

## **Initial Results from Applied Integrated Practices and Technologies for Sustainable Management of Agrofood Industrial Wastewater in Palestine**

Rashed Al-Sa`ed

Institute of Environmental and Water Studies (IEWS), Birzeit University (BZU), Birzeit, Palestine  
M: +970599999820; E: [rsaed@birzeit.edu](mailto:rsaed@birzeit.edu)

### **ABSTRACT**

Illicit direct discharges of raw agrofood industrial wastewater into wastewater treatment facilities (WWTFs) or seasonal Wadi beds pose serious public health risks and environmental degradation, exacerbated by socio-economic impacts and regional political conflicts. Policy makers in water and environmental authorities face power limitations by enforcing legal and technical regulations pertinent to connection, co-treatment and non-compliance of agrofood industrial discharges into WWTFs. This paper presents initial results on industrial wastewater management (INWA), a PADUCO program funded project. INWA aims at research development (RD) of new treatment approaches, and governance analysis for agrofood industries identified as heavy organic polluters including olive mills (Nablus), dairy industries (Hebron) and slaughterhouses (Gaza). We focused on governance assessment pertinent to institutional aspects of current wastewater management in the study area. RD entails five ongoing master thesis, of which are four at Birzeit University (BZU) covering governance enhancement and diverse treatment technologies applications. A recent defended BZU thesis proved the economic and environmental feasibility of advanced oxidation process using Fenton reaction as a pretreatment stage for mixed organic industrial wastewaters. Installed at BZU campus, an ongoing research study investigates monitoring and performance evaluation of a pilot UASB-nature based units for slaughterhouse wastewater treatment. The Islamic University of Gaza explores at bench scale the feasibility of activated sludge systems for slaughterhouse wastewater treatment. A fifth ongoing study entails using phytoremediation to revitalize Wadi Zaimer, which receives diverse industrial discharges from Nablus West. Compliance of agrofood industries with national guidelines reduces capital and operational costs, public health risks and pollution loads into receiving water bodies in Palestine.

**Keywords:** advanced oxidation process; agrofood industries; cleaner production; governance analysis; industrial wastewater