

## “Stabilization of Soil Using Bio-Enzyme”

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### ABSTRACT

The process of improving the strength and durability of soil is known as soil stabilization and time consuming, there is an urgent need for development of new We are mixed black cotton soil with various dosages of Bio-enzyme with different durations and had shown significant Content and Maximum Dry Density, and California Bearing Ratio (unsoaked and soaked). And on the basis of experimental results the optimum dosage of Bioenzyme was found out. The present study provides an effective technique of ground improvement using bio-enzyme. In this study a bio-enzyme named terrazyme is used for improving the California bearing ratio (CBR) value in road construction. Terrazyme is a natural, non-toxic and liquid enzyme. It is made from fermentation of plants, vegetable extract and fruit extract. Terrazyme can be used as soil stabilizer and also it can improve the value in road construction. The dosage of terrazyme are taken as 500ml/m<sup>3</sup>, 700ml/m<sup>3</sup>, 900ml/m<sup>3</sup> and 1000ml/m<sup>3</sup> in the soil sample and result is analyzed. A significant increase is found in CBR value of the soil sample as the dosage of terrazyme has been increased.

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### I. INTRODUCTION

Job satisfaction, therefore, is the result of colorful stations held by an hand. In a narrow sense, these stations are related to the job under condition with similar specific factors similar as stipend, administrators of employment, conditions of work, social relation on the job, prompt agreement of grievances and fair treatment by employers. between them since a long time. In the time 2013- 2014, complainant bought the aluminum compound panel and other raw material from the defendant, consequently, the defendant took two blank cheques bearing no. That when the complainant and his labour were working, he noticed that the accoutrements supplied by the defendant was imperfect and made spoken complaints dated 20.03.2013 and 26.03.2013 to defendant. The defendant assured the complainant that it'll not shoot the imperfect material again. 2.3 That the complainant continuously asked the defendant to compensate for the imperfect material, still, the defendant kept on avoiding on one rationale or the other. In the time 2014, the complainant again noticed that there were some imperfect accoutrements transferred by defendant and a written complaint dated 20.02.2014 was made. The defendant again assured to compensate the complainant.

Pozzolana material like cover ash can also be used as soil stabilizer. The accoutrements like cover ash aren't fluently available in every area. However, If cover ash is transported from distant places. transportation cost increases. An ideal soil stabilizer should be fluently available, provide and eco-friendly. Bio-enzyme (Tagzyme) is a good volition to the conventional soil stabilizers like cover ash, lime etc. Tagzyme is a bio-enzyme which is used as a soil stabilizer in construction of road structure. It's used to ameliorate the soil parcels. It's non-poisonous and natural substance. It's formulated from shops, vegetable excerpt and fruit excerpt. So it's also ecofriendly. In the present study, effect of addition of tagzyme for perfecting CBR value of soil is dissect.

### Objective

1. The charetuse effect of tagzyme on the soil
2. The study the effect of doses of tagzyme on strength and other characteristics identified soil.
3. To find out optimum enzyme doses required for selected soil.
4. To compare the results obtained from the enzyme with versions soil.

### II. LITRATURE REVIEW

1. Title: - Stabilization of soil using Fly-Ash, Lime, and Cement.

Publish: - International Journal of Science and Research (IJSR) - June 2016.

**Author :- 1) Santosh Dhakar**

**S. K.Jain**

T. Abstract:-

Black cotton soil is considered to be problematic soil as it show major volume changes due to change in its moisture content. This volume change cause wide spread damages to building and roads necessitating stabilization of such soil prior to the construction. The present paper investigates the effectiveness of different stabilizing agent viz. lime, cement and fly ash with soil for improving its engineering properties. Soil samples were collected from district Morena, in state of Madhya Pradesh, in order to look in to the relative effectiveness, and arrive at appropriate proportion of stabilizing. (1) Lime, (2) Cement, (3) Fly ash alone and combination of (1) Lime– Cement, (2) Cement–Fly ash, (3) Fly ash- Lime are used to stabilize the soil. Quantity of stabilizing agent varied from 2% to 10% of the soil weight and the performance is evaluated by observation.

**2..P Jenith at ol.(2017)** have done an examination investigation of bio-catalyst on black cotton soil as a parkway material.

In this test study, a preliminary advance must be taken to balance out the dark cotton soil for the development of streets and

structures. In this investigation, quality of the Untreated dark cotton soil and Enzymatic soil (Ecozyme + dark cotton soil) are tried

after the relieving time of 0days, 7days, 14days, 21days and 28days for different Ecozyme measurements of 200ml/3m<sup>3</sup>,

200ml/2.5m<sup>3</sup>, 200ml/2m<sup>3</sup>, 200ml/1.5m<sup>3</sup>. The different tests, for example, Preliminary test, Compaction test, Unconfined

Compression Test (UCC), Soaked and Unsoaked California Bearing Ratio (CBR) test are performed for both parent soil and

Enzymatic soil and furthermore test results are classified.

**3.Priyanka at ol.(june-2016):-** has done research center examination on dark cotton soil and furthermore on red soil with

bio-protein as a dirt stabilizer. They have concentrated how to enhance geotechnical properties of soil. The gathered soil tests were

treated with the financially accessible Enzyme and were restored for 7, 14 and 21days separately. The aftereffects of Consistency

limits, Compaction test, Free swell record (FSI), Unconfined Compressive Strength (UCS and California Bearing Ratio (CBR) of

untreated soils are introduced in this work.

**4.Brajesh Mishra (2015):-** has done a concise report on building conduct of dark cotton soil (BCS) and adjustment of dark

cotton soil with lime as a stabilizer, based on his work and trial examinations it was seen that the record properties of dark cotton

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soil successfully improved by utilization of various level of lime substance. In this exploration work he changing rate ( 3% and 5%)

of lime used to balance out the dark cotton soil.

.A Review on stabilization of soil using various Admixtures.

Publish:- International Journal of Engineering Research & Technology (IJERT)- Feb-2017

Author:- 1) R. Jagdeesh Kumar

**5.Krishna Puthiran**

**Manikandan G.**

Abstract:-

By using Bio-Enzyme, aggregate free pavement is possible and also promotes the use of locally available material.

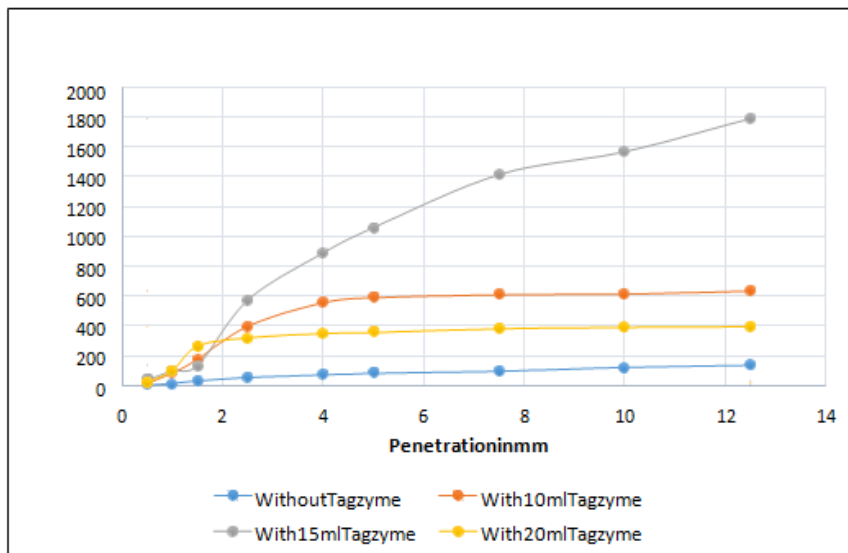
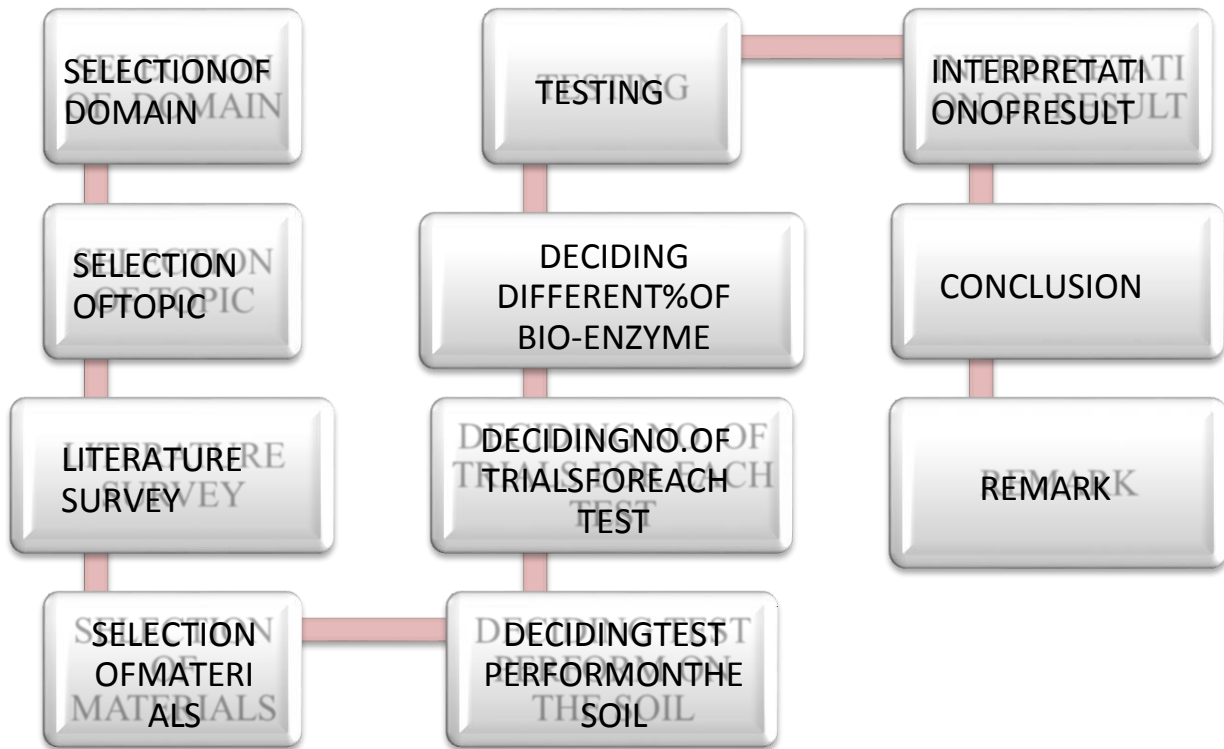
Use of bio –enzyme results in high compressive strength and also increase the hardness of stabilized soil.

Bio- Enzyme provide flexibility and durability to the pavement and also reduce the formation of crack.

Bio- Enzyme can also be used as a dust control agent, as 75% of dust reduction in road surface is reported in many construction work where bio- enzyme have been used.

Bio- Enzyme reduce the swelling and shrinkage properties of highly expansive clays.

III. Methodology



Graph No. 6:- Load Vs. Penetration for Black Cotton Soil (Without Tagzyme, 10ml Tagzyme, 15ml Tagzyme, 20ml Tagzyme)

IV. Result

This Chapter presents the test results, analysis and discussions. OMC & MDD & CBR Value on soil and soil-Tagzyme are all presented in this Chapter. The 0% Tagzyme on soil taken for making correlation between soil having 0% Tagzyme and soil with 5ml, 10ml, 15ml & 20 ml.

Standard proctor test:-For determining the optimum moisture and maximum dry density of the soil. Standard proctor test was conducted at laboratory.

The MDD of Black cotton soil with Tagzyme was 1.327 gm/cc & OMC is 22.2%

CBR Test

1. Graph shows the load variation with respect to penetration value in mm. The CBR values calculated from the loading condition & penetration showed significant variation w.r.t. amount of Tagzyme mixed.
2. The variation of CBR is noted as follows:-
3. For Black cotton soil without Tagzyme the CBR value of soil is 4.16% after one day curing.
4. For 10 ml dosage of Tagzyme CBR value of soil is 29.20% after one day curing.
5. For 15 ml dosage of Tagzyme CBR value of soil is 51.51% after one day curing.
6. For 20 ml dosage of Tagzyme CBR value of soil is 23.54% after one day curing.
7. CBR Test results shows the 15 ml dosage of Tagzyme is the optimum one because the maximum CBR value of soil is 51.51% for one day curing soil sample.

#### **V. Conclusion**

from the results following conclusions are comes out -:

Stabilization of soil using Tagzyme resulted in significant increase in CBR value of black cotton soil.

Best result for CBR values was observed with 15 ml dosage of Tagzyme at curing period of one day.

Soil stabilization by using Tagzyme should reduce the cost of pavement construction.

Tagzyme provide flexibility and durability to the pavement and also reduce the formation of crack.

This is eco-friendly Tagzyme. i.e. Tagzyme can be effectively used to increase the CBR value of Black cotton soil.

#### **References**

- [1]. Sandeep Panchal, Md. MohsinKhan, Anurag Sharma (2017) “Stabilization of Soil Using Bio-Enzyme”. IJCIET: Vol 8 [2017]
- [2]. Venika Saini and Priyanka Vaishnava (2015) “Soil Stabilization by using Terrazyme”, IJAET: [Aug 2015]
- [3]. Puneet Agarwal, Suneet Kaur (2017) “Effect of Bio-Enzyme Stabilization on the unconfined compressive strength of expansive soil”, IJRET [2017]
- [4]. PriyankaShaka, P. G. Rakaraddi, (2016) “Experimental study on the Effect of Bio-Enzyme Stabilization on Black Cotton Soils and Red Soil, IJRSET: Vol. 5 [2016]
- [5]. Mithilesh Kumar Yadav , Brajesh Kumar Singh , Dr. J.P.Tegar (2020) “Review Paper on Improvisation of Typical Soil under the Influence of Terrazyme and Waste Plastic Cement Bag Strips”, IJSRD: Vol 7 (2020)