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Research Article

Dehydrogenase Enzyme Activity in Sewages, Dairy Industry Waste Water Flooded Soils in Warangal

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ABSTRACT

The dehydrogenase enzyme activity in different polluted and control soils in Warangal city are analyzed during June 2014 to May,2015.The minimum and maximum dehydrogenase enzyme levels were0.23 mg/100g to 1.35mg/100g in the near Nayeemnagar sewage canal, while this range was0.31mg/g to 1.39mg/100g in the soils amended with dairy industry waste water flooded soil. The minimum and maximum range of dehydrogenase enzyme was 1.39 mg/100g to 2.84 mg/100g in sewage waste water flooded soil. The dehydrogenase enzyme activity range in soil, while the range of activity was 0.31mg/100g to1.43 mg/100g in control soils.

1. Introduction

Soil is a living system where all biochemical activities proceed through enzymatic processes. It is well known that all biochemical reactions in soils are catalyzed by soil enzymes. The physico-chemical state of enzymes and their influence on biochemical reactions are marked by the dependent on pH, ionic strength temperature and the available nitrogen and carbon percentage. Burns (1978)

The enzyme activity of soils results from the activity of accumulated enzymes from those in proliferating microorganisms as defined as Bayan and Eivazi (1999), Kiss et al (1975) accumulated enzymes in soils are regarded as enzymes present in active in a soil in which no microbial proliferation occurs. Sources of enzymes in soils are originating from plant animal residues. Enzyme activities in soils are derived from free enzymes such as exo-enzymes release from living cells, endo-enzymes released from disintegrating cells and enzymes bound to cell constituents.

2. Material and Methods

2.1 Study Area:

Warangal, historically known as Orugallu, is a historic city the capital of erstwhile Kakatiya Dynasty in 12th to 14thcentury.Orugallu renamed as Warngal. It is a tri city (Kazipet, Hanamkonda, Warangal) well connected by rail and road from National highway Maharashtra to chetthisgarh all major cities in Telangana. It lies between Latitude 17^0 58′8.04″N, Longitude $79^0$35′8.04″E.

Rapid industrialization and urbanization increasing of population utilization is more. It is used forfood material (plant and animal), disposal of wastes, metals and materials thrown in to soil. Most soils are capable to some degree of adsorbing and neutralizing many pollutants to the ability of a soil to accept wastes without some negative effect on the environment. In soil pollution, there are three basic urban land uses names residual, commercial and industrial, which are positively correlated with pollution.

The following sites were selected for the study:

Site 1. The soil sample collected from sewage canal near NIT, Kazipet.
Site 2. The soil sample collected from sewage canal near Hanmakonda.
Site 3. The soil sample collected from near dairy industry effluents flooded soil.
Site 4. Control soil sample collected from near place.

2.2 Preparation of soil enzyme

The soil solutions (1:5 soil and water) were made and filtered through Whatmann No. 42 filter paper and clear solution was used as soil enzyme extract.

Dehydrogenase (Casida et al 1964) five grams of soil weighed and put in a clean test tube and mixed with two ml of

Figure-1: Dehydrogenase enzyme activity among the soil sample collected from sewage canal near Kazipet

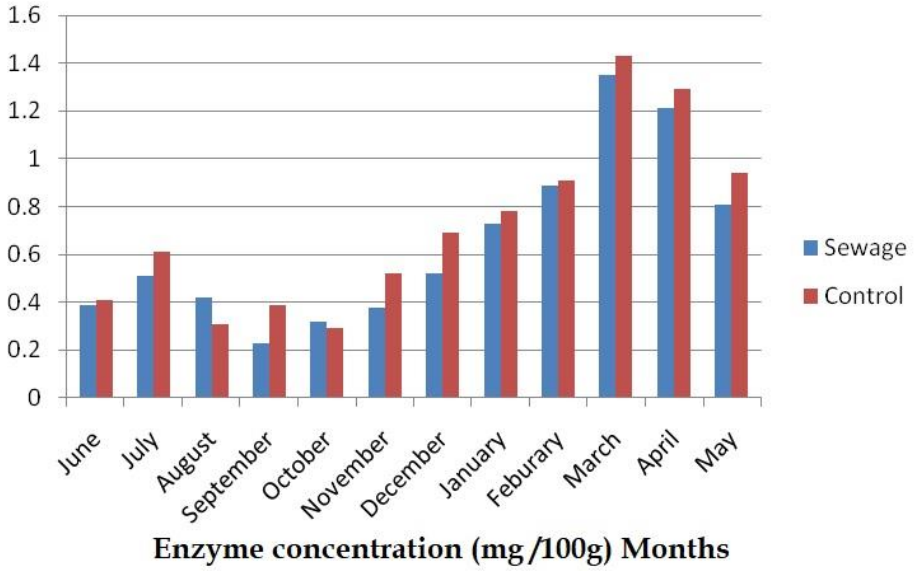
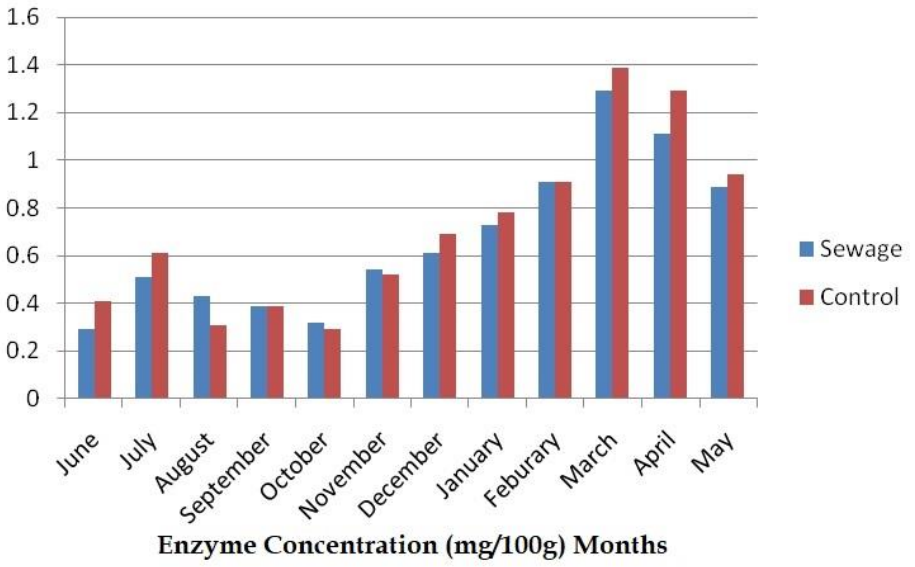


Figure -2: Dehydrogenase enzyme activity among the soil sample collected near sewage flooded soil at Hanmakonda.



one ml of INT 2(4 Indophenol) -3-(4 –nitro phenyl)- 5 phenyl tetra zolium chloride. The contents mixed thoroughly and tubes were tightly sealed with aluminum foil and incubated at room temperature 27^0 C for 24 hours and after the incubation 25 ml of methanol was added and stirred well. After incubation the above contents were filtered through whatmann no 1 filter paper and filtrate was made up to 100 ml with distilled water the developed color was measured at 485 nm using methanol as the reference blank. Results were recorded as mg of formanzan formed per kg of soil.

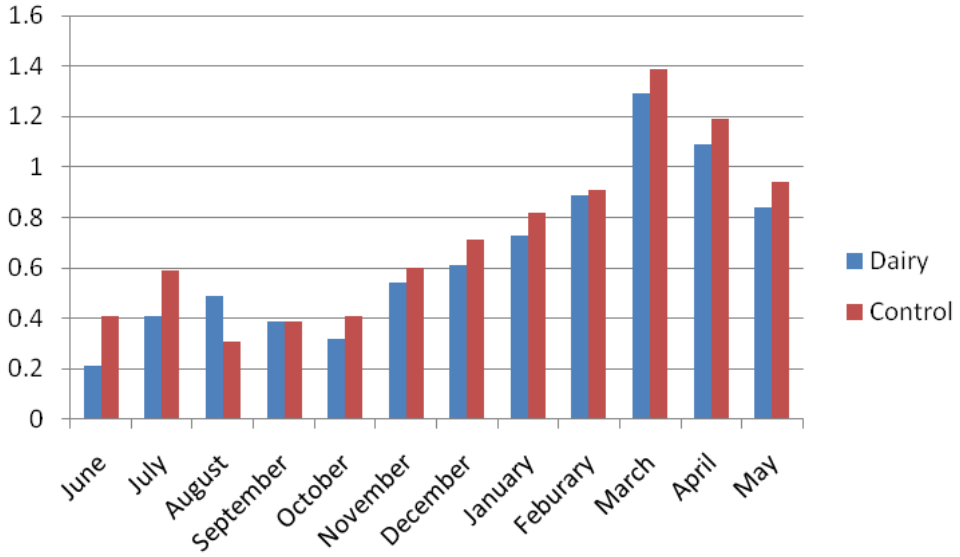
3. Results and Discussion

The current research undertaken the quantification of bio-accumulated dehydrogenase enzyme in three sewage soils. Un-contaminated soil was served as control for comparison. The data obtained presented in figures 1-3.

From the figures, it was concluded that the dehydrogenase enzyme varied in different soils with different activities. No remarkable variations were observed in the accumulated dehydrogenase enzyme in polluted and control soils.

The dehydrogenase enzyme was estimated in different industrial polluted and control soils during the year June 2014 to May 2015 (Figures 1 to 3). From the figures, it was concluded that the dehydrogenase enzyme varied in different soils with different activities. No remarkable variations were observed in the accumulated dehydrogenase in polluted and control soils. The sewage site 1 flooded soils could record the moderate dehydrogenase enzyme activity range was (mg/L to mg/L). The range of enzyme activity in the sewage site 2 amended soils varied from mg/L to mg/L while it was in between 14.31mg/L to 30.21mg/L in control soils.

Figure-3: Dehydrogenase enzyme activity among the soil collected from near dairy Industry at Warangal



Enzyme concentration (mg/100g) Months

The dairy industry waste water flooded soil showed the range of activity in between 13.92mg/L to 24.84mg/L. the enzyme activities did not show any significant relationship with pH, significant and positive correlations between the other properties and enzyme activities indicates that incorporation of organic manures has contributed significantly to soil organic carbon to total nitrogen and mineral nitrogen which in taken led to greater microbial proliferation and subsequently to greater enzyme synthesizes and accumulation. Higher organic carbon levels stimulate and accumulation in the soil matrix, since organic constituents are thought to be important in forming stable complexes with from enzymes. Similarly positive relationship between, total nitrogen content and enzyme activity indicates higher carbon materials turnover in soils amended with organic manures compared to control (Pancholi and Rice, 1973, Burns 1982, Dick et al 1988). Variations in enzyme activities among the amended soils might possibly be due to variations the soils (Dinesh et al, 2000).

Competing Interests

The authors have declared that no competing interests exist.

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