



**MARMARA UNIVERSITY
FACULTY OF ENGINEERING
ENVIRONMENTAL ENGINEERING DEPARTMENT**

**ENVE 4197/4198 ENGINEERING PROJECT
PROPOSAL FORM
FALL 2019**

Instructor : Prof. Dr. Barış ÇALLI, Özlem Kaplan (PhD Student)

Project Title : VACUUM DISINTEGRATION OF ANAEROBIC BIOGAS DIGESTATE

Proposal No. : BarışÇalli-1

Number of Students : Max 3 students

Requirements (from students) :

Scope of the Project : The purpose of physical, chemical or biological disintegration of waste activated sludge (WAS) is to disrupt the cell membrane to release the cell content and increase the biodegradable of WAS. Disintegration processes accelerates the hydrolysis which is considered to be the rate-limiting step in an anaerobic sludge digester. Although, it is supposed that vacuum application may be efficiently used for the lysis of cells in the WAS, there is very limited studies about vacuum sludge disintegration in the literature. In this study, the effects of vacuum application on the hydrolysis of waste activated sludge will be investigated by monitoring the increase in soluble COD, methane yield and methane production rate.

Hardware/Software/Lab/Equipment Requirements :

Spectrometre, Magnetic stirrer, Incubator, pH meter, Vacuum Pump, Manometer, HPLC (Uv detector), GC-FID, GC-TCD.

Development Plan :

- 1- Collection of the digestate (digested sludge) and raw WAS samples
- 2- Characterization of digestate and WAS before and after vacuum experiments (Total and soluble COD, TS, VS, TSS, VSS, TKN, NH₄-N)
- 3- Vacuum experiments
- 4- BMP (bio-methane potential) tests with digestate, WAS and vacuum applied samples.