Disposal of livestock wastewater effluent (LWE) is a costly expense for dairy farmers. The LWE contains high levels of orthophosphate (PO4-P), ammonium (NH4-N), nitrate (NO3-N), total suspended solids (TSS) and biochemical oxygen demand (BOD). One approach for disposal of LWE is to use it as a fertilizer as part of a crop nutrition plan. This is done by application to the topsoil of crop fields by spraying. Such treatment is a first reclaims nutrients as BOD, Ionic strength and TSS, compared to effluents from the swine lagoon. For dairy LWE the overall phosphate content was higher compare to swine and 80% of it was in the form of organic phosphate.

**Nutrients removal:** Recovery of PO4-P from dairy LWE (D-WW) with the aerated-FBR was 63% at HRT of 68 minutes. Aeration had limited impact on ammonium loss through ammonia gas (NH3) emission (<10%). Aeration raised LWE from 8 to 8.5 at HRT of 68 min, and NaOH was needed to reach the pH 9 goal. The presence of DOC in LWE hinder struvite formation, while higher sunlight radiation improves microbial removal. Switchgrass (Panicum virgatum) is used as a submerged oxygenator plant.

**Mineral composition:** solids from aerated-FBR was analyzed for mineral composition with X-ray diffraction (XRD; Bruker, D-8 advance). Thermal stability of the fertilizer product is evaluated using simultaneous thermal analysis with evolved gas analysis (STA-EGA; Netzsch, Perseus). Effluent composition for nutrient and pollutants removal is tested using colorimetry (DR-3900, Hach) and inductively coupled plasma optical emission spectrometry (ICP-OES).

**Acknowledgements**

This study was funded by SARE grant GNE 17-158

Special thanks to Mr. Robert Fulper, Owner of Fulper farm and to Mr. Clint Burgher, Manager of Rutgers animal science farm.

Thanks to Dr. Joseph Heckman from Rutgers New Brunswick and Dr. Beni Lew from ARO, ministry of agriculture Israel. STA analysis was done with Mr. Marlon Ramlogan of Rutgers Newark.