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Effect of post biomethanated spentwash on *Azotobacter* population in sodic soil

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SUMMARY

An investigation was carried out to study the effect of application of post biomethanated spentwash on Azotobacter population in sodic soil. The post biomethanated spentwashwash was applied prior to sowing @30,000, 60,000, 90,000, 120,000, 150,000 and 180,000 L ha^{-1}. The Azotobacter population increased with increase in rate application of post biomethanated spentwash upto180 m^3 ha^{-1}. The Azotobacter population increased upto flowering stage and thereafter it decreases.

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KEY WORDS : Biomethanated, Spentwash, *Azotobacter,* Sodic soil

India is a major producer of sugar in the world. There are about 579 sugar mills and 285 distilleries in India, about 75 million tonnes of molasses and 45 million tonnes of bagasse as valuable byproducts are generated (Rajukkanu and Manickam, 1997). The quantity of spentwash produced in a distillery is about 12 to 15 times of alcohol produced (Manohar Rao, 1983). At this rate, 40,950 million litres of spentwash per year could be produced (Anonymous, 2006). If such a huge quantity of spentwash is disposed to soil in untreated form, it causes pollution.

The distillery spentwash is non-toxic and when treated with microbial inoculants can be used as good organic manure. The spentwash is acidic in nature and loaded with organic and inorganic salts resulting in high EC (30-45 dSm^{-1}). As spentwash is plant originated, it also contains nitrogen (1600-4200 mg l^{-1}), phosphorus (225-3038 mg l^{-1}), potassium (9600-17,475 mg l^{-1}), calcium (2050-7000 mg l^{-1}). It also contains appreciable amount of plant growth regulators like gibberellic acid and indole acetic acid (Murugaragavan, 2002). After 50-75 times dilution and systematic application it would not cause any harm to soil and can be effectively used for recycling in agriculture (Bajpai and Dua, 1972). Untreated spentwash application to soil might deplete the oxygen level due to higher loads of BOD and COD which in turn would lead to decrease in microbial population and enzyme activity. The treated spentwash application at lower concentration increases enzyme activity due to increased microbial load in soil. The soil salinity and sodicity adversely affects many micro-organisms as is the case with plant growth. It is evident that soils do not become productive immediately after the removal of salts, but gradually as the favourable micro-organisms were given time to multiply.

Some of the soil biologists have undertaken experiments to evaluate the impact of distillery spentwash on soil enzyme activity and microbial dynamics. The pH of untreated spentwash was acidic whereas the treated spentwash was alkaline in nature. The total solid contents of the untreated, primary and secondary treated spentwash were 83,000, 46,000 and 31,000 mg l^{-1}, respectively. The untreated and treated spentwash were rich in plant nutrients and in addition treated spentwash recorded appreciable amount of microbial load and enhanced enzyme activity. Spentwash application showed significant increase with respect to bacteria, fungi, actinomycetes and *Azotobacter* (Mallika *et al.*, 2003).

EXPERIMENTAL METHODS

In order to study the effect of post biomethanated spentwash on the *Azotobacter* population on sodic soil, a

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