Chapter 3.

Plant Description
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Sixteen plants belonging to different families were screened in the present study for their *in vitro* antimicrobial and antioxidant activities and phytochemical analysis. The descriptions of the plants with their therapeutic uses are given below (Anjaria *et al.*, 2002).

3.1 *Alstonia scholaris* R. Br.

**Vernacular name:** Sapta parni  
**Family:** Apocynaceae  
**Part used:** Flowers  
**Voucher specimen number:** PSN439  
**Constituents:** Bark; alkaloid (0.16-0.27%); dilamine, ecbitamine, ecbitenine, ecbicavatchin (amorphous yellow mass), Ecbicerin (acicular crystal), ecbitin (crystallized scales), ecbtein (rhombic prisms of crystallisable acid), ecbiretin (amorphous substance). Uncrystallisable bitter principle; ditain, flowers alkaloid picrinine, essential oil.  
**Action/uses:** Bark; acrid, bitter, heating, oleagenous, appetiser, laxative, anthelmintic, galactagogue, astringent, alterative, antiperiodic, febrifuge, carminative, stimulant, stromachic, powerful tonic, ophrodisiac. Used in: Bark; heart disease, asthma, leucoderma, chronic blood disease, pains, tumers, caries of teeth, chronic diarrhea, advanced stages of dysentery, leprosy, chronic peludism with enlargement of spleen, liver complaints. Milky juice; ulcers, earache, Tendar leaves; in beri-beri, dropsy, congested liver, roasted, pulverized and made into poultices; act as local stimulant to unhealthy ulcers, latex applied to ulcers, tumers and rheumatic swelling. Flowers yielding essential oil and alkaloid picrinine, acts as depressent on central nervous system. Ash of the plant is caustic and is used to open abscesses.  
**Commercial utility:** wood is used for making; packing cases, tea boxes, writing boards, laminated boards, plywood, veneers, match splint, inferior quality pencil, minor furniture and in paper industries. Wood charcoal is used for gun powder. Bark yields fiber which is used in paper industries.  
**Reports:** Chemopreventive effect (Jagetia *et al.*, 2003); acute and subacute toxic effects (Baliga *et al.*, 2004); broncho-vasodilatory activity (Channa *et al.*, 2005);
antineoplastic activity (Jagetia and Baliga, 2005); pharmacognostical studies (Khyade and Vaikos, 2009); antidiabetic and antihyperlipidemic activities (Arunmozhi et al., 2010; Bandawane et al., 2011); antiinflammatory and analgesic effects (Shang et al., 2010a); antitussive, antiasthmatic and expectorant activities (Shang et al., 2010b)

### 3.2 Ammannia baccifera L.

**Vernacular name:** Jal agio  
**Family:** Lythraceae  
**Part used:** Whole  
**Voucher specimen number:** PSN298  
** Constituents:** Resin, glucose and active principle  
**Action/uses:** Herb: Antityphoid, antituberculosis, Leaves: acrid, irritant and vesicant, used in rheumatism, ring worm and parasitic skin affections, leaves or the ashes of plant mixed with oil are applied to cure eruptions. Fresh plant is used in intermittent fever.  
**Reports:** Diuretic activity (Chunekar, 1969); antisteroidogenic activity (Dhanapal et al., 2005); antibacterial and phytochemical studies (Parekh et al., 2006; Parekh and Chanda, 2007a); antiinflammatory and antiarthritic activities (Gopalakrishnan et al., 2010).

### 3.3 Annona squamosa Linn.

**Vernacular name:** Sitaphal  
**Family:** Annonaceae  
**Part used:** Leaves  
**Voucher specimen number:** PSN1  
**Constituents:** Pulp: Moisture, reducing sugar; non reducing sugar, total sugars. Seeds: oil, resin. Seeds, leaves, immature fruit: acrid; Amorphous alkaloid, toxic resin. Bark: Anonaine alkaloid.  
**Action/uses:** Fruit: Sweet, tonic, flavorful, stimulant, expectorant cooling and sedative to heart. Ripe; maturant, unripe, astringent. Root; canthartic, drastic purgative, Seed; abortifacient, pediculocidal, detergent, powerful irritant. Bark; powerful astringent, vermicidal. Used in: Fruit: enriching blood, increasing muscular
strength, burning sensation, lessening tendency to biliousness, retrieving vomiting.
Seed: difficult to digest, cause fever and furunculosis, produces ulcers in eyes, destroys lice. Root: dysentery, depression of spirits and spinal diseases. Crushed leaf: tympany, gloat, foot and mouth disease, dewormer, dressing on wound with maggots. Leaf juice: in broken horn.

**Commercial utility:** Pulp of the fruit is dried and used as flavoring agent and also used in preparing confectionary items especially ice cream. Edible fruits are available in local market.

**Reports:** Molluscicidal property (Santos and Sant’Ana, 2001); antidiabetic activity (Shirwaikar et al., 2004); antimicrobial and cytotoxic activities (Rahman et al., 2005); hypoglycemic and antidiabetic effects (Gupta et al., 2005); vasorelaxant activity (Morita et al., 2006); *in vivo* antioxidant and antilipidimic potential (Gupta et al., 2008); adulticidal and larvicidal efficacy (Bagavan et al., 2009); *in vivo* genotoxic effect (Grover et al., 2009); analgesic and anti-inflammatory activities (Chavan et al., 2010); anthelmintic property (Kamaraj and Rahuman, 2011); antimalarial activity (Jonhs et al., 2011); hepatotoxicity (Uduman et al., 2011).

### 3.4 *Aristolochia bracteolate* Lam.

**Vernacular name:** Kidamari
**Family:** Aristolochiaceae
**Part used:** Whole
**Voucher specimen number:** PSN662
**Constituents:** Volatile substance, alkaloid and salt.

**Action/uses:** Purgative, emmenagogue, alternative, antiperiodic, anthelmintic. Used in; syphilis, gonorrhoea and skin diseases. Leaf juice applied on eczema. Decoction of root is used for expelling round worms.

**Reports:** Antiinflammatory activity and free radical scavenging study (Shirwaikar and Somashekar, 2003); wound healing study (Shirwaikar et al., 2003); antiallergic activity (Chitme et al., 2010); phytochemical analysis and antimicrobial activity (Parekh and Chanda, 2006a; Vaghasiya and Chanda, 2007; Kavitha and Nirmaladevi, 2009; Ashokkumar et al., 2010; Vaghasiya et al., 2011a).
3.5 *Cyperus rotundus* L.

**Vernacular name:** Shaiyo  
**Family:** Cyperaceae  
**Part used:** Aerial parts  
**Voucher specimen number:** PSN764  
**Constituents:** Essential oil, Myristic and stearic acid, unstable alkaloid, β-selinne, Cyperenone.  
**Action/uses:** Tuber: diuretic, emmenagogue, anthelmintic, stimulant, tranquilizer, antipyretic. Used in: stomach disorder, diarrhea, dysentery, irritation of intestines, muscular inflammation.  
**Commercial utility:** Used in Ayurvedic medicines. Used in perfumes and agarbattis.  
**Reports:** Antimalarial activity (Thebtaranonth *et al.*, 1995); diuretic effect (Sripandkulchai *et al.*, 2001); antimitagentic and radical scavenging activity (Kilani *et al.*, 2005); antidiabetic activity (Raut and Gaikwad, 2006); Na⁺, K⁺-ATPase inhibitory activity (Ngamrojanavanich *et al.*, 2006); antidiarrhoeal activity (Uddin *et al.*, 2006); acetylcholinesterase activity (Sharma and Gupta, 2007); antimicrobial, antioxidant, cytotoxic and apoptotic activities (Duarte *et al.*, 2005; Parekh and Chanda, 2006b; Kilani *et al.*, 2008); antioxidant and antiproliferative capacities (Kilani-Jaziri *et al.*, 2009); antiviral activity (Soltan and Zaki, 2009); antiproliferation effect (Liu *et al.*, 2010a); antiplatelet effect (Seo *et al.*, 2011).

3.6 *Digera muricata* (L.) Mart.

**Vernacular name:** Kanajaro  
**Family:** Amaranthaceae  
**Part used:** Whole  
**Voucher specimen number:** PSN646  
**Constituents:** α and β spinasterols found in plant  
**Action/uses:** Astringent, Diuretic. Used in: urinary discharge, urinary troubles.  
**Commercial utility:** Used as spinach as well as cattle feed.  
**Reports:** Nephrotoxicity (Khan *et al.*, 2009); *in vivo* antioxidant activity (Khan and Ahmed, 2009); antimicrobial activity (Mathad and Mety, 2010).
3.7 *Enicostema hyssopifolium* (Willd.) Verdon

**Vernacular name:** Mamejavo  
**Family:** Gentianaceae  
**Part used:** Whole  
**Voucher specimen number:** PSN470  
** Constituents:** Alkaloids, Gentiocrucine present  
**Action/uses:** The plant is bitter, acrid, thermogenic, digestive, carminative, stomachic, laxative, anthelmintic, anti-inflammatory, liver tonic, urinary astringent, depurative, revulsive and antiperiodic. Used in: dyspepsia, flatulence, colic, helminthiasis, abdominal ulcers, hernia, constipation, dropsy, swellings, vitiated condition of kapha and vata, hepatopathy, glycosuria, leprosy, skin disease, pruritis, intermittent fevers and malaise. The plant is applied on snake bite.  
**Commercial utility:** Used in Ayurvedic medicine  
**Reports:** Antidiabetic effect (Maroo et al., 2002; Murali et al., 2002; Maroo et al., 2003; Upadhyay and Goyal, 2004; Prince and Srinivasan, 2005; Srinivasan et al., 2005; Vaidya et al., 2009; Visheakarma et al., 2010); hypolipidaemic and antioxidant effects (Gopal et al., 2004; Vasu et al., 2005; Thirumalai et al., 2011); hepatomodulatory effect (Gupta and Singh, 2007); hepatoprotective effect (Baranisrinivasan et al., 2009); diabetic neuropathy (Bhatt et al., 2009); antimetaboloidal activity (Soni and Gupta, 2009); pharmacognostical standardization (Laxman et al., 2010); antiulcer and anti-inflammatory activity (Roy et al., 2010b); anthelmintic activity (Vidyadhar et al., 2010); antifungal activity (Gopal et al., 2011).

3.8 *Lagenaria siceraria* (Molina) Standl.

**Vernacular name:** Dudhi  
**Family:** Cucurbitaceae  
**Part used:** Aerial parts  
**Voucher specimen number:** PSN328  
**Action/uses:** *Lagenaria siceraria* is official in Ayurvedic Pharmacopoeia of India, and having composition of variety of essential phytoconstituents, so that *L. siceraria* fruits are traditionally used for its cardio
protective, cardio tonic, general tonic, diuretic, and aphrodisiac, antidote to certain poisons and scorpion stings, alternative purgative and cooling effects. It cures pain, ulcers, and fever and is used for pectoral-cough, asthma and other bronchial disorders. Extracts of the plant have shown antibiotic activity.

**Commercial utility:** Cultivated for its fruits and seeds. Fruits used as vegetable.

**Reports:** Antihyperlipidemic effect (Ghule et al., 2009); cytotoxic activity (Ghosh et al., 2009); anthelmintic activity (Smita et al., 2009); antioxidant activity (Jadhav et al., 2010; Rakholiya et al., 2011); cardioprotective effect (Mali and Bodhankar, 2010); antimicrobial activity (Chanda et al., 2010b).

### 3.9 *Launaea procumbens* (Roxb.) Ram. & Raj.

**Vernacular name:** Moti bhoipatri  
**Family:** Asteraceae  
**Part used:** Whole  
**Voucher specimen number:** PSN397  
**Action/uses:** Coolent, diuretic, demulcent. Used in: bonemarrow dysfunction, allergic affetions  
**Commercial utility:** Used as spinach, good fodder.  
**Reports:** Allelopathic potential (Shaukat et al., 2003); antimicrobial activity (Parekh and Chanda, 2006a; Parekh and Chanda, 2006b); nephrotoxicity (Khan et al., 2010); phytotoxic characterization (Khan et al., 2011b).

### 3.10 *Manilkara zapota* (L.) van Royen.

**Vernacular name:** Chiku  
**Family:** Sapotaceae  
**Part used:** Leaves  
**Voucher specimen number:** PSN429  
**Constituents:** Teraxerol, glucosides, glucose and quercitol isolated from leaves  
**Action/uses:** The seed are aperients, diuretic, tonic and febrifuge. Bark is anti-biotic, astringent and febrifuge. Fruits are edible, sweet with rich fine flavour. Chicle from
bark is used in dental surgery. Bark is used as tonic and the decoction is given in diarrhea and peludism.

**Commercial utility:** Chicle gum is used as base for chewing gum. The tannin of bark is used by fisherman for coloring sails and fishing tackles seeds yield a fat. Edible fruits are available in local market.

**Reports:** Antimicrobial and antioxidant activity (Nair and Chanda, 2008; Kaneria et al., 2009; Jamuna et al., 2010; Chanda and Nagani, 2010; Isabelle et al., 2010); analgesic activity (Jain et al., 2011); antitumor activity (Osman et al., 2011).

### 3.11 Momordica charantia L.

**Vernacular name:** Karela  
**Family:** Cucurbitaceae  
**Part used:** Aerial parts  
**Voucher specimen number:** PSN333  
**Action/uses:** Roots: Bitter, Acrid, astringent, ophthalamic; Leaves: Bitter, anthelmintic, antipyretic, emetic and purgative; Fruits: Bitter, acrid, thermogenic, depurative, vulnerary, stimulant, purgative, antidiabetic, carminative, digestive, stomachic, anti-inflammatory, fat loss, fever (malarial), galactagogue, gout, hydrophobia, hyperglycemia, jaundice, kidney (stone), laxative, leprosy, leucorrhoea, liver, piles, pneumonia, febrifuge and tonic. Its hypoglycemic activity has been reported in pulps, seeds and leaves *in vivo*. Bitter gourd fruit juice can stimulate glucose uptake of skeletal muscle cells.

**Commercial utility:** Cultivated for its fruits. Fruits used as vegetable as well as in ayurvedic, antidiabetic preparations, anticancerous, antiviral, antibacterial, digestive stimulant, hypoglycemic activity.

**Reports:** Immunosuppressive activities (Leung et al., 1987); antimitogenic activity (Guevara et al., 1990); anti-HIV and antitumor activities (Lee-Huang et al., 1995); antispermatogenic and androgenic activities (Naseem et al., 1998); antimalarial activity (Munoz et al., 2000); antiulcer activity (Yesilada et al., 1999; Gurbuz et al., 2000; Alam et al., 2009); larvicidal efficacy (Prabakar and Jebanesan, 2004); toxicity and antidiabetic activity (Batran et al., 2006); antifeedant activity (Bing et al., 2008); antioxidant activity (Parekh and Chanda, 2007b; Kubola and Siriamornpun, 2008; Wu and Ng, 2008; Liu et al., 2010b; Rakholiya et al., 2011); antiprotozoal and cytotoxic
activities (Mesia et al., 2008); antidiabetic activity (Kumar et al., 2008a; Tan et al., 2008a; Yuan et al., 2008a; Kumar et al., 2009; Nivitabishekam et al., 2009; Jarald et al., 2009; Gunjan et al., 2010; Chang et al., 2011b); antimicrobial activity (Braca et al., 2008; Nair and Chanda, 2008; Parekh and Chanda, 2008; Chanda et al., 2010b); antiinflammatory effect (Lii et al., 2009); antileishmanial activity (Gupta et al., 2010c); neuroprotective effect (Malik et al., 2011).

3.12 *Psidium guajava* L.

**Vernacular name:** Jamphal  
**Family:** Myrtaceae  
**Part used:** Leaves  
**Voucher specimen number:** SU/BIO/510/Thakrar

**Constituents:** Ascorbic acid, gallic acid, arginine, arban, citric acid, fructose, arabinose  

**Commercial utility:** Edible fruits are available in local market.

**Reports:** Antiamoebic activity (Tona et al., 1998); anti-diarrhoeal activity (Lin et al., 2002); antidiabetic effect (Oh et al., 2005); antiviral activity (Goncalves et al., 2005; Balasubramanian et al., 2007); antiproliferative activity (Manosroi et al., 2006; Kawakami et al., 2009); antigenotoxic activity (Bartolome et al., 2006); hepatoprotective activity (Roy et al., 2006; D’Mello and Rana, 2010; Taju et al., 2010); anticestodal activity (Tangpu and Yadav, 2006); antiinflammatory and cytotoxic activities (Kaileh et al., 2007); antimicrobial activity (Nair and Chanda, 2007; Fathilah et al., 2009); antistress activity (Lakshmi and Sudhakar, 2009); antiallergic effect (Han et al., 2011); antioxidant activity (Musa et al., 2011).
3.13 *Punica granatum* L.

**Vernacular name:** Dadum  
**Family:** Punicaceae  
**Part used:** Leaves  
**Voucher specimen number:** PSN311  
** Constituents:** The stem bark and fruit rind contain 22-25% tannin. The root bark has punicotannic acid 20-25%. There is a subtle substance in the root called pelletierine. The fruit contain 15% fructose.  
**Action/uses:** Root and Stem bark: astringent, cooling and anthelmintic. Flower: stypic. Fruits: sweet, sour, astringent, cooling, tonic, aphrodisiac, laxative, diuretic.  
**Commercial utility:** Edible fruits are available in local market.  
**Reports:** Antiulcer activity (Alkofahi and Atta, 1999; Ajaikumar *et al*., 2005); antidiarrhoeal activity (Das *et al*., 1999); antidiabetic activity (Huang *et al*., 2005a; Li *et al*., 2005; Bagri *et al*., 2009; Althunibat *et al*., 2010; Kaushik *et al*., 2010); antiperoxidative activity (Sudheesh and Vijayalakshmi, 2005); antiproliferative, apoptotic and antioxidant activities (Seeram *et al*., 2005); hepatoprotective property (Kaur *et al*., 2006a); antioxidant capacities and cytotoxicities (Okonogi *et al*., 2007; Mousavinejad *et al*., 2009; Stangeland *et al*., 2009; Kaneria *et al*., 2011); acute and subchronic toxicity studies (Vidal *et al*., 2003; Patel *et al*., 2008); antimicrobial activity (Nair and Chanda, 2005; Nair and Chanda, 2006; Al-Zoreky, 2009; Endo *et al*., 2010); antiviral activity (Haidari *et al*., 2009); antiplasmodial activity (Dell’Agli *et al*., 2009); cardiotonic activity (Awari *et al*., 2009); antimutagenic activity (Wongwattanasathien *et al*., 2010; Zahin *et al*., 2010); antiinflammatory effect (Lee *et al*., 2010); cognitive effect (Adiga *et al*., 2010); pharmacognostic and physicochemical study (Bapodara *et al*., 2011).
3.14 *Sapindus emarginatus* Vahl.

**Vernacular name:** Aritha  
**Family:** Sapindaceae  
**Part used:** Leaves  
**Voucher specimen number:** PSN131  
**Constituents:** Saponins  

**Action/uses:** The roots and bark are expectorant and demulcent. The fruits are acrid, bitter, thermogenic, emetic, astringent, expectorant, anthelmintic, abortifacient and tonic. The roots are good for hemicrania, hysteria and epilepsy. A decoction of the bark is good for cattle suffering from ulcers due to worm infestation after calving. Fruits are good for asthma, diarrhea, cholera, lumbago, verminosis and gastralgia due to dyspepsia.  

**Commercial utility:** Dry fruits sold in the market, used as soap.  

**Reports:** Antifertility and antiandrogenic activities (Venkatesh *et al.*, 2002); antibacterial activity (Nair *et al.*, 2005; Vaghasiya *et al.*, 2009); central nervous system activity (Srikanth and Muralidharan, 2009); antihyperlipidemic activity (Jeyabalan and Palayan, 2009); antioxidant property (Srikanth and Muralidharan, 2010); antimosquito activity (Koodalingam *et al.*, 2009; Koodalingam *et al.*, 2011).

3.15 *Syzygium cumini* L.

**Vernacular name:** Jambu  
**Family:** Myrtaceae  
**Part used:** Leaves  
**Voucher specimen number:** PSN295  
**Constituents:** Ascorbic acid, Gallic acid, Oxalic acid, Folacin  

**Action/uses:** The bark is astringent, sweet, sour, acrid, refrigerant, carminative, diuretic, digestive, anthelmintic, febrifuge, constipating, stomachic and antibacterial. The fruits are sweet, acrid, sour, tonic and colling. The bark is useful in diabetes, leucorrhoea, stomachaigia, fever, gastropathy, strangary and dermatopathy. The tender leaves are used for vomiting. The leaves are used for strengthening the teeth and gums. The fruits and seeds are used in diabetes, diarrhea, pharyngitis, splenopathy, urethrorrhoea and ring worm.  

**Commercial utility:** Edible fruits are available in local market.
Reports: Antiinflammatory activity (Muruganandan et al., 2001; Lima et al., 2007; Kumar et al., 2008b); antidiabetic activity (Oliveira et al., 2005; Kumar et al., 2008c); antigenotoxic activity (Bartolome et al., 2006); cytotoxicity (Krishnaraju et al., 2006); central nervous system activity (Kumar et al., 2007a); antileishmanial and antifungal activities (Braga et al., 2007); antiallergic activity (Brito et al., 2007); vibriocidal activity (Sharma et al., 2009); antimicrobial and antioxidant activities (Duraipandiyann et al., 2006; Khan et al., 2007; Oliveira et al., 2007; Acharyya et al., 2009; Ruan et al., 2008; Kaneria et al., 2009; Chanda and Kaneria, 2011); phytochemical screening and antibacterial activity (Gowri and Vasantha, 2010); antihyperglycemic and antihyperlipidemic effects (Villasenor and Lamadrid, 2006; Rekha et al., 2010b); nephroprotector activity (Adikay et al., 2010).

3.16 Terminalia catappa L.

Vernacular name: Deshi badam

Family: Combretaceae

Part used: Leaves

Voucher specimen number: PSN291

 Constituents: Bark rich in tannin. Fruits rich in ascorbic acid. Seeds contain oil and Vitamin B.

Action/uses: The fruit is bitter, sweet, acrid, cooling, astringent and aphrodisiac. Leaves are maturant and emollient. Bark is astringent, mild diuretic and having cardiotonic properties. Fruit is useful in biliousness, bronchitis and bowels. Juice of the leaves is used in the preparation of the ointment for scabies, laprosy and other cutaneous diseases and also useful in headache and colic. The root bark is given in dysentery and diarrhea. The bark cures billion fevers.

Commercial utility: oil yield from kernels is substituted for almond oil.

Reports: Genotoxicity (Chen et al., 2000); antidiabetic activity (Nagappa et al., 2003); antiinflammatory activity (Fan et al., 2004); chemopreventive effect (Chen and Li, 2006); antimetastatic effect (Chu et al., 2007; Yang et al., 2010); antioxidant and hepatoprotective activities (Chyau et al., 2002; Chyau et al., 2006; Kinoshita et al., 2007); antimicrobial activity (Kloucek et al., 2005; Nair and Chanda, 2008); toxicological effect (Ajayi et al., 2008); photodamage inhibitory effect (Wen et al., 2011).