1. Introduction:
Microbes are known to grow and multiply in large numbers if suitable nutrients and environmental conditions are provided to them. However, in natural habitat, they may not be experiencing similar suitable conditions, there can be conditions of nutrition’s deficiencies, deficiencies of trace elements, or excess of growth requirements. Physical condition like, temperature, acoustic waves, gaseous tensions may also alter, rendering normal growth affected. The mute questions before us are, “how do they response under stress conditions”. Many studies have been done in this regard. The production of heat stable proteins by microbes to tie over the high temperature conditions is well documented. Similarly, bacteria under goes various genetic switch over to alternate metabolic pathways under nutritional deficiency stress. The role of many elements of first transition series elements in growth and metabolism is well documented. Cu, Zn, Mn are known to form metalloenzymes that are almost essential for their survival. Fe$^{2+}$ ions are also required in trace amounts by most bacteria for their growth. The stress responses of the members of first transition series has not been done in totality. However some reports of Fe stress are available but the complete picture of the complete series are still eluding.

In the present era, there is increased use of potable water in various industries including confectionary, pharmaceutical, and biotechnological and fermentation industries. The level of $1^{st}$ transition element in these water bodies is very essential even at ultra micro level. The frequent use of microbiological processes in food industry requires stringent control of these elements. The sudden shock loads of these metal ions may alter the overall metabolism of the organism involved in the microbial process. Such sudden changes may even alter the end used quality of the food product including pharmaceutical components. It is therefore very imperative that a thorough study of shock loads or stress responses of $1^{st}$ transition metal ions on the microbial system is called for.
The environmental pollution is becoming a world-wide problem in the present day. The biological treatment processes are being widely used for the treatment of water and waste water. The 1st transition element are usually responsible for two major problems in water bodies, namely imparting colour to the water and causing deleterious effects on the growth of microbial system responsible for pollution abatement. Hence it is very essential to thoroughly evaluate the role of these elements in lowering the efficiency of biological treatment plants. The stringent responses against these elements may at times even completely destroy the process of pollution abatement and result in severe water related health problems.

The present study therefore intends to study the stress responses against these metal ions so that a comprehensive analysis may provide in future a solution for the above mentioned problem.

**Stress:-** In the context of the present study, stress shall be defined as the presence of very low or very high concentration of first transition element.

**Response:-** Response shall be defined in terms of morphological changes, biochemical changes, metabolic changes as well as genetic changes observed under stress conditions.

**First Transition Series Elements:-** Some of the elements from atomic no.21- Scandium to atomic number 30- Zinc shall be considered for the studies.