Studi Momordica charantia


Anti-diabetic and hypoglycaemic effects of Momordica charantia (bitter melon): a mini review.

Leung L, Birtwhistle R, Kotecha J, Hannah S, Cuthbertson S.

Source

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Abstract

It has been estimated that up to one-third of patients with diabetes mellitus use some form of complementary and alternative medicine. Momordica charantia (bitter melon) is a popular fruit used for the treatment of diabetes and related conditions amongst the indigenous populations of Asia, South America, India and East Africa. Abundant pre-clinical studies have documented the anti-diabetic and hypoglycaemic effects of M. charantia through various postulated mechanisms. However, clinical trial data with human subjects are limited and flawed by poor study design and low statistical power. The present article reviews the clinical data regarding the anti-diabetic potentials of M. charantia and calls for better-designed clinical trials to further elucidate its possible therapeutic effects.


An overview on antidiabetic medicinal plants having insulin mimetic property.

Patel D, Prasad S, Kumar R, Hemalatha S.

Source

Pharmacognosy Research Laboratory, Department of Pharmaceutics, Institute of Technology, Banaras Hindu University, Varanasi-221005, India.

Abstract

Diabetes mellitus is one of the common metabolic disorders acquiring around 2.8% of the world's population and is anticipated to cross 5.4% by the year 2025. Since long back herbal medicines have been the highly esteemed source of medicine therefore, they have become a growing part of modern, high-tech medicine. In view of the above aspects the present review provides profiles of plants (65 species) with hypoglycaemic properties, available through literature source from various database with proper categorization according to the parts used, mode of reduction in blood glucose (insulinomimetic or insulin secretagogues activity) and active phytoconstituents having insulin mimetics activity. From the review it was suggested that, plant showing hypoglycemic potential mainly belongs to the family Leguminoseae, Lamiaceae, Liliaceae, Cucurbitaceae, Asteraceae, Moraceae, Rosaceae and Araliaceae. The most active plants are Allium sativum, Gymnema sylvestre, Citrullus colocynthis, Trigonella foenum greacum, Momordica charantia and Ficus bengalensis. The review describes some new bioactive drugs and isolated compounds from plants
such as roseoside, epigallocatechin gallate, beta-pyrazol-1-ylalanine, cinchonain Iβ, leucocyandin 3-O-beta-d-galactosyl cellobioside, leucopelargonidin-3-O-alpha-L rhamnoside, glycyrrhetinic acid, dehydrotrametenolic acid, strictinin, isostrictinin, pedunculagin, epicathechin and christinin-A showing significant insulinomimetic and antidiabetic activity with more efficacy than conventional hypoglycaemic agents. Thus, from the review majorly, the antidiabetic activity of medicinal plants is attributed to the presence of polyphenols, flavonoids, terpenoids, coumarins and other constituents which show reduction in blood glucose levels. The review also discusses the management aspect of diabetes mellitus using these plants and their active principles.


A novel herbal formulation in the management of diabetes.

Bhujbal SS, Hadawale SS, Kulkarni PA, Bidkar JS, Thatte VA, Providencia CA, Yeola RR.

Source
Padmashree Dr. D.Y.Patil Institute of Pharmaceutical Sciences and Research, Pimpri, Pune, India.

Abstract

BACKGROUND AND AIM:
Momordica charantia Linn. is traditionally used as a medicine for diabetes. The present investigation was aimed to formulate and evaluate transdermal patches of Momordica charantia Linn.

MATERIALS AND METHODS:
The transdermal films containing the herbal drug component fractionated from methanolic extract of M. charantia fruits were prepared by using hydroxy propyl methyl cellulose as a polymer. The films were evaluated for folding endurance, thickness, weight variation, drug contents and in vitro diffusion studies and in vivo parameters like acute and sub-acute antihyperglycemic activity in diabetic rats, biochemical studies, skin irritation in rats and stability studies.

RESULT AND DISCUSSION:
The weight of transdermal patches of M. charantia (2 cm(2); 10 mg/patch) and was found to be 0.03 gm. Thickness of patches of M. charantia (2 cm(2); 10 mg/patch) was found to be satisfactory. The percentage release of active constituents from transdermal patches of M. charantia (2 cm(2); 10 mg/patch) was found to be 47.59% in 10% hydroalcoholic phosphate buffer pH 7.4 at the end of 6 h. The transdermal route exhibited negligible skin irritation and in vivo results revealed that the patches successfully decrease the blood glucose level.

CONCLUSION:
From the results, we concluded that the well-known herbal drug M. charantia Linn. have been found to be effective for diabetes through modern pharmaceutical formulation techniques.
Momordica charantia for type 2 diabetes mellitus.

Ooi CP, Yassin Z, Hamid TA.

Abstract

BACKGROUND:

Momordica charantia (bitter gourd) is not only a nutritious vegetable but it is also used in traditional medical practices to treat type 2 diabetes mellitus. Experimental studies with animals and humans suggested that the vegetable has a possible role in glycaemic control.

OBJECTIVES:

To assess the effects of mormodica charantia for type 2 diabetes mellitus.

SEARCH METHODS:

Several electronic databases were searched, among these were The Cochrane Library (Issue 1, 2012), MEDLINE, EMBASE, CINAHL, SIGLE and LILACS (all up to February 2012), combined with handsearches. No language restriction was used.

SELECTION CRITERIA:

We included randomised controlled trials (RCTs) that compared momordica charantia with placebo or a control intervention, with or without pharmacological or non-pharmacological interventions.

DATA COLLECTION AND ANALYSIS:

Two authors independently extracted data. Risk of bias of the trials was evaluated using the parameters of randomisation, allocation concealment, blinding, completeness of outcome data, selective reporting and other potential sources of bias. A meta-analysis was not performed given the quality of data and the variability of preparations of momordica charantia used in the interventions (no similar preparation was tested twice).

MAIN RESULTS:

Four randomised controlled trials with up to three months duration and investigating 479 participants met the inclusion criteria. Risk of bias of these trials (only two studies were published as a full peer-reviewed publication) was generally high. 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 glycaemic 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.

**AUTHORS' CONCLUSIONS:**

There is insufficient evidence on the effects of *Momordica charantia* for type 2 diabetes mellitus. Further studies are therefore required to address the issues of standardization and the quality control of preparations. For medical nutritional therapy, further observational trials evaluating the effects of *Momordica charantia* are needed before RCTs are established to guide any recommendations in clinical practice.


**Antidiabetic potentials of *Momordica charantia*: multiple mechanisms behind the effects.**

Chaturvedi P.

**Source**

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**Abstract**

*Momordica charantia* fruits are used as a vegetable in many countries. From time immemorial, it has also been used for management of diabetes in the Ayurvedic and Chinese systems of medicine. Information regarding the standardization of this vegetable for its usage as an antidiabetic drug is scanty. There are many reports on its effects on glucose and lipid levels in diabetic animals and some in clinical trials. Reports regarding its mechanism of action are limited. So in the present review all the information is considered to produce some concrete findings on the mechanism behind its hypoglycemic and hypolipidemic effects. Studies have shown that *M. charantia* repairs damaged β-cells, increases insulin levels, and also enhance the sensitivity of insulin. It inhibits the absorption of glucose by inhibiting glucosidase and also suppresses the activity of disaccharidases in the intestine. It stimulates the synthesis and release of thyroid hormones and adiponectin and enhances the activity of AMP-activated protein kinase (AMPK). Effects of *M. charantia* like transport of glucose in the cells, transport of fatty acids in the mitochondria, modulation of insulin secretion, and elevation of levels of uncoupling proteins in adipose and skeletal muscles are similar to those of AMPK and thyroxine. Therefore it is proposed that effects of *M. charantia* on carbohydrate and fat metabolism are through thyroxine and AMPK.


**Momordica charantia extract, a herbal remedy for type 2 diabetes, contains a specific 11β-hydroxysteroid dehydrogenase type 1 inhibitor.**

Blum A, Loerz C, Martin HJ, Staab-Weijnitz CA, Maser E.

**Source**
Institute of Toxicology and Pharmacology for Natural Scientists, University Medical School Schleswig-Holstein, Campus Kiel, Kiel, Germany.

Abstract

11β-Hydroxysteroid dehydrogenase type 1 (11β-HSD1) catalyzes the intracellular regeneration of active cortisol from inert cortisone in key metabolic tissues, thus regulating ligand access to glucocorticoid receptors. There is strong evidence that increased adipose 11β-HSD1 activity may be an important aetiological factor in the current obesity and diabetes type 2 epidemics. Hence, inhibition of 11β-HSD1 has emerged as a promising anti-diabetic strategy, a concept that is largely supported by numerous studies in rodent models as well as limited clinical data with prototype inhibitors. Momordica charantia (also known as bitter melon, bitter gourd or karela) is traditionally used for treatment of diabetes in Asia, South America, the Caribbean, and East Africa. In the present study, we show that M. charantia extract capsules contain at least one ingredient with selective 11β-HSD1 inhibitory activity. The finding constitutes an interesting additional explanation for the well-documented anti-diabetic and hypoglycaemic effects of M. charantia.


The complete amino acid sequence of momordin-a, a ribosome-inactivating protein from the seeds of bitter gourd (Momordica charantia).

Minami Y, Funatsu G.

Source

Laboratory of Protein Chemistry and Engineering, Faculty of Agriculture, Kyushu University, Fukuoka, Japan.

Abstract

The complete amino acid sequence of momordin-a, a ribosome-inactivating protein from the seeds of bitter gourd, has been analyzed. Twenty-two peptides were isolated from the tryptic digest of momordin-a and sequenced by the DABITC/PITC double coupling method. The alignment of these tryptic peptides was done by analyzing the amino acid sequences of the peptides derived from chymotryptic digestion and cyanogen bromide cleavage of momordin-a as well as V8 protease-digestion of the CNBr fragment. Momordin-a consisted of 250 amino acid residues and carbohydrate residues attached to Asn227, and its molecular mass was calculated to be 28,690 Da. The sequence comparison with ricin A-chain shows that 33% of the residues of momordin-a are identical to those of ricin A-chain and that the residues involved in the catalytic site of the ricin A-chain are conserved in momordin-a.


Hypoglycemic effect of bitter melon compared with metformin in newly diagnosed type 2 diabetes patients.


Source
ETHNOPHARMACOLOGICAL RELEVANCE:

Bitter melon (Momordica charantia L.) has been widely used as a traditional medicine treatment for diabetic patients in Asia. In vitro and animal studies suggested its hypoglycemic activity, but limited human studies are available to support its use.

AIM OF STUDY:

This study was conducted to assess the efficacy and safety of three doses of bitter melon compared with metformin.

MATERIALS AND METHODS:

This is a 4-week, multicenter, randomized, double-blind, active-control trial. Patients were randomized into 4 groups to receive bitter melon 500 mg/day, 1,000 mg/day, and 2,000 mg/day or metformin 1,000 mg/day. All patients were followed for 4 weeks.

RESULTS:

There was a significant decline in fructosamine at week 4 of the metformin group (-16.8; 95% CI, -31.2, -2.4 µmol/L) and the bitter melon 2,000 mg/day group (-10.2; 95% CI, -19.1, -1.3 µmol/L). Bitter melon 500 and 1,000 mg/day did not significantly decrease fructosamine levels (-3.5; 95% CI -11.7, 4.6 and -10.3; 95% CI -22.7, 2.2 µmol/L, respectively).

CONCLUSIONS:

Bitter melon had a modest hypoglycemic effect and significantly reduced fructosamine levels from baseline among patients with type 2 diabetes who received 2,000 mg/day. However, the hypoglycemic effect of bitter melon was less than metformin 1,000 mg/day.

EMCD, a hypoglycemic triterpene isolated from Momordica charantia wild variant, attenuates TNF-α-induced inflammation in FL83B cells in an AMP-activated protein kinase-independent manner.

Cheng HL, Kuo CY, Liao YW, Lin CC.

Source

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Abstract
Insulin resistance is a causative factor for type 2 diabetes, whereas the development of insulin resistance is closely related to chronic inflammation induced by factors such as tumor necrosis factor-α (TNF-α). Momordica charantia, also known as bitter melon, has been used as an herbal medicine and reported to ameliorate inflammation and hyperglycemia. Previously, a triterpene 5β,19-epoxy-25-methoxy-cucurbita-6,23-diene-3β,19-diol (EMCD), purified from M. charantia L. wild variant WB24, was found to activate AMP-activated protein kinase (AMPK) and have a hypoglycaemic effect in TNF-α-treated FL83B cells. AMPK has been a target for developing anti-diabetic medicine and suggested to play a role in anti-inflammation. The current study aims to investigate if EMCD might repress TNF-α-induced inflammation via AMPK. TNF-α-induced inflammation in FL83B cells was characterized using Western blotting and reverse transcriptase-polymerase chain reaction. Consequently, the expression of inflammatory markers including inducible nitric oxide synthase (iNOS), the p65 subunit of nuclear factor-κB (NF-κB), protein-tyrosine phosphatase-1B, TNF-α and interleukin-1β were significantly elevated by TNF-α in the cell, and EMCD obviously suppressed the TNF-α-induced expression of these markers. When the effect of EMCD was tested simultaneously with epigallocatechin-3-gallate (EGCG), a catechin from green tea reported to be anti-inflammatory, EMCD showed a more obvious anti-inflammatory activity than EGCG did. Investigation of the underlying mechanism suggested that EMCD inhibited the activation of the IκB kinase (IKK) complex and the NF-κB pathway, and the effect was likely independent of AMPK. Collectively, the multiple functions of EMCD suggest it to be a potential agent in treating diabetic complications and other inflammation-related disorders.


Bitter melon (Momordica charantia L.) inhibits adipocyte hypertrophy and down regulates lipogenic gene expression in adipose tissue of diet-induced obese rats.

Huang HL, Hong YW, Wong YH, Chen YN, Chyuan JH, Huang CJ, Chao PM.

Source

Department of Health and Nutrition, Chia Nan University of Pharmacy and Science, Tainan, Taiwan.

Abstract

Bitter melon (Momordica charantia; BM) has been shown to ameliorate diet-induced obesity and insulin resistance. To examine the effect of BM supplementation on cell size and lipid metabolism in adipose tissues, three groups of rats were respectively fed a high-fat diet supplemented without (HF group) or with 5 % lyophilised BM powder (HFB group), or with 0.01 % thiazolidinedione (TZD) (HFT group). A group of rats fed a low-fat diet was also included as a normal control. Hyperinsulinaemia and glucose intolerance were observed in the HF group but not in HFT and HFB groups. Although the number of large adipocytes (>180 microm) of both the HFB and HFT groups was significantly lower than that of the HF group, the adipose tissue mass, TAG content and glycerol-3-phosphate dehydrogenase activity of the HFB group were significantly lower than those of the HFT group, implying that BM might reduce lipogenesis in adipose tissue. Experiment 2 was then conducted to examine the expression of lipogenic genes in adipose tissues of rats fed low-fat, HF or HFB diets. The HFB group showed significantly lower mRNA levels of fatty acid synthase, acetyl-CoA carboxylase-1, lipoprotein lipase and adipocyte fatty acid-binding protein than the HF group (P < 0.05). These results indicate BM can reduce insulin resistance as effective as the anti-diabetic drug TZD. Furthermore, BM can suppress the visceral fat accumulation and inhibit
adipocyte hypertrophy, which may be associated with markedly down regulated expressions of lipogenic genes in the adipose.


**Bitter melon (Momordica charantia) reduces adiposity, lowers serum insulin and normalizes glucose tolerance in rats fed a high fat diet.**

Chen Q, Chan LL, Li ET.

**Source**

Food and Nutritional Science Program, Department of Zoology, The University of Hong Kong, The People's Republic of China.

**Abstract**

Bitter melon (BM) is known for its hypoglycemic effect but its effect on rats fed a hyperinsulinemic high fat diet has not been examined. In a dose-response (0.375, 0.75 and 1.5%) study, oral glucose tolerance was improved in rats fed a high fat (HF; 30%) diet supplemented with freeze-dried BM juice at a dose of 0.75% or higher (P < 0.05). At the highest dose, BM-supplemented rats had lower energy efficiency (P < 0.05) and tended (P = 0.10) to have less visceral fat mass. In a subsequent experiment, rats habitually fed a HF diet either continued to consume the diet or were switched to a HF+BM, low fat (LF; 7%) or LF+BM diet for 7 wk. BM was added at 0.75%. Final body weight and visceral fat mass of the two last-mentioned groups were similar to those of rats fed a LF diet for the entire duration. Rats switched to the HF+BM diet gained less weight and had less visceral fat than those fed the HF diet (P < 0.05). The addition of BM did not change apparent fat absorption. BM supplementation to the HF diet improved insulin resistance, lowered serum insulin and leptin but raised serum free fatty acid concentration (P < 0.05). This study reveals for the first time that BM reduces adiposity in rats fed a HF diet. BM appears to have multiple influences on glucose and lipid metabolism that strongly counteract the untoward effects of a high fat diet.