Methodology:

**Collection, identification** and Authentication of Plant material collected from Patan District (Gujarat).

**Soil analysis** from plant collection site was conducted by Biochemical test method described by Jayaraman J., Chaturvedi R. and Sankar R. and also method described by Singh D. (1999).

**Pharmacognostical studies** like Powder analysis including macroscopical and microscopical studies, organoleptic evaluation and histochemical studies of plant. (Khandelwal et. al. 1996, Kokate C. *et. al.* 2005)

**Physicochemical analysis** like total ash, acid insoluble ash, water soluble ash and different soluble extractives values of plant part both stem and leaves were performed according to standard methods prescribed in Indian Pharmacopeia and also determined as per the WHO Guideline.

**Phytochemical investigation** of different plant extracts such as presence of alkaloids, glycosides, saponins, flavonoids, tannins, sterols, anthroquinones, triterpinoides, proteins, carbohydroxylates ect. were performed by method described by Harborne (1998) and Sazada *et al* (2009) and also Trease and Evans (2002).

**The confirmation and identification** of the presence of phytoconstitutes in plant *Tecomella undulata* were carried out by Thin Layer Chromatography (TLC) method described by Hildebert W and Sabine B (1996).

**Quantification of the primary and secondary metabolites** in selected plant part and *in vitro* developed plant using High Performance Thin Layer Chromatography (HPTLC).

**An assessment of genetic variability** among the mother plant and in vitro developed plant using Randomly amplified polymorphic DNA markers (RAPD) method described by Jindal *et. al.* (1992).

**The antimicrobial activity** of different plant extracts of both stem and leaves of *Tecomella undulata* were evaluated by disc diffusion method and agar well method as described by Langfeld.


Collection of explants like leaves, shoot apex node and internode excised from *Tecomella undulata*. 
Preparation of culture media Murashige and skoog’s (1962) basal medium was used for the micropropagation of plant supplemented with various hormone such as a-naphthalene acetic acid (NAA), 6-benzylaminopurine (BAP), kinetin (KIN), indole-butyric acid (IBA) and indole-acetic acid (IAA) in various concentration.

The sterilization of culture media and equipment were usually carried out in autoclave for 20 minutes at 121°C with 15 Psi (lb/inch2) nominal pressures.

Surface sterilization of explants, first plant was washed with tap water then treated with 2% aqueous solution of tween 80, followed by treated with 20% sodium hypochlorite for 2 minutes, 0.1% mercuric chloride, 5% H2O2 solution, sterile distilled water and then finally dipped into the 80% alcohol.

Induction of callus, various explants from the plant *Tecomella undulata* (Sm.) Seem. were inoculated in the tubes containing the MS medium supplemented with various concentrations of different growth regulators such as BAP, KIN, 2,4-D and NAA to check the effect on callus induction rate. The tubes with explants are kept into the growth room under the growth favorable conditions such as Light - 4000 lux, Temperature -25+_2°C, Relative humidity -50.

Plant regeneration from developed calli of internodal explants. BAP, 2,4- D and KIN alone and BAP and KIN also in combination with NAA were used for regeneration of plantlets from callus culture. The rooting response was observed on different concentration on IBA and IAA alone.