Result of the study showed that the altered concentration of organic and inorganic salts of MS medium which stimulate the various stress conditions of environment, has very pronounced effect on the growth, differentiation, biochemical and phytochemical profile of the plant *Bacopa monnieri*. Altered concentration of organic, inorganic salts and vitamins of MS medium (MS, MS-1/2, MS-2) had negative effect on development of leaves. The size of leaves were found to be very small (Table 7) on omission of zinc. Similarly it also has pronounced effect on growth measured in terms of fresh and dry weight (Table 8). As zinc plays an important role in cell division and also forms a part of many key enzymes the omission of it has negative effect on growth. The omission of zinc was favourable for secondary metabolite production as the higher concentration of total bacoside and phenolics was found during investigation. This is a desirable character of a medicinal plant. The higher concentration of zinc tested was proved to be favourable for growth and phytochemical profile. However the biochemical profile showed that the plant experienced more stressed conditions. Omission of other trace metals like copper and manganese also had negative effect on growth profile as depicted by fresh weight and dry weight and also by high concentration of bacoside in case of copper, while Mn-0 had negative effect (Table10). Excess of these trace metals up to the concentration tested, did not have any effect as shown by FW and DW. Mn-4 showed reduced activity of primary and secondary metabolite production measured in terms of protein and bacoside levels. Higher level of copper was favourable for chlorophyll content in the plant. Level of GPX and SOD measured was higher than control (MS) and *in vivo* grown plant which says Mn-4 exerted metal stress on the plant (Table 9)