

Reducing the amount of water used for washing palm methyl ester in biodiesel industry

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ABSTRACT

Washing biodiesel with water is the most common method of purifying biodiesel. Most dry wash methods require evaporate or distil the methanol into a flammable and toxic gas as part of the purification process. Other wash methods generate hazardous waste streams. Currently, the plant uses a lot of water in the purification process of palm methyl ester (PME). The industry would like to find a way to replace/reduce the usage of water while keeping the yield of PME the same, in quantity and quality. At first, the knowledge on dynamic mixing is transfer in which the reactants and the catalyst (sodium methylate) are mixed via dynamic vortex mixer in order to reduce the catalyst amount needed for the reaction, hence reduces the need for water to wash it at later stage. Secondly, knowledge is transfer on static washing, which is the least aggressive and least likely way to generate emulsions. Impurities migrate from biodiesel to the water through the boundary layer over time. It is very effective washing method, particularly for biodiesel industry. Currently the plant uses water at lower than 30 °C, this water washing at lower temperature is resulted in nasty emulsions. As such, as a third knowledge transfer, the temperature of water use for washing is increased to 50 °C hence reduces the amount of water needed for an effective washing of biodiesel. According to all three knowledge transfer methods, about 30% of catalyst is reduced and about the yield loss can be eliminated and, overall, reduces the water from current used.

KEYWORDS:

Biodiesel, Dynamic Vortex Mixture, Static Water, Warm Water Washing