I. INTRODUCTION

China aster [Callistephus chinensis (L.) Nees], is one of the most popular commercial flower crops grown throughout the world. It belongs to the family Asteraceae, native to China and was introduced in Europe during 1731 and then spread to different parts of the world (Desai, 1967). The genus Callistephus includes the lone ornamental cultivated species chinensis with chromosome number 2n=2x=18. The genus Callistephus derives its name from two Greek words ‘kalistos’ means ‘most beautiful’ and ‘stephos’ means ‘a crown’ referring to the flowers. Cassini described the china aster as Callistephus hortensis while Linnaeus as Aster chinensis and Nees subsequently changed this name to Callistephus chinensis. The cultivated asters of today were developed from single form of wild species, Callistephus chinensis.

It is a winter season, flowering, half hardy and free blooming annual grown all over the world for its cut flowers. The wide spectrum of forms, colors (pink, blue, violet and white) and their long vase life have made this plant, a popular cut flower. Among the annuals it ranks next to chrysanthemum and marigold. It can easily be grown in the open field for the production of cut flowers. It is also suitable for growing as intercrop in coconut gardens and orchards (Janakiram, 1997).

Its cultivation is becoming popular around the cities for its extensive use as, in making bouquets, buttonholes, for floral decorations and also for making garland. In ornamental gardening, it finds use as a bedding plant, edging pot plant and planting herbaceous border. The dwarf pompon and liliput are also suitable for edging and window boxes.

The commercial importance of china aster is increasing in India especially in Karnataka, Tamil Nadu, Andhra Pradesh, Maharashtra and West Bengal. It is estimated to be grown in an area of 1,983 hectares with a production of 19,034 tones of flowers in Karnataka (Anon., 2011). Its cultivation needs to be popularized in Karnataka as there is a tremendous scope for its usage.

There are many reasons behind the low average production of china aster crop. Among the many constrains in the way of aster production, nutrient management is of prime importance. Though nitrogen, phosphorous and potassium influence the production and quality of flowers greatly, the fertilizer recommendation (180:120:60 NPK kg/ha) is very high which reflects directly on cost of production (Anon., 1991) and also some adverse effect on physical, chemical and biological properties of soil, which is an incoming calamity faced by the agriculturists. Thus, any step leading to reduction of fertilizer doses is a boon to the farmers. The long-term use of chemical fertilizers tends to degrade the soil structure. Now a day, attention to biological fertilizer has been increased due to high price of chemical fertilizers.

Biofertilizers are live formulates of microorganisms (useful bacteria and fungi) that are ready to be used to improve the quality and the health of the soil and the plant species by increasing the nutrient availability for the soil and plants. Biofertilizers naturally activate the microorganisms found in the soil restoring the soil fertility and protecting it against drought and soil borne diseases and thus stimulate plant growth. Using biofertilizers that contain different microbial strains has led to a decrease in the use of chemical fertilizers and has provided high quality products free of harmful agrochemicals for human safety. Biofertilizers are products containing living cells of different types of microorganisms, which have an ability to convert nutritionally important elements from unavailable to available form through biological processes. Bio fertilization is considered an important factor in reducing the used rates of chemical fertilizers which appear to be safe for environment in terms of improving soil fertility and increasing soil productivity.

Inoculation of bacterial biofertilizers like Azospirillum and Pseudomonas increase yield when applied along with recommended doses of nitrogen. They may bring about biological
nitrogen fixation, phosphatesolubility, mineralization of nitrogen and transformation of several elements like sulphur and iron into available forms. In addition, they are eco-friendly, easily available and cost effective. By the addition of PSB, the unavailable form of P is converted to the available form, increasing P uptake and leading to increased yields.

Vesicular arbuscular mycorhizae inoculation improved the phosphorous uptake by the expanded hyphal network beyond the phosphorous depletion zone along with certain micronutrients. The soil fertility management practices involving judicious combination of biofertilizers and chemical fertilizers seem to be a feasible option for sustained production on a commercial and profitable scale. Therefore, in the present study emphasis is focused on the use of biofertilizers viz., Azospirillum, PSB and Arka Microbial consortia in combination with NPK in china aster cv. Poomima in order to assess the response in terms of vegetative growth, yield and quality of flower for cut flower purpose was taken up with following specific objectives.

1. To study the effect of NPK and biofertilizers on vegetative growth
2. To assess the effect of NPK and biofertilizers on yield and quality of cut flowers
3. To study the influence of NPK and biofertilizers on vase life
4. To workout the economics of china aster production