Wastewater Treatment Solution for Vehicle Service Stations by Using Ultrafiltration Membrane

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A vehicle service station is place where large amount of water is consumed for vehicle washing. This wash water includes contaminants which may cause adverse effects if not treated properly before discharge. Many treatment methods have been suggested by researchers to treat service station effluent. These treatment methods have drawbacks such as large space requirement, high chemical consumption, sludge production, not user friendly compact systems. With that the need for improved techniques to purify contaminated waters arises. Over the past decennia membrane technology has been introduced as a cost effective method to treat water in a smaller foot print. Therefore, a prefabricated membrane reactor using Ultrafilters was introduced to study the effectiveness of removing contaminants from service station wastewater. The treatment process included an oil trap and then the membrane reactor which included a sand filter, carbon filter and a micron filter as the pretreatment steps for the Ultrafilter. As analyzing part, the characteristics of wastewater for parameters such as pH, total suspended solids, oil and grease, biochemical oxygen demand, and chemical oxygen demand were measured in the raw water, oil trapped water and water sent through the membrane reactor. In the absence of any specific discharge standard, the outlet water quality was compared with the Sri Lankan standard for discharge of effluents to inland surface waters. The treatment process was able to keep the parameters within the tolerance limit values of the standards by removing 91.46% of total suspended solids, 98.8% of oil and grease, 78.71% of biochemical oxygen demand and 93.32% of chemical oxygen demand. As a result, this water can be safely discharged into the environment or can be taken into reuse purposes.

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