



Studies on effect of different concentration of carbon and nitrogen sources on growth and biomass production of *Beauveria bassiana*

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Abstract

The study on effect of different carbon and nitrogen sources on the entomopathogenic fungi is done using Czepeck Dox Broth media. From the study, it was concluded that Fungi *Beauveria bassiana* showed higher growth on all the nutrient sources. Sodium Nitrate, Potassium Nitrate and Ammonium Sulphate are the nitrogen sources used in Czepeck Dox Broth media. In these *Beauveria bassiana* showed high growth of biomass content of 20.706g in Sodium Nitrate at the concentration of 1.5g/l, whereas in carbon sources like Fructose, Lactose and Dextrose, high growth of biomass content of 20.463g is found in Lactose at the concentration of 30g/l.

Keywords: *B. bassiana*, biomass, czepeck dox broth, growth

Introduction

The entomopathogenic fungus *Beauveria bassiana* is widely distributed throughout the world and can be isolated from insect, mites and soil [3]. The fungus can infect a wide range of hosts and shows promise for commercial development as a biological control agent of agriculture insect Pest [3]. The Mycoinsecticide based on *Beauveria bassiana* (Balsamo) Vuillemin [2&4] have been used to control various insect pests. Production of adequate quantities of a good quality inoculum is an essential component of the biocontrol programme.

The knowledge of nutritional requirements is the main need in the cultivation of microorganisms using any cultural technique. The carbohydrates, proteins, lipids, nucleic acids are made up of macro elements like carbon, hydrogen, nitrogen, sulphur, phosphorus and these are involved in mechanisms like host pathogen interaction and self defence mechanisms. Carbon is the major component and the molecules of carbon also contribute to oxygen and hydrogen. The effect of the nutrient sources on the growth and development of microorganisms is studied. The fungus which is used and the media components used are responsible for the mycelia growth and spore yield. For the growth of microorganisms, the macro elements like carbon, hydrogen, oxygen, sulphur, phosphorus and nitrogen are required which are the components of carbohydrates, nucleic acids and proteins. The preparation used for the growth, storage and transport of microorganism can be used in solid or liquid form. The media should have all the nutritional requirements for the growth of microorganisms [1&5]. The study is done to know the effect of nitrogen and carbon source on biomass production of *B. bassiana* and media which support highest biomass production is y effective for mass production of *B.*

bassiana.

Materials and Methods

Pure culture of fungi *Beauveria bassiana* is obtained from NFCCI, Pune (NFCCI-3319). Culture media with carbon and nitrogen sources with different ratios were used in the study for growth of culture. Potato Dextrose Agar medium is prepared and slants is prepared. After this different media are prepared with different concentration of different constituents. The PH of all the media was maintained at 7.0 and was sterilized at 121°C at 15 lbs for 20 min.

The first Czepeck Dox Broth Medium is prepared in which the main constituent is sodium nitrate to study the effect of nitrogen source. The sodium nitrate is used in concentration of 1g, 1.5g, and 2g per litre in different conical flasks respectively. The second Czepeck Dox Broth Medium is prepared with main constituent with potassium nitrate with concentration 1g, 1.5g, 2g per litre respectively. The third Czepeck Dox Medium prepared to study the effect of nitrogen sources consist of ammonium sulphate as the main constituent in concentration of 1g, 1.5g, and 2g respectively.

Then the fourth Czepeck Dox Medium is prepared to study the effect of carbon source with main constituent lactose in concentration of 10g, 20g, and 30g per litre. The fifth Czepeck Dox Medium is prepared with fructose as major constituent in concentration of 10g, 20g, and 30g per litre. The sixth media is prepared with dextrose as main constituent with same range of concentrations of 10g, 20g, and 30g per litre.

After preparation of the media, the inoculation is done. The pure cultures of *Beauveria bassiana* are then inoculated in different concentrations of media prepared and kept for incubation for 3 weeks. The growth of the fungus observed

after every week. After three weeks are finished, the filtration of the media with biomass of fungus is done and the weight of the biomass is measured to study the effect of different concentration of Carbon and nitrogen sources on the growth and biomass production of *Beauveria bassiana*.

Results and Discussion

In the present study, Czapeck Dox Broth media with different concentration of constituents are used to study the effect of carbon and nitrogen sources on biomass production *Beauveria bassiana*. The effect of carbon and nitrogen sources is studied on the basis of the total biomass production of the fungi on *B. bassiana*. These results are shown in the Tables 1, 2 and Fig. 1, 2 for *B. bassiana*.

The Czapeck Dox media with nitrogen sources showed the high biomass product formation of *Beauveria bassiana* in Sodium Nitrate at concentration of 1.5 g/l the biomass formation is 20.706 g. In Potassium nitrate at concentration of 2.0 g/l the biomass formation is 18.450 g. In Ammonium sulphate at concentration of 1.5 g/l and 2.0 g/l the biomass formation is 18.483 g and 17.426 g.

The Czapeck Dox media with carbon source showed the high biomass product formation of *Beauveria bassiana* in Lactose at concentration of 10 g/l and 30 g/l the biomass formation is 20.463g and 19.160 g. In Dextrose at Concentration of 20g/l and 30g/l the biomass formation is 18.676g and 19.060g. In Fructose at concentration of 10g/l and 30g/l the biomass formation is 18.740g and 17.980g.

Table 1: Total biomass production of *B. bassiana* as influenced by nitrogen source

Nitrogen Source	Total biomass content(g/250 ml)		
	1g/l	1.5g/l	2.0g/l
Sodium nitrate	18.303	20.706	14.516
Potassium nitrate	13.900	15.626	18.450
Ammonium sulphate	16.213	17.426	18.483

Table 2: Total biomass production of *B. bassiana* as influenced by carbon sources

Carbon Source	Total biomass content(g/250 ml)		
	10g/l	20g/l	30g/l
Fructose	18.740	15.893	17.980
Lactose	19.160	18.346	20.463
Dextrose	15.310	18.676	19.060

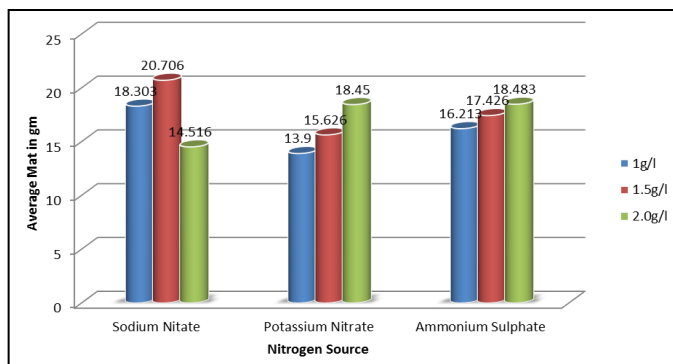


Fig 1: Total biomass production of *Beauveria bassiana* as influenced by nitrogen sources.

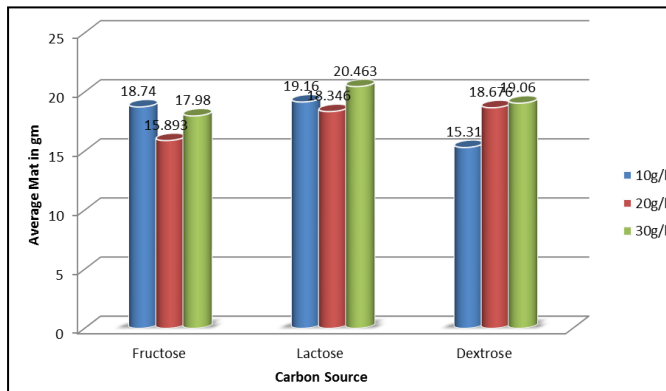


Fig 2: Total biomass production of *Beauveria bassiana* as influenced by carbon sources.

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