



Central Ayurveda Research Institute

Govt. of India, Ministry of AYUSH,
Central Council for Research in Ayurvedic Sciences

CHEMISTRY BEHIND FAMILIAR ANTI-DIABETIC PLANTS



Discover Ayurvedic Solutions for Diabetes!



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Turmeric

A Golden Root for Health

Why is Turmeric Beneficial?

- Rich in curcuminoids (3-6%):
 - Curcumin
 - Demethoxycurcumin
 - Bis-demethoxycurcumin
- Other Benefits :
 - Anti-parasitic properties
 - Antispasmodic effects
 - Anti-inflammatory action
 - Anticarcinogenic benefits
 - Gastrointestinal support



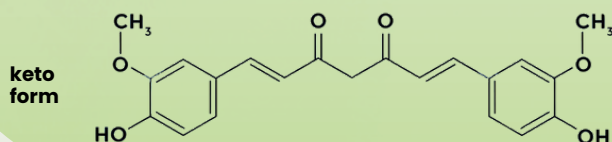
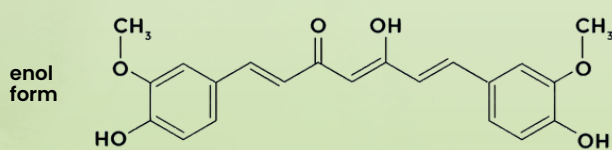
How Does Turmeric Improve Blood Glucose Levels?

Decreases blood glucose and glycosylated hemoglobin levels by:

- Reducing hepatic glucose production
- Enhancing glycogen synthesis
- Stimulating glucose uptake by increasing expression of GLUT1, GLUT2, GLUT3 genes



CURCUMIN $C_{21}H_{20}O_6$

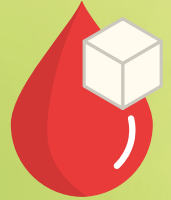


Cinnamon

A Natural Aid for Blood Sugar Management

How Does Cinnamon Work?

- Cinnamon helps lower blood sugar levels by imitating the effects of insulin
- The Key Component:
 - *Methyl Hydroxy Chalcone* is the chemical constituent responsible for decreasing blood sugar levels.
 - It assists in blunting blood sugar spikes by stimulating glucose oxidation.

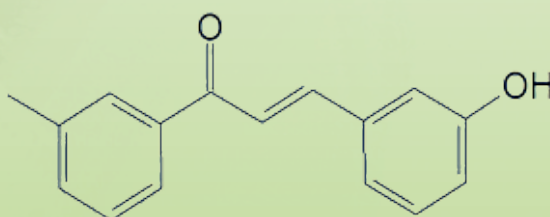


Health Benefits of Cinnamon Consumption

- Significant Decrease in:
 - Fasting plasma glucose levels
 - Total cholesterol
 - LDL-C (bad cholesterol)
 - Triglyceride levels
- Significant Increase in:
 - HDL-C (good cholesterol) levels



Methyl Hydroxy Chalcone



AMLA

A Natural Powerhouse for Health

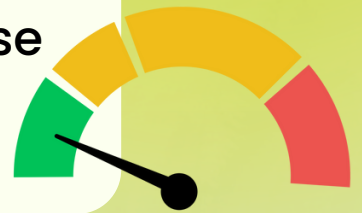
Nutritional Richness of Amla

- Amla is a rich source of vitamin C and carotenoids
- It contains various polyphenols, including *Ellagic acid*, *Gallic acid*, *Apigenin*, *Quercetin*, *Luteolin* and *Corilagin*



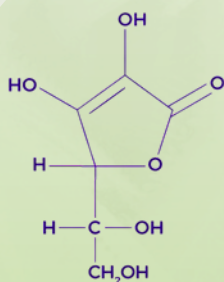
Role of Amla in Blood Sugar Management

- Reducing fasting blood glucose levels
- Lowering post-prandial blood glucose levels
- Decreasing HbA1c levels

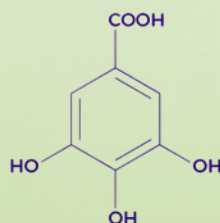


Antihyperglycemic Properties of Amla

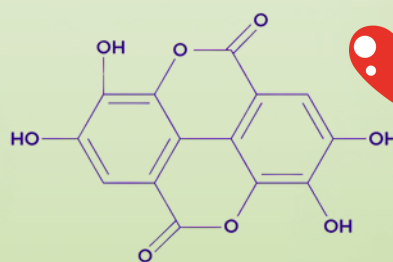
- Amla inhibits aldose reductase, contributing to its antihyperglycemic effects
- This makes it a powerful natural solution for managing blood sugar levels



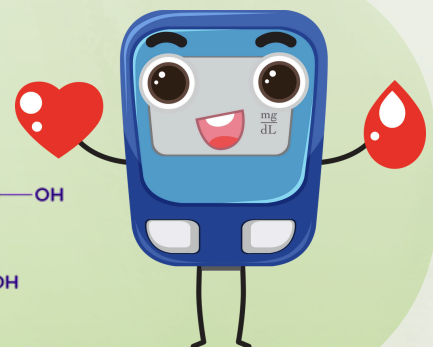
Vitamin C



Gallic acid



Ellagic acid



FENUGREEK SEEDS

A Natural Aid for Diabetes Management

Key Component: Galactomannan

Galactomannan, the most effective dietary fiber found in fenugreek seeds, is known for its role in reducing:

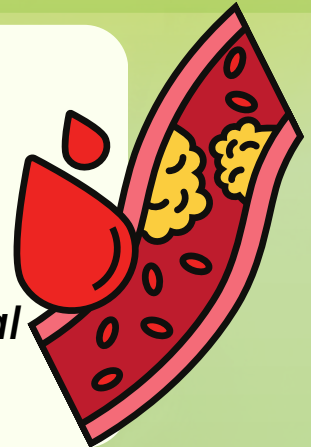
- HbA1c levels
- Fasting blood glucose levels
- Triglycerides
- LDL cholesterol



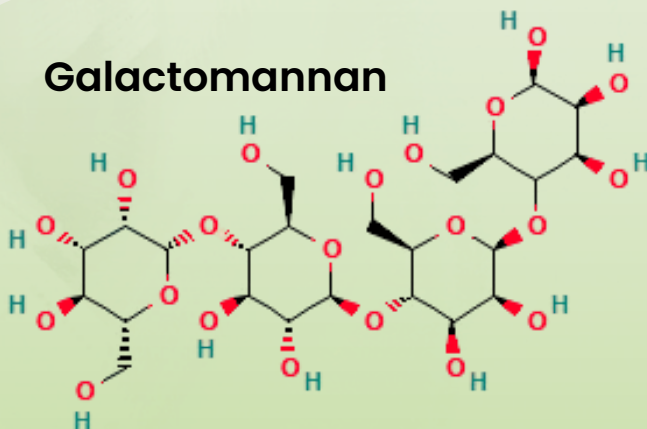
How Fenugreek Seeds Help Lower Blood Sugar?

Slows down digestion and absorption of carbohydrates, helping to regulate blood sugar levels effectively.

This natural remedy is particularly beneficial for patients with type 2 diabetes.



Galactomannan



Neem

A Natural Powerhouse of Nutrients and Wellness

Rich Source of Amino Acids and Fatty Acids

Neem leaves are packed with essential amino acids and fatty acids such as *Tyrosine, Alanine, Cysteine, Glutamic acid, and Glutamine.*



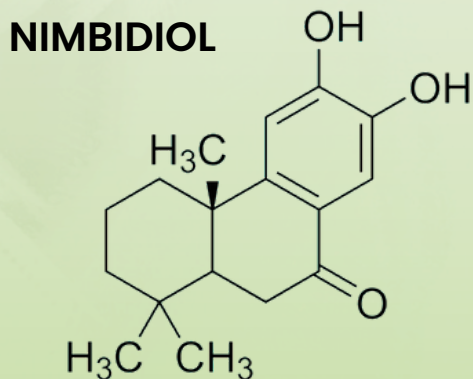
Health Benefits of Neem

Neem leaf components exhibit various therapeutic properties, including *Antibacterial, Anticarcinogenic, Antihyperglycemic, Anti-inflammatory, and Antioxidant effects*



Key Component: Nimbidiol

Nimbidiol, a flavonoid found in neem leaves, plays a significant role in managing blood sugar levels by increasing insulin sensitivity and stimulating glucose uptake into cells.



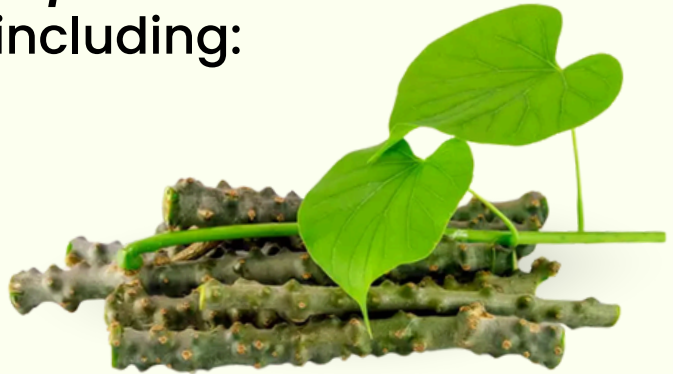
INDIAN TINOSPORA

A Natural Solution for Diabetes Management

Bio-Active Components in Tinospora Leaves

The leaves of Indian *Tinospora* contain bio-active chemical components, including:

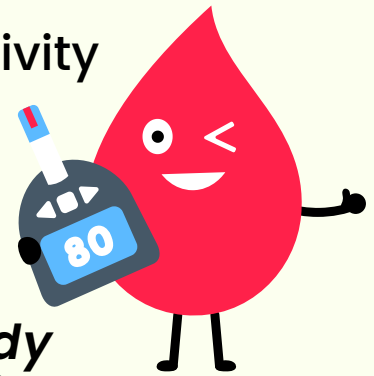
- Tinosporine
- Cordifolide
- Tinosporide
- Barberin



These components play a vital role in its anti-diabetic properties.

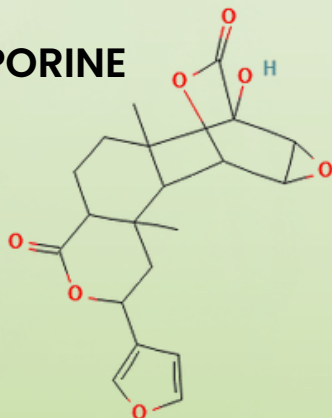
How Indian Tinospora Helps Control Sugar Levels?

- Exhibits **α -glucosidase** inhibiting activity
- Promotes **glycolysis**, aiding in the regulation of blood sugar levels effectively



Indian Tinospora is a natural remedy with powerful anti-diabetic potential

TINOSPORINE



MORINGA LEAVES

A Natural Remedy for Diabetes Management

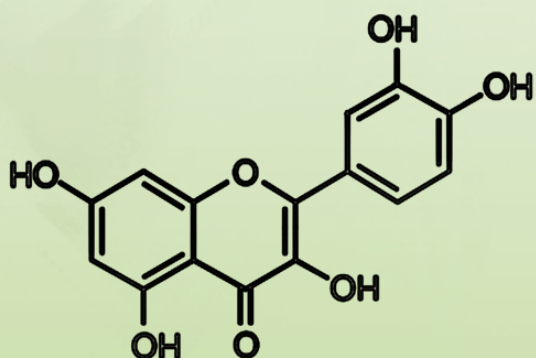
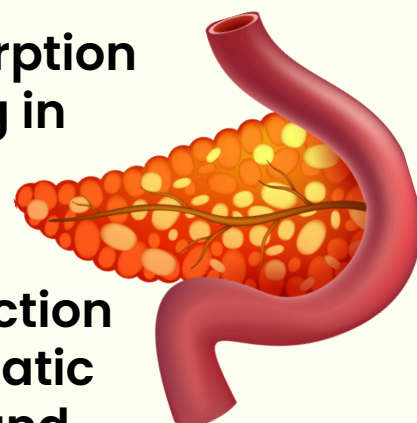
Bioactive Substances in Moringa

- The anti-diabetic properties of moringa are attributed to its high concentration of bioactive substances, including:
 - Flavonoids
 - Phenolic Acids
 - Alkaloids

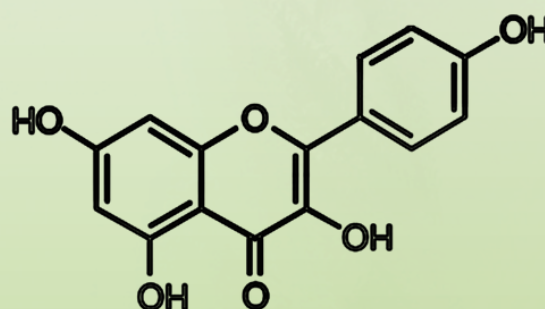


Probable Mechanism of Action

- Quercetin
 - Found in moringa leaves, quercetin enhances muscle cell glucose absorption
 - It improves insulin sensitivity, aiding in better blood sugar regulation
- Kaempferol
 - Kaempferol promotes insulin production
 - It reduces oxidative stress in pancreatic beta-cells, supporting their health and function



Quercetin



Kaempferol

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