

Treatment and Reuse of Dairy Waste Water by Membrane Technology

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INTRODUCTION

From all dairy productions there is a lot of waste water which contains lipids, proteins and lactose remains. By filtering the waste water it is possible to reuse the clean water and to convert the other compounds into useful bio-products. For example, through acid treatment, the sediment (Casein) will be used as additive for animal feed. Through ultrafiltration, the filtrated lactalbumin can be used as additive for food. After nano-filtration, the remained solution, which contains a large amount of lactose and lipids, can be transformed into biogas by fermentation.

EXPERIMENT

The experiments are conducted at Institute of Process Engineering (IPE), Beijing, China in collaboration with DTU. In this study, 2.38 g/L milk powder solution was used to simulate dairy waste water. The experimental procedure is illustrated in Fig.1. An acidic pretreatment is implemented to extract the majority of the caseins. Afterwards the full purification by ultrafiltration (Ultrasel PES10 membrane) and nano-filtration (NF270 and NF90 membranes), the chemical oxygen demand (COD) of the final permeate is tested.

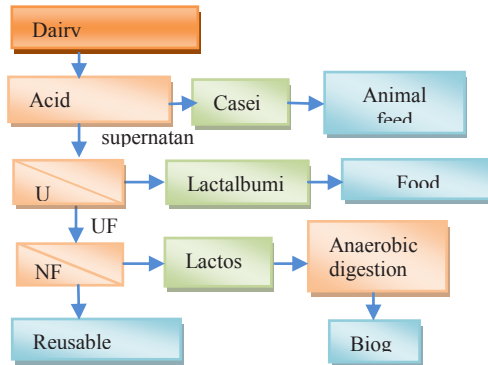


Fig.1 The experimental flowsheet

RESULT AND CONCLUSION

Table 1 The COD value of different samples

	After Acid treatment	UF Retentate	UF Permeate	NF270 Retentate	NF270 Permeate	NF90 Retentate	NF90 Permeate
COD(mg/l)	1874	2154	800	3824	292	3903	215

The COD values of the different samples are shown in Table 1. It is seen that after nano-filtration by NF270 and NF90 membranes, the COD value in the waste water is reduced to 292 mg/l and 215 mg/l, respective. Based on the results, we conclude that the method can successfully convert dairy waste water into reusable water and valuable bio-products.