Effect of Dipotassium Phosphate and Ferrous Sulphate on Growth of *Azotobacter chroococcum* in Jensen's Medium

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Abstract:

Nutritional requirement of microorganism can depend mainly on the other nutrient components in defined media.Media enhance the growth and predominance of particular type of bacterium and not allow the other organisms.Influence of Dipotassium phosphate (K_2HPO_4) and Ferrous sulphate ($FeSO_4$) on *Azotobacter chroococcum* were measured at various concentrations in Jensen's medium. Dipotassium phosphate ranging from 0.2 gl^{-1} to 2.0 gl^{-1} and Ferrous Sulphate from 0.02gl^{-1} to 0.20 gl^{-1}. The bacteria showed maximum growth were found at 0.6gl^{-1} $K_2HPO_4$and at 0.1 gl^{-1} $FeSO_4$.

Keywords : Dipotassium phosphate, Ferrous sulphate, *Azotobacter chroococcum*

Introduction:

Phosphorus is most important major element for the growth of microorganisms. *Azotobacter* does not develop in soils containing less than 10 ppm soluble phosphorus. Minor element iron is required for nitrogenase and ferredoxin (Postgate, 1971). The bacteria vary in their requirement and sensitivity for iron sulphate. In this study we are taken into consideration of both the minor and major nutrient for growth of bacteria in Jensen's medium.

Material and Method:

Preparation of experimental (Modified) medium

1. In the preparation of modified medium the study of a particular compound was omitted and rest of the compounds as they are in a basic medium. An omitted compound was taken at different concentrations to study the influence of such compound on the growth of bacteria. The growth was compared at different concentration estimated by optical density using UV spectrophotometer at 660nm at pH 6.8.

Results:

I Dipotassium phosphate

From the graph 1,it is observed that the maximum growth obtained at 0.6 gl^{-1} K_2HPO_4. The requirement of K_2HPO_4 is less as compared with control where 1 gl^{-1} K_2HPO_4.

II Ferrous sulphate

The concentration of ferrous sulphate in Jensen's medium was 0.1 $gl^{`1}$. Maximum growth of *Azotobacter* was observed at the same concentration (0.1 gl^{-1} $FeSO_4$)

III Growth in Experimental modified medium

Growth was maximum as compared to the basal medium as shown in the graph 2

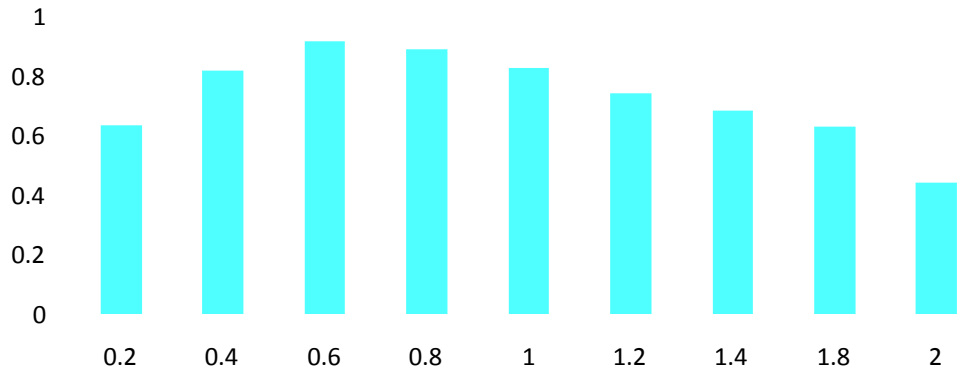
Table. 1- Influence of macroelement K_2HPO_4 on *Azotobacter chroococcum*

Concentration gl-1	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2
Optical density	0.637	0.821	0.964	0.921	0.893	0.831	0.743	0.684	0.631	0.443

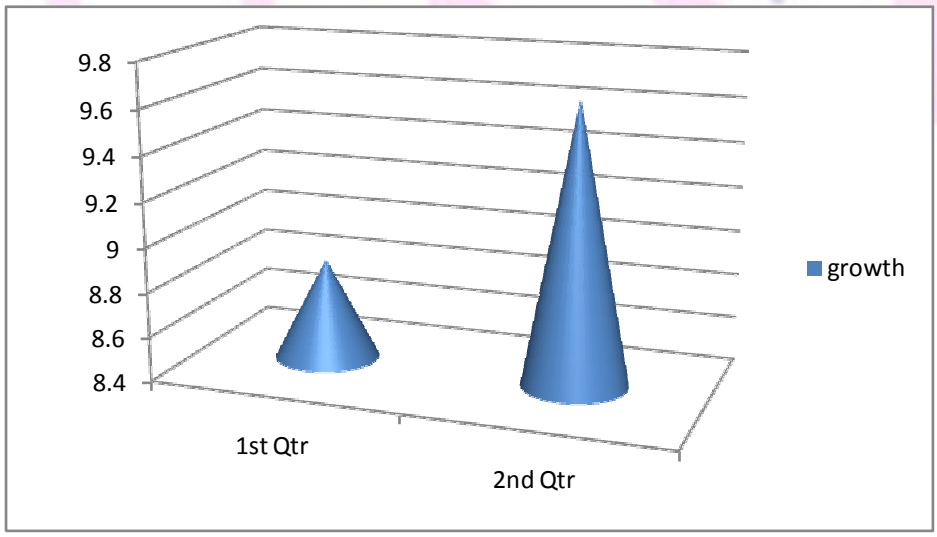
Table. 2- Growth of *Azotobacter chroococcum* in Jensen's medium and modified containing K_2HPO_4 and $FeSO_4$ in Jensen's medium.

Amount of medium	Optical density of *Azotobacter* in Jensen's medium	Optical density of *Azotobacter* in influence of potassium containing Jensen's medium
10 ml	8.85	9.65

Graph1- Effect of K2 HPo4



Graph 2 -Growth of *Azotobacter* in Jensen's and modified Jensen's medium



Conclusion:

In present study, *Azotobacter* needs at 0.6 gl^{-1} K_2HPO_4 for its maximum growth which is less than control 1.0 gl^{-1} as reported by Jensen's (1942). The growth of organisms at 0.5 gl^{-1} needed for *Azotobacter* (Becking, 1959). Dipotassium phosphate 0.4 gl^{-1} for phosphate solubilising microorganisms (PSM) by Louw and Webley, 1959

Ferrous sulphate

In case of $FeSO_4$ as increase or decrease in the concentration of the solution the growth of *Azotobacter* decreases. Skerman (1967) reported the sufficient growth of organism at 0.03 gl^{-1} FeSO4

The cell density of bacteria was low as in basal medium compared with the results in the modified medium. The growth as well as survival rate of bacteria was high and it seems that the growth of bacteria depend on the surrounding available concentration of the nutrients in the medium.

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