CHAPTER - I

INTRODUCTION

Mango (*Mangifera indica* L.) is one of the most important members of family Anacardiaceae under the order sapindales. India is the home of more than 1000 varieties of mango (*Chadha, 1999*). Most of them are result of open pollination arising as a chance seedlings. Some monoecious and polygamous flowers produce delicious fruits which are rich in amino acids, carbohydrate, fatty acids, proteins, vitamins, carotenoids, phenolic compounds and other dietary-antioxidants. Ripe mango fruits pulp contain as much vitamins A as butter.

Production of mango fruits is spread over in 111 countries of 5 continents, but India is still the largest producer. It is a cultural and religious symbol in our country and considered as “The king of all fruits”. It occupies an area of 2.30 million hectare with a production of 12.750 million tones of fruits. Mango shares 37.85 percent of the area and 18.62 percent of production of total fruit cultivation area and production respectively. Indian shares about 42.11percentage of total mango production of the world (*Indian Horticulture Database, 2011*).

Productivity of total fruits in Indian has become stable i.e. 11.2 tones/ha on the other side, post-harvest loss of fruits is still lying between 25 to 30percent. Productivity of mango is also declining since last three years (*Indian Horticulture Database, 2011*).

So, obtaining maximum profit will be served only if production is supplemented with the similar efforts to minimize post-harvest losses and to enhance the shelf life of mango fruits.

Therefore, a detail study on this aspect was undertaken to preserve the fruits in good condition during storage and ripening and to enhance the shelf life of mango fruits.

Mango fruits take 6-10 days to ripe under ambient temperature and become over ripe and spoiled within 15 days. A series of biochemical changes such as degradation of chlorophyll, biosynthesis of carotenoids, anthocyanins, essential oils and flavor components increase the activity of cell well degrading enzymes. It is initiated by autocatalytic production of ethylene which increase rate of respiration causing physiological, biochemical and organoleptic changes ultimately resulting into characteristic colour taste, aroma with desirable softening (*Tharanathan et al., 2006*).

In the harvesting season there is a glut of fruits in the market. In these days Farmers can’t get reasonable price. So, it becomes imperative to prolong the shelf life of the fruits in the best interest of farmer’s community and consumers as well (*Hayat et al., 2003*).
Although, India by and large, is the largest mango producing nation in the world, we export only a negligible proportion of fresh fruits. Negi (2004) reported that 37 percent of our highly perishable horticultural crops are wasted due to inadequate post-harvest management techniques and cold chain infrastructures which account for an annual loss of Rs. 23000 crore approximately. Export of fresh mango fruits can be increased by organized efforts aimed at systematic packing, pre-storage and Post-harvest treatments. Cold storage methods and selection of proper cultivars (Singh, 1996). An efficient post-harvest management plays a very significant role for future development of the fruit industry in this country.

The deterioration of fruits is mainly due to increase in respiration rate induced during ripening. Due to this, physiological and mechanical damage to the skin can’t be completely checked but it can be reduced by treating with respiratory inhibitors, waxing and wrapping. Post-harvest treatments such as dipping in hot water, fungicidal, solutions and by using modified packing. Such measures are also helpful in reducing the infection by micro-organism.

There are different methods of extending shelf life viz., pre-cooling, cold storage, controlled atmosphere storage and wax coating. In all these methods, the shelf life is extended by reducing the respiration rate and moisture loss of the fruits (Rajkumar et al., 2007).

Though, refrigeration is the principal method for prolonging the storage life of highly perishable mango fruits but existing cold storage facility is inadequate to accommodate the bulk of fresh fruits in the country. Therefore, some measures for improving the storage life of fresh fruits at ambient temperature is the crying need for the proper development of fruits industry and export potential.

Alphonso has been the single variety which is in high demand but in the recent past Dasehari and Chausa have been gaining popularity in the overseas markets, Shikamany and Sudha (2004). Presently only 0.60 per cent mango fruits are exported from India out of which maximum export is of Alphonso, followed by Dasehari. But the production of these two cultivars are very limited. Singh (1996) opined that none of the present commercial varieties of mango could be called perfectly and ideal type, as some of the desirable characters are lacking in every variety. To promote mango growing for export, we need a mango variety that could meet the challenge of the present day requirements.

Among the promising mango hybrids, Amrapali is most suitable variety for internal market and export. It has been developed at I.A.R.I. as a result of cross between Dasehari and Neelum released in 1978. It is precocious, distinctly dwarf, highly regular and prolific in bearing and hence, is most suitable for high density orcharding (Majumdar et al., 1982). The fruit quality of Amrapali, is favorably superior to its better parent Dasehari. It has high pulp percentage and total
soluble solids. The flesh is deep orange red and has about 2.5 to 3.0 times more β carotene content which indicates higher vitamin A. Besides, because of the attractive flesh colour, this variety is more suitable for export and processing industry. Under this condition the cultivar Amrapali has been selected for this investigation.

In India, some works have been done earlier for increasing the storage life of mango under room at ambient temperature. Waxing treatment of mango fruits effectively reduced respiration, delayed ripening and improved the storage life at 32.2°C-38.8°C. Singh et al. (1967) observed delayed ripening when mango fruits were packed in perforated polyethylene bags in combination with fungicidal wax coating and tissue paper with wax coating. Post-harvest treatment of fruits with growth regulators slows down the ripening process. Subramanyam et al., (1972) reported that shock treatment in hot water bath at 52 ± 1°C for 5 minutes was effective in reducing the microbial spoilage, accelerated ripening in several mango varieties. Thus, the present study was undertaken for increasing the storage life of mango fruits cv. Amrapali without affecting the quality of fruit at the post-harvest stage.

Hence, the present investigation entitled “Studies on physico-chemical changes and shelf life of mango (Mangifera indica L.) fruits cv. Amrapali” was undertaken with the following objectives:-

- To find out suitable measures for extending the storage life of mango fruits cv. Amrapali at ambient temperature.
- To observe the physical and bio-chemical changes in mango fruits cv. Amrapali during storage under different treatments.
- To assess the organoleptic acceptability during storage.
- To work out economic Feasibility of different treatments.