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ORIGINAL RESEARCH ARTICLE

Effect of Different Concentrations in Yeast Biomass on the Seed Germination of Black Gram and Green gram

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ABSTRACT

Yeast biomass is obtained as a byproduct of alcohol industries. It is an excellent source of proteins, vitamins, amino acid and nucleic acid. Reutilization of biomass is a valuable fertilizer and an serve as a suitable alternative to chemical fertilizer. Under the reutilization and recycling strategy of distillery yeast biomass was used in petridish culture experiments to its effect of seed germination, seedling growth and plant height. This experiment was conducted into two different varieties of seeds. Black gram and Green gram treated with different concentration of yeast biomass respectively (0 %, 5 %, 10 %, 15 %, 20 % and 25 %). The results of the experiment showed that low concentration of yeast biomass [5 percent (T_2) and 10 per cent (T_3)] gave high level of seed germination, seedling growth and plant height compared to control.

Key words: Yeast, Seed germination, Black gram and Green gram.

1. INTRODUCTION

Distillery industries generate large quantities of liquid and solid wastes causes indiscriminate disposal of such wastes causes environmental hazards. Yeast biomass is one of the wastes generated by molasses based distilleries to the tune of million tones [1]. The proper recycling of yeast biomass, in an eco –friendly way, has become a need of the day. This by-product has been regarded as wastes that requires disposal, but now there is a realization that it constitutes a rich renewable organic resource worth recycling and utilizing in agriculture, aquaculture and other allied areas. An existing anew field of research work is the use of yeast biomass waste as a fertilizer. It is important organisms in many ecosystems and form a significant contribute of biodiversity soil yeast are also capable of diversity enhancing plant growth. However, the mechanisms by which growth is increased differ depending on the yeast species involved.

The yeast biomass so produced is disposed of in several ways it's release of nutrients for a good response in plant growth. Various industries have been continuously adding lot of waste containing high level of nutrients, heavy metals and hazardous substances to the cultivable land [2]. These biomasses not only increase the nutrient level, but also excess tolerance limits and causes toxicity.[3]studied the physicochemical characteristics of distillery biomass respectively. The high values of COD revealed the presence of high concentration of biodegradable organic matter in the yeast biomass [4, 5], while studying the effect of different concentrations of biomass waste of distillery, observed inhibition of seed germination, seedling growth. On the other hand [6] studied the inhibitory effect of distillery yeast biomass on plants as well as on soil properties. Experiments conducted by [7] for studying the effect of low concentration of yeast biomass on growth and field N,P and K contents in rice showed increase in growth and yield of crop and also reported that the lower concentration of yeast biomass increase the seedling growth in green gram and black gram seedling in 10 days experiment .

In the past physicochemical characteristics of yeast biomass as well as their impacts on plants and animals have been worked out extensively [3] but very little known about their reutilization effects. The distillery industry yeast biomass was used for the experiments and the present experiment was undertaken to study the effect of this biomass to find out the impact of various

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concentration level of the biomass on seed germination, growth performance and using certain morphological and biochemical parameters.

2. MATERIALS AND METHODS

Collection of yeast biomass

The biomass sample was collected in the plastic containers from National co – operative sugar mill and distillery industry, Madurai, Tamil Nadu. The samples carefully transferred to microbiology laboratory in Department of Microbiology and the biomass stored in 4ºC for further uses.

Collection of seeds materials

The undamaged and uniform sized seed materials collected from experimental farm, Department of Horticulture, Annamalai University, Annamalai Nagar. The seed materials stored to polythene bag for further uses.

Germination Experiment:

Different concentration of yeast biomass solutions were (0, 5, 10, 15, 20 and 25 per cent V/V) prepared with distilled water were used to investigate the effect of yeast biomass on germination of black gram and green gram seeds. The germination of seeds are used to petridish experiments. All petridish sterilized for before uses. The healthy and uniform sized seeds were surface sterilized with 0.1 per cent mercury chloride for 2-3 minutes, washed in running tap water for 3 minutes and in distilled water for 2 minutes. They were thoroughly washed with tap water to avoid surface contamination 10 healthy and undamaged seeds of equal size were evenly placed in each sterilized petridish which contained water soaked filter papers. The germinating seeds and seedling were washed with distilled water every alternate day for the prevention of contaminants and fresh solutions were applied for the maintenance of biomass concentration, after incubation period (10 days) seed germination and plant height was measured.

3. RESULTS AND DISCUSSION

The findings of the experiment are showed in Figure 1 to 4. The percentage of seeds grown under different concentrations of yeast biomass is shown in (**Fig 1 & 2**). Germination percentage was initially delayed with increasing levels of biomass, but it became relatively faster after 4 days. Maximum plumules emergence occurred in T_2 and T_3 treatment. The biomass concentration will be increased the growth will be degreased. The seed germination bioassay technique was performed by blotter technique to know the effect of different concentration of yeast biomass on the seed germination. The 5 percent concentration of yeast biomass all seeds grown in black gram and green gram. The different concentration seeds germination compared to control. The 10 percent yeast biomass grown 5 seeds for 3rd day. 15 percent yeast biomass 7seeds for 6th day. The 25 per cent yeast biomass initially not grown. The concentration will be high growth is slow only 6 seeds grown to out of 10 seeds. The 5 per cent yeast biomass grown in all seeds grown, 10 per cent yeast biomass grown in 9 seeds. 15 per cent yeast biomass grown in 7 seeds. 20 and 25 per cent yeast biomass grown in only 6 seeds. The 5 per cent yeast biomass grown in 11 cm of plant height, followed by 10 (10.6 cm), 15 (9.2 cm) and 20 (9.1cm) per cent (Fig 3). The 5 per cent yeast biomass grown in 11.5 cm of plant height, followed by 10 (10.8 cm), 15(9.23cm) and 20 (9.0cm) per cent (Fig 4). The plant height measured in 7 to 10th day. The 5 per cent concentration of yeast biomass well grown in black gram and green gram. The maximum height will be observed in T_2 and T_3 treatment. The concentrations were increased no effect. The plant height compared to control (**Fig 3 & 4**).

Fig 1: Effect of different concentration of yeast biomass on the germination potential Black gram

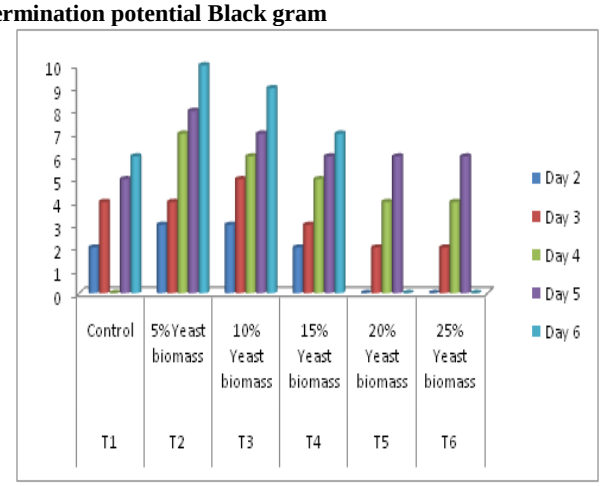


Fig 2: Effect of different concentration of yeast biomass on the germination potential Green gram

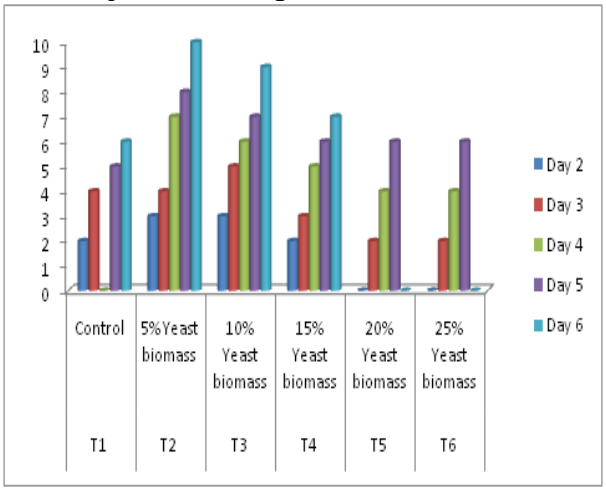


Fig 3: Effect of different concentration of yeast biomass on the plant height of Black gram

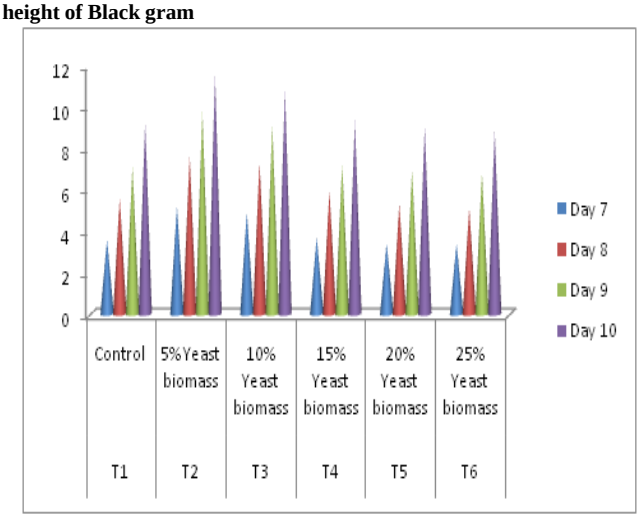
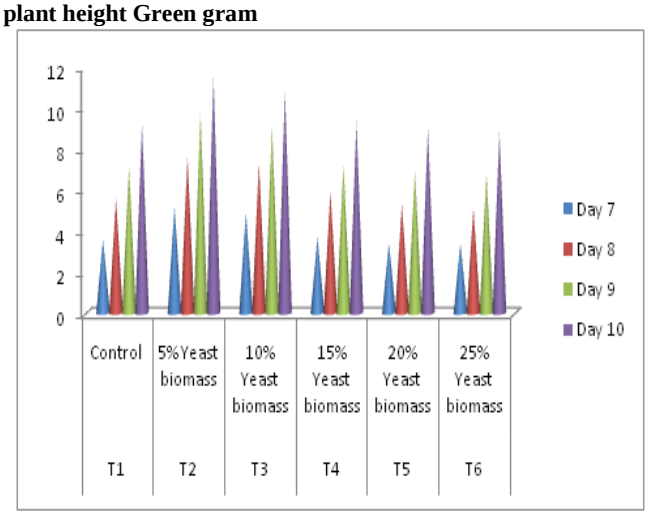


Fig 4: Effect of different concentration of yeast biomass on the plant height Green gram



4. CONCLUSION

Yeast biomasses are excellent source of proteins, vitamins, amino acid and nucleic acid. Yeast biomass in an ego - friendly way, has become a need of the day. The yeast biomass used to plant cultivation. Low concentration of biomass increased the plant height. Further, studies going on the yeast biomass.

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