



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

**ENVE 497/498 ENGINEERING PROJECT
PROPOSAL FORM
FALL 2016**

Instructor : Assoc. Prof. Kozet YAPSAKLI

Project Title : The effect of heavy metals on Anammox

Proposal No. : *KozetYapsakli*

Number of Students : 3

Requirements (from students) :

Scope of the Project :

The purpose of this study is the investigation of heavy metal inhibition in enriched Anammox culture in short-term experiments. In this context, first of all, heavy metal inhibition in enriched Anammox culture will be tested for 4 different heavy metals (Cu, Cd, Ni and Zn) and will be introduced as species-specific threshold values.

Hardware/Software/Lab/Equipment Requirements :

Atomic Absorption Spectrofotometer, Centrifuge, pH meter, Analytical balance, 105oC oven, 550oC muffle furnace

Development Plan :

In the first part of the study, Anammox culture will be enriched in the laboratory. The medium will consist of ammonium and nitrite in the form of $(\text{NH}_4)_2\text{SO}_4$ and NaNO_2 , KHCO_3 as the carbon source and other trace elements that culture needs to grow. Heavy metal standard solutions will be prepared using 2% nitric acid and ICP (Inductively Coupled Plasma)



standards having a concentration of 1 g/L metal. Each test will be divided into a 24-h exposure phase and a following 72-h recovery phase. Batch experiments will be carried out in 100 mL serum vials containing 50 mL medium, each containing Anammox biomass (MLVSS concentration of between 600-700 mg/L) with varied heavy metals addition. With each metal, three sets of runs will be conducted to ensure reproducibility of results. Based on previous literatures, the heavy metal concentrations range test will be as follows – copper 0-10 mg/L; cadmium 0-60 mg/L, nickel 0-120 mg/L; zinc 0-20 mg/L.

Concentrations of ammonia, nitrite, nitrate, VSS and pH will be determined by using Standard Methods (APHA/AWWA, 1998). The soluble heavy metal concentrations will be determined by Atomic Absorption Spectrophotometer (AAS).