RESEARCH PAPER

Effect of levels of post biomethanated spent wash (PBSW) on physical and chemical properties of soil at harvest of soybean [*Glycine max* (L.) Merrill]

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ABSTRACT

An experiment was conducted on inceptisol soil at Rahuri (M.S.) concluded that the application of post biomethanated spent wash $60 \text{ m}^3 \text{ PBSW}$ ha⁻¹ + RDF was beneficial for achieving higher yield of soybean along with improvement in soil physical and chemical properties at harvest without any adverse effect on the soil quality during first year of study.

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INTRODUCTION

Soybean [*Glycine max* (L.) Merrill] is an important pulse as well as oilseed crop. Nutritionally, soybean is excellent source of protein and oil. It contains 38 to 43 % protein, 18 to 20 % oil, 26 % carbohydrates, 4 % minerals and 2 % phospholipids. Among the oilseed crops, soybean has occupied third place in the edible oil scenario of India, next to groundnut, rapeseed and mustard.

In India, the area under soybean was 8.88 million ha, with production and productivity of 9.99 Mt and 1124 kg ha⁻¹, respectively. In Maharashtra area under soybean was 2.66 million ha production and productivity of 3.97 Mt and 1492 kg ha⁻¹, respectively (Anonymous, 2008).

Alcohol is one of the major revenue earning enterprises for the government. The fermented molasses is distilled and alcohol is obtained. The liquid left after distillation of fermented molasses is known as spent wash.

In India, Alcohol is mostly produced from sugarcane molasses. The molasses are fermented with the yeast (*Saccharomyces cerevisiae*). The fermented wash is distilled and alcohol is obtained. The liquid left after distillation of alcohol is generally known as spent wash, vinase, distillery effluent, under slopes.

The amount of spent wash produced is quite staggering causing environmental pollution and disposal problem. However, some recent studies indicate its potential for crop production as a source of nutrient. The idea of methane generation from spent wash came forward generated with a view to use huge organic load present in spent wash. The effluent left after the methane

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The post biomethanated spent wash is nearly neutral in reaction (pH 7.51), contain high concentration of soluble salts (EC 41.6 dSm⁻¹) with low BOD (5400 mg L⁻¹) and COD (24680 mg L⁻¹) and good amounts of N, P and K. Therefore, post biomethanated spent wash could be utilized as a liquid manure and should not have adverse effects on availability of soil nutrients as well as on physico-chemical properties of soil. Due to addition of high amounts of potassium through spent wash, the potassium dynamics could be altered and may change the forms of soil potassium fixation and release of potassium is expected.

MATERIALS AND METHODS

The field experiment with soybean was conducted at Post Graduate Institute Research Farm, Department of Soil Science and Agricultural Chemistry, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmadnagar (M.S.) during *Kharif* season of 2009. The soil of the experimental site belonged to order Inceptisol. The field experiment was laid out in Randomized Block Design with eight treatments and three replications. The treatments comparised of control, RDF (Recommended dose of fertilizer) only, post biomethanated spent wash @ 20, 40, 60, 80, 100 and 120 m³ ha⁻¹ + RDF. The quantity of N, P and K supplied through the post biomethanated spent wash was adjusted while applying the quantity of N, P and K through recommended dose of fertilizers.