CHAPTER –8

BIOCHEMICAL ANALYSIS OF TOTAL NITROGEN, PHOSPHATE AND HEAVY METAL OF SOIL AND PARTS OF CROPS GROWN ON UNPOLLUTED FARM AND ON POLLUTED FARM

Water does possess a self clearing property but there is a limit to it. On account of the discharge of untreated waste water the problem of water pollution increases and this problem intensifies with the addition of pollutants in water ways from many sources. A comparative biochemical analysis was done on certain plants to estimate the extent of hazard caused by water pollution, under actual field condition. For the experiment two economically important crops were taken into account viz. *Vigna mungo* and *Triticum aestivum*. Studies were carried out on these two plants under field conditions at two different locations. Plants growing at the nearest farm before polluted stream discharge is considered to be (unpolluted) control set at first location and plants growing at the nearest farm from the point of polluted stream discharge down stream is considered to be experimental (polluted) set at second location. The plants were then subjected to total nitrogen, phosphate and heavy metal estimation.

For the study, plants were taken out from the polluted and unpolluted soil. Special care is taken while taking out the plant so that the root and shoot part should remain intact at 60th day
in case of *Vigna mungo* and at 90\textsuperscript{th} day in *Triticum aestivum* from the day of sowing. These plants were then thoroughly washed and different parts of the plant viz. root, shoot and edible parts were separated and were oven dried at 70\textdegree C for 36 hours. Similarly soil samples was also collected from both the farm lands. This soil collected was kept in polythene containers already washed with 1:1 nitric acid and de-ionized water to avoid adsorption of heavy metal on the wall of the containers and was later kept for the analysis of total nitrogen, phosphate and heavy metal.

Table 60 and 61 presents the result of these studies on mg/gm dry weight basis. It was observed that total nitrogen, phosphate and heavy metal level increase in farm soil and plant parts when irrigated with polluted stream with Hindane river water at Paragpur.

8.1 *Vigna mungo* :

Table 60 shows a comparative biochemical analysis of soil and crop of *Vigna mungo* at 60\textsuperscript{th} day on unpolluted farm which is located before the polluted river water discharge point and on a polluted farm located after the polluted river water discharge point. Dry matter of the soil and the crop parts was subjected to total nitrogen, phosphate and heavy metal estimation. Thus total M, P and heavy metal of the polluted soil was ca. 127.7\%, 130.4\% of the control. These values in root was observed to be 140.4\%, 138.4\% and 161.3\% in shoot 150.7\%, 158.3\% and 145.7\% of the control. Similarly estimation of total N, P and heavy metal was carried out in the edible part
of the crop. Therefore the estimated value in pod cover was ca. 118.6%, 144.6% and 215.7% of the control whereas, in seeds the value was ca. 159.4%, 114.5% and 189.0% of the control respectively.

8.2 *Triticum aestivum* :

Table 61 indicates a comparison of the crop of *Triticum aestivum* unpolluted and a nearest polluted farm which is located before the effluent discharge (control) and after the effluent discharge point (experimental) respectively. Analysis of total nitrogen, phosphate and heavy metal was done in soil and crop parts. Estimated values of total N, P and heavy metal of soil are 114.0%, 150.0% and 125.4% of the control. Similarly in root the values are ca. 114.5%, 120.7% and 147.0% of the control. Further in shoot the estimated values recorded for total N, P and heavy metal are 114.9%, 113.8% and 117.6% of the control. Likewise in the edible part of the plant total N, P and heavy metal was analysed. Thus in spike the values are ca. 121.7%, 138.4% and 113.3% of the control while in seed the values for total N, P and heavy metal are ca. 106.2%, 118.7% and 127.6% of the control respectively. Thus showing accumulation of more nitrogen, phosphate and heavy metal in the soil and crop parts of the *Triticum aestivum* grown on (experimental plots) nearest farm after the effluent discharge.