CHAPTER-I
INTRODUCTION

Sapota [Manilkara achras (Mill.) Forsberg] is commonly known as ‘Chiku’ in India. It is an evergreen tree and belongs to the finally sapotaceae and is native of tropical America especially the South Mexico or Central America. The chromosome number of sapota is 2n=26. It comprises of 40 genera and about 600 species, distributed in the tropics. In India, it was first introduced at Gholwad village of Dhanu Taluka in Thane district of Maharashtra state in 1898 (Chadha, 1992).

Popularity of this fruit is due to continuous fruiting throughout the year and very little incidence of disease and pest. Besides, this is quite hardy and can tolerate salinity to a very great extent. It is a crop of tropical region, need warm and humid climate. Sapota can be grown on a wide range of soil. The most ideal soils are deep alluvium, sandy loams, red laterites and medium black. It requires 125-250 cm annual rainfall and 11-34 °C temperature.

Fruit of sapota is a fleshy berry. The fully ripe fruit is delicious and sweet (content about 12 to 18 percent sugar) chiefly used for fresh table purpose. Generally, sapota is eaten as fresh fruit and possesses excellent qualities as dessert fruit, in ripe fruit the skin can also be eaten with flesh. The fruit impart a characteristic pleasant flavour, when blended with milk; therefore its fresh form and powder can freely utilized in many milk based products like ice-cream, milk shake and Indian sweets. "Chiku Halva” famous milk based Indian sweet prepared by sapota shreds. Fruit can also be used for preparing liquor and alcohol due to richness in sugar. The ripe fruits are used for squash but unripe fruit are astringent. It is an excellent preventive against bilious and febrile disease. The 100 g of sapota flesh contains 73.7 % water, 1.1 % fat, 0.7 % protein, 21.4 g carbohydrate, 28 mg calcium, 27 mg phosphorus, 2 mg iron and 6 mg ascorbic acid (Bal, 2006).

Sapota is mainly grown in India, Philippines, Malesia, Indonesia, Florida, Guatemala, Mexico and Sri Lanka. India is the largest producer of sapota in the world. In India the area under sapota cultivation is 106.0 thousand hectares (2.5 % of total fruit area) with 1286 thousand metric tonnes production (2.0 % of total fruit production) and 12.132 metric tonnes per hectare productivity (Anon., 2016).
Introduction

It is commercially grown in the state like Maharashtra, Gujarat Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Uttar Pradesh, West Bengal, Punjab, Haryana and some humid part of Rajasthan. In Gujarat, sapota cultivated in Bulsar, Gandevi, Navasari, Umbergam and Pardi talukas, although few plantations are seen in Chikli, Vansada and Dharampur talukas. In Saurashtra region of Gujarat, sapota cultivation carried out in Vanthli, Keshod and Veraval taluka. Gujarat have total are under sapota is 28.6 thousand hectare and 297.0 thousand metric tonnes production, (Anon., 2016). In India, Gujarat stand 3rd rank in both area and production after Karnataka and Maharashtra, it also stand 3rd rank in productivity after Tamil Nadu and Karnataka but productivity (10.4 MT/ha) is very less in comparison to Tamil Nadu i.e. 15.0 MT/ha. So, need to make concentrated efforts to decrease the high gap of productivity with Tamil Nadu for this particular fruit. Therefore, experiment is needed for increase the productivity. In this regards, the use of growth regulators is one step advanced and only way to boost up the production of existing orchards instead of cultural methods.

‘Kallipati’ is most planted cultivar in the Gujarat, and accounting about 99 per cent of acreage. Tree have spreading branches with broad, thick and dark green leaves. Fruit is oval shape, good quality, mallow flesh, sweet with mild fragrance. Each fruit contains 1-3 seed. Average yields are 160 kg per tree with fruit of medium size. It also appears to be the highest yielding cultivar of those tested in India (Chundawat and Bhuva, 1982) and therefore, will likely continue to be the most widely planted.

Area of this fruit in ascendancy due to high production per unit area and hardy nature of crop against biotic and abiotic stresses. Like any other crop, it also requires nutrition for healthy growth and good quality of fruits. This crop can also be grown across the country even in marginal and degraded lands with the good supplementation of fertilizers.

Continuous use of chemical fertilizers has hazardous effect on overall soil health. This has resulted in deterioration of soil physical and chemical properties resulting in stagnation in yield of the crop, and if the trend continues, will have disastrous consequences. In recent years, concept of integrated nutrient supply involving combined use of chemical nutrients with plant growth regulators is being
initiated to overcome the problem of deterioration of soil health and crop production as they are applied as foliar spray. Substitution of the fertilizer by plant growth regulators is the main strategy of integrated nutrient management.

Sapota is evergreen tree in continuous state of growth and production under warm and humid tropics. Therefore, health of sapota tree assumes special significance for the sustenance of vegetative growth and optimum production of high quality fruit. Like any other plants sapota also requires different nutrient elements for proper growth and yield.

The sapota tree flowers all the year round with two to three main flowering seasons in different agro climatic condition. In the case of chiku, maximum vegetative growth along with flowering takes place during October-November. The crop from July-August flowering matures in March-April, whereas crop of October-December flowering matures in the month of July-August when the price is comparatively remunerative.

Different groups of plant growth regulators like auxins, gibberellins and growth retardants at various concentrations have been reported to influence flowering, fruit set, retention development and quality characters of several fruit crops (Bhujbal et al., 2013). Among the various causes of fruit drop, the simplest one is decline in the level of endogenous auxins. Among the synthetic auxins tested in this regards, the NAA has been found to be the most effective in Sapota (Chavan et al., 2009).

In case of sapota, maximum vegetative growth along with flowering takes place during September-November. Therefore, it seems essential to suppress the vegetative growth with the help of growth retardant, which help to divert the major portion of metabolites towards flowering. The commonly used growth retardant cycocel is reported to be most promising in respect of growth retarding and flowering promoting effect (Chacko and Kohli, 1979).

Sapota produces a number of flowers throughout the year in different flushes. But flowers and fruits tend to drop in different stages of development right from its setting to maturity. However fruit drop at later stage of development drastically reduces the yield. In recent years considerable attention has been given to increase fruit set and to check fruit drop of many fruit crops with the help of plant growth regulators (Patil and Narwadkar, 1974).
The informations are lacking on this aspect under Saurashtra region of Gujarat. Keeping this in view, the present investigation entitled “Effect of plant growth regulators on flowering, yield and quality of sapota \textit{[Manilkara achras} (Mill.) Forsberg\textit{]} cv. Kalipatti” was proposed with the following objectives.

**Objectives:-**

1. To find out the effect of plant growth regulators on flowering and fruit set of sapota.
2. To find out the effect of plant growth regulators on yield and quality of sapota.
3. To find out economic feasibility of the treatments.