



Karalla, Bitter Melon, Bitter Gourd, Momordica

Botanical Name: *Momordica charantia* (family Curcubitaceae)

The fruit contains several biologically active constituents that include glycosides e.g. momordicins I and II, 25 ξ -isopropenylchole-5, taiwacin A(1),23,24,25,26,27-pentanorcucurbitane, and steroidal saponins e.g. charantins, Kuguacin J.

References:

- Liu P et al. A new C30 sterol glycoside from the fresh fruits of *Momordica charantia*. *Chi. J. Nat. Med* 10.2 (2012):88–91.
- Lin K-W et al. Antioxidant constituents from the stems and fruits of *Momordica charantia*. *Food Chem* 127.2 (2011): 609–14.
- Pitchakarn P et al. Kuguacin J, a triterpenoid from *Momordica charantia* leaf, modulates the progression of androgen-independent human prostate cancer cell line, PC3. *Food Chem Toxicol* 50(2012): 840–47.

Antidiabetic Property:

In traditional medicine, this fruit has been used to treat diabetes. Thus in modern times, it is intensively studied for its antidiabetic claim. Here we present a very brief summary of over 140 studies on this potential of various constituents of *Momordica charantia* in animal models and human studies.

References:

- Ahmed I et al. Beneficial effects and mechanism of action of *Momordica charantia* juice in the treatment of streptozotocin-induced diabetes mellitus in rat. *Mol Cell Biochem* 261 (2004): 63–70.
- Bailey CJ et al. Cerasee, a traditional treatment for diabetes: studies in normal and streptozotocin diabetic mice. *Diabetes Res* 2 (1985): 81–84.
- Chaturvedi P. Role of *Momordica charantia* in maintaining the normal levels of lipids and glucose in diabetic rats fed a high-fat and low-carbohydrate diet. *Br J Biomed Sci* 62.3 (2005): 124–126.
- Day C et al. Hypoglycaemic effect of *Momordica charantia* extracts. *Planta Med* 56 (1990): 426–429.
- Harinantenaina L et al. *Momordica charantia* constituents and antidiabetic screening of the isolated major compounds. *Chem Pharm Bull (Tokyo)* 54.7 (2006): 1017–1021.

The aqueous extract of fresh, unripe, whole fruits reduced fasting blood glucose by 50%, which was consistent until the study ended. These observations have special significance when one considers that the whole bitter melon is cooked in water and consumed in many cultures, particularly in India

Reference:

- Viridi J et al. Antihyperglycemic effects of three extracts from *Momordica charantia*. *J Ethnopharmacol* 88 (2003): 107–111.

It appears to stimulate pancreatic insulin secretion, improves peripheral glucose uptake and improves insulin sensitivity and signaling.

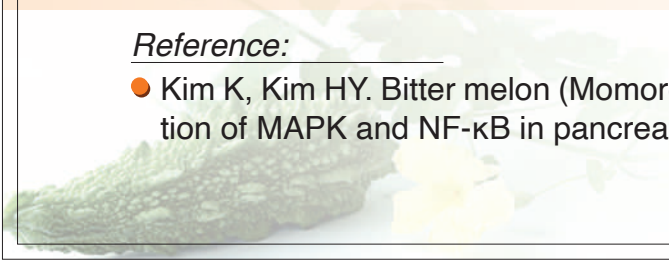
References:

- Fernandes NP et al. An experimental evaluation of the antidiabetic and antilipidemic properties of a standardized *Momordica charantia* fruit extract. *BMC Complement Altern Med* 7 (2007): 29.
- Welihinda J et al. The insulin-releasing activity of the tropical plant *Momordica charantia*. *Acta Biol Med Ger* 41 (1982): 1229–1240.
- Welihinda J, Karunanayake EH. Extra-pancreatic effects of *Momordica charantia* in rats. *J Ethnopharmacol* 17 (1986): 247–255.
- Sridhar MG et al. Bitter melon (*Momordica charantia*) improves insulin sensitivity by increasing skeletal muscle insulin-stimulated IRS-1 tyrosine phosphorylation in high-fat-fed rats. *Br J Nutr* 99.4 (2008): 806–812.

It has been demonstrated that *Momordica charantia* has a protective effect on pancreatic β -cells via downregulation of mitogen-activated protein kinases and nuclear factor kappa-light-chain enhancer of activated B cells

Reference:

- Kim K, Kim HY. Bitter melon (*Momordica charantia*) extract suppresses cytokine-induced activation of MAPK and NF- κ B in pancreatic β -Cells. *Food Sci. Biotechnol* 20.2 (2011): 531–5.



Also, other biochemical and physiological processes such as glucose utilisation in skeletal muscles, intestinal glucose uptake inhibition and suppression of gluconeogenic enzymes have been inferred through in vivo and in vitro studies

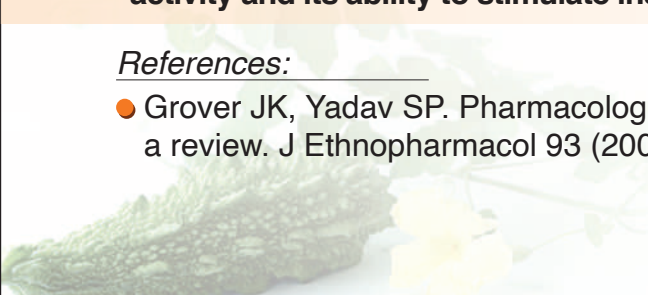
References:

- Ahmed I et al. Beneficial effects and mechanism of action of Momordica charantia juice in the treatment of streptozotocin-induced diabetes mellitus in rat. *Mol Cell Biochem* 261 (2004): 63–70.
- Jayasooriya AP et al. Effects of Momordica charantia powder on serum glucose levels and various lipid parameters in rats fed with cholesterol-free and cholesterol-enriched diets. *J Ethnopharmacol* 72 (2000): 331–336.
- Kar A et al. Comparative evaluation of hypoglycaemic activity of some Indian medicinal plants in alloxan diabetic rats. *J Ethnopharmacol* 84 (2003): 105–108.
- Kumar GS, et al. Modulatory effect of bitter gourd (Momordica charantia Linn.) on alterations in kidney heparan sulfate in streptozotocin-induced diabetic rats. *J Ethnopharmacol* 115.2 (2008): 276–283.
- Mamun MD. A study on hypoglycemic effects of Momordica charantia (wild variety) in alloxan induced type 2 diabetic Long-Evans rats. *Clin Biochem* 44.13(2011): S116.
- Miura T et al. Hypoglycemic activity of the fruit of the Momordica charantia in type 2 diabetic mice. *J Nutr Sci Vitaminol (Tokyo)* 47 (2001): 340–344.
- Ojewole JA, et al. Hypoglycaemic and hypotensive effects of Momordica charantia Linn (Cucurbitaceae) whole-plant aqueous extract in rats. *Cardiovasc J S Afr* 17.5 (2006): 227–232.
- Reyes BA et al. Anti-diabetic potentials of Momordica charantia and Andrographis paniculata and their effects on estrous cyclicity of alloxan-induced diabetic rats. *J Ethnopharmacol* 105 (2006): 196–200.
- Sarkar S, et al. Demonstration of the hypoglycemic action of Momordica charantia in a validated animal model of diabetes. *Pharmacol Res* 33 (1996): 1–4.
- Shibib BA et al. Hypoglycaemic activity of Coccinia indica and Momordica charantia in diabetic rats: depression of the hepatic gluconeogenic enzymes glucose-6-phosphatase and fructose-1,6-bisphosphatase and elevation of both liver and red-cell shunt enzyme glucose-6-phosphate dehydrogenase. *Biochem J* 292 (1993): 267–270.
- Shetty AK et al. Effect of bitter gourd (Momordica charantia) on glycaemic status in streptozotocin induced diabetic rats. *Plant Foods Hum Nutr* 60.3 (2005): 109–112

The hypoglycaemic activity is attributed to a mixture of steroidal saponins known as charantins, insulin-like peptides and alkaloids that are concentrated in the fruit whereas several different fractions of M. charantia extract may make different contributions to its cell-repairing activity and its ability to stimulate insulin secretion

References:

- Grover JK, Yadav SP. Pharmacological actions and potential uses of Momordica charantia: a review. *J Ethnopharmacol* 93 (2004): 123–132.



- Xiang L et al. The reparative effects of *Momordica charantia* Linn. extract on HIT-T15 pancreatic beta-cells. *Asia Pac J Clin Nutr* 16 (Suppl 1) (2007): 249–252.

Bitter melon has shown promising effects in prevention as well as delay in progression of diabetic complications (e.g. nephropathy, neuropathy, cataract and insulin resistance) in experimental animals.

Reference:

- Grover JK, Yadav SP. Pharmacological actions and potential uses of *Momordica charantia*: a review. *J Ethnopharmacol* 93 (2004): 123–132.

Lipid Lowering:

Lipid-lowering activity has been reported in studies of normal and diabetic animals for the fruit extract, flavonoids extracted from bitter melon or a methanolic fraction of the plant. Typically, decreases in triglyceride and low-density lipoprotein levels and increases in high-density lipoprotein levels are seen.

References:

- Ahmed I et al. Hypotriglyceridemic and hypocholesterolemic effects of anti-diabetic *Momordica charantia* (karela) fruit extract in streptozotocin-induced diabetic rats. *Diabetes Res Clin Pract* 51 (2001): 155–161.
- Anila L, Vijayalakshmi NR. Beneficial effects of flavonoids from *Sesamum indicum*, *Emblia officinalis* and *Momordica charantia*. *Phytother Res* 14 (2000): 592–595.
- Chaturvedi P. Role of *Momordica charantia* in maintaining the normal levels of lipids and glucose in diabetic rats fed a high-fat and low-carbohydrate diet. *Br J Biomed Sci* 62.3 (2005): 124–126
- Chaturvedi P et al. Effect of *Momordica charantia* on lipid profile and oral glucose tolerance in diabetic rats. *Phytother Res* 18 (2004): 954–956.
- Senanayake GV et al. The effects of bitter melon (*Momordica charantia*) extracts on serum and liver lipid parameters in hamsters fed cholesterol-free and cholesterol-enriched diets. *J Nutr Sci Vitaminol (Tokyo)* 50 (2004): 253–257.
- Singh N et al. Effects of long term feeding of acetone extract of *Momordica charantia* (whole fruit powder) on alloxan diabetic albino rats. *Indian J Physiol Pharmacol* 33 (1989): 97–100.

A study on human preadipocytes treated with bitter melon juice demonstrated inhibition of lipogenesis and stimulation of lipolysis.

Reference:

- Nerurkar PV et al. *Momordica charantia* (bitter melon) inhibits primary human adipocyte differentiation by modulating adipogenic genes. *BMC Complement Altern Med* 10.1(2010): 34.



Like us on
facebook
[.com/OpsoninPharma](https://www.facebook.com/OpsoninPharma)

Opsonin
Opsonin Pharma
Ideas for healthcare

FURTHER INFORMATION IS AVAILABLE FROM:
Opsonin Pharma Limited
Opsonin Building, 30 New Eskaton, Dhaka 1000,
Visit our website: www.opsonin-pharma.com