



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

**ENVE 497/498 ENGINEERING PROJECT  
PROPOSAL FORM  
FALL 2018**

**Instructor :** Prof. Dr. Barış Çallı

**Project Title :** Nitrogen and Phosphorus Recovery from the Liquid Fraction of Anaerobic Digestate

**Proposal No. :** *BarışÇallı2018-1*

**Number of Students :** 2

**Requirements (from students) :** Enve 302 'Environmental Engineering Unit Processes' course

**Scope of the Project:** The objective of this proposed project is to optimize the process of struvite crystallization in order to achieve struvite crystals with optimum properties and size for land application as a fertilizer. Fluidized Bed Reactor (FBR) experiments will be performed to identify the most important parameters that influence the process of struvite crystallization. Parameters such as up-flow velocity and supersaturation are believed to have strong influence on the crystallization efficiency, for this purpose, experiments with synthetic water will be conducted. The results of these experiments will be used to conduct crystallization of the liquid fraction of anaerobic chicken manure digestate.

**Hardware/Software/Lab/Equipment Requirements :**

Fluidized bed reactor, Spectrophotometer, Peristaltic pumps, atomic absorption spectrometer, and visual minteq software.

**Development Plan :**

1. Identification of the metastable region of struvite.
2. Operation of semi-batch study of crystal growth for identifying the optimum up-flow velocity.
3. Operation of continuous FBR experiments with synthetic solution
4. Operation of continuous FBR experiments with the liquid fraction of anaerobic chicken manure digestate