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## APPLICATION OF PHYSICO-CHEMICAL PRE-TREATMENTS FOR ENHANCED BIOGAS YIELD FROM WASTEWATER SLUDGE



Zoltán JÁKÓI<sup>1,2\*</sup>, Sándor BESZÉDES<sup>1</sup>, Cecília HODÚR<sup>1</sup>

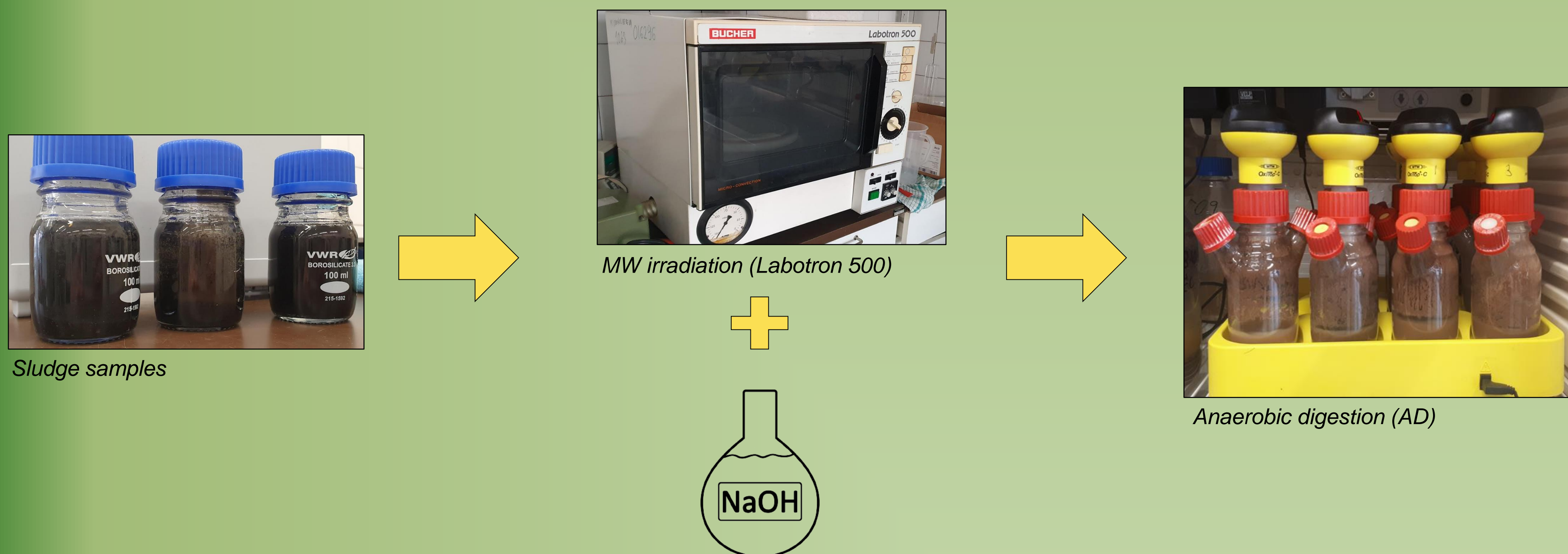
<sup>1</sup>University of Szeged, Faculty of Engineering, Department of Biosystem Engineering, Szeged, Hungary  
<sup>2</sup>University of Szeged, Faculty of Science and Informatics, Doctoral School of Environmental Science, Szeged, Hungary

E-mail: jakoiz@mk.u-szeged.hu

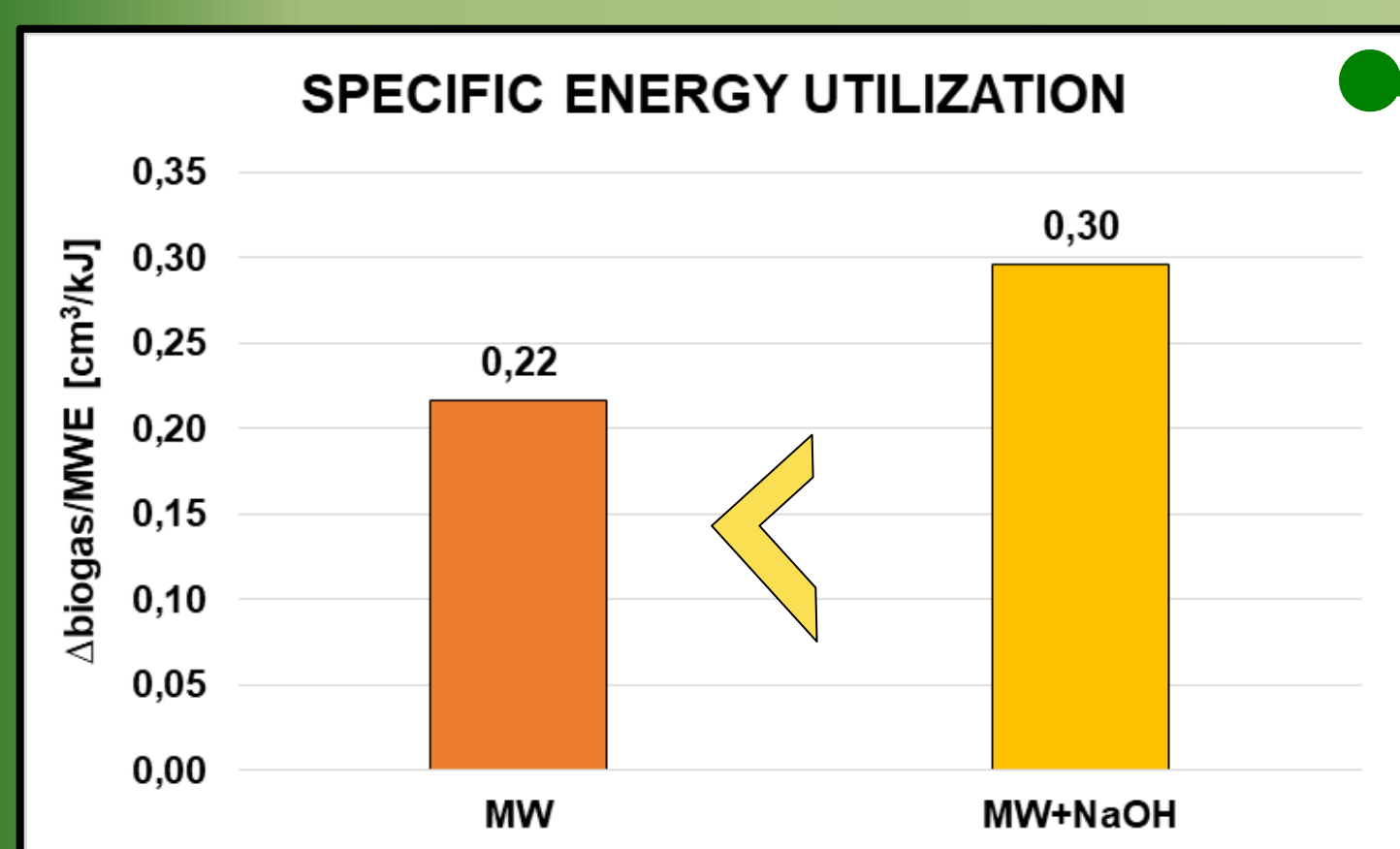
### ABSTRACT

The main obstacle in the utilization of sludge and waste activated sludge (WAS) for biogas production is the often inadequate SCOD/TCOD ratio and/or degree of disintegration. It has been already shown that by using advanced treatment methods (like microwave (MW) irradiation) these values can be significantly improved, however the operational parameters and conditions can present a high impact on the effectiveness. The aim of our experimental work was to apply different variations of physicochemical pre-treatment methods (intermittent MW irradiation, NaOH dosing, combined MW-NaOH) to meat industry-originated wastewater sludge samples in order to investigate how they affect the kinetics of biogas production and the overall biogas yield. For the experiments, 100 cm<sup>3</sup> of sludge samples were being treated by intermittent microwave irradiation (P=250 W, total irradiated energy = 93,6 kJ, 30s-30s cycle), alkaline treatment (2 cm<sup>3</sup> of 1M NaOH) and the combination of these two. The following mesophilic anaerobic digestion process was carried out in a temperature-controlled laboratory incubator (35°C, 24 days); the gas pressure was measured via OxiTop-C manometric measuring heads.

### MATERIALS AND METHODS



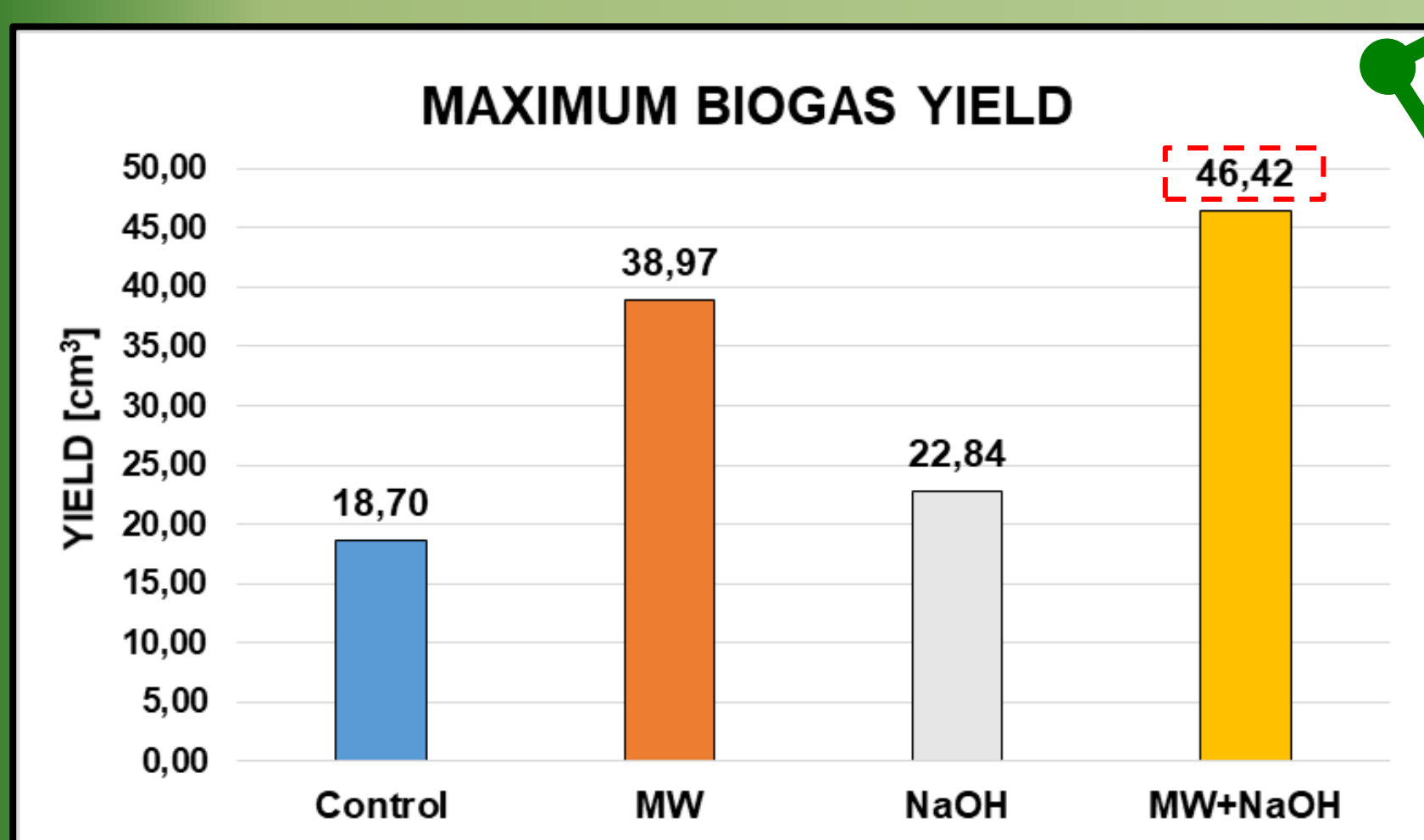
### RESULTS AND DISCUSSION



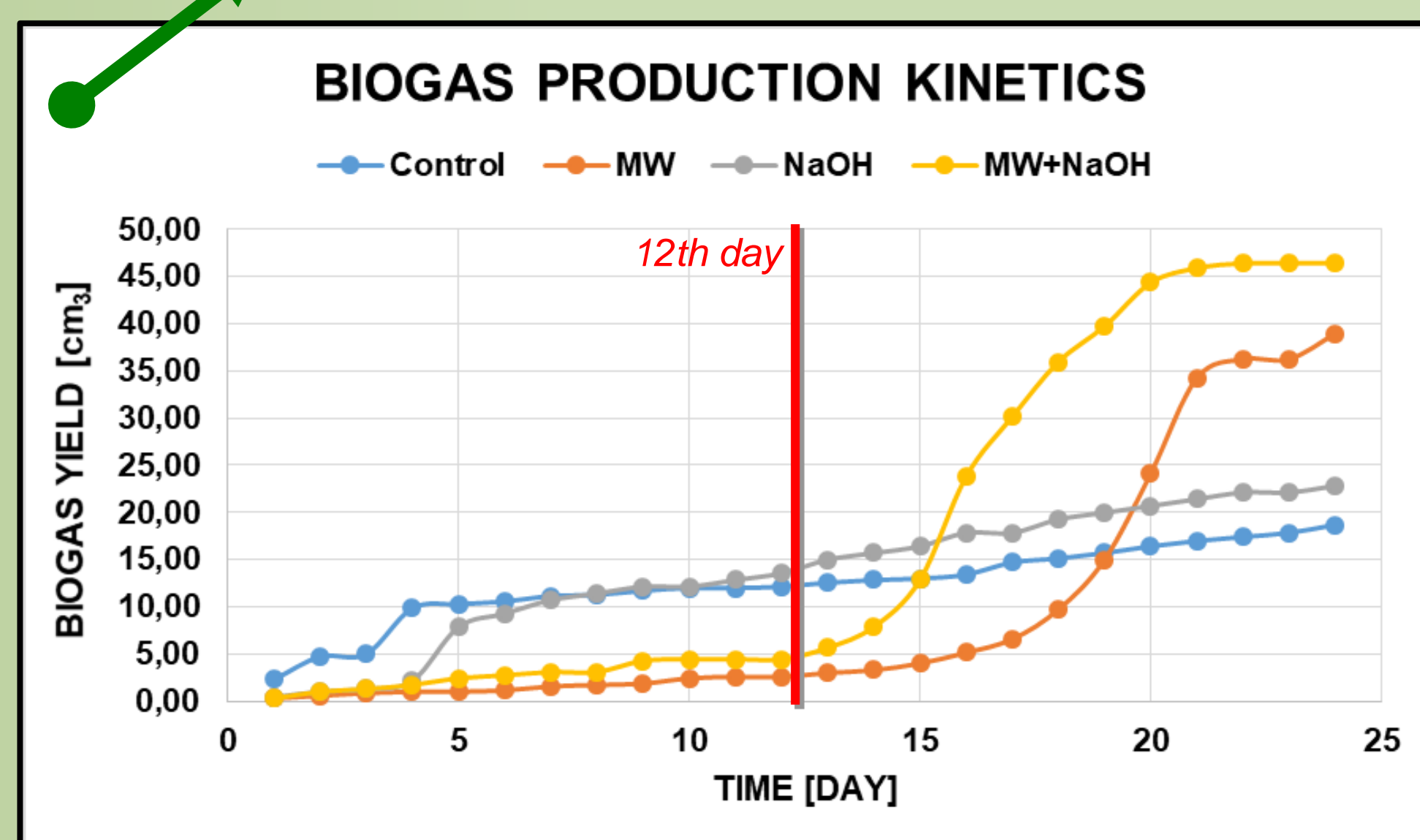
+NaOH: **37% increment** in energy utilization

Treatment	Increment Rate
MW	2,08
NaOH	1,22
MW+NaOH	2,48

Increasing **rate of production**



**2.5-fold increment** in yield



### ACKNOWLEDGEMENTS

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