

Annotated Herbal Review on 10 Ayurvedic Ingredients for Glycemic Response

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October 2019

“The evidence found in this review appears to suggest that these herbs can be beneficial in the treatment of type 2 diabetes in adults, though it is important that co-morbidities and their treatment need to be carefully considered to avoid potentially harmful drug/herb interactions and side effects. Anyone considering using the herbs should seek the advice of their medical practitioner. The evidence disclosed did not report any studies that used the 10 herbs combined in the doses provided in the supplement. Likewise, no studies were found which reported safety issues”

Sue Acreman

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Yellow highlighting denotes human studies.

Herbs Review

Neempan – Melia azadirachta

1)

Authors and Title: Molecular approach to identify antidiabetic potential of *Azadirachta indica*. Satyanarayana K et al.

Journal & Year: J. Ayurveda Integr. Med. (2015) Jul-Sep; 6(3): 165–174.

Study Type: Controlled Animal study

Sample Size (where disclosed): NA

Results: *A. indica* leaf extract was able to successfully restore glucose oxidation to normal range

It is concluded that *A. indica* may play a significant role in the management of type-2 diabetes mellitus, by improving the insulin signaling molecules and glucose utilization in the skeletal muscle.

2)

Authors and Title: Antidiabetic activity of alcoholic extract of Neem Azadirachta Indica root bark. Patil P et al.

Journal & Year: National Journal of Physiology, Pharmacy and Pharmacology. (2013). 3. 142-146. 10.5455/njppp.2013.3.134-138.

Study Type: Animal study

Sample Size (where disclosed): NA

Results: Neem root has anti hyperglycaemic and hypoglycaemic activity. It is not as significant as glibenclamide.

3)

Authors and Title: In vivo Antidiabetic evaluation of Neem leaf extract in alloxan induced rats Kumar S et al.

Journal & Year: Journal of Applied Pharmaceutical Science (2011) 01 (04);: 100-105

Study Type: Animal study controlled

Sample Size (where disclosed): NA

Results: After treatment for 24 hrs, Azadirachta indica 250mg/kg (single dose study) reduced glucose by 18%. Multiple dose study for 15days also reduced glucose. In a glucose tolerance test in diabetic rats with neem extract 250 mg/kg demonstrated glucose levels were significantly less compared to the control group. Azadirachta indica significantly reduced glucose levels at 15th day in diabetic rats. Azadirachta indica serves as an important alternative source in the management of diabetes mellitus involved in reducing increased

blood glucose during diabetes which should be examined further by oral hypoglycemic therapy.

4)

Authors and Title: Evaluation of Hypoglycaemic Activity of Neem (Azadirachta Indica) In Albino Rats Nagashayana G. et al.

Journal & Year: Journal of Dental and Medical Sciences (2014)(Volume 13; 9:04-11

Study Type: Controlled Animal study

Sample Size (where disclosed): NA

Results: Neem oil has got the potential to reduce blood glucose levels within a short period of time and also it has potential to improve the glucose tolerance after a treatment period of 4 weeks. Azadirachta Indica may have beneficial effects in diabetes mellitus and holds the scope of new generation of antidiabetic drug.

Acute toxicity testing showed that the test compound was safe up to the dose of 1000mg/kg body weight in rats.

5)

Authors and Title: Effect of Aqueous Extract of Azadirachta indica (Neem) Leaves on Some Indices of Pancreatic Function in Alloxan-induced Diabetic Wistar Rats. Akpan et al.

Journal & Year: Pharmacologia, (2012)3: 420-425.

Study Type: Controlled animal study

Sample Size (where disclosed): NA

Results: Treatment with the extract caused a significant ($p < 0.05$) reduction in fasting blood glucose level in Diabetic rats by 54% but not in Normal rats. The serum α -amylase activity was also significantly lower ($p < 0.05$) in the extract treated Diabetic rats (DT) when compared to the placebo treated Diabetic Control (DC). However, there was no significant difference ($p < 0.05$) in the serum α -amylase activity of the Normal Treated (NT) rats when compared to the normal control. Histological examination of pancreas of diabetic control rats showed cellular degeneration which appeared to be reversed in the animals following extract treatment.

The extract might have antidiabetic properties, which may be associated with enhanced islets cells regeneration.

6)

Authors and Title: Protective role of extracts of neem seeds in diabetes caused by streptozotocin in rats Guptaa S. et al.

Journal & Year: Journal of Ethnopharmacology (2004) 90:185–189

Study Type: Controlled Animal study

Sample Size (where disclosed): NA

Results: Neem seed kernel (NSK) and husk (NSH) reduced the LPO in heart and erythrocytes, thus effectively protected cell functions and structure. Both seed kernel (NSK) and husk (NSH) showed significant protection against the oxidative damage induced by STZ in heartland erythrocytes of rats. NSK and NSH may act as cardio-protective and free radical scavenger agent.

Gymnema sylvestre

1)

Authors and Title: Gymnema sylvestre for Diabetics Singh V.K.et al.

Journal & Year: Journal of Herbs Spices & Medicinal Plants. (2008) 14. 1-42.

Study Type: Review

Sample Size (where disclosed): NA

Results: Explains that the plant leaves are used to treat type II (adult-onset) diabetes.

2)

Authors and Title: Phytochemical and Pharmacological Properties of Gymnema sylvestre: An Important Medicinal Plant. Tiwari P. et al.

Journal & Year: [Biomed Res Int](#). (2014) 2014: 830285. Published online 2014 Jan 6. doi: [10.1155/2014/830285](https://doi.org/10.1155/2014/830285)

Study Type: Review

Sample Size (where disclosed): NA

Results: The mode of action of the drug is through stimulation in insulin secretion from pancreas [53]. It also exerts a similar effect by delaying the glucose absorption in the blood. In the intestine it attaches to the receptor present in external layer of intestine, thereby preventing the absorption of sugar molecules by intestine, leading to reduction in blood sugar levels. The herb is widely used as a naturopathic treatment for diabetes.

3)

Authors and Title: An open label study on the supplementation of Gymnema sylvestre in

type 2 diabetics. Kumar S. et al.

Journal & Year: J Diet Suppl.(2010) Sep; 7(3):273-82. doi: 10.3109/19390211.2010.505901.

Study Type: Purposive study

Sample Size (where disclosed): NA

Results: 500mg of the herb daily for three months reduced polyphagia, fatigue, blood glucose (fasting and post-prandial), suggesting a beneficial effect of GS in the management of diabetes mellitus.

4)

Authors and Title: A systematic review of *Gymnema sylvestre* in obesity and diabetes management. Pothuraju R. et al.

Journal & Year: J Sci Food Agric (2014); 94: 834–840

Study Type: Sys review

Sample Size (where disclosed): 14 studies of which 3 were on humans or human tissue

Results: *Gymnema sylvestre* has a role in the treatment of body weight gain, plasma glucose levels and accumulation of lipids in epididymal fat tissue, liver and muscle. One study showed a reduction in ↓ Body weight, BMI 44 ↓ Serum leptin levels ↓ Serum LDL, VLDL, TG at a dose of 400mg/kg BW.

5)

Authors and Title: *Gymnema sylvestre* (Gurmar): A Potent Herb with Anti-Diabetic and Antioxidant Potential. Laha S, Paul S.

Journal & Year: Pharmacog J. (2019);11(2):201-6.

Study Type: Lit review

Sample Size (where disclosed): NA

Results: The review found that bio components in G S possess both anti diabetic and antioxidant activities.

6)

Authors and Title: Role of *Gymnema sylvestre* as Alternative Medicine. Kishore L. et al.

Journal & Year: J Homeop Ayurv Med (2014)3: 172. doi:10.4172/2167- 1206.1000172

Study Type: Lit review

Sample Size (where disclosed): NA

Results: There is sufficient evidence of pharmacological and phytochemical studies to draw a definite conclusion about the efficacy of the gymnemic acid for the treatment of diabetes and obesity.

Galo - Tinospora cordifolia

1)

Authors and Title: Effect of Tinospora cordifolia as an add - on therapy on the blood glucose levels of patients with Type 2 diabetes. Mishra S, Verma N, et al.

Journal & Year: Int J Basic Clin Pharmacol (2015);4:537-41

Study Type: RCT

Sample Size (where disclosed): 100

Results: Group A took their usual hypoglycaemic medication and group B took TC alongside their usual hypoglycaemic medication. Both groups showed a decrease in the fasting, postprandial, and HbA1c levels of the patients. However, this decrease was found to be more statistically significant ($p \leq 0.005$) in Group B. When given in the form of add-on therapy, was found to be synergistic and effective in the better management of Type 2 diabetes. The drug was well tolerated by the patients and no adverse drug event was recorded.

2)

Authors and Title: Medicinal and Beneficial Health Applications of Tinospora cordifolia (Guduchi): A Miraculous Herb Countering Various Diseases/Disorders and its Immunomodulatory Effects. Dhama K. Et al

Journal & Year: Recent Patents on Endocrine, Metabolic & Immune Drug Discovery (2016), 10, 96-111

Study Type: Review

Sample Size (where disclosed): NA

Results: The present review suggests that T. cordifolia has mild hypoglycaemic and antihyperglycaemic action as demonstrated by its action leading to increasing glucose-6-phosphate level in the liver.

3)

Authors and Title: Tinospora cordifolia (Willd.) Hook. f. and Thoms. (Guduchi) - validation of the Ayurvedic pharmacology through experimental and clinical studies. Upadhyay A.K. et al.

Journal & Year: Int J Ayurveda Res. (2010); 1(2):112–121. doi:10.4103/0974-7788.64405

Study Type: Review

Sample Size (where disclosed): NA

Results: Various studies demonstrate amelioration of experimental diabetic neuropathy and gastropathy in rats with a reduction of blood sugar in alloxan-induced hyperglycaemic rats and rabbits, significant reduction in blood glucose and brain lipids, increase in glucose tolerance in rodents, increase in glucose metabolism, inhibitory effect on adrenaline-induced hyperglycaemia by pyrrolidine derivative and significant hypoglycaemic effect in normal and alloxan diabetic rabbits following administration of T. cordifolia.

4)

Authors and Title: Nadig PD, Revankar RR, Dethé SM, Narayanswamy SB, Aliyar MA. Effect of *Tinospora cordifolia* on experimental diabetic neuropathy

Journal & Year: Indian J Pharmacol (2012); 44:5803.

Study Type: Animal study

Sample Size (where disclosed): NA

Results: *Tinospora cordifolia* prevents the hyperalgesia in experimental diabetic neuropathy. It has an aldose reductase inhibitory activity in-vitro which may contribute to the beneficial effects. There was no significant change in the fasting blood glucose (FBS) in any of the groups. In-vitro aldose reductase inhibition was observed with TC with an IC₅₀ of 103 mcg/ml.

5)

Authors and Title: *Tinospora cordifolia* attenuates oxidative stress and distorted carbohydrate metabolism in experimentally induced type 2 diabetes in rats. Sangeetha, M.K. et al.

Journal & Year: J Nat Med (2011) 65: 544. <https://doi.org/10.1007/s11418-011-0538-6>

Study Type: Animal study

Sample Size (where disclosed): NA

Results: *Tinospora cordifolia* mediates its anti-diabetic potential through mitigating oxidative stress, promoting insulin secretion and also by inhibiting gluconeogenesis and glycogenolysis, thereby regulating blood glucose.

6)

Authors and Title: Traditional Indian anti-diabetic plants attenuate progression of renal damage in streptozotocin induced diabetic mice. Grover JK, et al.

Journal & Year: J. Ethnopharmacol. (2001); 76:233–8.

Study Type: Animal study

Sample Size (where disclosed): NA

Results: *Tinospora*, among other herbs showed positive effects on hyperglycaemia in the study.

Kariyatu - Swertia chirata

1)

Authors and Title: A Review of Swertia chirayita (Gentianaceae) as a Traditional Medicinal Plant. Kumar V. Van Staden J.

Journal & Year: Front. Pharmacol.(2016) 6:308. doi: 10.3389/fphar.2015.00308.

Study Type: Review

Sample Size (where disclosed): NA

Results: The whole plant of *S. chirayita* has been reported for the hypoglycaemic activity. Amarogentin, Mangiferin and Swertiamarin appear to be among the active chemicals relevant to diabetic control. So far no serious side effects or toxicity of *S. chirayita* have been reported, but further toxicological studies are still needed to confirm the safety of *S. chirayita* in humans.

2)

Authors and Title: Sapkota Sabita et al. A review on Swertia chirayita (Roxb. Ex Flem.) Karsten: Comparative analysis of Ayurvedic pharmacology, experimental and clinical studies.

Journal & Year: Int. Res. J. Pharm. (2019);10(7):1520

Study Type: Review

Sample Size (where disclosed): NA

Results: Medicinal usage of Swertia chirata is reported in Indian pharmaceutical codex, the American and the British pharmacopoeias and in the different traditional systems of medicine (Unani, Ayurveda and Siddha).

Identifies the active ingredients for inducing hypoglycaemia. Also shows the folklore of the uses of *S. chirayita*

3)

Authors and Title: Review on Swertia chirata as traditional uses to its phytochemistry and pharmacological activity, Alam A. Kabir H.

Journal & Year: Journal of Drug Delivery and Therapeutics. (2018); 8(5-s):73-78 DOI: <http://dx.doi.org/10.22270/jddt.v8i5-s.1957>

Study Type: Review

Sample Size (where disclosed): NA

Results: Medicinal usage of Swertia chirata is reported in Indian pharmaceutical codex, the American and the British pharmacopoeias and in the different traditional systems of medicine (Unani, Ayurveda and Siddha). Swertia chirata is commonly known as a bitter tonic in traditional system of medicine for the treatment of fever, loss of appetite, digestive disorders, diabetes, skin and various other diseases.

4)

Authors and Title: Swertia chirayita—an overview. Joshi P., Dhawan V.

Journal & Year: Curr. Sci. (2005); 89:635–640

Study Type: Review

Sample Size (where disclosed): NA

Results: Herbal medicines such as Ayush-64, Diabecon, Mensturyl syrup and Melicon V ointment^{2–4} contain chirata extract in different amounts for its antipyretic, hypoglycaemic, antifungal and antibacterial properties. The entire plant is used in traditional medicine; however the root is mentioned to be the most powerful part.

5)

Authors and Title: Antioxidant, antihyperglycaemic and antiglycation properties of some swertia species from western Ghats. Kshirsagar P. More T. et al.

Journal & Year: International Journal of Pharmacy and Pharmaceutical Sciences (2014 Vol 6; 9: 1-4

Study Type: Review

Sample Size (where disclosed): NA

Results: All the Swertia species distillate analyzed in this study has exhibited potent hypoglycaemic activity. The study tends to support the traditional use of these medicinally important species and alternative source of diabetic medicines.

6)

Authors and Title: Potential hypoglycaemic effect of swertia chirata- a diabetic – an Indian subcontinent herb with important medical value. Alam K. Et al.

Journal & Year: Pharmacologyonline (2011) 2: 642-647

Study Type: Controlled Animal study

Sample Size (where disclosed): NA

Results: Swertia chirata shows significant hypoglycaemic activity on Swiss albino mice in relative to control and standard group. Glibenclamide which is used as standard in the study showed significant fall in blood glucose in the first hour of the observation and blood glucose tend to rise slightly in the next two hours. Whereas, pet-ether fraction showed sustained hypoglycaemic effect at the end the observation.

Bitter Melon – Karela, Momordica charantia

1)

Authors and Title: Antidiabetic effects of *Momordica charantia* (bitter melon) and its medicinal potency. Joseph B. And Jini D.

Journal & Year: [Asian Pac J Trop Dis](#). (2013) Apr; 3(2): 93–102.

Study Type: Review

Sample Size (where disclosed): 15 clinical studies using RCT and case series.

Results: Available clinical data as reviewed in the paper are often flawed by small sample size, lack of control and poor study designs.

It is not an original research paper but a review so it can be just said that *M. charantia* plays a very promising role in controlling blood glucose and there by controlling the risk factor towards CVD. The paper also reports on animal and biochemical studies which have been disregarded for this evidence.

2)

Authors and Title: Narendra Kumar and S. M. Paul Khurana, Nutritive and Antidiabetic Benefits of *Momordica Charantia* L. (Bitter Gourd),

Journal & Year: Indo Am. J. P. Sci, 2016; 3(12)

Study Type: Review

Sample Size (where disclosed): NA

Results: More than 100 in vivo studies have demonstrated the blood sugar-lowering effect of bitter gourd. The fruit has also shown the ability to enhance cells' uptake of glucose, to promote insulin release, and to potentiate the effect of insulin.

3)

Authors and Title: The effect of bitter melon (*Momordica charantia*) in patients with diabetes mellitus: a systematic review and meta-analysis Yin R. et al

Journal & Year: [Nutr Diabetes](#). 2014 Dec; 4(12): e145. Published online 2014 Dec 15. doi: [10.1038/nutd.2014.42](#)

Study Type: Systematic review

Sample Size (where disclosed): 4 RCT's 208 subjects in total

Results: Bitter melon supplementation compared with no treatment did not show significant glycaemic improvements on either A1c or FPG

NB subjects had been diagnosed with either type 1 or type 2 diabetes, so it is possible that the patients evaluated in randomized controlled trials have limited β -cell function, decreasing their ability to respond to bitter melon.

4)

Authors and Title: *Momordica charantia* L. lowers elevated glycaemia in type 2 diabetes mellitus patients: Systematic review and meta-analysis. Peter E.L. et al

Journal & Year: [J Ethnopharmacol.](#)(2019) Mar 1; 231:311-324. doi: 10.1016/j.jep.2018.10.033. Epub 2018 Oct 30.

Study Type: Sys review

Sample Size (where disclosed): 10 studies using 1045 subjects

Results: The findings suggest that *M. charantia* monoherbal and polyherbal preparations taken orally at a dose of 2–6 g/day for at least four weeks significantly reduces elevated FPG level, PPG and HbA_{1c} among adult T2DM patients. *M. charantia* monoherbal also reduces elevated FPG in [prediabetes](#), indicating that *M. charantia* preparations could be used as adjunct therapy for glycaemic control and thus could reduce risk for microvascular complications in T2DM patients.

No serious adverse effects were reported though 5 studies reported side effects including [hyperacidity /heartburn](#), [nausea](#) and/or vomiting, diarrhea, [abdominal discomfort](#), enhanced appetite, [constipation](#) and flatulence.

Studies reported headache and dizziness.

5)

Authors and Title: Bitter Gourd (*Momordica charantia*): A Dietary approach to Hyperglycaemia Krawinkel M.B. Keding G.B.

Journal & Year: Nutrition Reviews(2006); 64; 7: (I)331–337

Study Type: Review

Sample Size (where disclosed): NA

Results: Metabolic and hypoglycaemic effects of bitter gourd extracts have been demonstrated in cell culture, animal, and human studies. The mechanism of action, whether it is via regulation of insulin release or altered glucose metabolism and its insulin-like effect, is still under debate. Adverse effects are also known. Nevertheless, bitter gourd has the potential to become a component of the diet or a dietary supplement for diabetic and prediabetic patients

6)

Authors and Title: *Momordica charantia* for type 2 diabetes mellitus. Ooi C.P. Yassin Z, Hamid T.A.

Journal & Year: Cochrane Database of Systematic Reviews (2012) Issue 8. Art. No.: CD007845.DOI: 10.1002/14651858.CD007845.pub3.

Study Type: Sys review

Sample Size (where disclosed): 4 RCTs with 479 subjects

Results: Two RCTs compared the effects of preparations from different parts of the momordica charantia plant with placebo on glycaemic control in type 2 diabetes mellitus. There was no statistically significant difference in the glycaemia control with momordica charantia preparations compared to placebo. When momordica charantia was compared to metformin or glibenclamide, there was also no significant change in reliable parameters of glycaemic control. No serious adverse effects were reported in any trial. No trial investigated death from any cause, morbidity, health-related quality of life or costs. There is insufficient evidence on the effects of momordica charantia for type 2 diabetes mellitus

Kutki (Picorhiza kurroa)

1)

Authors and Title: A study of standardized extracts of Picrorhiza kurroa Royle ex Benth in experimental non-alcoholic fatty liver disease. Shetty S. et al.

Journal & Year: [J Ayurveda Integr Med.](#) (2010) Jul-Sep; 1(3): 203–210.

Study Type: RCT Animal study

Sample Size (where disclosed): 30 in 5 groups – 6/group

Results: The group treated with P. kurroa, showed minimal hepatic damage and a distinct preservation of structure and architecture of liver tissue. Intervention with standardized plant extracts of P. kurroa regressed several features of NAFLD like lipid content of the liver tissue, morphological regression of fatty infiltration, hypolipidaemic activity, and reduction of cholestatis.

2)

Authors and Title: Picrorhiza kurroa: An ethno pharmacologically important plant species of Himalayan region. Masood M. et al.

Journal & Year: Pure and Applied Biology(2015) Vol. 4; 3: 407-417

Study Type: Review

Sample Size (where disclosed): NA

Results: It is considered as an important medicinal plant and one pharmacological activity of P. kurroa includes that of an anti diabetic

3)

Authors and Title: Anti diabetic activity of standardized extract of Picrorhiza kurroa in rat model of NIDDM Gulam Mohammed Husain, Paras Nath Singh, Vikas Kumar*

Journal & Year: Drug Discov Ther. (2009); 3(3):88-92.

Study Type: Animal study

Sample Size (where disclosed): 5 group each of 6 rats.

Results: In oral glucose tolerance test, oral administration of PkE increased the glucose tolerance. PkE treatment also significantly ($p < 0.001$) reversed the weight loss associated with streptozotocin treatment. These findings provide in vivo evidence that standardized extract of Picrorhiza kurroa possess significant antidiabetic activity in streptozotocin-nicotinamide induced type-2 diabetes mellitus in rats.

3)

Authors and Title: Potential mechanism of anti-diabetic activity of Picrorhiza kurroa. Husain G.M. et al.

Journal & Year: TANG (2014) 4; 4:27

Study Type: Animal study

Sample Size (where disclosed): NA

Results: The present study revealed that standardized PkE increased the insulin-mediated translocation of GLUT-4 from cytosol to plasma membrane which result better glucose uptake by skeletal muscles and improved glycaemic control in diabetic rats. It may be concluded that GLUT-4 is at least partly involved in the observed antidiabetic activity of PkE in rats.

5)

Authors and Title: A study of standardized extracts of Picrorhiza kurroa Royle ex Benth in experimental non-alcoholic fatty liver disease Shetty S. et al

Journal & Year: Journal of Ayurveda & Integrative Medicine (2010) 1; 3:203-10

Study Type: Animal study

Sample Size (where disclosed): 18 rats

Results: P. kurroa extract brought about a reversal of the fatty infiltration of the liver (mg/g) and a lowering of the quantity of hepatic lipids (mg/g) compared to that in the HFD control group.

P. kurroa extract brought about a reversal of the fatty infiltration of the liver (mg/g) and a lowering of the quantity of hepatic lipids (mg/g) compared to that in the HFD control group.

6)

Authors and Title: Anti diabetic activity of standardized extract of Picrorhiza kurroa in rat model of NIDDM Gulam M.H. et al.

Journal & Year: Drug Discov Ther. (2009)3; 3:88-92.

Study Type: Animal study

Sample Size (where disclosed): NA

Results: PkE treatment induced significant reduction ($p < 0.001$) in elevated fasting blood glucose level in streptozotocinnicotinamide induced type-2 diabetic rats. In oral glucose tolerance test, oral administration of PkE increased the glucose tolerance. PkE treatment also significantly ($p < 0.001$) reversed the weight loss associated with streptozotocin treatment. These findings provide in vivo evidence that standardized extract of Picrorhiza kurroa possess significant anti diabetic activity in streptozotocin-nicotinamide induced type-2 diabetes mellitus in rats.

Syzygium Cumini – Jambubeej, Eugenia jambolana

1)

Authors and Title: Jamun (*Syzygium cumini*) seed and fruit extract attenuate hyperglycaemia in diabetic rats. Masood A.R. et al.

Journal & Year: Asian Pacific Journal of Tropical Biomedicine (2017) 7; 8: 750-754

Study Type: Controlled animal study

Sample Size (where disclosed): NA

Results: The present research revealed that both jamun fruit and seeds have potent prophylactic role against hyperglycaemia. In this respect, diet based regimen may be tailored using jamun fruit/seed and their extracts to alleviate hyperglycaemia.

Jamun seed and fruit extracts proved effectual in the regulation of [blood glucose and insulin](#) parameters. Likewise, hyperglycaemia and hyperinsulinemia were also managed by the provision of jamun seed extracts. Results exhibited that fruit has lower potential than seed in reducing the sugar levels of diabetic rats. It can be concluded that jamun is potential source of naturally occurring bioactive components, thus regulating the blood glucose profile and may be used as curing therapy in diabetes.

2)

Authors and Title: *Syzygiumcumini* (L.)Skeels., a novel therapeutic agent for diabetes: Folk medicinal and pharmacological evidences. Ayyanar M. et al.

Journal & Year: Complementary Therapies in Medicine (2013)21,232—243

Study Type: Review

Sample Size (where disclosed): 51 papers

Results: Jambolan exerts an action like sulphonylurea and biguanides and brings about its hypoglycaemic action through stimulation of surviving-cells of islets of Langerhans to release more insulin. However, it increases G-6- Pase content in liver indicating an overall increase in glucose influx; thus it has an overall effect in increasing glucose homeostasis and it may be acting as hypoglycaemic agent by the enhanced insulin content through increasing activity of cathepsin B.

Different parts of jambolane especially fruits, seeds and stem bark possess promising activity against diabetes. Based on the antidiabetic effects of jambolan described in the present review.

3)

Authors and Title: A review on the role of jamun, *syzygium cumini* skeels in the treatment of diabetes. Jagetia G. C

Journal & Year: .Int J Complement Alt Med. (2018)11(2):91–95.

Study Type: Review

Sample Size (where disclosed): Animal study

Results: The seed, fruit and the extract of stem bark of was found to be effective in reducing the blood glucose levels in spontaneous diabetic rats.

4)

Authors and Title: Syzygium cumini inhibits adenosine deaminase activity and reduces glucose levels in hyperglycaemic patients A. Bopp A. Et al.

Journal & Year: Fundamental & Clinical Pharmacology 23 (2009) 501–507

Study Type: RCT

Sample Size (where disclosed): 112

Results: Serum total ADA activities in hyperglycaemic patients were significantly higher than ADA activities observed in controls. A significant positive correlation between serum ADA activities and blood glucose levels was also observed

5)

Authors and Title: Hypoglycaemic and hypolipidaemic effects of triterpenoid-enriched Jamun (: Eugenia jambolana Lam.) fruit extract in streptozotocin-induced type 1 diabetic mice Xu J. Et al

Journal & Year: Food and Function (2018) 9; 6:3330-3337

Study Type: Animal study

Sample Size (where disclosed): NA

Results: Histopathology and mechanism-based studies revealed that triterpenoid-enriched Jamun fruit extract preserved the architecture and function of pancreatic islets, attenuated insulin secretion deficiency, enhanced insulin/AKT signaling transduction, reduced lipogenic gene expression, and prevented the abnormal activation of Erk MAPK in the liver tissues of the STZ-induced diabetic mice.

6)

Authors and Title: Effect of Syzygium cumini (jamun) seed powder on glycaemic control: A double-blind randomized controlled trial. Sidana S. et al

Journal & Year: J Med Soc (2017); 31:185-9.

Study Type: RCT

Sample Size (where disclosed): 113

Results: The study found the effective role of S. cumini in lowering blood glucose levels in type 2 DM patients with poor glycaemic control on OHAs. Mean F.P.G. levels reduced from 143 ± 13.42 mg/dl to 131 ± 14.97 mg/dl, 121 ± 15.14 mg/dl, and 110 ± 15.49 mg/dl and after 30, 60, and 90 days of supplementation with S. cumini seed powder which was a statistically significant reduction by 9.16%, 18.18%, and 30%, respectively.

Fenugreek - Methi, Trigonella foenum graecum

1)

Authors and Title: Best herbs for managing diabetes: A review of clinical studies Ghorbani A.

Journal & Year: Brazilian Journal of Pharmaceutical Sciences (2013) 49;3:413-422

Study Type: Review of clinical studies

Sample Size (where disclosed): Small study numbers ranging from 5 -46 patients

Results: Trigonella foenum-graecum has been shown to induce hypoglycaemic and, in some cases, hypolipidaemic activities in diabetic patients. Among them, Gymnema sylvestre, Momordica charantia, Silybum marianum and Trigonella foenum-graecum have acquired enough reputation for managing diabetes. Thus, it seems that physicians can rely on these herbs and advise for the patients to improve management of diabetes.

2)

Authors and Title: Effect of Trigonella foenum-graecum (fenugreek) seeds on glycaemic control and insulin resistance in type 2 diabetes mellitus: a double blind placebo controlled study. Gupta A. Et al.

Journal & Year: [J Assoc Physicians India.](#) (2001) Nov; 49:1057-61.

Study Type: Double blind placebo

Sample Size (where disclosed): 25

Results: Adjunct use of fenugreek seeds improves glycaemic control and decreases insulin resistance in mild type-2 diabetic patients. There is also a favourable effect on hypertriglyceridemia.

3)

Authors and Title: Effect of fenugreek seeds on blood glucose and lipid profiles in type 2 diabetic patients. Kassaian N. et al

Journal & Year: [Int J Vitam Nutr Res.](#) (2009) Jan; 79(1):34-9.

Study Type: Clinical trial

Sample Size (where disclosed): 24

Results: This study shows that fenugreek seeds can be used as an adjuvant in the control of type 2 diabetes mellitus in the form of soaked in hot water.

4)

Authors and Title: A randomized controlled clinical trial evaluating the effect of Trigonella foenum-graecum (fenugreek) versus glibenclamide in patients with diabetes. Najdi R.A. et al

Journal & Year: [Afr Health Sci.](#) (2019)19(1):1594-1601.

Study Type: Controlled trial

Sample Size (where disclosed): 12 in two groups

Results: Fenugreek at 2 g/day caused an insignificant drop in fasting blood glucose ($P = 0.63$), but the fasting insulin level increased significantly ($P = 0.04$). The ratio of high- to low-density lipoprotein was significantly decreased from before to after treatment ($P = 0.006$). Fenugreek did not cause any notable adverse impacts on hepatic and renal functions throughout the study.

5)

Authors and Title: Fenugreek bread: a treatment for diabetes mellitus. Losso J.N et al

Journal & Year: [J Med Food](#). (2009) 2; 5:1046-9.

Study Type: Double blind randomized

Sample Size (where disclosed): 8

Results: The area under the curve for glucose and insulin was lower in the fenugreek-containing bread, but only reached significance with insulin ($P < .05$).

6)

Authors and Title: The Postprandial Hypoglycemic Activity of Fenugreek Seed and Seeds' Extract in Type 2 Diabetics: A Pilot Study. Bawadi H. Et al.

Journal & Year: Pharmacognosy Magazine. (2009). 4. 134-138.

Study Type: RCT

Sample Size (where disclosed): 166

Results: Fenugreek seeds appear to have a significant hypoglycaemic effect in patients with type 2 diabetes.

Turmeric – Haldi, Curcuma longa

1)

Authors and Title: Antioxidant and anti-inflammatory activities of curcumin on diabetes mellitus and its complications. Meng B et al.

Journal & Year: [Curr Pharm Des.](#) (2013)19(11):2101-13.

Study Type: Review

Sample Size (where disclosed): NA

Results: Curcumin can be considered suitable for the prevention and amelioration of diabetes.

2)

Authors and Title: Experimental evidence for curcumin and its analogues for management of diabetes mellitus and its associated complications. Rivera-Mancía S et al.

Journal & Year: [Eur J Pharmacol.](#) (2015) 5; 756:30-7.

Study Type: Review

Sample Size (where disclosed): NA

Results: The shortening of the central seven-carbon chain of curcumin has given rise to compounds without glucose-lowering effects but potentially useful for the treatment of diabetes complications; whereas preserving this chain retains the glucose-lowering properties in animal research.

3)

Authors and Title: Effects of curcumin on serum cytokine concentrations in subjects with metabolic syndrome: post hoc analysis of a randomized controlled trial Panahia Y. et al

Journal & Year: Biomedicine & Pharmacotherapy (2016) 82:578-582

Study Type: RCT

Sample Size (where disclosed): 117

Results: It suggests that curcumin supplementation significantly decreases serum concentrations of pro-inflammatory cytokines in subjects with Metabolic Syndrome.

4)

Authors and Title: Antioxidant and Anti-inflammatory Activities of Curcumin on Diabetes Mellitus and its Complications Meng B. Et al

Journal & Year: Current Pharmaceutical Design (2011) 19;11:2101-13

Study Type: Review

Sample Size (where disclosed): NA

Results: Discusses the anti-oxidant and anti-inflammatory activities of curcumin in DM and its ability to mitigate the effects on DM and its associated complications in detail.

5)

Authors and Title: Curcumin: A Natural Product for Diabetes and its Complications Nabavi S.F. et al

Journal & Year: Current Topics in Medicinal Chemistry (2015) 15; 23: 2455-55

Study Type: Systematical discussion

Sample Size (where disclosed): NA

Results: Overall, scientific literature shows that curcumin possesses anti-diabetic effects and mitigates diabetes complications

6)

Authors and Title: Targeted delivery of curcumin for treating type 2 diabetes Muralidhara Rao Maradana, Ranjeny Thomas and Brendan J. O'Sullivan

Journal & Year: Mol. Nutr. Food Res. 2013, 57, 1550–1556

Study Type: Review

Sample Size (where disclosed): NA

Results: A number of studies have shown that dietary curcumin reduces inflammation and delays or prevents obesity-induced insulin resistance and associated complications, including atherosclerosis and immune mediate liver disease

Several randomized, double-blind, placebo-controlled human trials have been conducted either with active curcumin or curcuminoids (turmeric extract) to study their effect on inflammation and insulin resistance. Anti hyperglycaemic effects of curcumin have been observed in T2D and obese patients [30] similar to the observations made in animal models

Amla -Emblica officinalis

1)

Authors and Title: A systematic review on the cardiovascular pharmacology of *Emblica officinalis* Gaertn. Hashem- dabaghian F. Et al

Journal & Year: [J Cardiovasc Thorac Res](#). (2018) 10; 3: 118–128.

Study Type: Systematic review

Sample Size (where disclosed): 19 studies

Results: The plant has shown anti-atherogenic, anticoagulant, hypolipidaemic, antihypertensive, antioxidant, anti-platelet, and vasodilatory effects as well as lipid deposition inhibitory properties.

However, there is not sufficient evidence to confirm the plant efficacy in preventing and treating CVD, nor is there a definitive decision on the efficacy of this plant. NB animal studies comprise the majority of the evidence reviewed.

However, the EO fruit is safe, and no side effects have been reported in clinical studies. The EO fruit extract reduces blood sugar levels. Thus, caution should be taken when using hypoglycaemic medications, and patients taking insulin or drugs for diabetes need to be monitored closely. In addition, EO decreases serum lipid levels; hence, cholesterol- or triglyceride-lowering medications should be taken with caution.

EO fruit is also a rich source of tannin and may interfere with intestinal absorption of iron.

2)

Authors and Title: Effect of Amla fruit (*Emblica officinalis* Gaertn.) on blood glucose and lipid profile of normal subjects and type 2 diabetic patients. Akhtar MS, et al.

Journal & Year: *Int J Food Sci Nutr*. (2011)62;6:609-16

Study Type: RCT

Sample Size (where disclosed): 32 (16 in each arm)

Results: In volunteers with and without type 2 diabetes, 2 to 3 g daily of powdered, dried emblica fruit improved the lipid profile (decreased total cholesterol, low-density lipoprotein, and triglycerides; increased high-density lipoprotein) at 21 days. Only among the volunteers with diabetes was there a decrease in total lipids at the 3 g daily dose.

The results of the present study indicated a significant decrease ($P < 0.05$) in fasting and 2-h post-prandial blood glucose on day 21 in normal subjects and diabetic patients as compared with baseline values (day 0). The supplementation of powdered Amla fruit at all the given doses did not show any negative impact on blood glucose levels in both the normal and diabetic subjects as these values remained within the normal blood glucose range; that is, 70–110 mg/dl (World Health Organization 2006 World Health Organization. 2006. Definition and Diagnosis of Diabetes Mellitus and Intermediate Hyperglycaemia: Report of a World Health Organisation (WHO) and International Diabetes Federation (IDF) Consultation. Geneva, Switzerland: WHO Document Publication Services. [\[Google Scholar\]](#))

NB Doses of 1, 2 and 3 gms of the plant were used, which are greater than the 240mg in the daily dose for which this review is being conducted.

3)

Authors and Title: Anti-diabetic effects of the Indian indigenous fruit *Emblica officinalis* Gaertn: active constituents and modes of action. D'souza J.J. et al

Journal & Year: [Food Funct.](#) (2014) 5;4:: 635-44.

Study Type: Review

Sample Size (where disclosed): NA

Results: Amla has been reported to prevent/reduce hyperglycaemia, cardiac complications, diabetic nephropathy, neuropathy, cataractogenesis and protein wasting. However, clinical trial data with human subjects are limited and preliminary.

4)

Authors and Title: Commonly Used Herbal Food Supplements. Deng R.

Journal & Year: [Recent Pat Food Nutr Agric.](#) (2012); 4; 1: 50–60.

Study Type: Review

Sample Size (where disclosed): RCTs using groups in various numbers

Results: The data from human clinical studies did not support a recommendation for all five supplements to manage hyperglycaemia. Fenugreek and composite supplements containing *emblica officinalis* showed the most consistency in lowering fasting blood sugar (FBS) or glycated haemoglobin (HbA1c) levels in diabetic patients.

Limitations are noticed in a considerable number of clinical studies including small sample size, poor experimental design and considerable variations in participant population, preparation format, daily dose, and treatment duration.

It is suggested that there is strong scientific evidence (Level B1) to support that composite supplements containing *emblica officinalis* is effective in lowering blood glucose levels in diabetic patients. However, there was not enough evidence to support the hypoglycaemic activity of *emblica officinalis* alone.

5)

Authors and Title: Impact of Amla (*Embilica Officinalis*) supplementation on the glycaemic and lipidaemic status of type 2 diabetic subjects Iyer U. Et al

Journal & Year: [J Herbal Medicine and Toxicol.](#) (2009)3:15–21.

Study Type: RCT

Sample Size (where disclosed): 49 people, 30 in treatment group and 19 controls

Results: The treatment group took a medium sized fresh amla (~35g) on a daily bases while the control group received no supplementation for 2 months. During the course of study, no modification in the diet or medication was made in both groups. At the end of study, no significant reduction in both FBS and HbA1c levels were detected in the treatment and control group. However, more detailed analysis of the data revealed that a significant reduction in FBS was achieved in subjects with FBS > 150 mg/dl, accompanied by a non significant fall in HbA1c levels. It was thus concluded that consumption of fresh *emblica officinalis* fruit improved FBS levels in diabetic patients with high FBS levels.

6)

Authors and Title: Suresh S, Satheesh Kumar R, Augusti KT. A study on the hypoglycaemic and hypolipidaemic effects of an ayurvedic drug Ra-janyamalakadi in diabetic patients. Indian Faizal P. et al

Journal & Year: J. Clinical Biochem. (2009); 24:82–7.

Study Type: RCT

Sample Size (where disclosed): 53 people 43 who had been diagnosed with type 2 diabetes and 10 non diabetic volunteers

Results: Regarding EO, a significant reduction in both FBS and HbA1c levels were detected in all the three age groups. When grouping the patients based on initial FBS levels into subjects with FBS levels above or below 145.9 mg/dL, both groups exhibited significant decreases in FBS and HbA1c levels. However, it remained undetermined how much emblica officinalis contributes to the observed hypoglycaemic effect.

General evidence across a range of herbs

1)

Authors and Title: Ayurvedic treatments for diabetes mellitus Sridharan K et al

Journal & Year: Cochrane Database of Systematic Reviews 2011, Issue 12. Art. No.: CD008288. DOI: 10.1002/14651858.CD008288.pub2.

Study Type: Systematic Review

Sample Size (where disclosed): NA

Results: Some evidence for the effectiveness of certain herbs in the control of diabetes, but robustness appears to be an issue.

2)

Authors and Title: A review of five traditionally used anti-diabetic plants of Bangladesh and their pharmacological activities Rafe M.D

Journal & Year: Asian Pacific Journal of Tropical Medicine (2017) 10;10: 933-939

Study Type: Review

Sample Size (where disclosed): NA

Results: Chirata root is used for the treatment of diabetes with a mixture of honey. It is taken 1–2 g a dose per day in the morning.

When animal models were treated with a 250 mg/kg *S. chirata* ethanolic plant extract, it significantly reduced the blood glucose level in [tolbutamide](#) pre-treated, glucose fed and fasted animals.

3)

Authors and Title: Hypoglycaemic activity of an indigenous drug (*Gymnema sylvestre*, 'Gurmar') in normal and diabetic persons A.K. Khare, et al

Journal & Year: Indian Journal of Physiology and Pharmacology(1983), 27 (3), pp. 257-258

Study Type: RCT

Sample Size (where disclosed): 16

Results: In a clinical observation of aqueous decoction of *G. sylvestre* leaves (2 gm thrice daily) to 10 healthy persons (10 days) and 6 diabetic patients (15 days) significantly reduced the fasting and OGTT glucose level in all the groups except OGTT in healthy group

4)

Authors and Title: Medicinal plants of India with anti-diabetic potential. Grover, J. Et al

Journal & Year: J. Ethnopharmacol (2002) 8: 81–100.

Study Type: Review

Sample Size (where disclosed): 45 plants

Results: The paper reviewed 45 such *Gymnema sylvestre*, *Momordica charantia*, *Ocimum sanctum*, *Pterocarpus marsupium*, *Swertia chirayita*, *Syzygium cumini*, and *Tinospora cordifolia juncea*. and their products (active, natural principles and crude extracts) that have been mentioned/used in the Indian traditional system of medicine and have shown experimental or clinical anti-diabetic activity.

5)

Authors and Title: Review on Medicinal Herbs Used for Diabetes Narhe Sonal N. Et al

Journal & Year: International Journal of Pharmaceutical and Clinical Research (2018); 10(8): 224-228

Study Type: Review

Sample Size (where disclosed): Herbs of relevance referred to in the paper - *Gymnema sylvestre*, *Syzygium cumini* and *Momordica charantia*

Results: The study aimed to produce an inventory of plants used by traditional healers in southern western Ghats of Tamil Nadu to treat diabetes. The paper reveals whether fresh or dried herbs were used and in what quantities

6)

Authors and Title: A review on anti diabetic and antioxidant activity of bhunimbadi churna. BC Patel

Journal & Year: International Journal of pharmaceutical research and bioscience (2014)3(2): 223 237

Study Type: Review

Sample Size (where disclosed): NA

Results: Bhunimbadi churna includes the herbs *Swertia chirata*, *Katuki* *Picrorrhiza kurroa*. In various pharmacological studies, done in few decades on the drugs of Bhunimbadi Churna, it has been proved that almost all the constituents of Bhunimbadi Churna, pose anti hyperglycaemic, hypolipidaemic, antioxidant and other therapeutic properties.

Potential Side-Effects and Drug Interactions

Neempan - Melia azadirachia

Potential side effects in adults: In the Chinese medical literature, human M. azedarach poisoning is said to occur if six to nine fruits, 30 to 40 seeds, or 400 g of the bark is consumed. Onset of symptoms typically occurs within 4-6 h, M. azedarach poisoning may result in gastrointestinal, cardiovascular, respiratory, or neurological effects, and death in severe cases.

Neem is possibly safe for most adults when taken by mouth for up to 10 weeks, when applied inside the mouth for up to 6 weeks, or when applied to the skin for up to 2 weeks. When neem is taken in large doses or for long periods of time, it is possibly unsafe. It might harm the kidneys and liver

Pregnancy and breast-feeding: Neem oil and neem bark are likely unsafe when taken by mouth during pregnancy. They can cause a miscarriage.

Neem might cause the immune system to become more active. This could increase the symptoms of auto-immune diseases. In which case it is best to avoid using neem.

There is some evidence that neem can harm sperm. It might also reduce [fertility](#) in other ways. If trying to conceive, avoid using neem.

Organ transplant: There is a concern that neem might decrease the effectiveness of medications that are used to prevent organ rejection. Neem should not be used post organ transplant.

Surgery: Neem might lower blood sugar levels. There is a concern that it might interfere with blood sugar control during and after surgery. Stop using neem at least 2 weeks before a scheduled surgery.

Potential drug/herb interactions in adults: [Lithium](#) Interaction Rating: Moderate. Be cautious with this combination.

Neem might have an effect like a water pill or "diuretic." Taking neem might decrease how well the body gets rid of lithium. This could increase how much lithium is in the body and result in serious side effects. Healthcare provider should be consulted before using this product if taking lithium. The lithium dose might need to be changed.

Neem might decrease blood sugar. Diabetes medications are also used to lower blood sugar. Taking neem along with diabetes medications might cause blood sugar to go too low. Monitor blood sugar closely. The dose of diabetes medication might need to be changed.

Dosing in adults: The appropriate dose of neem depends on several factors such as the user's age, health, and several other conditions. At this time there is not enough scientific information to determine an appropriate range of doses for neem.

Gudmaar - Gymnema sylvestre

Potential side effects in adults: Gymnema is possibly safe when taken by mouth appropriately for up to 20 months.

Pregnancy and breast-feeding: There is not enough reliable information about the safety of taking gymnema when pregnant or breast feeding. Stay on the safe side and advise to avoid use.

Surgery: Gymnema might affect blood sugar levels and could interfere with blood sugar control during and after surgical procedures. Stop using gymnema at least 2 weeks before a scheduled surgery.

Potential drug/herb interactions in adults: Insulin interacts with Gymnema and might cause low blood sugar. Monitor blood sugar closely. The dose of insulin might need to be changed.

Dosing in adults: The appropriate dose of gymnema depends on several factors such as the user's age, health, and several other conditions. At this time there is not enough scientific information to determine an appropriate range of doses for gymnema

Galo -Tinospora cordifolia

Potential side effects in adults: Tinospora cordifolia might cause the immune system to become more active, and this could increase the symptoms of autoimmune diseases. Avoid the use of Tinospora cordifolia in these conditions.

Tinospora cordifolia might affect blood sugar levels, so there is a concern that it might interfere with blood sugar control during and after surgery. Stop taking Tinospora cordifolia at least 2 weeks before a scheduled surgery.

Potential drug/herb interactions in adults: Tinospora cordifolia might increase the immune system. Taking it along with some medications that decrease the immune system might decrease the effectiveness of these medications.

Tinospora cordifolia might decrease blood sugar. Diabetes medications are also used to lower blood sugar. Taking Tinospora cordifolia along with diabetes medications might cause blood sugar to go too low. Monitor blood sugar closely. The dose of diabetes medication might need to be changed.

Dosing in adults: The appropriate dose of Galo -Tinospora cordifolia depends on several factors such as the user's age, health, and several other conditions. At this time there is not enough scientific information to determine an appropriate range of doses.

Kariyatu -Swertia chirata

Potential side effects in adults: Chirata might lower [blood sugar levels](#) in some people. Watch for signs of [low blood sugar \(hypoglycaemia\)](#) and monitor [blood sugar](#) carefully in [diabetes](#) where chirata is used as a medicine.

Intestinal (duodenal) ulcers: Chirata can make ulcers in the intestine worse.

Chirata might lower blood sugar. In theory, chirata might interfere with blood sugar control during and after surgical procedures. Stop using chirata as a medicine at least two weeks before a scheduled surgery.

Potential drug/herb interactions in adults: No current information on drug interactions

Dosing in adults: The appropriate dose of chirata for use as treatment depends on several factors such as the user's age, health, and several other conditions. At this time there is not enough scientific information to determine an appropriate range of doses for chirata.

Bitter Melon – Karela, Momordica charantai

Potential side effects in adults: Bitter melon is possibly safe for most people when taken by mouth short-term (up to 3 months). Bitter melon may cause an upset stomach in some people. The safety of long-term use of bitter melon is not known.

Bitter melon is possibly unsafe when taken by mouth during pregnancy. Certain chemicals in bitter melon might start menstrual bleeding and have caused abortion in animals. Not enough is known about the safety of using bitter melon during breast-feeding. Stay on the safe side and advise to avoid use.

Glucose-6-phosphate dehydrogenase (G6PD) deficiency: People with G6PD deficiency might develop "favism" after eating bitter melon seeds. Favism is a condition named after the fava bean, which is thought to cause "tired blood" (anaemia), headache, fever, stomach pain, and coma in certain people. A chemical found in bitter melon seeds is related to chemicals in fava beans. In G6PD deficiency, advise to avoid bitter melon.

There is a concern that bitter melon might interfere with blood sugar control during and after surgery. Advise to stop using bitter melon at least 2 weeks before a scheduled surgery.

Potential drug/herb interactions in adults: Bitter melon can decrease blood sugar levels. Diabetes medications are also used to lower blood sugar. Taking bitter melon along with diabetes medications might cause your blood sugar to be too low. Monitor blood sugar closely. The dose of diabetes medication might need to be changed

Dosing in adults: The appropriate dose of bitter melon depends on several factors such as the user's age, health, and several other conditions. At this time, there is not enough scientific information to determine an appropriate range of doses for bitter melon.

Kutaki - Picorhiza kurroa

Potential side effects in adults: Picrorhiza is possibly safe for most people, when taken by mouth for up to one year. It can cause vomiting, rash, anorexia, diarrhea, and itching.

There is not enough reliable information about the safety of taking picrorhiza when pregnant or breast-feeding. Stay on the safe side and advise to avoid use.

“Auto-immune diseases” such as [multiple sclerosis](#) (MS), lupus (systemic lupus erythematosus, SLE), [rheumatoid arthritis](#) (RA), or other conditions: Picrorhiza might cause the immune system to become more active. This could increase the symptoms of auto-immune diseases. If you have one of these conditions, it's best to avoid using picrorhiza.

Picrorhiza might lower blood sugar in some people. In theory, picrorhiza might interfere with blood sugar control during and after surgical procedures. Advise to stop using picrorhiza at least 2 weeks before a scheduled surgery.

Potential drug/herb interactions in adults: Picrorhiza might increase the immune system. Taking picrorhiza along with medications that decrease the immune system might decrease the effectiveness of these medications. Caution is advised.

Picrorhiza might lower blood sugar levels in some people. Watch for signs of low blood sugar (hypoglycaemia) and monitor blood sugar carefully in diabetes and use picrorhiza.

Dosing in adults: The following doses have been studied in scientific research:

For a disease called vitiligo that causes white patches on the skin: 200 mg of picrorhiza rhizome powder twice a day, in combination with a medication called methoxsalen that is taken by mouth and applied to the affected skin.

No information on dosage for type 2 diabetes

Syzgium Cumini – Jambubeej, Eugenia jambolana

Potential side effects in adults: Jambolan is possibly safe for most people when taken by mouth, short-term. Jambolan tea prepared from 2 grams of jambolan leaves per liter of water seems to be safe.

There isn't enough reliable information to know

if jambolan is safe to use when pregnant or breast-feeding. Advise to avoid use.

Jambolan might lower blood sugar levels. There is some concern that it might interfere with blood sugar control during and after surgery. Advise to stop using jambolan at least 2 weeks before a scheduled surgery.

Potential drug/herb interactions in adults: Jambolan seed and bark extracts might decrease blood sugar levels. Diabetes medications are also used to lower blood sugar. Taking jambolan seed or bark along with diabetes medications might cause low blood sugar. Monitor blood sugar closely. The dose of diabetes medication might need to be changed.

Dosing in adults: The appropriate dose of jambolan depends on several factors such as the user's age, health, and several other conditions. At this time there is not enough scientific information to determine an appropriate range of doses for jambolana.

Fenugreek Methi -Trigonella foenum graecum

Potential side effects in adults: When taken in large doses, side effects can include gas and bloating.

Potential drug/herb interactions in adults: Fenugreek can also react with several medications, especially with those that treat blood clotting disorders and diabetes. A reduction in diabetes medication doses to avoid low blood sugar may be required.

Dosing in adults: For diabetes: 5-100 grams of powdered fenugreek seed added to one or two meals daily for 4 days to 3 years has been used. A dose of 1 gram daily of an extract of fenugreek seeds has been used.

Turmeric – Haldi, Curcuma longa

Potential side effects in adults: Turmeric is likely safe when taken by mouth for up to 12 months. Turmeric usually does not cause serious side effects. But some people can experience stomach upset, nausea, dizziness, or diarrhea. In one report, a person who took very high amounts of turmeric, over 1500 mg twice daily, experienced a dangerous abnormal heart rhythm. However, it is unclear if turmeric was the actual cause of this side effect. Until more is known, avoid taking excessively large doses of turmeric.

Turmeric is likely safe when taken by mouth in food amounts during pregnancy or breast-feeding. However, turmeric is likely unsafe when taken by mouth in medicinal amounts during pregnancy. It might promote a menstrual period or stimulate the uterus, putting the pregnancy at risk. Do not take medicinal amounts of turmeric when pregnant. There is not enough reliable information to know if turmeric is safe to use in medicinal amounts during breast-feeding. Advise to avoid use.

Turmeric can make gallbladder problems worse. Do not use turmeric if there are gallstones or a bile duct obstruction.

Taking turmeric might slow blood clotting. This might increase the risk of bruising and bleeding in people with bleeding disorders.

Turmeric can cause stomach upset in some people. It might make stomach problems such as gastroesophageal reflux disease (GERD) worse. Advise to stop turmeric if it worsens symptoms of GERD.

Turmeric contains a chemical called curcumin, which might act like the hormone oestrogen. In theory, turmeric might make hormone-sensitive conditions worse. However, some research shows that turmeric reduces the effects of oestrogen in some hormone-sensitive cancer cells. Therefore, turmeric might have beneficial effects on hormone-sensitive conditions. Until more is known, advise to use cautiously in conditions that might be made worse by exposure to hormones.

Turmeric might lower testosterone levels and decrease sperm movement when taken by mouth by men. This might reduce fertility. Turmeric should be used cautiously by people trying to have a baby.

Taking high amounts of turmeric might prevent the absorption of iron. Turmeric should be used with caution in people with iron deficiency.

Turmeric might slow blood clotting. It might cause extra bleeding during and after surgery. Stop using turmeric at least 2 weeks before a scheduled surgery.

Potential drug/herb interactions in adults: Turmeric might slow blood clotting. Taking turmeric along with medications that also slow clotting might increase the chances of bruising and bleeding.

Turmeric may reduce blood glucose levels, use with caution when using hypoglycaemic medication.

Dosing in adults: No dosage advice for the treatment of type 2 diabetes.

Amla - Emblica officinalis

Potential side effects in adults: Ayurvedic formulations containing Indian gooseberry have been linked to liver damage. But it's not clear if taking Indian gooseberry alone would have this effect.

There isn't enough reliable information to know if Indian gooseberry is safe to use as medicine when pregnant or breast-feeding. Stay on the safe side and stick to food amounts.

Indian gooseberry might increase the risk of bleeding or bruising in some people with a bleeding disorder, advise use Indian gooseberry with caution.

In theory, taking Indian gooseberry with ginger, *Tinospora cordifolia*, and Indian frankincense might make liver function worse in people with liver disease. But it's not known if taking Indian gooseberry alone can have these effects.

Indian gooseberry might increase the risk of bleeding during and after surgery. Stop taking Indian gooseberry at least 2 weeks before a scheduled surgery.

Potential drug/herb interactions in adults: Indian gooseberry might decrease blood sugar levels. Diabetes medications might need to be adjusted.

Dosing in adults: No dosage advice for the treatment of type 2 diabetes.