

Elucidating the Nitrogen fixing Ability for an Isolate Segregated from Tea Rhizosphere of South Assam, India.

¹P.B.Mazumder, ³Prof.G.D.Sharma and ^{2*} M.K.Bhattacharjee, ⁴O.N.Tiwari,
⁵ Lakhmi priya and ⁶Abhijeet.

^{1, 2,3}Assam University, Silchar, Assam-788011. ^{4, 5, 6}IBSD, Imphal, authors

Abstract: As previously work has been done on the isolation of free living nitrogen fixers from tea rhizosphere of South Assam, this edition was an additional work for verifying the nitrogen fixing ability of an isolate was an attempt to understand the nitrogenase activity of the isolate. In this paper an isolate has been isolated in a nitrogen free medium, it's morphological and biochemical assessments have been made earlier. And here its nitrogen fixation ability was depicted after doing Acetylene reduction Assay. From that a clear idea of its nitrogen fixing ability has been drawn, even if the capacity is low.

Key Words: Free living nitrogen fixers, nitrogenase activity, nitrogen free medium and Acetylene reduction Assay.

I. Introduction:

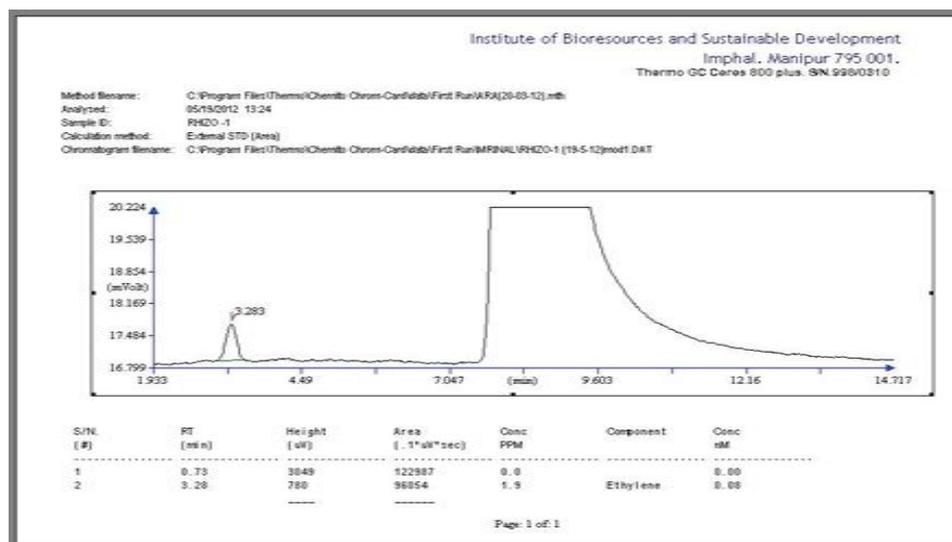
As many work on this aspect have been done earlier, but here in this part of South Assam for finding out the nitrogen fixing ability of an isolate which has been taken from the rhizosphere of a tea plant has been carried out for the first time. Here an isolate was isolated from tea rhizosphere of Toklai Variety 20 (TV) from a tea Estate of South Assam, as the morphological and biochemical assessment has been made earlier for that isolate, based on that it was identified of the genus *Rhizobium* and the isolate was marked as Rhi-2 after being it been isolated on a nitrogen free medium which was nothing but the YEMA (Yeast Extract Mannitol Agar) medium (Dubey ,*et al.*,2002).Although by how much amount that the isolate fix nitrogen was not calculated only its ability to fix nitrogen has been depicted and the entire work has been carried out at IBSD, Imphal under the supervision of scientist O.N.Tiwari and his co-mates. The curve for the nitrogen fixing ability has been depicted in the next page.

Acetylene Reduction Assay to determine the nitrogen fixing ability of the isolates:

As it has been known that the enzyme which is exclusively conscientious for the attestation of nitrogen from the atmosphere is nitrogenase and through the technique of Acetylene Reduction Assay (Hardy *et al.*, 1968) the deed of the enzyme can be established. The underlying opinion for this practice is diminution of acetylene into ethylene with the aid of enzyme nitrogenase and further this is accessed by using a gas chromatography.

II. Methodology:

By following the methods described by (Dubey, *et al.*, 2002) the process was done and by Capone (1993) the acetylene reduction calculation could be done.



III. Results and Discussion:

As from the above graph it has been clear that to some extent the isolate that has been isolated from tea estates of South Assam, India, the isolate fix nitrogen. And that has been depicted actually, but the amount is not calculated here. So from that it is clear that it has the ability for N₂ fixation and the isolate was identified up to its genus level as by performing its characteristics tests that were done earlier prior to this work mentioned in this paper.

Acknowledgement:

The thankfulness is conveyed towards IBSD specially O.N.Tiwari and his team for assistance in carrying out the work. Thanks to DBT and director IBSD.

References:

- [1] .Capone, D. G. 1993. Determination of Nitrogenase Activity in Aquatic Samples Using the Acetylene Reduction Procedure, 621-631. In P. F. Kemp, B. Sherr, E. Sherr and J. Cole, [eds.], Handbook of methods in aquatic microbial ecology. Lewis Publishers.
- [2]. Dubey, R.C. and D.K, Maheshwari. (2002).A Textbook of Practical Microbiology.S.Chand & Co.Ltd, Ram Nagar, Newdelhi.1:2-192.
- [3] Hardy, R.W.F., Holsten, R.D., Jackson, E.K. and Burns, R.C. (1968).The Acetylene-Ethylene Assay for Nitrogen Fixation: Laboratory and Field Evaluation. Plant Physiology.43:1185-1207.