SUMMARY

Rice is the staple food of Indians. India is the second most population country with more than one hundred crores of people. To feed the ever-increasing population the productivity of rice has to be increased at the corresponding rate of increase of population. After independence, various governments both at the center and states have taken very many measures to increase the production of paddy. One of the methods, which were vehemently, advocated the use of chemical fertilizers, insecticides, pesticides etc. But soon it became evident that the continued use of these chemicals has not only deteriorated the quality of soil but also caused serious consequences such as land, water and air pollution. To avoid these bad effects, agricultural scientist started recommending the use of green manure and biofertilizers. The capacity of nitrogen fixing microorganisms, phosphate-solubilizing microorganisms and plant growth promoting microorganisms etc., could be utilized to maintain the fertility of the soil and to increase the production. Thus sustainable agriculture was given more emphasis.

Biofertilizers or bioinoculants are microorganisms beneficial to the growth of plants. Usually these bioinoculants are applied to soil along with carrier material. At present various materials such as peat, lignite, charcoal, rice husk, compost and soil etc., are used as carriers. They differ in their characteristics of maintaining shelf life of cultures during storage. In the present study two carrier materials viz., vermicompost and lignite were used to understand their capacity to maintain shelf life in storage and to know the impact of their use in field conditions. The result obtained are enumerated as follows:
1. The maximum survival capacity of *Azospirillum lipoferum*, *Bacillus megaterium* and *Pseudomonas fluorescens* was found in Vermicompost carrier when compared to lignite carrier. From the present study it was found that vermicompost is the best alternative carrier for bioinoculants.

2. Generally the combined form of application of bioinoculats showed better results in various morphological, biochemical, and quality parameters of rice such as the plant height, leaf area, total numbers of tillers per plant, number of days for 50 percent flowering recorded a significant results in T10 treatment (VAZS+VPSB+VPSN). But in the case of plant dry matter the T11 treatment, which treated with lignite, based bioinoculants as combined form showed maximum mean value both in pot and field experiments. The minimum number of days for maturity was recorded with the T11 treatment in field experiment but in the case of pot experiment it was T10.

3. The T10 treatment, which treated with vermicompost, based bioinoculant as combined form recorded maximum value of leaf chlorophyll a, chlorophyll b, starch, protein, sugar and aminoacids content both in field and pot experiments.

4. Regarding the number of panicles per plant, panicle length, total number of grains per panicle, number of filed grains per panicle the T10 treatment recorded maximum mean value both in field and pot experiments. But in the case of thousand grains weight the T11 treatment showed maximum mean value followed by T10.

5. Comparatively, both in field and pot experiments the maximum value of grain and straw yield was recorded with the T10 treatment, which treated with vermicompost carrier based bioinoculants as combined form.
In the case of hulling percentage and milling percentage of rice grain, and water uptake, volume expansion, elongation ratio, protein content and amylose content of rice kernel the maximum mean value was observed in T10 treatment both in field and pot experiments.

Among the individual, dual and combined form of application of bioinoculants the combined form of application showed better results when compared.

It is concluded that the vermicompost carrier is the best alternative to lignite carrier in maintaining shelf life of inoculant and better performance in field level with specific reference to *Azospirillum lipoferum*, *Bacillus megaterium* and *Pseudomonas fluorescens*. 