World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:9, No:04, 2015

Studies on the Effect of Bio-Methanated Distillery Spentwash on Soil Properties and Crop Yields

Authors : S. K. Gali

Abstract : Spentwash, An effluent of distillery is an environmental pollutant because of its high load of pollutants (pH: 2-4; BOD>40,000 mg/l, COD>100,000mg/l and TDS >70,000mg/l). But However, after subjecting it to primary treatment (bio-methanation), Its pollutant load gets drastically reduced (pH: 7.5-8.5, BOD<10,000 mg/l) and could be disposed off safely as a source of organic matter and plant nutrients for crop production. With the consent of State Pollution Control Board, the distilleries in Karnataka are taking up 'one time controlled land application' of bio-methanated spentwash in farmers' fields. A monitoring study was undertaken in Belgaum district of Karnataka State with an objective of studying the effect of land application of bio-methanated spent wash of a distillery on soil properties and crop growth. The treated spentwash was applied uniformly to the fallow dry lands in different farmers' fields during summer, 2012 at recommended rate (based on nitrogen requirement of crops). The application was made at least a fortnight before sowing/planting operations. The analysis of soils collected before land application of spentwash and after harvest of crops revealed that there was no adverse effect of applied spentwash on soil characteristics. A slight build up in soluble salts was observed but, however all the soils recorded EC of less than 2.0 dSm-1. An increase in soil organic carbon (SOC) and available nitrogen (N) by about 10 to 30 % was observed in the spentwash applied soils. The presence of good amount of biodegradable organics in the treated spentwash (BOD of 6550 mg/l) contributed for increase in SOC and N. A substantial build up in available potassium (K) status (50 to 200%) was observed due to spentwash application. This was attributed to the high K content in spentwash (6950 mg/l). The growth of crops in the spentwash applied fields was higher and farmers could get nearly 10 to 20 per cent higher yields, especially in sugarcane and corn. The analysis of ground water samples showed that the quality of water was not affected due to land application of treated spentwash. Apart from realizing higher crop yields, the farmers were able to save money on N and K fertilisers as the applied spentwash met the crop requirement. Hence, it could be concluded that the bio-methanated distillery spentwash can be gainfully utilized in crop production without polluting the environment.

Keywords : bio-methanation, pollutant, potassium status, soil organic carbon
Conference Title : ICEES 2015 : International Conference on Environmental and Earth Sciences
Conference Location : Venice, Italy
Conference Dates : April 13-14, 2015