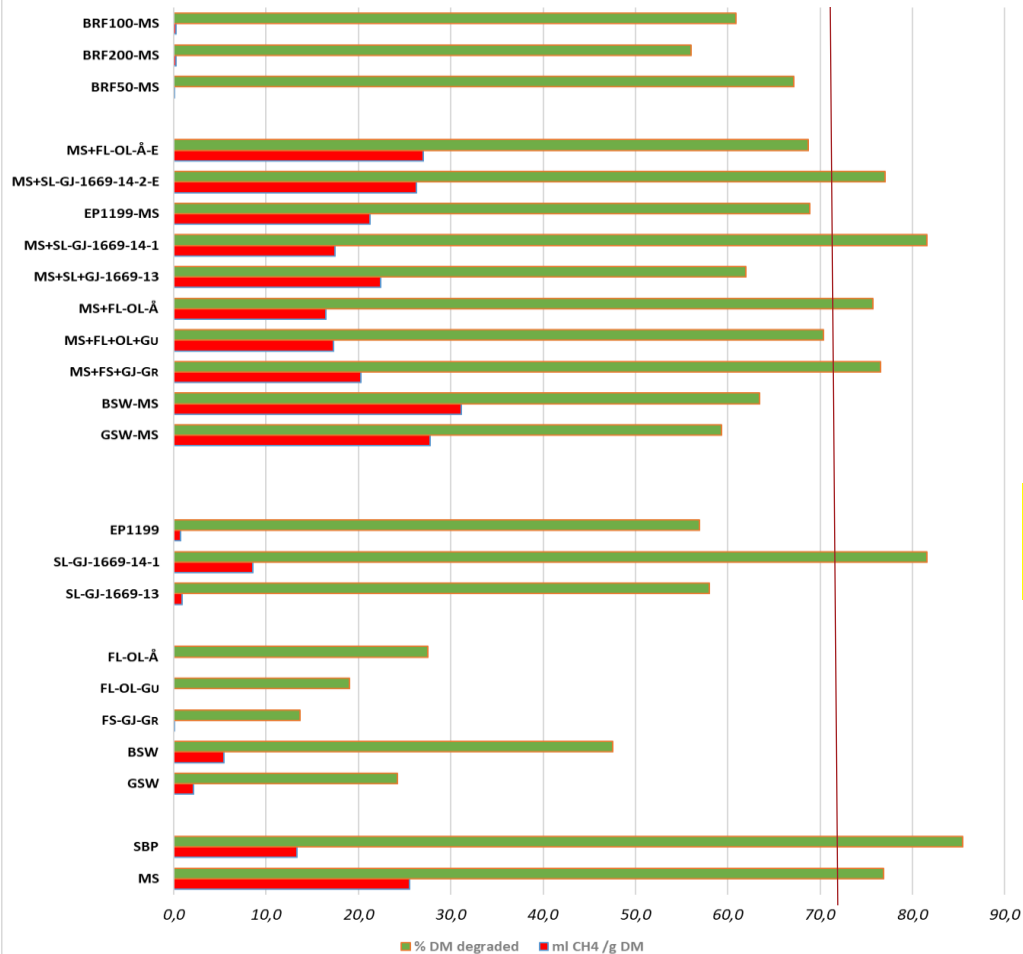
- Inhibited methane emission up til 21%
- WITHOUT negative effects on feed degradation

# Extracted CHO fractions: not the total explanation



Macroalgae CHO fractions only partially induced the same response (dose dependent)

## % DM degraded VS. CH4 production during 48h fermentation



Bromoform + Maize silage

MaizeSilage+seaweed extract

Extract and fermented seaweed

Seaweeds

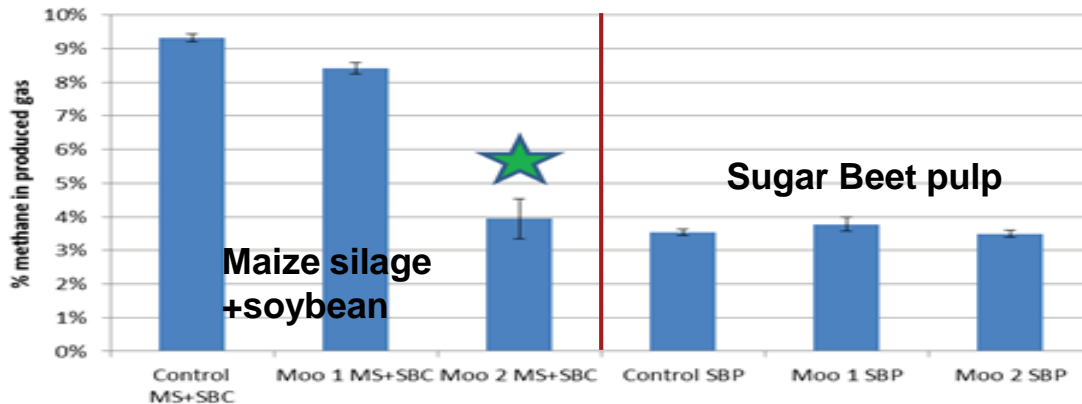
Cattle feeds



Mootral (commercial product unknown composition)

- reduced methane content in fermented maize silage >50%
- WITHOUT negative effect on rumen degradation

Effect of Mootral on methane production



Feed	%Mootral (of tot. DM)	% degraded
MaizeSilage + Soybean cake	0	87
	6	84
	11	85
Sugar Beet Pulp	0	88
	6	88
	11	89



## Dry matter vs Organic Matter

- Variable ash content some of which is rumen soluble.
- INCREASE digestibility if we calculate without the total ash 😊
- INCREASE the methane production if we calculate without the total ash 😞

## Conclusions:

- Seaweeds can reduce methane production when fed to cows.....
  - - CAN be done without significant loss of production
- Mineral content (ash) variable and must be considered !
- We need more information on dose and delivery
- We need more information on how the seaweeds affect the rumen microbes
- **THANK YOU !**