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Winery Wastewater Treatment. A Case-Study in Cyprus

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Introduction

- In Cyprus there are 40 small and 4 large wineries that produce annually around 10,000 tonnes of wine
- Cyprus is recognized as an exporter of high quality wines-42% export increase is monitored after the COVID19
- The winemaking process produces large volumes of liquid and solid waste. The total wastewater production of a winery is approximately 1.2 times greater than the production of wine
- The aim of this Bachelor project is to show the wastewater treatment in a winery in the region of Paphos

Winery By-products

- Liquid:
  - ➢washing operations (from crushing and pressing processes)
  - ➢rinsing during fermentation phase and bottling
- Solid waste
  - ➢Pips, skins, stems
  - ➢Lees, sludge

Environmental Impacts

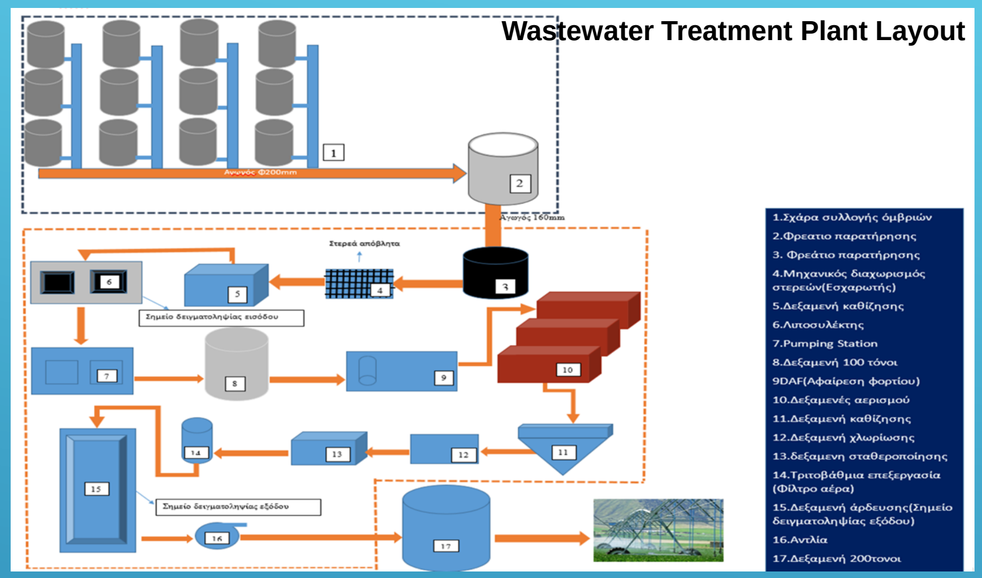
- Due to its high organic/inorganic load, the large volumes produced and its seasonal variability, winery wastewater causes water resources pollution, soil health disturbance, odors, visual pollution, etc
- Therefore, the treatment system should be versatile in order to face both the high organic loadings and the stream fluctuation for short periods

Treatment Methods

- Biological treatment methods are well recognized for the significant –but not complete due to recalcitrant compounds-degradation of winery wastewater
- The most common management method in Europe is the pre-treatment with the activated sludge process and the release in the sewerage system

Materials and Methods

- Influent sampling from the open tank equalization tank
- Effluent samples were collected regularly from the tertiary treatment
- Samples were placed in 1 lt sealing bottles and transferred to a 4°C mobile storage cooler
- Sampling parameters include BOD5, COD, Nh4+, Cl-, TN, and TP
- Period of sampling: 2021-2024



Parameter	Unit	Average	Max	Min	StDev	No of Samples
pH		8.16	9.00	7.50	0.44	10
EC	dS/m	1559	2520	1082	671	6
COD	mg/L	46.90	190.00	17.00	43.68	31
BOD	mg/L	15.66	65.00	3.00	15.75	29
TN	mg/L	38.08	264.00	1.30	69.09	19
TP	mg/L	10.22	63.00	0.50	13.38	19
NH4+	mg/L	0.84	3.60	0.14	0.89	17
SS	mg/L	16.50	72.00	4.00	16.73	20
CL	mg/L	174.08	210.00	64.00	37.64	12
E.coli	cfu/100ml	0	0	0		20

Conclusion

Adequate treatment, however there are limited results available
Significant variations in the results, due to seasonal variations and cleaning works within the winery premises
Effluent is used to irrigate an adjacent crop (clover plantation)

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