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A REVIEW ON HYPOGLYCAEMIC ACTIVITY OF DIFFERENT EXTRACTS OF VARIOUS MEDICINAL PLANTS

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ABSTRACT: Diabetes mellitus is the common metabolic disorder seen in 2.8% of the world's population. It is expected to cross 5.4% by 21st century. It is one of the causes of death in this 21st century. Since many years, herbal medicines are used as a source of medicine in Ayurveda and also in some traditional systems of medicine. Ayurveda and other traditional systems have textual evidence about the uses of medicinal plants to cure various types of diabetes in human beings. Thousands of plant species has shown the therapeutic efficacy to control diabetes. As the usage of natural medicinal plants can have lesser side effects when compared with the synthetic drugs. This review mainly aims to know about various plant species in India and all around the world that are used in curing Diabetes Mellitus.

INTRODUCTION: Diabetes is a global health problem. In recent years, an estimated 3.4 million people died due to risk of diabetes. The WHO predicts that the number of deaths due to diabetes will be doubled by 2030. Diabetes mellitus is a metabolic disorder [9] characterised by major defect in hyperglycaemia or glucose metabolism, de arrangement in fat and protein metabolism. It mainly affects the nerves and blood vessels. It affects due to defect in insulin secretion or action of insulin which continuously leads to chronic diabetics which shows secondary manifestations by affecting eyes, kidneys and heart. It also leads to the cause of various diseases to various parts of our body. This requires treatment and some changes in human life styles.

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Diabetes is mainly of two types.

Type-1: It is Insulin Dependent Diabetics Mellitus[1] or Juvenile onset diabetes. It is seen in 5-10% of diabetic patients. It is recognized as an auto immune disease where beta cells are destroyed by antibodies, hence pancreas cannot secrete insulin. So, it requires insulin exogenously. Symptoms include thirst, hunger, weight loss, fatigue, frequent urination and diabetic ketoacidosis.

Type-2: It is Non-Insulin Dependent Diabetes Mellitus or adult onset diabetes[15]. It occurs due to development of insulin resistance in the body and to a state where pancreas decreases its ability to produce sufficient amount of insulin required for the body. Insulin resistance is a state where the body does not utilize the secreted insulin properly. Insulin resistance associates with various physiological factors like hyper coagulation, obesity, dislipideamia, hypertension, hyperinsulinemia, all physiological together called the metabolic syndrome. This can be cured by giving anti-hyperglycaemic agents.

Gestational diabetes:
This type is rarely seen during pregnancy. It occurs in women who are not having the family history of diabetes. It requires treatment to avoid complication in the infant and also to control the hypoglycaemia.

There are many synthetic drugs to cure diabetics but they have undesirable side effects [10]. Alternatively herbal formulations are preferred as they are safe and cheap when compared to synthetic oral hypoglycaemic. These herbal formulations may delay the development of diabetic complications. Plants are a potential source for hypoglycaemic agents, as proved by Ethno botanical information reports stating that nearly 800 plants possess anti-diabetic activity. This review represents the profile of Indian plants commonly used, which has been pharmacologically proven to be effective hypoglycaemic agents, as represented in **Table 1**.

TABLE 1: LIST OF PLANTS AND THEIR EXTRACTS CONTAINING ACTIVE CONSTITUENTS POSSESSING ANTI-DIABETIC ACTIVITY [13, 14, 16]

S. no	Common name	Botanical name	Family	Part of the plant	Name of the extract	Active Constituents
1.	Ladies finger	*Ablemoschus esculentus*	Malvaceae	Fruit	Aqueous	Flavanoid glycoside quercetin, coumarin scopoletin
2.	Pindrow-Fir	*Abies pindrow*	Pinaceae	Whole plant	50%Ethanolic	Terpenoids, flavonoids, ligans
3.	Tailsapatri	*Abies spectabilis*	Pinaceae	Leaves		Terpenoids, flavonoids, ligans,together with minor constituents of phenols, steroids
4.	Chinese bell flowers	*Abutilon indicum*	Malvaceae	Leaves	Alcoholic	A(1) and -N-(1-methoxy carbonyl-2-phenylethyl)-4hydroxybenzamide (2)
5.	Babul	*Acacia Arabica* [1]	Mimosaceae	Stem bark and seeds		Arabin
6.	Catechu	*Acacia catechu*	Mimosaceae	seeds	50% Ethanolic	Catechuic acid, catechu tannic acid, catechu red, quercetin, catechin, epi catechin
7.	White babbul	*Acacia leucophloea*	Mimosaceae	Bark		Flavonoids, triterpenoids
8.	Black wattle	*Acaacia melanoxylon*	Mimosaceae	Whole plant	50% Ethanolic	Quinones
9.	Babul	*Acacia nilotica*	Mimosaceae	Bark		Alkaloids, flavonoids, glycoside
10.	White catechu	*Acacia polyacantha*	Mimosaceae	Whole plant		Saponins, catechu tannins, mucilages, flavonoids, anthocyanins
11.	khor	*Acacia Senegal*	Mimosaceae	Gum		Tannins, saponins, sterols
12.	Kuppi	*Acalypha ciliate*	Euphorbiaceae	Root		Quinine, sterols and cyanogenic glycosides
13.	Prickly chaff flower	*Acaranthes aspera* [1]	Amaranthaceae	Whole plant		Triterpenoid, saponins, ecdysterone
14.	Indian Aconite	*Aconitum ferox*	Ranunculaceae	Root		Pseudoaconitine

15.	Peacock's tail	*Actinipterus radiate*	Actinopteridaceae	Whole plant		Hentriacontane, hentriacontanol, β-sitosterol
16.	Thali	*Actinodaphne malabarica*	Lauraceae	Leaves		
17.	Malbar nut	*Adhatoda Zeylanica*	Acanthaceae	Leaves		Pyrroloquinazoline, alkaloid- Vasicine
18.	Rock Fern	*Adiantum Capillis*	Adiantaceae	Whole plant		Astragalin, isoquercitin, nicotiflorin, Kaempferol-3-glucorinide, rutin, querciturone
19.	Venus hair	*Adiantum caudatum*	Adiantaceae	Leaves		Triterpenoids, flavonoids, phenyl propanoids, alicyclic acids
20.	Vahrishikhaa	*Adiantum incisum*	Adiantaceae	Whole plant	50%ethanolic	Tannins, alkaloids, Saponins
21.	Bael tree	*Aegle marmelos* [1]	Rutaceae	Leaves	Aqueous	
22.	Priyangu	*Aglaia diepenhorstii*	Meliaceae	Fruits		
23.	Agrimony	*Agrimony eupatoria* [1]	Rosaceae		Aqueous	
24.	Tree of heaven	*Ailanthus integrifolia*	Simarubaceae	Stem bark	Ethanolic	Ailanthone
25.	Ankola	*Alangium Salvifolium*	Alangiaceae	leaves	Methanolic, 50%ethanolic	Alkaloids, ankorine, marckidine, marck
26.	Black siris	*Albizia chinensis*	Mimosaceae	seeds		
27.		*Albizia falcataria*	Mimosaceae	Seeds		Saponins, terpenes, alkaloids, flavonoids
28.	Siris tree	*Albizia lebbeck*	Mimosaceae	Roots	50%ethanolic	Tannins
29.	Black siris	*Albiziaodoratissima*	Mimosaceae	Seeds, bark	Methanolic	Odoratissimin, echinocystic acid, glucose, rhamnose, arabinose
30.	Onion	*Allium cepa* [1]	Liliaceae	Bulb	Pet ether[23]	Allyl propyl disulphide
31.	Garlic	*Allium sativum* [1]	Alliaceae	Whole plant	Ethyl ether, ethanolic	S-Allyl cysteine sulphoxide
32.	Indian aloe	*Aloe barbadensis*	Liliaceae	Leaves	Ethanolic	Pseudoprototinosaponnin All and prototinosaponins Alll
33.	Nepalese alder	*Alnus nepalensis*	Betulaceae	Bark, stem	Ethanolic	Terpenoids, flavonoids, diarylheptanoids
34.	Geater galangal	*Alpinia galangal*	Zingiberaceae	Rhizome		Flavanol-galangin
35.	Dita bark tree	*Alstonia scholaris*	Apocyanaceae	Whole plant		Alkaloids ditamine, echitenine, echitamine
36.	Matsyaakshi	*Alternanthera sessilis*	Amaranthaceae	Leaves		Ester, sterols and hydrocarbons
37.	Marsh mallow	*Althaea officinalis*	Malvaceae	Whole plant		Coumarins, scopoletin, aspargine, phytosterols
38.	Devil's cotton	*Ambroma augusta*	Sterculiaceae	Whole plant	Ethanolic	Taraxerol and its acetate

39.	Cardamom	*Ammomum aromaticum*	Zingiberaceaee	Rhizome	Ethanolic	0.12% essential oil
40.	Nepal cardamom	*Ammomum subulatum*	Zingiberaceae		Ethanolic	Carbohydrates, flavonoids, glycosides, tannins
41.	Pellitory	*Anacyclus pyrethrum*	Asteraceae			Alkyl amide and pellitorin
42.	Raktaskandana	*Anaphalis triplinervis*	Asteraceae	Whole plant	Ethanolic	
43.	Cashew nut	*Anacardium occidentale*	Anacardiaceae	Leaves	Ethanolic	
44.	Kalmegh	*Andrographis paniculata*[5]	Acanthaceae	Whole plant	Aqueous	Diterpene glycosides, flavonoids
45.		*Anemarrhena asphodeloides*	Liliaceae			Mangiferin
46.	Indian dill	*Anethum sowa*	Apiaceae	Fruit	Ethanolic	Tannins, terpenoids, cardiac glycosides
47.	Custard apple	*Annona squamosa* [2]	Annonaceae	Leaves	Ethanolic	Atisine, histine, hetisine
48.	Soursop	*Annona mucirata*	Annonaceae	Leaves	Aqueous	Alkaloids, megastigmanes
49.	Kadam	*Anthocephalus chinensis*	Rubiaceae	Stem bark	50% ethanolic	Triterpenes, triprenoid glycosides
50.	Bhandari	*Anticharis senegalensis*	Scrophulariaceae	Whole plant	Aqueous	Cathine-alkaloid
51.	Vettikan	*Aporosa lindleyana*	Euphorbiaceae	Wholeplant	50%ethanolic	Phytosterol, alkaloids, flavonoids
52.	Peanut	*Arachis hypogea*	Papilionaceae	Nut		Tocopherols
53.	Strawberry tree	*Arbutus unedo*	Ericacerae	Leaves		
54.	Betel nut	*Areca catechu*	Aricaceae	Nut		Arecatannins
55.	Elephant creeper	*Argyeia cuneata*	Convulvulaceae	Leaves		Ergoline alkaloids such as ergine
56.	Wormwood	*Artemisia annua*	Compositae	Whole plant	Methanolic	Artemisin
57.	White wormwood	*Artemisia herbaalba*	Asteraceae	Aerial parts	Ethanolic	Chrysanthenone
28.	Davana	*Artemisia pallens*[1]	Compositae	Aerial parts	50% ethanolic, methanolic	Davanone
59.	Indian asparagus	*Asparagus racemosa*	Asparagaceae	Root	Hexane, chloroform, ethyl acetate, ethanol	Asparagine, Arginine
60.	Kokolaaksha		Acanthaceae	Whole plant		Butelin, Lupeol
61.	Bombay atlantia	*Asteracantha ongifolia*	Rutaceae	Whole plant	50% ethanolic	Xanthyletin
62.	Belladona	*Atlantia racemosa*	Solanaceae	Leaves	50% ethanolic	Atropine, Scopolamine
63.	Bilimbi	*Atropa belladonna*	Oxalidaceae	Leaves		Steroids, triterpenes
64.	White Mangrove	*Averrhoa bilimbi*	Avicenniaceae	Leaves	50% ethanolic	Cardiac glycosides and catechol
65.		*Avicennia officinalis*	Poaceae	Leaves	Methanolic	Tannins
66.	Neem	*Azadirachta indica*[1,20]	Meliaceae	Leaves	Aqueous	Isomeldenin, nimbin, nimbiene
67.	Sambranicettu	*Axonopus compressus*	Scrophulariaceae	Whole plant		Bacosides, brahmine, nicotine, herpestiene

68.	Spiny bamboo	*Bacopa monereri*	Poaceae	Leaves	Ethanolic	Lysine and methionine
69.	Malabans	*Bambusa bambos*	Poaceae	Whole plant	50% Ethanolic	Oxalic acid, arginine, betain, choline
70.	Raktajhinti	*Bambusa nutans*	Acanthaceae	Whole plant	50% Ethanolic	Barlerinoside
71.	Kanapa	*Barleria cristata*	Barringtoniaceae	Root	50% Ethanolic	Barrigenic acid, gamma sitosterols
72.	Nicula	*Barringtonia acutangula*	Lecithyidaceae	Fruits		Dihydromyticetin, gallic acid, bartogenic acid
73.	Janglimoha	*Barringtonia acutangula*	Sapotaceae	Bark		Saponins, triterpenoids, flavonoids
74.	Deva kanchana	*Bauhinia candicans*	Caesalpinaceae	Whole plant		Steroids and cardiac glycosides
75.	Orchid tree	*Bauhinia forficate*	Caesalpiniaceae			Catharantine, leurosine, lonchnerine, vindoline and vindolininine
76.		*Bauhinia megalandra*	Caesalpiniaceae			
77.	Semla kandla	*Bauhinia roxburghiana*	Caesalpiniaceae	Seeds		Alkaloida and flavonoids
78.	Kancanar	*Bauhinia variegata*	Caesalpiniaceae	Leaves	Ethanol	Roseoside
79.	Golkaddu	*Benincasa cerifera*	Cucurbitaceae	Fruits		
80.	Kusmanda	*Benincasa hispida*	Cucurbitaceae	Fruits		Lupeol,β-sitosterol,mannitol
81.	Chotra	*Berberis aristata*	Berberidaceae	Roots	50%ethanolic	Berberine
82.	True barberry	*Berberis vulgaris*	Berberidaceae	Roots	Aqueous	Berbamine and palmatine
83.	Elephants ear	*Bergenia stracheyi*	Saxifragaceae	Roots	50%ethanolic	Gallic acid,bergenin
84.	Garden beet	*Beta vulgaris*	Chenopodiaceae	Roots		Betanin
85.	Hairy beggarticks	*Bidens pilosa*	Asteraceae	Whole herb		Group of glycosides
86.	Lajalu	*Biophytum nervifolium*	Oxalidaceae	Leaves		Phenyl propanoids,8 porphyrins
87.	Pulicenta	*Biophytum sensitivum*	Oxalidaceae	leaves		Amentoflavone
88.	Jaffracettu	*Bixa orellana*	Bixaceae	Aerial parts		2-butanamine
89.	Kagitapoolu	*Bonninghauseni a albiflora*	Rutaceae	Whole plant	Ethanolic	Acridone
90.	Pigweed	*Boerhaavia diffusa*[1]	Nyctaginaceae	leaves	Aqueous and chloroform	Quercetin,kaempferol
91.	Redsilk cotton tree	*Bombax ceiba*[1]	Bombaceae	Flowes	Ethanolic	Apigenin
92.	Gugal	*Boswellia serrate*	Burseraceae	Fruits	Ethanolic	Boswellic acid
93.	Great bougainvillea	*Bougainvillea spectabilis*	Nyctaginaceae	Leaves	Ethanolic	Pinitol
94.	Sucupisa	*Bowdichia virgilioides*	Papillonaceae	Whole plant		Benzofuranoids
95.	Cabbage	*Brassica capitata*	Cruciferae	Leaves	Ethanolic	Trilinolenin,lutein andβ-carotene
96.	Brown mustard	*Brassica juncea*[1]	Brassicaceae	Whole plant	Aqueous	Myrosin

97.	Black mustard	*Brassica nigra* [2]	Cruciferae		Aqueous	Glucoside sinigrin
98.	Cabbage	*Brassica oleracca*	Brassicaceae	Cabbage oil		Lutein and zeaxanthin
99.		*Bridelia ferruginea*	Euphorbiaceae	Leaves		Biflavanol
100.	Wild pine apple	*Bromelia penguin*	bromeliaceae	Fruits		Diterpenes and flavonoids
101.	Bryony	*Bryonia alba*	Cucurbitaceae	Roots	Methanolic	Guaifenesin
102.		*Buddleja officinalis*	Buddlejaceae			Acacetin,quercetin,mimenhuasides
103.	Palash	*Butea monosperma*	Fabaceae	Seeds		Lignins
104.	Ghana	*Bridelia ndellensis Beille*	Euphorbiaceae	Leaves	Aqueous and ethanolic	Gallocatechin
105.		*Bumelia sartorum*		Root and bark	Ethanolic	Polysaccharides and phenolics
106.	Putikaranja	*Caesalpinia crisata*	Caesalpiniaceae	Stem bark		Terpenoids
107.	Fevernut	*Caesalpinia bonducella*	Caesalipiniaceae	seeds	Aqueous & 50%ethanolic	Brazilin and bonducin
108.	Patang	*Caesalpinia sappan*	Caesalipiniaceae	Plant		Taraxerol
109.	Teri pods	*Caesalpinia digyna*	Fabaceae	Roots	Methanolic	Bonducin and saponin
110.	Zergul	*Caesalpinia officinalis*	Asteraceae	Plant	Methanolic	Saponins
111.	Long stalked peashurb	*Caragana brevispina*	Fabaceae	Aerial parts	50%ethanolic	Quercetin,narcissin
112.		*Caralluna tuberculata*	Asclepiadaceae	Plant	Alcocholic	Flavanois
113.	Sand sedge	*Carexx arenaria*	Cyperaceae			Glycinebetaine
114.	Red gram	*Cajanus cajan*	Fabaceae	Leaves,stem & twig	Aqueous	α ,β ,γ-selinenes,copaene
115.	Green tea	*Camellia sinensis*	Theaceae	Leaves	Hot water	Epigallocatechin gallate
116.	Horse bean	*Canavalia ensiformis*	Leguminosae	Seeds	Aqueous	
117.	Mirch	*Capsicum frutescens*	Solanaceae	Whole plant		Vanillylamide
118.	Papaya	*Carica papaya*	Caricaceae	Root		Cryptoglavine,cis-violaxanthin and antheraxanthin
119.	Kumbhikah	*Careya arborea*	Lecythidaceae	Seed		
120.	Pimpri	*Casearia championii*	Flacourtiaceae	Root	Aqueous	
121.	Wild cowrie fruit	*Casearia esculenta*	Flacourtiaceae	Root	Aqueous	Chroman and abenzoquinol
122.	Chilla	*Casearia tomentos*	Flacourtiaceae	Root		Butenolide
123.	Scrambled egg blush	*Cassia glauca*	caesalpiniaceae	Bark		Flavonoids,anthocyanidins and tannins
124.	Sophera senna	*Cassia sophera*	caesalpiniaceae	Seeds		Flavonoids and anthraquinone
125.	Golden senna	*Cassia surattensis*	caesalpiniaceae	Leaves		Quercetine
126.	Beam tree	*Castanospermum austrate*	Fabaceae	Leaves		Australine
127.	Tanners cassia	*Cassia*	Caesalpiniaceae	Flowers	Aqueous	Flavanol

		auriculata		&leaves		
128.		*Cassia kleinii wight*	Caesalpiniaceae	Leaves	Alcoholic	Cardiac glycoside and phlobatannins
129.	Madagascar periwinkle	*Catharanthus roseus* [25]	Apocyaceae	Leaves & twigs	Aqueous, alcoholic & dichloromethane-methanol	Rosinidin
130.	Trumpet tree	*Cecropira obtusifolia*	Lecropiaceae	Leaves	Butanolic	
131.	Tuni	*Cedrula toona*	Meliaceae	Stem bark		Toonacilin
132.	Devadaru	*Cedrus deodar*	Pinaceae	Heart wood		Atlantone, sesquiterpenes
133.	Safedsimul	*Ceiba pentandra*	bombacaceae	Roots		Tannins, flavanoids and glycosides
134.	Common century	*Centaurium erythrea*	Gentianaceae	Leaf	Aqueous	Swertiamarin and sweroside
135.	Carob	*Ceratonia siliqua*	Caesalpiniaceae	Seeds		Gallotannins
136.	Iceland moss	*Cetraria islandica*	Parmeliaceae			Cetrarin
137.	Japanese quince	*Chaenomeles sinensis*	Rosaceae	Fruits	Ethyl acetate	Myricetin
138.	Garbhedarno	*Chonemorpha fragrans*	Apocyanaceae	Roots		
139.	Tejpatre	*Cinnamomum tamala*	Lauraceae	Leaf		Linalool
140.	Dalchini	*Cinnamomum zeylanicum* [4]	Lauraceae	Bark		Cinnamaldehyde
141.	Colosynth bitter apple	*Citrullus colocynthis* [1]	Cucurbitaceae	Seedless pulp, roots	Aqueous & ethanolic	Beta-pyrazole-1-ylalanine
142.	Perdepis	*Clausena anisata*	Rutaceae	Roots	Methanolic	Alkaloid camptothecin
143.	Wampee	*Clausera lansium*	Rutaceae	Leaves		Daucosterol
144.	Agni manta	*Clerodendrum phlomidis*	Verbenaaceae	Roots		Pectolinaringenin
145.	Aparagit	*Clitoria ternatea* [26]	Fabaceae	Roots [18]	Methanolic	Taraxerol,taraxerone,ternatins
146.	Ivy-guard	*Coccinia indica wight*	Cucurbitaceae	Fruit&leaves	Alcoholic	Triterpenes
147.		*Cocculus cordifolius*	Menispermaceae			Nishindine and hydrocotylene
148.	Broom-creeper	*Cocculus hirsutus* [1]	Menispermaceae	Leaves	Aqueous	Coclaurine,magnoflorine,trilobine
149.	Coconut palm	*Cocos nucifera*	Arecaceae	Leaves,oil	Hydro-methanol	Myricyl ester of cerotic acid
150.	Dodak	*Convolvulus pluricaulis*	Convulvulaceae			Steroids, coumarins, flavonoids, glycosides
151.	Japanese cornel	*Cornus officinalis*	Cornaceae		Alcoholic	B-dihydrocorin, isoquercetin, loganin
152.	Tree turmeric	*Coscinium fenestratum*	Menispermaceae	Stem	Alcoholic	Berberine
153.	Spiral ginger	*Costus pictus* [3]	Zingiberaceae			B-amyrin
154.	Wild ginger	*Costus speciosus*	Costaceae	Rhizome	Hexane	Cycloartanol
155.	Mid land hawthorn	*Crataegus laevigatus*	Rosaceae	Whole plant		Oligomeric procyanidins
156.	Ban-sangli	*Crataegus*	Rosaceae	Whole plant		Quercetin,

		oxycantha				hyperoside, rutin
157.	Turmeric	*Cuecuma longa*	Zingiberaceae			Tumerone, atlantone
158.	Guar gum	*Cyamopsis tetragonoloba* [4]	Leguminosae			Quinone, terpenoid
159.	Wheel wingnut	*Cyclocarya paliurus*	Cyclocaraceae	Bark	Aqueous, chloroform, ethyl acetate, n-butanol	Kaempferol glycosides
160.	Elephant apple	*Dillenia indica*	Dilleniaceae	Leaves	Methanolic	Betulinic acid
161.	Bitter yam	*Dioscorea dumetorum*	Dioscoreaceae	Tuber	Aqueous	Oxalates, tannins, phytates
162.	Prickly leaved elephant's foot	*Elaphantopus scaber*	Asteraceae		Acetone	Lupeol, phytol
163.	Embelia	*Embelia ribes*	Myrsinaceae	Berries	Hexane	Embelin
164.	Indian gooseberry	*Emblica officinalis*	Euphorbiaceae	fruit		Chromium
165.	Indian gentian	*Enicostemma littorale*	Gentianaceae	Whole plant	Aqueous	Glycosides, tannins
166.	Ephedra	*Ephedra distachya*	Ephedraceae			L-ephedrine
167.	Loquat	*Eriobotrya japonica*	Rosaceae			Cinchonain
168.	Eucalyptus	*Eucalyptus globulus*	Myrtaceae	Leaves	Aqueous	α- pinine
169.	Indian blackberry	*Euginea jambolana* [4]	Myrtaceae	Seede & leaves	Ethanolic	Pandanus odorus
170.	Banyan tree	*Ficus benghalensis* [1]	Moraceae	Bark	Ethanolic	Leucocyanidine, 3-O-β-d- galactosyl cellobioside
171.	Kaakodumbara	*Ficus hispida* [22]	Moraceae		Alcoholic	Pelargonidine-3-0-α-L-Rhamnoside
172.	Peepal	*Ficus religiosa*	Moraceae	Whole plant		Leucocyanidine, 3-O-β-d- galactosyl cellobioside
173.	Knew tree	*Ginko biloba*	Ginkgoaceae			
174.	Liquorice	*Glycerrhizae radix*	Fabaceae			Glycyrrhetinic acid, dihydroxy gymnemic
175.	Parusha	*Grewia asiatica*	Lilliaceae	Fruit		
176.	Gudmar	*Gymnema sylvestre*	asclepiadeceae	Leaves	Alcoholic & aqueous	dihydroxy gymnemic
177.	Shoe-flower plant	*Hibiscus rosa sinensis* [1]	Malvaceae	Whole plant	Ethanolic	Flavonoid glycosides
178.	East Indian screw tree	*Helicteres isora* [1]	Sterculiaceae	Roots[17]	Butanolic & ethanolic	Helisterculins A & B, helisorin
179.	Barley	*Hordeum vulgare*	Gramineae	Germinant fruits		Tocopherols and tocotrienols
180.	Green violet	*Hybanthus enneaspermus*	Violaceae	Whole plant	Alcoholic	Cedrandiol
181.	Inkomfe	*Hypoxis hemerocallidae fisch*	Hypoxidaceae		Methanolic	Pentenyne glycoside, hypoxoside
182.	Pauskaram	*Inula racemosa* [1]	Asteraceae	Root		Inunolise
183.	Sweet potato	*Ipomoea batata*	Convulvulaceae			Abietadiene
184.	Hauber	*Juniperus communis*	Pinaceae	Fruit		A-terpinene and γ-terpinene
185.	Henna	*Lawsonia inermis* [21]	Lytharaceae	Leaves	Ethanolic & methanolic	Triterpenoids, steroids, xanthones
186.		*Lepichinia caulescens*	Laminaceae			Monoterpenes, sesquiterpenes

187.	Wild sage	*Lippa nodiflora* [11]	Verbenaceae	Whole plant	Methanolic	Neptin
188.		*Lithocarpus polystachyus*	Fabaceae	Leaves	Ethanolic & aqueous	Phloridzin, phloretin
189.	Mango	*Mangifera indica* [1]	Anacardiaceae	Leaves	Aqueous	Mangiferin- a xanthone glycoside
190.	Alfalfa	*Medicago sativa*	Fabaceae		Aqueous	Soyasaponin, azukisaponin
191.	Bitter guard	*Momordica charantia* [4]	cucurbitaceae	Fruit	Aqueous	Momordicin, charantin and galactose binding lectin
192.	White mulbary	*Morus alba*	Moraceae	Root		Steroids, flavanoics
193.	Cowhage	*Mucuna pruriens*	Leguminosae	Whole plant & seeds	Alcoholic	Fatty acids
194.	Curry-leaf tree	*Murraya koenigii* [1]	Rutaceae	Leaves		Sabinene
195.	Banana	*Musa paradisiacal*	Myrtaceae	flowers		Cyclomusalenol, cyclomusalenone
196.	Small fennel	*Nigella sativa oil*	ranunculaceae			Thymoquinone
197.	Holy basil	*Ocimum sanctum* [1]	Lamiaceae	Aerial parts	Hydro alcoholic	Euginol and urosolic acid
198.	Olive	*Olea europia* [8]	Oleaceae	Root		Olecanthal and oleuropein
199.	Monkey grass	*Ophiopogon japonicas*	Asparagaceae	root	Ethanolic	Ophiogenin
200.	Pricly pear	*Opuntia sterptacantha*	Cactaceae	leaves	Ethanolic	Hordinine
201.	Asian rice	*Oryza sativa*	Graminae	Bran	Aqueous	Polysaccharides
202.	Screw pine	*Pandanus odorus*	Pandanaceae	Root		4-hydroxy benzoic acid
203.	American ginseng	*Panax ginseng* [4]	Araliaceae	Leaves & stems	Aqueous & ethanolic	Polypeptides
204.	Carolina leaf-flower	*Phyllanthus carolinensis*	Euphorbiaceae	Rhizome		Quercetin and β-sitosterol
205.	Picrorhiza	*Picorrhiza kurroa* [1]	Scrophulariaceae		Alcoholic	Picrosides, kutkosides
206.	French maritime pine	*Pinus maritimae*	Pinaceae	bark		Pycnogenol
207.	Honey Mesquite	*Prosopis glandulosa*	Fabaceae	Whole plant	Gelatin	Apigenin
208.	Heal all	*Prunella vulgaris*	Labiatae			Jiangtangsu
209.	Guava tree	*Psidium guajava* [24]	Myrtaceae	Fruits & leaves	Aqueous & ethanolic	Strictinin, isostrictinin, pendunculagin
210.	Malabar kino tree	*Pterocarpus marsupium* [4]	Leguminosae	Bark	Aqueous & methanolic	Epicatechin
211.	Red sandle wood	*Pterocarpus santalinus*	Leguminosae	Wood	Alcoholic	Flavonoids, glycosides
212.	Pomegranate	*Punica granatum* [23]	Punicaceae	Flowers and seeds	Ethanolic & methanolic	Ellagitannins
213.	Quassia wood	*Quassia amara*	Simaroubaceae	Whole plant		Phyllanthine, hypophyllanthine, bio-flavanoids
214.	Sacred lotus	*Radix rehmanniae*	Scrophulariaceae	Rhizome		Catalpol- an iridiod glycoside
215.	Chinese	*Rehmania*	scrophulariaceae	Rhizome	Ethanolic	Iridoids

	foxglove	*glutinosa*				
216.	White weeping broom	*Retama raetam*	Fabaceae	Leaves	Aqueous	A-humelene, β-caryophyllene
217.	Rhubarb	*Rheum sps*	Polygonaceae	Rhizome		Emodin, sennoside-A
218.	Castor	*Ricinus communis*	Euphorbiaceae		Ethanolic	Ricinine, ricin
219.	Saptrangi	*Salacia latifolia*	Hippocrataceae	Roots	Alcoholic	Corosolic acid
220.	Saptrangi	*Salacacia macrosperma*	Celastraceae	Roots		Salcinol, kotanlol
221.	Saptrangi	*Salacacia oblonga*	Celestracae	Whole plant		Polyols, xanthone
222.	Salacia	*Salacacia reticulate*	Celestracae	Root bark	Aqueous	Mangiferin, kotanlol
223.	Spanish Sage	*Salvia lavandifolia*	Lamiaceae			Germacerene-D
224.	Thorny Burnet	*Sarcopoterium spinosum*	Rosaceae		Aqueous	Elemol
225.	Sweet broomweed	*Scoparia dulcis*	Scrophulariaceae	Whole plant	Aqueous	Amellin-6-methoxy benzoxazolinone
226.	Keoun Back	*Selaginella tamarscina*	Selaginellaceae			Phenyl propanoids
227.	Marking nut	*Semecarpus anacardium*	Anacardiaceae	Nut	Milk	Bhilawanols, minerals
228.	Coix seed	*Semen coicis*	Graminae	Seeds		Coixans
229.	Foxtail millet	*Setaria italic*	Poaceae	Seeds	Aqueous	6,7-dimethoxy coumarin, 5,8-dimethoxy coumarin
230.	Yacon	*Smallanthus sonchifolius*	Asteraceae	Leaves	Aqueous	Dicaffeoylquinic acids
231.	West indian turkey bery	*Solanum torvum*	Solanaceae	fruit	Methanolic	Solasonine and solamargine
232.	Wild egg plant	*Solanum xanthocarpum* [12]	Solanaceae	Leaves	Aqueous & methanolic	Alkaloids, steroids, saponins
233.	Sweet leaf	*Stevia rebaudiana*	Asteraceae			Stevioside, steviol
234.	Chiretta	*Swertia chiryata* [1]	Gentianaceae	Whole plant	Hexane	Swerchirin, ophelic acid & chiratin
235.		*Symplocos cochichinensis*	Sympolaceae	Leaves	Hexane	Irioids and triterpenoids
236.	Jaman	*Syzygium cumini*	Myrtaceae	Leaves, fruits & seeds	Aqueous, alcoholic & acetone	Jambosine, antimelin
237.	Iboga	*Tabernanthe iboga*	Apocyanaceae		Aqueous	Ibogaine
238.	Indian almond	*Terminalia catappa* [22]	Combretaceae	Fruits	Aqueous, methanolic & pet ether	Kaempferol
239.	Black myrobalan	*Terminalia chebula* [1]	Combretaceae	Seeds	Chloroform	Chebulinic acid, terchebin, luteolin
240.	Fetty germander	*Teucrium polium*	Lamiaceae		Aqueous	Apigenin
241.	Cocoa	*Theobroma cacao*	Sterculiaceae	Coca beans		Polyphenols, epicatechin, quercetin, procyanidin
242.	Guduchi	*Tinospora cardifolia* [1]	Menispermaceae	Stem & roots	Aqueous	Ligans and terpenoids
243.	Giloe	*Tinospora crispa*	Menispermaceae	Stem	Aqueous	Aporphine alkaloid
244.	Puncture vine	*Tribuluks*	Zygophyllaceae			Flavonoids, flavanol

		terrestris				glycosides, steroidal saponins, alkaloids
245.	Greek hayes	*Trigonella foenum graecum* [4]	Leguminosae	Seeds	Aqueous & methanolic	4-hydroxyleucine and hydroxy isoleucine
246.		*Triphala*				Chebulic acid, garlic acid
247.	Bichhu booti	*Urtifca dioica*	Urticaceae			Glucoquinone, scopoletin
248.	Cranberry	*Vaccinium arctostaphylos*	Ericaceae	fruit	Ethanolic	Delphindin-3-o-β-glucoside
249.	Sandarbhar	*Vinca rosea* [7]	apocyanaceae			Rosnidin
250.	European mistletoe	*Viscum album*	Loranthaceae	Whole plant		Ursolic acid, kaempferol, pectin
251.		*Viscum schimperi*	Viscaceae	Aerial parts	Methanolic	Oleanane triterpenes
252.	Five leaved chaste tree	*Vitex negundo*	Verbenaceae	Leaves	Methanolic	Chrysophenol D, luteolin
253.	Ginger	*Zingiber officinalis* [4]	Zingiberaceae			Poly penols, vitamin C, β-carotene
254.	Chinese Tsao	*Zizyphus sativus*	Rhamnaceae	Fruit		Minor benzoids, oxygenated monoterpenes
255.	Christ's thron JuJube	*Zizyphus spina Christi*	Rhamnaceae	Leaves	Butanol	christininA
256.	Tetraena alba	*Zygophyllum album*	Zygophyllaceae	Whole plant	Ethanolic	Kaempferol, isorhamnetin & quercetin-3-O-glucoside

CONCLUSION: This review reveals that the Diabetes Mellitus is a metabolic disorder caused due to improper metabolism of proteins, carbohydrates and fats. The major cause is due to insufficient production of insulin in the body or due to destruction of beta cells in the pancreas (or) improper utilization of produced insulin in the body. Currently many synthetic drugs are available in the market for the treatment of Diabetes Mellitus which may have some side effects. Besides, there are many number of plants having the hypoglycaemic activity used to treat Diabetes Mellitus which are having less side effects, lavish availability and economical when compared with the synthetic drugs.

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