2. Review of Literature

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. These range from autoimmune destruction of the β-cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. The basis of the abnormalities in carbohydrate, fat, and protein metabolism in diabetes is deficient action of insulin on target tissues (Whiting et al., 2011). Deficient insulin action results from inadequate insulin secretion or diminished tissue responses to insulin at one or more points in the complex pathways of hormone action. The vast majority of cases of diabetes fall into two broad etiopathogenetic categories. **Type 1 diabetes** (β-cell destruction, usually leading to absolute insulin deficiency) Immune-mediated diabetes. This form of diabetes, which accounts for only 5–10% of those with diabetes, previously encompassed by the terms insulin dependent diabetes (International Diabetes Federation, 2011; American Diabetes Association, 2010). **Type 2 diabetes** (ranging from predominantly insulin resistance with relative insulin deficiency to predominantly an insulin secretory defect with insulin resistance). This form of diabetes, which accounts for 90–95% of those with diabetes. Previously, it is referred as non–insulin dependent diabetes, type 2 diabetes, or adult-onset diabetes, encompasses individuals who have insulin resistance and usually have relative (rather than absolute) insulin deficiency. At least initially and often throughout their lifetime, these individuals do not need insulin treatment to survive (International Diabetes Federation, 2011; American Diabetes Association, 2010). Impairment of growth and susceptibility to certain infections may also accompany chronic hyperglycemia. Patients with diabetes have an increased incidence of atherosclerotic cardiovascular, peripheral arterial and cerebrovascular disease. Hypertension and abnormalities of lipoprotein metabolism are often found in people with diabetes (American Diabetes Association, 2010; Shaw et al., 2010).

Hyperlipidemia has been ranked as one of the greatest risk factors contributing to the prevalence and severity of coronary heart diseases. Coronary heart disease, stroke, atherosclerosis and hyperlipidemia are the primary cause of death. Hyperlipidemia is characterized by elevated serum total cholesterol, low density lipoprotein, very low density lipoprotein and decreased high density lipoprotein levels. “The main aim of
treatment in patients with hyperlipidemia is to reduce the risk of developing ischemic heart disease or the occurrence of further cardiovascular disease or cerebrovascular disease. The consumption of synthetic drugs leads to hyperuricemic, diarrhea, nausea, myositis, gastric irritation, flushing, dry skin and abnormal liver function” (Gunjan et al., 2011).

Free radicals are highly reactive and unstable compounds produced in the body during normal metabolic functions or introduced from the external environment such as pollution and cigarette smoke. Human bodies are protected from oxidative damage of free radicals through some complex defense systems which are called antioxidants. Antioxidants works to maintain the oxidant at optimum level and to reduce free radicals, stopping it from forming before it can disrupt living cells in our body. Excessive oxidants or free radicals can cause cell damage and lead to chronic diseases (Premanath and Lakshmidevi, 2010; Aris et al., 2009). Antioxidant vitamins may improve functions of immune system and may even delay some of the effects of aging. Unfortunately, the antioxidants produced naturally by the body are not enough to neutralize all of the free radicals in the body. Therefore, a constant supply of external source of antioxidants should be a part of one’s daily diet in order to reduce oxidative stress and related damage.

Oxidative stress reflects an imbalance between the systemic manifestation of reactive oxygen species and a biological system's ability to readily detoxify the reactive intermediates or to repair the resulting damage. Oxidative stress is thought to be linked to certain cardiovascular disease, since oxidation of LDL in the vascular endothelium is a precursor to plaque formation (Halliwell, 2007). The cause of these disease are multifactorial having not only genetic components but also inputs from hypertension, hypocholesterolemia, obesity and low physical fitness along with dietary, behavioral and environmental quarters. Researche on medicinal plants to the best nutraceuticals and drugs for prevalent diseases like diabetes, hypertention, ulcer and cancer are one of the leading areas of research globally. The search for specific constituents of plants and fuctional foods which are beneficial to our mental and physical health. Such plants have some medicinal properties thus used in prevention and treatment of various health ailments. Commiphora mukul and Bombax ceiba are the medicinal plants which have some bioactive components but are less familiar to the peopl
2.1. Commiphora mukul (GUGGUL)

*Commiphora mukul* belongs to the family of Burseraceae of class Magnoliopsida. In plant kingdom, guggul is paramount importance since ancient times because of its medicinal value in order to cure number of serious and chronic diseases in one or the other form.

2.1.1. SCIENTIFIC CLASSIFICATION

Kingdom: *Plantae*

Order: *Sapindales*

Family: *Burseraceae*

Genus: *Commiphora*

Species: *C. wightii*

Binomial name- *Commiphora wightii* (Arn.) Bhandari

Synonyms- *Commiphora mukul* (Stocks) Hook

2.1.2. SHOWING VERNACULAR NAMES OF GUGGUL

Guggul is known as Marudeshya because it is a plant which grows in arid zone. It is known as Ulukhala because it exudes a gum resin coming out of cavities. The resin is the best medicine, so it is known as Pura (Sharma *et al.* 2011). Guggul has its various names in different language as well as in some state its also has different name.

Different languages have its different name such as Arabic- Aflatan, Moql, Moqlearzaqi and Mukularabi. In Hindi - Gogil, Gugal, Guggul, Mukul and Ranghalturb. Marathi - Guggala, Gulag and Mukul. Persian – Boejahudan. Sanskrit - Bhavabhishtha, Bhutahara, Devadhupa, Deveshta, Dhurta, Divya, Durga, Guggulu, Jatala, Jatayu, Kalaniriyasa, Kaushika, Kumbha, Kumbhi, Kumbholu, Kumbholukalaka, Kunti, Mahishaksha, Mahishakshaka, Marudishta, Nishadhaka, Palankasha, Pavandvishta, Pura, Puta, Rakshoha, Sarvasaha, Shambhava, Shiva, Uddipta, Ulukhalaka, Usha and Vayughna.

In some state it is known by different name like in Bengal- Gugal, Guggul, Mukul and Ranghalturb Canarese- Guggala. Cutch – Gugal. Deccan- Gugal, Guggal, Mukul and Ranghaturb. Gujarat- Gugal, Gugali, Gugar, Guggul, Mukul and Ranghalturb.

2.1.3. DISTRIBUTION OF GENUS GUGGUL

In Indian sub-continent *Commiphora* species occur in India, Pakistan, Baluchistan etc. In India six species of *Commiphora* including C. wightii (Arn.) Bhand are distributed in South-Western India and parts of Central India which is represented by Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Maharashtra, Madhya Pradesh, Gujarat and Rajasthan states, besides stray occurrence in other states. In Rajasthan, it occurs in the districts of Jaisalmer, Jodhpur, Barmer, Sirohi, Pali, Nagaur, Sikar, Churu, Bikaner and Jhunjhunu.

2.1.4. MORPHOLOGY

The guggul plant prefers arid and semi-arid climates and is tolerant of poor soil, but is most common in Rocky tracks of Western India and Eastern Himalayas. It is slow growing, much branched and shrubby plant. It is 2 to 3 meter high with silvery and paper like grayish or grayish-brown bark peeling off in small pieces. The plant with branches spirally ascending spinescent with young parts glandular and pubescent. The leaves are simple or trifoliate, the leaflets ovate, 1–5 cm long, 0.5–2.5 cm broad, irregularly toothed. The individual flowers are red to pink, with four small petals. The ash-coloured bark of this tree flakes off roughly, as does the under bark found beneath. Stamens are alternately long and short. Fruits of this tree are drupe, ovate in shape with a two-celled store each with four valves. When ripe, the fruit is red in colour.

2.1.5. BIOACTIVE COMPONENTS OF GUGGUL

The active components in guggul are guggulipid, guggulsterones and plant steroids which act as a medicinal element for the cure of various diseases (Shishodia et. al.2008). The presence of guggulsterones in guggul differentiates it from other *Commiphora* species such as the two isomers, E and Z guggulsterones, from the ketonic fraction have pronounced hypolipidaemic and anti-inflammatory properties (Ramawat et. al.2008). The complex dry oleo-gum resin mixture includes steroids, sterols, terpenes, cembrenoids, flavones, tannins, ferrulates and lignans (Kulloli et. al. 2009).
Along with these compounds, some phytochemicals are present in guggul such as flavonoids, steroids, terpenes, phytosterols and tannins etc (Pradhan and Dash 2011). Fractionation of gum-resin is necessary for identification of individual bioactive components. The ethyl-acetate-soluble fraction (45%), known as guggulipid, has been shown to contain the bioactive principles. Gums, minerals and other ingredients form the insoluble portion (55%). Deng R. (2007) reported that additional fractionation of the neutral fraction leads to the isolation of a major non-ketonic fraction (88%, includes fatty acids, diterpenes and lignans) and a small ketonic (12%, includes most bioactive compounds, sterols and steroids) fraction. In addition, myrrhanol A and myrrhanone A are the other potential components for the anti-inflammatory effect of gum guggul (Kalshetti et. al., 2014, Shishodia et. al. 2007).

The seeds of \textit{Commiphora mukul} contain 9.8 ± 0.7% oil. The fatty acid composition and chemical properties of the extracted oil were determined. Gas liquid chromatography of the methyl esters of the fatty acids shows the presence of 46.62% saturated fatty acids and 51.40% unsaturated fatty acids. The fatty acid composition is as follows: acids such as capric 3.50%, myristic 14.51%, palmitic 6.68%, stearic 4.70%, arachidonic 3.18%, behenic 14.05%, myristoleic 1.34%, palmitoleic 12.07%, oleic 14.15%, eicosenoic 0.11%, linoleic 22.34% and alpha linoleic 1.37% (Patel et. al., 2009).

According to Priya nighantu, excess dose of Guggul leads to Klaivaya (impotency), Mukhshosh (dryness of mouth), Timira (cataract), Krishta (loss of weight), Murcha (vertigo) and Atisara (dysentery) etc. Guggul should not be used in patients with above complaints (Sushruta Samhita , 2007). Vridhha Vaghbhata describes that about 1 Tula of Guggulu may be consumed for Rasayan purpose.

2.1.6. THERAPEUTIC IMPORTANCE

2.1.6.1. Hypolipidaemic properties

It is known that guggulsterone isolated from the gum resin of guggul is a hypolipidaemic agent. Guggul extracts have been widely used as cholesterol lowering agents in Asian countries. Guggulsterone was proposed to enhance the rate of uptake of LDL by stimulation of LDL receptor-binding activity in the cellular membranes of hepatocytes. The lipid-lowering activity is also a result of direct stimulation of the
thyroid gland. Treatment with guggulipid in rats lowered serum triglycerides with a simultaneous increase in serum HDL levels (Sudhakara G. et al., 2015, Shishodia et al., 2008).

2.1.6.2. Cardioprotective properties
Cardioprotective benefits of guggul and its principle constituent, guggulsterone, have been studied. Both the isomers (cis and trans) of guggulsterone exhibit excellent cardioprotective activities. Treatment with a hydroalcoholic extract of guggul enhances cardiac function and ameliorated myocardial necrosis. This was evident from increased heart rate, reduced arterial blood pressure and improved left ventricular function. It was further considered that guggulsterone was responsible for the protective action of guggul (Muthulakshmi et al., 2012, Ojha et al., 2011, Ojha et al., 2008).

2.1.6.3. Anti-cancer properties
The anti-carcinogenic effects of guggulsterone have been well-studied. Guggulsterone has been found to modulate various steps of cancer. Induction of apoptosis and repression of proliferation, invasion, angiogenesis and metastasis are the mechanisms of anticancer activity. Inhibition and suppression of the molecular targets are specifically responsible for its anticancer activity (Bharti et al., 2015, Xiao M. and Xiao D. 2012, Leeman-Neill et al., 2009).

2.1.6.4. Anti-obesity properties
The effect of guggulsterone was resolute on apoptosis, adipogenesis and lipolysis. Results showed that guggulsterone isomers exert antiobesity effects. Both cis- and trans-guggulsterone showed an increase in apoptosis with simultaneous increase in dose (Yadav anad Chaudhary, 2015, Reddy et al., 2014, Verma and Paraidathathu, 2014, Bujjirao and Kumar 2013, Yang et al., 2008, Rayalam et al., 2007).

2.1.6.5. Anti-diabetic properties
Sharma et al.,(2009) reported that a hypoglycaemic role of guggulsterone used against diabetes. Due to the insulin-sensitizing activity of PPARg, guggulipid showed improvement in glucose tolerance in female Lepob/Lepob mice (Cornick et al., 2009).
2.1.6.6. Anti hyperglycemic properties
Administration of alcoholic extract of guggul at a dose of 200mg/kg may reduce the plasma glucose levels in streptozotocin-induced diabetic rats (Bellamkonda et al. 2011). A study showing effect of guggulsterone isolated from guggul in high-fat diet induced diabetic rats and has also conducted the different biochemical parameters which clearly demonstrated the hypoglycemic effect. The results suggest that guggulsterone has hypoglycemic effects which can help in cureing type II diabetes (Sharma et al. 2009).

2.1.6.7. Neuro-protective properties
The neuroprotective effects of guggulipid have been studied in drug-induced memory deficit rat models which show a dose-dependent improvement in scopolamine-induced deficits in rats. This antidementia activity can be attributed to antioxidant and anticholinesterase enzyme (AChE) activities of guggulipid (Saxena et. al., 2007). The study demonstrates that the guggal gum resin is a potent neuroprotective agent against oxidative damage induced under diabetes (Sudhakara et.al., 2012, Gowrishankar et. al., 2008).

2.1.6.8. Anti-inflammatory and antioxidant properties
Chaudhary G. (2012) suggests that the anti-inflammatory activity of guggul has been attributed to its principle phyto constituents, the guggulsterones. It is believed to play a significant role at every stage of atherosclerosis. These results suggests the anti inflammatory potential of gum guggul. The alcoholic extract of guggul exhibits the antioxidant property (Bellamkonda et al. 2015).

2.1.6.9. Anti- microbial properties
The volatile oil of guggul was found to be highly effective against Rhyzopertha dominica which suggested its role as a fumigant. The ethanolic extract of guggul exhibited best antibacterial activity against multidrug-resistant Klebsiella pneumonia (Sharma et. al.2010). An active compound of methanolic extract of guggul gum possessed significant antibacterial activity against Gram-positive bacteria and moderate activity against Gram-negative bacteria (Goyal et.al.2010, Ishnava et. al., 2010).
2.1.6.10. Rheumatoid arthritis
Rheumatoid arthritis is a type of chronic inflammatory disease of the joints. Pathophysiology of rheumatoid arthritis often leads to penetration of inflammatory cells into the synovial joints causing chronic synovitis and destruction of cartilage. The fraction containing gum guggal in the experimental arthritis decreased the thickness of joint swelling during the course of drug treatment. (Upadhaya and vaidya, 2014, Karan et. al., 2012, Lee et. al., 2008, Khanna D. et al., 2007).

2.1.6.11. Bone resorption
Bone diseases are commonly seen in the ageing stage. Diseases such as osteoporosis, osteoarthritis and cancer-induced bone-loss coupled with increased bone resorption are commonly observed among the elderly and cancer patients. The study conducted on the efficacy of guggul against osteoarthritis (Ichikawa and Aggarwal, 2006).

2.1.6.12. Inflammatory bowel disease
“Inflammatory bowel disease (IBD) is a group of chronic inflammatory disorders of the gastrointestinal tract. This progressive and relapsing disease of the colon and intestines manifests itself as either Crohn’s disease (CD) or as Ulcerative colitis” (Mencarelli et. al., 2009). Use of guggulsterone in targeting the attenuation of murine colitis could be looked upon as a therapeutic treatment of IBD (Cheon et. al., 2006).
Figure no.-1. The tree of *Commiphora mukul* (Guggul) and its bark and seeds

Figure no.-2. The tree of *Bombax ceiba* (Semal) and its bark and seeds
2. Bombax ceiba (SEMAL)

*Bombax ceiba* is also known as Bombax malabaricum) an important medicinal plant of tropical and subtropical in India commonly known as Silk Cotton Tree or Semal which is belongs to the family Bombaccaceae of the class Magnoliopsida. It is commonly known as Simbal, Simul, Indian kapok, Katsavar, Purani, Pagun, Roktosimul, Indian bombax or Red Silk cotton (Chakraborty *et. al.* 2010). Semal has gummy resin which is obtained from the bark. It is dried and sold as 'semul-gum'or 'mocharas'. It is a tall deciduous tree, with straight butteres shed trunk and wide spreading branches. Almost every part of this plant is used as medicine for curing maximum number of ailments (Wahab *et. al.*, 2014).

2.2.1. SCIENTIFIC CLASSIFICATION

Kingdom: - *Plantae*

Division : - *Angiosperms*

Class : - *Eudicoids*

Order : - *Malvales*

Family : - *Malvaceae*

Genus : - *Bombax*

Species : - *B. ceiba*

Bombax ceiba Linnaeus belongs to the family Bombaccaceae which contains about 26 genera and nearly 140 pantropical species. It is widely found in temperate Asia, tropical Asia, Africa and Australia. In India, it can be found at altitudes upto 1500 m. In peninsular India, the tree is very common in the dry as well as moist deciduous forests and near rivers.

2.2.2. MORPHOLOGY

The tree forms a straight bole with horizontal or upward branches that grow in regular whorls, tier above tier, like a gigantic upside down candelabrum. The red silk-cotton has a medium growth rate and grows up to 100 feet tall. The trunk and branches are usually covered with conical thorns especially when young. Thorns on older trees are often absent. The tree often forms buttress roots but they are not as pronounced or as massive as those of Ceiba pentandra. Leaves are palmate and up to 24 inches long. The petioles are longer than the leaflets. Sometime in January or February the tree begins to
drop its leaves in preparation for flowering. The flowers begin appearing when the tree is deciduous or nearly so. The flowers are 6 to 7 inches long and are up to 7 inches wide. They are borne solitary or in clusters at or near the ends of the branches. Releafing is completed as the fruits develop and begin to open on the tree. The fruits are large, up to 6 inches long, ovoid, pointed, woody capsules, filled with silky hairs. In April and May the pods split open (dehiscent) on the tree and disgorges quantities of silky cotton in which small brown seeds are imbedded. The bursting pods cover the neighborhood with drifting floss and are carried far by the winds. Propagation is by seeds, large cuttings or by air layering (Brown) (Stephen, 2011).

2.2.3. BIOACTIVE COMPONENTS

The active components present in semal are ‘lupeol (Islam et. al. 2011), β-sitosterol and sesquiterpenes’ (Jain et.al. 2011), beyond these components semal contain many other bioactive components in their various parts which are beneficial for curing diseases. **Root**- The phytochemical studies on the root of semal afforded n-triacontanol, β-sitosterol and a new glycoside. It is identified as 5,7,3,4 tetrahydroxy-6-methoxy flavon-3-O-β-D glucopyranosyl -D-xylotyranoside sesquerpenoids, isohemigossopol-1-2-dimethyl ether, 8-formyl-7-hydroxy-5-isopropyl-2-methoxy-3-methyl-1, 4-naptha quinine, 7-hydroxy cadaleve. New sesquerpenene lactone, 6-dihydroxy-3-methyl 5-{1-methyl ethyl 1-7- methoxy naphthalene-8-carboxylic acid (8→1)} lactone were isolated. Root bark was reported to yield lupeol, β-sitosterol and a napthoquinone (Zhang et. al. 2007). **Stem bark**- It was reported that the bark contain lupeol and β-sitosterol. The presence of flavonoides, glycoside, sterol and terpenoids was also reported in the stem bark (Bairwa et. al. 2011). **Flower**-Chemical constituents in the flowers of semal were polar methanol fraction afforded seven flavones: vicenin 2, linarin, saponarin, cosmetin, isovitexin, xanthomicrol and apigenin. It also shows a presence of “β-D- glucoside of β-setosterol, free β-setosterol, hentriacontane, hentriacontanol, kaempferol, quercetin and trace of an essential oil. A polysaccharides consisting of D- glucose, L-arabinose and L-rhamnose” was isolated of the dried stamens of the flower. The fresh petals of flower were reported to yielded two anthocyanidine glycoside named A and B (El-Hagrassi et. al. 2011). **Seeds**- It contain n-hexacosanol, palmitic acid, octadecyl palmitate, gallic acid, tannic acid, 1-gallayl-β-glucose, ethyl gallate and a mixture of α, β-and γ- tocopherol. The oil from the seeds
were found to contain 94.5 percent mixed fatty acid composed oleic acid as a major constituent, along with myristic, palmitic, arachidic and linoleic acid (Stauffer Eric, 2005). Leaves- It contain crude protein, crude fiber, calcium, and phosphorous. Shamimin isolated from semal leaves (Faizi et al. 2006).

**2.2.4. THERAPEUTIC IMPORTANCE**

**2.2.4.1. Hypotensive activity and Hypoglycemic properties:** Rehman et al. (2010) had reported the hypoglycaemic effect of semal root bark extract in normal and alloxan induced diabetic rats. The blood glucose level of treated groups of rats showed significant reduction after 7 weeks of treatment with semal root bark extract. By statistical analysis of results it was found that semal root bark extract has hypoglycaemic effect in normal and alloxan induced diabetic rats (khan et al., 2015).

**2.2.4.2. Hypolipidaemic properties:** Hypoglycaemic and hypolipidaemic effects of feed prepared with semal leaves have been investigated in alloxan induced diabetic rats. The result demonstrates that semal leaves at moderate concentrations, exert both hypoglycaemic and hypolipidaemic effects in alloxan induced diabetic rats in a dose dependent fashion. Therefore, semal leaves could be of importance in the treatment of diabetes and its associated complications such as coronary artery disease (Aloke et al. 2011).

**2.2.4.3. Anti-Inflammatory properties:** In order to clarify the pharmacological effects of bark, xylem of stem and root of semal, anti-inflammatory and liver protective effects were evaluated (Hossain et al., 2013, Kumar Sampath 2011).

**2.2.4.4. Anticancer and Anti-HIV properties:** Methanolic extract of leaves and pure compounds mangiferin and acetyl derivative of mangiferin were evaluated in anticancer and anti-HIV activities. All the samples were evaluated to be inactive as cytotoxic and as anti-HIV agents (Nam et al. 2003)

**2.2.4.5. Anti-ulcer properties:** Anti ulcer activity on methanolic extract of semal roots on ethanol induced ulcer and Pylorus ligated induced ulcers in rats. The result indicated a dose-dependent anti-ulcerogenic activity in semal roots (Bhushan et al. 2011).
2.2.4.6. Hepato-protective properties: - Hepato-protective activity of methanolic extract of flowers of semal was investigated aligned with hepatotoxicity produced by administering a combination of two anti-tubercular drugs Isoniazid and Rifampicin. (Ravi et al. 2010). The protective activity of ethyl acetate fraction of methanol extract of stem bark of semal against paracetamol-induced liver damage in rats (Bairwa et. al. 2011).

2.2.4.7. Analgesic and Antioxidants properties: - Mangiferin, 2-beta-D-glucopyranosyl-1,3,6,7-tetrahydroxy-9H-xanthen-9-one, obtained directly from methanolic extracts of semal leaves in substantial amounts demonstrated strong antioxidant activity using DPPH assay comparable to rutin, commonly used as antioxidant for medical purposes. It displayed significant analgesic effect in acetic acid – induced writhing and hot plate test in mice (Patil and Bhaskar, 2006).

2.2.4.8. Cholinesterase properties: - Leaf and stem bark of the seedling were screened for cholinesterase activity. The activity was observed only in leaf (Taiwo et al. 2010).

2.2.4.9. Antimicrobial properties: - Methanol extract of semal was assayed for their activity against multi-drug resistant Salmonella typhi. Strong antibacterial activity was showed by the methanol extract of semal (Ananda raja gopal et. al., 2013).

2.2.4.10. Anti-Helicobacter Pylori properties: - Ethanolic extracts of semal evaluated strong anti- Helicobacter pylori activities. The minimum inhibitory concentration values of the anti- Helicobacter pylori activity given by the ethanolic extracts ranged from 0.64 to 10.24 mg/ml (Yuan and Tung, 2005).

To sum up, all the plants, herbs, shrubs and arid zone plants are evolutionary companions of human beings. They contain an array of compounds which individually or in combinations have therapeutic and health enhancing properties. Such plants contain substantial amount of antioxidant and phytochemicals compounds that can be used to scavenge the excess free radicals from human body. Many medicinal plants are used to prepare pharmaceutical drugs and many more drugs are also prepared by using active components of plants. World’s 80% people uses plants as medicine varying from minor to severe discomfort and diseases. The intake in the human diet of antioxidant
and phytochemical compounds that ameliorate the biological mechanism can prevent and in some cases, help in the treatment of various diseases. Therefore, it become important to explore the effectiveness of different parts of plants to prevent and manage diseases of chronic and degenerative kinds with diabetes mellitus, coming with forefront of all such diseases.