6. SUMMARY

The present investigation deals with the effect of different concentrations of sugar mill raw effluent and biological treated effluent (BTE) (*Eichhornia crassipes* and *Pistia stratiotes*) effluent on seed germination, seedling growth, biochemical, mineral contents and yield components of groundnut (*Arachis hypogaea* L.). Ten varieties of groundnut seeds (VRI 2, VRI 3, VRI 4, VRI 6, VRI 7 TMV 2, TMV 7, CO 2 CO 3, and JL 24) were obtained from Oil seeds Research Stations of Tamil Nadu Agricultural University, situated at Virudhachalam and Tindivanam of Tamil Nadu. These healthy seeds were used for both the germination studies and field experiments including the varietal screening experiment.

The sugar mill effluent was collected from the outlet E.I.D Parry sugar factory, Nellikuppam, Cuddalore district, Tamil Nadu. The effluent stored in refrigerator at 5°C to avoid changes in its characteristics, and brought to the Laboratory for the physico chemical analysis purpose. The effluent was alkaline in nature with higher amount of suspended solids and dissolved solids. It contained a considerable amount of dissolved oxygen, biological oxygen demand and chemical oxygen demand. The values of sulphate, calcium, nitrate, sodium and magnesium were beyond the tolerant limits for irrigation prescribed by Tamil Nadu Pollution Control Board, Tamil Nadu.

Germination study (I) was conducted with ten varieties of groundnut seeds treated with different concentrations (10, 25, 50 and 100 per centage) of sugar mill effluent under Laboratory condition. The morphological growth parameters such as
germination percentage, seedling growth fresh and dry weights were taken into consideration for this varietal screening experiment. All these growth parameters gradually decreased with the increase of effluent concentrations. However, the lower concentrations (10 per centage) of sugar mill effluent increased the above mentioned parameters in germination studies. On the basis of data obtained from germination studies, the variety VRI - 2 was found to be tolerant than the other nine varieties were studied. In order to reduce the effluent toxicity, biological treatment was given for two days (48 hours) by using some free floating aquatic plants such as *Eichhornia crassipes* and *Pistia stratiotes*.

Germination study (II) the morphological growth parameters such as germination percentage, fresh and dry weights, vigour index, tolerance index and per centage of phytotoxicity were recorded. The biochemical parameters such as chlorophyll ‘a’, chlorophyll ‘b’, total chlorophyll, carotenoid, amino acids, protein, starch and sugar were estimated in both the control and treated (diluted and B.T Effluent) of groundnut. Similarly the mineral contents such as nitrogen, phosphorus, potassium of the groundnut seedlings were also estimated. All these biochemical parameters were higher in 10 per centage concentration of sugar mill effluent irrigation. Similarly, the mineral contents of groundnut seedlings gradually increased with the increase of effluent concentration (diluted and BT Effluent). The field experiment was conducted using the tolerant variety (VRI-2). The morphological growth parameters such as root length, shoot length, total leaf area, total dry weight of groundnut were recorded at 30, 60, 90 and 120 DAS. The yield parameters such as number of pods/plant and dry weight of pods were recorded at the time of harvest (120 DAS). The morphological
growth, yield, biochemical parameters and soil microbial activity were higher at 10 per centage of sugar mill effluent on diluted and Biologically Treated Effluent (BTE).

**Conclusion**

Hence, it is concluded that discharge of sugar mill effluent containing minerals and nutrients may greatly affect the germination, growth, yield parameters, biochemical constituents and mineral contents of the crop plants. Among the cultivars studied, it was found that the variety VRI 2 was tolerant under effluent treatment with *Eichhornia crassipes* and *Pistia stratiotes*. When compared to these two free floating plants, the *Eichhornia* treated effluent was highly efficient than the *Pistia* treated effluent at 10% of BTE (*Eichhornia*). The effluent at lower concentration particularly 10% was found to be suitable for the seed germination and biochemical changes of *Arachis hypogaea* variety (VRI-2) seedlings, it can be safety used as a liquid fertilizer for the crop. It was recommended that the groundnut variety VRI 2 can be cultivated nearby sugar mill effluent polluted area.