

1. Introduction

The Earth ecosystems containing an enormous mass of plants and animals upon which all other living forms are directly or indirectly dependent. Man's total dependence on it for his existence has been of vital importance. The necessities of life food, clothing, shelter, agriculture, medicine, etc. are supplied in great part by plants. As far as the ethnobotany is concerned it is worth studying.

A proper documentation of primitive knowledge is essential because the ethnic groups have acquired it by long experience and constant touch with the forest. They don't even have any written documents but impart the knowledge orally to next generation. However, the new generation is least interested in this knowledge.

However, most of the ethnobotanical studies appear to have been restricted among the tribals or urban people for recording their knowledge about plant wealth and search for new resources of edible plants, herbal drugs and other aspects of plants. The other three aspects and the urban populations have generally been left. Now a day the term ethnobotany applies to total inter-relationship between human beings and plants (Jain, 1986).

Moreover economic botanists and pharmacologists can utilize the documentation of ethnobotany/ethnomedicine means it is the only source of interrelationship between humankind and plants. Gujarat is situated in the Central Western part of India, with an area of 1, 96,020 Sq. Km. and about 1,600 km long coast. The Eastern hilly region is formed by Southern, Western and Northern extension of Aravalli, Satpura and Sahyadri (Western Ghat) Mountain ranges respectively.

Gujarat State can be divided into four major biogeographic zones viz. Semiarid, Deserts, Western Ghat Mountains and Mangrove rich Coastal belts. These four zones support a wide range of flora covering about 2200 species of plants (Anonymous, 1996). According to the classification of Forest Types by Champion & Seth (1968) the forests of North Gujarat have been placed under *Boswellia* forest (5/E2). Though the following three sanctuaries viz. Thol Bird Sanctuary in Mehsana

district, Jessore Sloth Bear Sanctuary and Balaram-Ambaji Wildlife Sanctuary in Banaskantha district are situated in North Gujarat.

As far as the floristic explorations are concerned, several botanists have intensively studied the North Gujarat region. Several taxonomists continued to survey many areas of Gujarat in length and breadth. Followings are of some important contributions; Plants of North Gujarat (Saxton and Sedgwick, 1918) and Saxton (1922), Flora of Visnagar Taluka-N. G. (Bharathi, 1959), contribution to the Flora of North Gujarat area (Yogi, 1970; Ant, 2000; Patel, 2001; Patel, 2002; Patel, 2002; Patel and Reddy, 2002).

Some parts still remain virtually unexplored or under explored (Bonny *et al.*, 1998). There was a considerable reduction in forest cover in North Gujarat, Panchmahals and Central Gujarat. 62 species of Angiosperms have been given different rarity status. Majority of them are distributed in the semi-arid regions (Chavan and Lal, 1998). However, drastic reduction in the vegetation cover has been noticed in the recent years due to extensive cutting of plants for timber, fuel, medicine and fodder.

1.1 *Anisomeles indica* (L.) O. Ktze.

Anisomeles indica (Lamiaceae/ Labiateae) (**Plate No.1, Photo.1 and 2**) is found all over steamy and subtropical region of India. The plant is used in a treatment in intermittent fever and essential oil used in uterine affection. (Kirtikar and Basu *et al.*, 1999; Anonymous *et al.*, 2003; Ushir *et al.*, 2010) The plant having properties like antipyretic, analgesic and anti-inflammatory activity, also acts as natural herbicide in wheat fields. (Dharmasiri *et al.*, 2000; Dharmasiri *et al.*, 2003; Ushir *et al.*, 2010). The leaves of plant also contain ovatodiolide diterpenoids and its derivatives. (Alam *et al.*, 2000; Ushir *et al.*, 2010)

Roots contain K-sitosterol, stigmasterol, fatty acids and paraffins. (Ushir *et al.*, 2010) Microorganisms have developed resistant to several antibiotics because of random utilization of the action of infectious diseases as antimicrobial drugs. There is certainly have to develop alternative antibiotics from medicinal plants. So, they require development of novel antibiotics from medicinal plants. (Ushir *et al.*, 2010)

1.2 *Boswellia serrata* Roxb. ex Colebr.

Boswellia serrata (Plate No.1, Photo.3, 4 and 5) is a deciduous tree in the Burseraceae family. It is native to Pakistan and India. *B. serrata* is same botanical Burseraceae family as the tree from which myrrh is harvested. In India, frankincense from the tree is called "salai guggal." On the average, the tree grows to about 9–15 m tall, with a trunk diameter of about 38–57 cm. It is found in altitudes of up to 1,150 m, although in India it usually occurs at an altitude range of 275–900 m. It grows in a range of yearly mean temperatures of 0–45°C. *Boswellia serrata*'s bark is greyish and peels off like paper. In India, *Boswellia serrata* flowers February–April and the tree's fruit ripens May–June. The flowers are white and each fruit produces three seeds.

Indian frankincense is used in the treatment of arthritis, osteoarthritis and lower back pain. Boswellic acids, which are aromatic, multi-ringed organic compounds found in Indian frankincense, contribute to frankincense's anti-rheumatic properties. Boswellic acids inhibit 5-lipoxygenase, an enzyme which enables the formation of leukotrienes, compounds that cause inflammation in various types of illnesses including arthritis, asthma, etc. The gum oleoresin consists of terpenoids, essential oils and gum. The active constituents in boswellia are terpenoid it contains boswellic acids. The extracts are containing 37.5–65% boswellic acids. Plant is used in the anti-inflammatory, anti-cancer activity and anti-arthritic.

The production of boswellic acids in plants belong to the genus of *Boswellia*. β -boswellic acid has fearful in apoptosis of cancer cells (Raja *et al.*, 2011). *Boswellia serrata* has also acted as an anti-arthritic, analgesic and anti-inflammatory (Ethan *et al.*, 2004). 3-O-Acetyl-11-keto-beta-boswellic acid (AKBA) is the active compound of *Boswellia* extract (Safayhi *et al.*, 1992; Sailer *et al.*, 1996).

Boswellia extracts which is act as a anti-arthritic and anti-inflammatory properties. (Joos *et al.*, 2006; Anthoni *et al.*, 2006; Gupta *et al.*, 2001; Kimmatkar *et al.*, 2003). Boswellic acids are pentacyclic triterpenic acids that active components of the plants have anti-inflammatory and anticancer properties which located at the periodontal resin. (Han, 1994; Jian-Jun *et al.*, 2006).

Boswellic acids are already useful for treating Crohn disease, bronchial asthma and arthritis (Safayhi *et al.*, 1991; Gupta *et al.*, 1997; Gupta *et al.*, 1998;

Gupta *et al.*, 2001; Gerhardt *et al.*, 2001; Kiela *et al.*, 2005; Jian-Jun *et al.*, 2006). Extracts from the periodontal glue of *Boswellia* trees has got recently been used medically as a modern treatment regarding the management of human brain tumors. (Winking *et al.*, 2000; Janssen *et al.*, 2000; Jian-Jun *et al.*, 2006; Streffer *et al.*, 2001).

The boswellic acids inhibited cellular explosion and also the apoptosis in mind cancer, (Glaser *et al.*, 1999; Winking *et al.*, 2000; Park *et al.*, 2002), leukemia (Han, 1994; Shao *et al.*, 1998; Hoernlein *et al.*, 1999; Jing *et al.*, 1999; Jian-Jun *et al.*, 2006), hepatoma, melanoma and prostate cancer cell lines (Liu *et al.*, 2002; Zhao *et al.*, 2003; Syrovets *et al.*, 2005; Jian-Jun *et al.*, 2006).

1.3 *Chlorophytum borivilianum* Sant. & Fernand.

The therapeutic possessions of quite a lot of herbal plants have been renowned in the research in Indian journalism and the arrangements found to helpful in the treatment of diseases. (Sampathkumar *et al.*, 2008; Sundaram *et al.*, 2011). Different antibiotics are available to cure different antibacterial diseases, but bacteria develop resistance against these antibiotics or they show side effects. (Pandey and Mishra *et al.*, 2010; Sundaram *et al.*, 2011).

In Indian system of ayurveda tubers of *Chlorophytum borivilianum* (**Plate No.1, Photo.6 and 7**) family liliaceae are very famous for its adaptogenic and aphrodisiac properties. About 256 species of this plant are found in world and all are comes under the name of safed musli. Among this *Chlorophytum borivilianum* has very great market demand. But such important medicinal plant has get attention of researchers just 2-3 years before and now it is extensively studied for its pharmacological and phytochemical aspects. (Deore *et al.*, 2008)

Safed musli is genus of regarding 200-220 species of recurrent flowering plants in the Liliaceae family, native to the humid and subtropical regions of Africa and Asia (Kaushik, 2005; Sundaram *et al.*, 2011). It is found in the oldest mountain ranges, presently known as the states of Gujarat, Rajasthan, Madhya Pradesh and the Central Deccan Plateau.

It is grow to 10-60 cm tall, with a rosette of long, 0.5-2 cm broad and slender leaves 15-75 cm long, thick growing, rhizome are fresh. The flowers are small and

white in some species the panicle also bears plantlets. Its tubers are used in Ayurvedic medicine.

Chlorophytum borivilianum contains about 30% alkaloids, polysaccharides (40 to 45%), Natural steroid saponin (10-20%), carbohydrates and proteins (5 to 7%) (Tandon *et al.*, 1992; Deore and Khadabadi, 2008; Mayank and Dixit, 2008; Sundaram *et al.*, 2011). These compounds are source of polysaccharides and have antioxidant, antibacterial, antiviral, antifungal, antistress, antihepatitis and hypolipidemic. (Li *et al.*, 1990; Sundaram *et al.*, 2011). The study of purpose of antimicrobial activities on medicinal plant provides in order on the diverse microorganisms' activity of *C. borivilianum* extract. (O'Donnell *et al.*, 2006; Chakraborty and Aeri, 2009; Sundaram *et al.*, 2011).

1.4 *Euphorbia hirta* L.

Euphorbia hirta (Euphorbiaceae) (**Plate No.1, Photo.8**), commonly known as *Dudhi* is an annual hairy plant. It is abundant in waste places along the roadsides and open grasslands. It is native to India and Australia (Rastogi and Mehrotra, 2002). The *E. hirta* have been reported to contain saponins, alkaloids, flavonoids, tannins phenolic acids and amino acids (Hore *et al.*, 2006; Mangathayaru *et al.*, 2007, Kandalkar *et al.*, 2010).

Conventionally, Plant is utilize in conjunctivitis, exhibits antipyretic, anthelmintic, antispasmodic, antibacterial, antifertility, antifungal, and antiinflammatory activities (Sood *et al.*, 2005; Elizabeth, 2002). Our literature survey revealed that there is no experimental evidence of antidiabetic effect of the plant. Therefore, the ethanolic and petroleum ether flower extracts of *E. hirta* influences lipid parameters in alloxan induced diabetic mice. (Kumar *et al.*, 2010) Molecular continues to be concerned within human illness including coronary heart failure, nephrotoxicity, lung illness, inflammation and also diabetes. (Gopinathan *et al.*, 2004; Kandalkar *et al.*, 2010)

Euphorbia hirta is a really small, particular come is actually slender as well as reddish in color, it may grow to an elevation regarding 40 cm, the younger parts cover with yellow bristly hairs, flowers are very small opaque in a circle clusters, greenish or reddish, oppositely arranged and 5 cm long leaves. The originate leaving create

white or even milky fruit juice any time reduce. The plants extract used in treatment of asthma, respiratory system inflammations, coughs, diarrhea and dysentery, wound healing. (Igoli *et al.*, 2005).

1.5 *Evolvulus alsinoides* L.

Evolvulus alsinoides (Convolvulaceae) (**Plate No.1, Photo.9**), commonly known as *Shankhpushpi* or *Shankhawali*. (Anonymous *et al.*, 2003; Akhtar *et al.*, 2009) It is well known for its therapeutic effect on brain disorders in Ayurvedic system of medicine. (Akhtar *et al.*, 2009)

E. alsinoides L. (dwarf morning glory) is a persistent herb, numerous, yearly, greater than 30 cm long branches, a small branched and tiny woody rootstock, hairs are long, slender and thin, small, total, base sensitive, wide, apiculate leaves. (Austuin *et al.*, 2008). *E. alsinoides* L. is used for support growth of hair, (Kirtikar and Basu *et al.*, 1999; Akhtar *et al.*, 2009), asthma, (Goyal *et al.*, 2005), antiulcer (Asolkar *et al.*, 1992, Akhtar *et al.*, 2009), adaptogenic, antioxidant, immunomodulatory.

The plant contains aliphatic fatty acids, hydrocarbons, sterols, and alkaloids: betaine, shankhpushpine and evolvine (Prajapati *et al.*, 2003; Akhtar *et al.*, 2009). An unidentified compound has been isolated (Goyal *et al.*, 2005; Singh *et al.*, 2008) Scopoletin, umbelliferone, scopolin, 2-methyl-1, 2, 3, 4-butanetetrol, oleic, 8-methyldecanoic palmitic, and heptadecanoic acids, (Cervenka *et al.*, 2004 and 2006, Singh *et al.*, 2008) 6-methoxy-7-O- β -glucopyranoside coumarin, caffeic acid have been reported from from the ethanol extract of *E. alsinoides*. (Gupta *et al.*, 2007; Singh *et al.*, 2008)

1.6 Virtual Screening

Virtual screening is a computational approach utilized inside medication discovery research. The *in silico* measurement of big ligand libraries associated with substance buildings in order to determine those structures almost certainly to stimulation to drug target, protein receptor or enzyme. (Rollinger *et al.*, 2008) Virtual screening the identify small novel molecule tthat bind to target protein that useful for recent step in drug discovery.(Seifert *et al.*, 2007)

Define virtual screening as “automatically evaluating large libraries of compounds” using computer programs. (Walters *et al.*, 1998).

1.7 Docking

In the field of molecular modeling, docking is a method which predicts the preferred orientation of one molecule to a second when bound to each other to form a stable complex. (Lengauer and Rarey, 1996) Knowledge of the preferred orientation in turn may be used to predict the strength of association or binding affinity between two molecules using for example scoring functions.

In the context of molecular modelling, docking means predicting the bioactive conformation of a molecule in the binding site of a target structure. (Blaney and Dixon, 1993) In essence, this is equivalent to finding the global free energy minimum of the system consisting of the ligand and the target. (Verkhivker *et al.*, 2000; Totrov and Abagyan, 1997) Docking is used as a tool in structure-based drug design as well as in SBVS.

The associations between biologically relevant molecules such as proteins, nucleic acids, carbohydrates, and lipids play a central role in signal transduction. Furthermore, the relative orientation of the two interacting partners may affect the type of signal produced (e.g., agonism vs antagonism). Therefore docking is useful for predicting both the strength and type of signal produced.

Docking is frequently used to predict the binding orientation of small molecule drug candidates to their protein targets in order to in turn predict the affinity and activity of the small molecule. Hence docking plays an important role in the rational design of drugs. (Kitchen *et al.*, 2004) Given the biological and pharmaceutical significance of molecular docking, considerable efforts have been directed towards improving the methods used to predict docking.

1.8 Objectives

1. To ethnomedicinal survey, collection, identification and authentication of the Plants
2. To select some wild medicinal plants from North Gujarat forest areas
3. To collect selected wild ethnomedicinal plants from North Gujarat forest areas
4. To extract the selected wild ethnomedicinal plants
5. To determine antimicrobial activity of the selected wild ethnomedicinal plants
6. To study of Quantitative Structure Activity Relationship (QSAR) by *in silico*.
7. To study of Molecular Docking by *in silico*.
8. To study of ADME (absorption, distribution, metabolism and excretion) by *in silico*.



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Plate. 1