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Research Paper -Botony

RESPONSE OF AZOTOBACTER CHROOCOCCUM TO SODIUM CHLORIDE AND MAGNESIUM SULPHATE.

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ABSTRACT

Influence of Sodium Chloride (NaCl) and Magnesium Sulphate (MgSO4) on Azotobacter chroococcum were measured at various concentration in basal medium. Sodium chloride ranging from 0.2 gl-1 to 2gl-1 and Magnesium Sulphate from 0.1gl-1 to 1.9gl-1. The magnitude of salt (NaCl) showed maximum at 1.1gl-1 and Magnesium sulphate was at 0.3gl-1.

Key Words : Sodium chloride (NaCl) Magnesium sulphate (MgSO4), Azotobacter chroococcum

INTRODUCTION

Bacteria are most dominant group of microorganisms in soil and probably equal one half of the microbial biomass in soil. They are present in all types of soil but their population decreases as the depth of soil increases.

Azotobacter is a hetrotroph, aerobic organism capable of fixing dinitrogen as non-symbiont and produces growth promoting substances and has shown to be antagonistic to pathogens. It increases in growth and yield of crop (Vancura and Macura, 1961).

The Microorganism always exists in a mixture. All forms of life share certain nutritional requirements for growth, normal functioning and source of electrons for their metabolism. Not all biological functions of metal ions are known but Fe2+, Mg2+, Zn2+, Mo2+, Mn2+ and Cu2+ are known to be cofactor for various enzymes. Media provide nutrients that enhance the growth and predominance of a particular type of bacterium and donot increase other types of organism that may be present.

MATERIAL AND METHODS

The growth of Azotobacter chroococcum was determined by culturing in Jensen's medium. In the preparation of medium the study of particular compound was omitted and rest of compounds as they are in basal medium.

An omitted compound was taken at different concentration to study the influence of such compound on the growth of bacteria.

Autoclaved 10 ml medium in test tubes and inoculated. The growth measurements at different concentration were estimated by optical density using UV spectrophotometer.

RESULTS AND DISCUSSION

The requirement of sodium chloride and Magnesium sulphate in Jensen's medium is 0.5gl-1. Azotobacter shows maximum growth at higher concentration of sodium chloride 1.1gl-1 and at lower concentration of Magnesium sulphate observed at 0.3gl-1.

Azotobacter tolerates 1.1gl-1 NaCl. The magnitude of salt tolerance to Azotobacter isolates is directly propotional to the degree of salinity. Emerson and Lewis (1942) have reported a higher sodium requirement for Chlorococcus. Iswaran et al (1966) observed higher range in Azotobactor. Sodium uptake and exchange that flagellates in Chlamydomonas mere highly perserable especially to NaCl, Guillard (1960). Rhizobium fredii-P220 was able to grow in concentration upto 0.4m NaCl, although the growth rate greatly diminshed at contents cellular constituents in salt tolerant strain P220 is in response to the concentration of NaCl (Fujihara and Yoneyama, 1993)

Magnesium is important in the activation of enzymes containing (-SH) Sulphydryl gp (Pirson, 1955) 0.3gl-1 MgSO4 needed for growth of Azotobacter, it is lower than that of basal medium. According to Norris (1963), and Date (1974) lower concentration of 0.2gl-1 MgSO4 reported in YEM for optimum growth of Rhizobium. 0.06gl-1 in Pikovaskaya's medium needed for the growth of Bacillus (Okon et al, 1976). Malavolta et al (1981) observed that in Azolla deficiency of Mg decreases uptake of K and increases uptake of Co, Fe and Mn.

The different between gram positive and gram negative bacteria in Mg 2+ content, uptake of Mg2+ and ability to grow in media of low Mg2+ content were reported by Tempest et al (1967).

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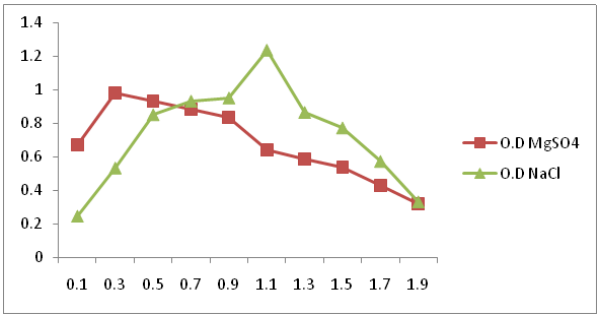
This article is a part of my thesis.

Fig:- Influence of MgSo4 and NaCl on growth of Azotobacter chroococcum



REFERENCES

Date, R.A. (1947). Legume inoculants production. Proc. INSA.40 (B), 667-686.

Emerson, R and Lewis, C.M. (1942)., J. Gen. Physiol. 25, 569.

Fujihama S. and Yoneyama, T. (1993). Effect of PH and osmotic stress on cellular polyamine contents in the soyabean Rhizobia, Rhizobium fridii P220 and Bradyrhizobium japonicum. A 1017 Appl. Enviorn Microbiol 59(4), 1104-1109.

Guillard, R.R.L. (1960) A mutant of Chlomydomonas Maewusii lacking contractile vacuoles.

Iswaran, V.J. Subba Rao, N.S. and Sundana Rao, W.V.B. (1966). Sodium Chloride tolerance by Azotobactor chroococcum. Curr Sci., 35, 126-127.

Malavolta, E, Acorsi, W.R., Rusctel. A.P., Krug, F.J. Nakayama, L.I. and Fimoi, I (1981), Mineral Nutrition and N2 fixation in Azolla.(In Associative Nitrogen fixation. Ceds. Vare, P.B. and Ruskhel A.P.) (2) 205-211, CRC Press, Florida.

Norris, D.C. (1963). A porcelain bead method for strong Rhizobium. J. Exp. Agric., 31, 255-258.

Okon, Y, Albereeht, S.L. and Burreis, R.H. (1976) Factors affecting growth and nitrogen fixation by Spirillum lipoferum J. Bact 217, 1248-1254.

Pirson, A (1955), Functional aspects in mineral nutrition of green plants Ann Rev. Plant physio 6, 71-114.

Tempest, D.W. Dicks, J.W. and Neers, J.L. (1967) Magnesium limited growth Bacillus substilis in Pune and mixed cultures in a chemostat. J. Gen Microbiol. 49 (1/2/3) 139-147.

Vancura, J and Macura, J. (1961). The effect of root excretion of Azotobacter. Folia Microbiol. 6(4), 250-259.