Medicinal plants play an important role in human life to fight diseases since time immemorial. The World Health Organization has estimated that up to 80% of people still rely on herbal remedies for their health care (Afolayan and Adebola, 2004). All the major system of medicine, such as Allopathy, Homeopathy, Unani and Ayurvedic, use most of the drugs obtained from plants. Most of these medicines are actually the byproducts of various processes of plants and each plant species produces its own characteristic chemicals. Medicinal properties of various plants have been described in ancient manuscripts like the Bible and the Vedas. In India the earliest reference of medicinal plants is available in the Rigveda, Atharvaveda, Charak Samhita and Sushruta Samhita. Sushruta Samhita deals with about 700 drugs, some of these were not found in India.

India is a land of about 17000 spp. of higher plants, out of which 7500 are known for their therapeutic uses (Kala et al., 2006). The diverse agro-climatic conditions in the country make it suitable for growing a wide variety of valuable medicinal plants. About 70% of country’s population is using plants for health care. Over the past few years, the medicinal plants have received a wide acceptance due to the faith in herbal medicine in view of its lower side-effects as compared to allopathic medicine. With increasing demand of herbal drugs in country, the Government of India has set up a national level body, the National Medicinal Plant Board (NMPB) for the growth and development of medicinal plants sector in the country. According to a report of National Medicinal Plant Board, New Delhi and Foundation for Revitalisation of Local Health Traditions, Bangalore (Ved and Goraya, 2007); In India, nearly 9500 registered herbal industries and a multitude of unregistered cottage-level herbal units depend upon the continuous supply of medicinal plants for manufacturing of herbal medicinal formulation based on Indian system of medicine. The annual demand of botanical raw drugs in the country was at 3,19,500 metric tonnes with annual turnover of Rs. 8,800 crores for the year 2005-06 (Ved and Goraya, 2007). Consumption of herbal medicines is widespread and increasing. According to World Health Organization, Global market size for herbal and medicinal plants is estimated at 14
billions US dollars per year and likely to increase more than 5 trillion US dollars in 2050 (Kala et al., 2006). With the passage of time, more and more plants with medicinal properties were brought to list, and at present more than 1500 species of plants are used in medicines. Among these, *Tinospora cordifolia* and *Buddleja madagascariensis* are two of the important plants used in various systems of medicine.

*Tinospora cordifolia* (Willd.) Miers ex Hook. f & Thoms. is a large, woody climber belonging to the family Menispermaceae. It is popularly known as Guduchi (Sanskrit), Giloya (Hindi) and Heart leaved moonseed plant (English). It is distributed throughout tropical India, Srilanka, Bangladesh and China, ascending to an altitude of 300 m. (Ishnava and Mohan, 2009; Sharma et al., 2010). The young stem is green, cylindrical and smooth. The mature stem has warts on surface, hanging aerial roots and peeling bark which is creamy-white. Leaves are petiolated, cordate and membranous (Plate 1). The flowers are small and yellow. The male flowers are clustered and female flowers are usually solitary. The fruits (drupes) are fleshy, ovoid, glossy, red, single seeded and pea-sized. The seeds are curved. Flowers grow during the summer and fruits during the winter.

Guduchi is widely used in Ayurvedic system of medicine. It is bitter in taste and astringent. Bitter principles present in the drug show anti-spasmodic, anti-pyretic, anti-inflammatory, anti-arthritis, anti-allergic and anti-diabetic properties (Anonymus, 1992; Singh et al., 2003). The principal constituents of creeper, stem and leaves are tinosporine, tinosporon, tinosporic acid, tinosporol, tinosporidine, tinosporide, perberilin, alfa-sitosterol, beta-sitosterol, cordifolone and heptacosanol (Khare, 2004). It is prescribed in case of general debility, diabetes, fever, jaundice, piles, skin diseases, chronic rheumatism, urinary disease, dyspepsia, gout, syphilis, gonorrhoea and leucorrhoea (Farooqi and Sreeramu, 2004). A kind of starch called Giloe-ka-sat, prepared from aqueous extract of dry stem is used as a tonic (Anonymus, 1992). The extract of its stem is useful in skin diseases (Singh et al., 2003). The root and stem of *T. cordifolia* are prescribed in combination with other drugs as an anti-dote to snake bite and scorpion sting (Singh et al., 2003). *T. cordifolia* is widely used in Indian Ayurvedic medicine for treating diabetes mellitus (Mathew and Kuttan, 1997; Prince and Menon, 1999; Stanely et al., 2001). *T. cordifolia* is reported to benefit the immune system in a variety of ways (Rege et al., 1993; Nagarkatti et al., 1994; Kapil and Sharma, 1997). A
dried extract of Guduchi is used as a powerful immuno-booster which helps in boosting the White Blood Corpuscles (WBC). T. cordifolia upregulate antitumor activity of tumor-associated macrophages (TAM) (Singh et al., 2005). A dichloromethane extract of Guduchi has been isolated which showed anticancer activity towards carcinoma mice. (Jagetia and Rao, 2006).

*Buddleja madagascariensis* Lam., also known as Smoke bush or Butterfly bush belongs to family Buddlejaceae. It is native to Madagascar. It is cultivated and naturalized in tropical areas of the world (Wagner et al., 1999). It grows wildly in Southern China, along the Mediterranean coast in France and Hawaii (Stuart, 2006; Wagner et al., 1999). In India, it is cultivated in gardens as an ornamental plant. It is a striking, fragrant ornamental shrub having medicinal importance which grows to heights of 2 to 10 meters (Plate 2). Leaves are usually opposite on the stem, narrow oval in shape with a tapered tip, margins entire, 7-12 cm long. The upper surface of leaf is glabrous while lower surface densely tomentose. Flowers are orange-yellow coloured, rich in nectar and often strongly scented. Individual flower arranged in groups at the end of a spike about 10-30 cm long. Fruits are small fleshy berries about 2-5 mm. in diameter. Fruit white to begin with, becoming bluish purple at maturity. The seeds are ellipsoid in shape, about 1mm long and are brown in colour.

Smoke bush has a great medicinal value. The leaves used to treat asthma, cough and bronchitis (Anonymus, 1992). A triterpenoid saponin- mimengoside B has been isolated from the leaves of this plant (Emam et al., 1997). A poultice of leaves of *B. madagascariensis* is used to aid the healing of wounds. Evidence from scientific studies suggested that water soluble compounds found in the leaves may play an active role in the promotion of wound healing. An aqueous infusion of leaves is taken for the treatment of liver diseases. The leaves show diuretic activity due to presence of the flavonoid and iridoid content (Romeo, 1999). Also, a dye is obtained from the flowers (Anonymus, 1992). Besides these medicinal values *B. madagascariensis* have an attractive spike (inflorescence) of scented orange colour flowers. So it is grown as a popular ornamental plant.

*T. cordifolia* suffers from poor seed set. Vegetative propagation by stem cuttings, though useful for propagation, is dependent upon weather conditions for proper growth (Kumar et al. 2003; Raghu et al. 2006). Also, conventional methods of propagation of
this plant have limited potential for large scale production. On the other hand, *B. madagascariensis* is not very common plant growing in the India and conventional methods of its propagation are very slow. So, due to their commercial importance, ornamental value and extensive use in medicine there is a need to develop rapid and reliable methods of propagation of Guduchi and Smoke bush plants.

Plant propagation by tissue culture is one of the possible approaches to overcome these problems. Plant tissue culture is the technique of growing plant cell, tissue and organ in an artificially prepared nutrient medium, semi-solid or liquid under aseptic conditions. It is based on the principle of totipotency. Plant tissue culture technique allows mass multiplication and propagation under aseptic conditions. Another advantage of this technique is that it is not dependent on the season for the availability of plant material. Tissue culture technique allows obtaining a large number of plants from limited source available. Also, it offers a viable tool for meeting the pharmaceutical needs.

**OBJECTIVES:**

Keeping in view the above mentioned problems and to develop a method of rapid multiplication of *Tinospora cordifolia* and *Buddleja madagascariensis* plants under *in vitro* condition work was initiated with the following objectives:
1. To study the regenerative potential of various parts of Guduchi and Smoke bush plant under *in vitro* conditions.
2. To study the effect of various growth regulators on the regenerative potential.
3. To find out conditions which will support maximum shoot multiplication.