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Streptomyces from heavy metal contaminated soils of mines of Orissa, India

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Sixty isolates of *Streptomyces* were isolated from heavy metal contaminated soils of different mines of Orissa.. These isolates were studied for their gram staining properties , extra cellular and fermentative activity . All cultures were branching and rods, gram positive. They showed varied performance during the biochemical and enzymatic tests and analysis. The importance of these isolates is discussed with respect to their distribution in such a extreme habitat of heavy metal contaminated soils of mines of Orissa.

Key words : Streptomyces, Mines, Matal contaminated soil.

INTRODUCTION

Streptomyces are a large and heterogeneous group of prokaryotic organisms. Knowledge of *Streptomyces* biology is rapidly increasing because these organisms have attracted , and continuing to attract attention from the stand point of antibiotic production, mineralization of matter , and R DNA technology (Joo, 2005;. Clark *et al*., 2004; Zhang *et al*., 2004; Hashimoto *et al.,* 2004). The diversity of habitats , ranging from mesothermal to extremely thermal , normal to saline conditions adapted for growth and survival is yet another important feature of this group of organisms (Xiong *et al*., 2005;.Basil *et al*., 2004). Since very rare reports and / or no proper reports are available on *Streptomyces* of mines of heavy metals , it was thought of to explore the possibility of obtaining this group of bacteria from soils of different mine sites of Orissa.

MATERIALS AND METHODS

Study sites and sample collection

Chromite mine Sukinda (Cuttack Dist) :

The Sukinda is the largest single chromiferous fields mass in orissa which is very close to the trifurcation of Cuttack, Dhenkanal and Keonjahr districts of Orissa,. It lies in a watery sloping valley between Mahagiri and Daitari hill ranges between $21^0$00' and $21^0$04' N latitudes and $85^0$40' and $85^0$50' E longitudes in the district of cuttack. The climate is subtropical and wet abundant seasonal rainfall during monsoon months from June to September. Chromite mine soil was loamy sandy with pH of 6.2 This mine soil was endowed with high concentration of Chromium , Iron and aluminum .

Sample collection :

The total mine area was divided into different sectors according to the type of soil and mining processes.

1. Sample collected from the plantation sites (done by RPRC) on the over burden soil
2. Sample collected from the only overburdened soil
3. Samples collected from the mining sides of different top layers.
4. Samples collected from the pure ore of different kinds.

In total 35 different types of samples were collected and brought to the laboratory for isolation.

Manmora manganese mine, Joda (Keonjhar district):

The Manmora manganese mine is laocated at Joda in the district of Keonjhar which is 280 km away from Bhubaneswar, the capital of Orissa. The mining area lies at $22^0$05' N latitude and $88^0$17 E' longitude. The maximum temprarature in the locality ranges from 30^0C to 47^0C and minimum from 5^0C to 2^0C. in different seasons of the year. Annual rainfall varies between 3.9 mm to 320 mm. Soil analysis revealed that the soil was sandy loam in texture and acidic in nature. Organic, carbon, nitrogen, phosphorus, potassium contents are generally low. Due to porous soil, water holding capacity is also very less. This mine soil was endowed with high concentration of Manganese, Iron and nickel .

Sample collection :

The total mine area was divided into different sectors according to the type of soil and mining processe111.

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