CHAPTER III

EXPERIMENTAL FINDINGS
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INFLUENCE OF GRADED LEVELS TANNERY EFFLUENTS (TE) SUPPLY ON SALINE SODIC FACTORS, WATER SOLUBLE ANIONS AND CATIONS OF USAR SOILS AND GROWTH METABOLISM AND MINERAL COMPOSITION OF BARLEY (Hordeum vulgare L var. Jyoti) AND PADDY (Oryza sativa L var. Shaket 4) PLANTS RAISED ON SUCH SOILS UNDER POT CULTURE CONDITIONS.
INTRODUCTION

In view of the findings of (Pande, 1985) advocating fertilizer utility of tannery effluents for better growth of sugarcane and Shekh and Irshad (1980) recording conversion of saline sodic soils into normal soils and normal soils into saline sodic soils in response to tannery effluent supply, it was thought desirable to re-examine some of the earlier findings and study utility of tannery effluent as fertilizer and in reclamation of USAR (saline sodic soils) with this in view, influence of tannery effluent both from vegetable and chrome tanneries on physico-chemical characteristics of normal and USAR soils and growth metabolism and mineral composition of serial crop plants was studied. This was also in mind if chromium content of edible crops exceeds permissible limits but tannery effluent can reclaim USARs, such soils could be used for cultivation of petro crops which may form very important source of petro energy for future not very far away.

EXPERIMENTAL

SOILS: With the said aim after scraping surface to avoid contamination one to nine inch deep soil
was collected from normal and USAR tracts of Unnao. After examination twelve samples representing normal saline, sodic and saline sodic soils were brought in the laboratory in clean poly bags avoiding any chances of contamination taking all precautions, each soil was mixed well and filled in acid washed transparent alkanthene lined ten inch clay flowers pots.

The experimental pots were properly arranged in randomised block design in North South direction on raised structures to avoid any chances of contamination. For each treatment at each level two replicates were maintained.

TANNERY EFFLUENT: Vegetable tannery effluent was obtained with thanks from M/s Unnao Tannery, Unnao and chrome tannery effluent was procured from M/s Haqson Leather Complex, Unnao directly from the outlet in respective acid washed transparent poly containers and transported to the laboratory avoiding any chances of contamination. After analysis the effluents were used for treatment avoiding any unnecessary delay. According to plan treatments were provided in diluted form at desired levels in equal volumes to all most saturated soil in pots. In case of barley experiment dated 11.05.1989
to 26.11.1989 in both vegetable and chrome tannery effluent series three levels $L_0(B)$, $L_1(B)$ and $L_2(B)$ were maintained. To each five kilogram soil in each pot at $L_0(B)$ level respective tannery effluents were used at nil level serves as control. At $L_1(B)$ level respective effluents in both the series were supplied in amounts calculated at the rate of 50 $M^3/ha$ and at $L_2(B)$ level these effluents were supplied at 100 $M^3/ha$.

Fifteen days after providing respective tannery effluent treatments to soil, the pots were sowed with Barley (*Hordeum vulgare* L. variety Jyoti) obtained as certified seeds from Chandra Shekhar Azad University, Kanpur in two cm. deep holes created with a clean policeman in each soil. When needed pots were watered with amounts to maintain as far as possible similar soil moisture conditions. Percentage emergence and visual symptoms were recorded as and when they appeared after emergence, plants in each pot were thinned to uniform size and number.

At in 53 to 56 days growth barley plant tops were estimated for yield, chlorophylls (leaves only) $a$, $b$, $a+b$, $a/b$ ascorbic acid (AA) and assayed for catalase and peroxidase activity in crude tissue.
extract in fresh matter and determined for tissue concentration of Na, Ca, K, Mg, P, S, N, Fe, Mn, Cu, Zn and Cr in dry matter. On 134 days growth the barley tops were sampled, estimated for yield and determined in their tissue concentration of mineral nutrient elements as stated above in their dried grains.

Soils of each type of each level were analysed for physical and chemical properties stated for virgin soil.

After soil analysis respective soils of each pot (4 Kg in each pot) were treated again with tannery effluents. This time the treatments, were provided after twelve days barley harvest and soils were incubated for 82 days before transplantation of 60 days old paddy seedlings (Oryza sativa L variety Saket 4), seedlings raised from certified seeds obtained from Chandra Shekhar Azad University, Kanpur, in garden soil nursery beds. In $L_0(B)$ soils after barley harvest (ABS) no effluent was supplied. It acted as control for paddy and has been labelled as $L_0(P)$. $L_1(B)$ soils of ABC tannery effluents supplied were calculated @ 100 $M^3$/ha. This level was maintained as $L_1(P)$. The soils of $L_2(B)$ were incubated with amounts of
tannery effluents calculated @ 200 M³/ha supply and this level has been labelled as L²(P). Similar levels were maintained for both tannery effluents from vegetable as well as chrome tannery. Paddy thus grown was treated, analysed and estimated for the same parameters and in the same way as described for barley. 45 to 48 days old paddy tops were sampled for the determination of yield, fresh and dry matter analysis. At 118 days growth paddy tops were harvested for the determination of yield and analysis of grains for mineral nutrient elements already stated for barley. After paddy harvest the soils were again sampled from respective pots after thorough mixing for determination of physical and chemical properties of soils described above for ABS.

Data has been statistically analysed and tested for significance at p=0.05 and p=0.01 probability levels.

Changes in physical and chemical properties of virgin NSNSS, SS and SSS in response to barley culture treated with vegetable and chrome tannery effluent supply at L₀(B), L₁(B), L₂(B) and those in soils after paddy culture treated with vegetable and chrome tannery effluents at L₀(P), L₁(P) and
$L_2(P)$ levels our respective ABS soils have been studied and results have been suitably presented.

Culture and analytical techniques were used were essentially the same as described in Chapter IIInd.