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Dehydrogenase Activity in Intensively Cultivated Areas of West Godavari District, Andhra Pradesh

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Dehydrogenase activity of soil as influenced by its physico-chemical characteristics and agricultural management practices.it provides correlative information on biological activity and microbial population (skujins 1973). Dynamic characteristics such as microbial bio mass, soil enzymes and soil respiration responds more quickly to changes in crop management practices and type of cultivation than physico-chemical properties of soils (McGill *et al*. 1986). For highly deteriorated alkali soil, dehydrogenase activity was greater in the rice based cropping sequence than sorghum based cropping sequence (Batra 1998). Keeping this point in view, the present study was undertaken to compare the dehydrogenase activity of paddy-sugarcane growing soils and relate them with certain physico- chemical properties of soils under different management practices.

Soil samples were collected from different villages in sixteen mandals of paddy-sugarcane cultivated areas of West Godavari district by following random sampling technique. Soil samples collected were air dried, powdered and ground with a wooden hammer and passed through a 2 mm sieve and finally a representative sample of 1 kg was preserved in a labeled cloth bag for laboratory analysis. Biological activity of the soils was determined by dehydrogenase activity enzyme assay (Lenhard, 1956) using 2, 3, 5-triphenyl tetrazolium chloride (TTC) as electron acceptor and expressing the results in microorganisms triphenyl formazan (TPF) produced per gram dry soil. Organic C, bulk density and cation exchange capacity of the soils were determined by following procedures as described by Piper (1996).

DEHYDROGENASE ACTIVITY

Dehydrogenase activity of soil samples ranged from 18 to 225 µg TPF/g soil/day and with mean value of 73.93. Dehydrogenase activity in paddy growing soils varied from 36 to 225 µg TPF formed g^{-1} soil day^{-1}. All the paddy growing mandals recorded higher dehydrogenase values (> 30 µg TPF / g soil / day) whereas sugarcane growing areas recorded values which ranges from 18 to 115 µg TPF / g soil / day. The lowest dehydrogenase activity was recorded in sugarcane soils grown in Dwaraka Tirumala mandal (18 µg TPF / g soil / day) and the highest value was found in paddy grown in Poduru mandal (225 µg TPF / g soil / day) . The dehydrogenase activity in paddy grown soils was higher when compared dehydrogenase values in sugarcane grown soils (Table 1 and Fig. 1). This might be due to high organic carbon in paddy grown soils. The CEC values showed significant and positive correlation with organic

Table 1
Dehydrogenase activity µg of TPF/g soil/day of soils of West Godavari district

S. No.	*Mandal*	*No. of samples*	*Surface Range*	*Surface Mean*
		Paddy growing areas		
1	Nidadavolu	3	36-115	93.00
2	Undrajavaram	3	38-94	60.00
3	Tadepalligudem	4	31-101	60.00
4	Ungaturu	3	38-70	57.00
5	Bhimadole	3	18-31	25.60
6	Tanuku	3	29-94	57.00
7	Dwarakatirumala	3	18-42	30.33
8	Denduluru	3	24-36	29.33
		Sugarcane growing areas		
9	Poduru	3	120-225	157.66
10	Penugonda	4	24-148	68.30
11	Iragavaram	3	38-63	51.66
12	Undi	3	54-125	90.66
13	Bhimavaram	3	56-220	110.66
14	Pentapadu	3	96-125	110.33
15	Atchanta	3	96-148	121.33
16	Penumantra	3	36-96	60.00
	Average		**18-225**	**73.93**

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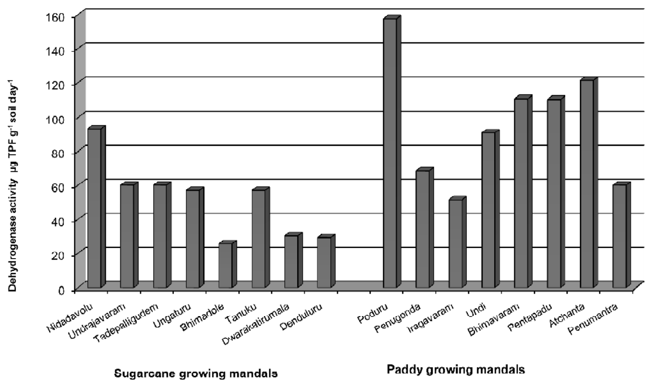
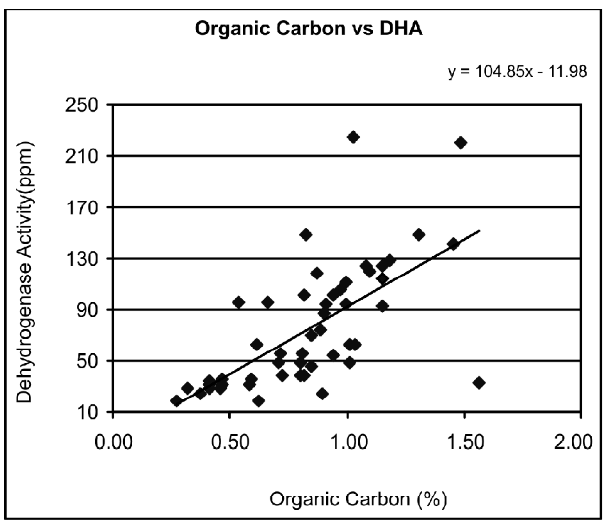
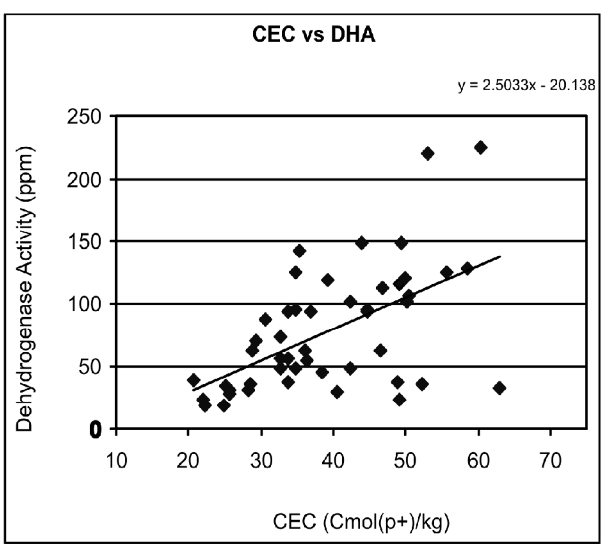


Figure 1: Dehydrogenase activity µg of TPF g^{-1} soil day^{-1} of soils of West Godavari district

carbon (r = 0.65) (Fig. 2). Similar results were reported by Kalidurai (1988). Rice rhizosphere recorded higher enzyme activities than non rhizosphere soil. Higher dehydrogenase activity was due to increased microbial population. Similar results were reported by Batra (1998).





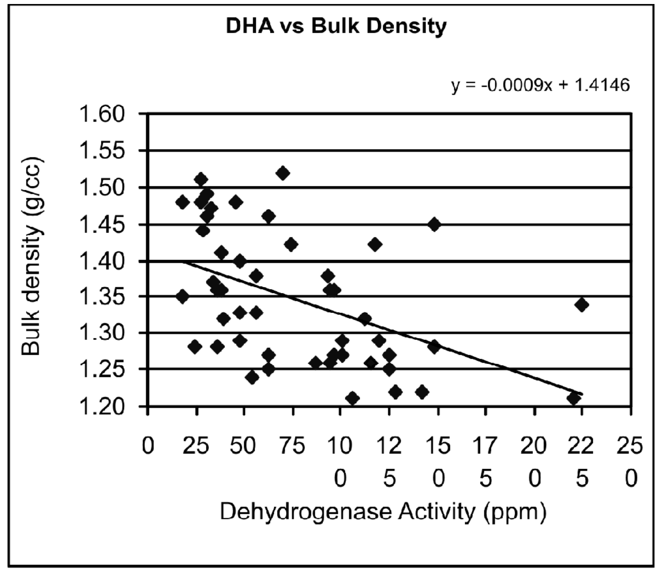


Figure 2: Correlations among physical, chemical and biological attributes

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