Bioethanol Production by Whey's Sugars Fermentation

Pinal, Daniela

Oil, natural gas and its by-products represent 55% of global energy consumption. Unfortunately they won’t last more than a few decades, their reserves are finite and their use is the main source of gases that are causing climate change and global warming. It’s necessary to find substitutes of these fuels and make them from organic cull materials, like whey. An option is bioethanol, an excellent substitute. The bioethanol is a renewable resource, it can be produced by materials rich in sugars. The whey has 4.5-5% of lactose. The whey’s sugars can be isolated and fermented by yeast strains (like Saccharomyces c.) if we control their hydrolysis, temperature, fermentation time, with the purpose of produce bioethanol. The idea is to propose alternatives to catch and process 22,500 gallons of whey that are being thrown in Cofradia dam in Aculco, State of Mexico. 264 gallons of whey, thrown to the enviroment creates 77 lb of (BOD) and 150 lb (COD), equivalent to the wastewater generated by 45 people/day, The objective of the investigation is: experiment and value bioethanol production by whey hydrolysis and fermentation, using Saccharomyces cerevisiae. The experimental design involve 5 treatments, in them, the whey’s lactose will be hydrolyzed for 24 hrs with a enzyme (B-galactosidase) and natural enzymes present in tomato and ‘’peshto’’ leaves. After, is fermented with Saccharomyces for 8 days and distilled at 163.4°F, the recovered bioethanol will be tested by potassium dichromate test to know its purity. First, distillation outgoings were excessive, it covered 95% of the production. To avoid these outgoings was constructed ‘’solar distiller’’, it heats up 167°F, necessary temperature for the distillation. Using this method, the production only costs 1.81dollar/gallon

Awards Won: