

# The Ingredients behind CuraLin



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### Ingredient #1 Momordica Charantia

# Momordica Charantia



#### **Colloquially** Bitter Melon

Habitat the Far East, the Caribbean, and East Africa.

#### **Traditional medicinal usage**

peptic ulcers, psoriasis, asthma, skin infections, Gastrointestinal tract problems, and hypertension.

#### **Active phytoconstituents**

Vicine, Charantin, Triterpenoids, and anti-oxidants.



vicine



Charantin acid



anti-oxidants

### Mechanism Of Action

Phytoconstituents found in Momordica Charantia may have a beneficial impact on diabetes:

Improvement in regeneration, physiological function, and functionality of damaged pancreatic cells.

Increase in muscle insulin sensitivity.

Reduction of glucose absorption from the intestine.

Reduction of gluconeogenesis activity.

Celia Garau et al. Int J Diabetes & Metabolism (2003)



Momordica Charantia

# **Clinical Study**

### **PRR Eligibility Criteria**

### Men and women between the age of 35 to 70, newly diagnosed with type 2 diabetes:

- Fasting plasma glucose (FPG) ≥126 mg/dL
- 2 hours postprandial glucose levels during a 75-gram oral glucose tolerance test (OGTT) ≥ 200 mg/dL
- FPG levels did not exceed 180 mg/dL

### **Q** Findings

#### 4-week treatment Metformin (1000mg/day) or fruit extract (500-2,000mg/day)

- Fruit extract had a modest hypoglycemic effect.
- Fruit extract significantly reduced fructosamine levels from baseline among patients with type 2 diabetes who received 2,000 mg/day.
- The hypoglycemic effect of the fruit extract was lower than metformin.
- It should be noted, the side-effects of metformin sometimes reduce patient compliance.

Fuangchan A et al. J Ethnopharmacol. (2011)

# **Clinical Study**

### **PR Eligibility Criteria**

42 Taiwanese men and women, min age 45.7 ±11.4, display of at least three symptoms of metabolic syndrome:

- Hypertension
- Hyperlipidemia abdominal obesity
- Insulin resistance

### $\mathbf{Q}$ Findings

#### 3 weeks of supplementation

- A 19% decrease in the labeled cases of the metabolic syndrome.
- Decrease in mean waist circumference, 2 cm decrease in average.
- The continuous effect of treatment was maintained for an additional month after the end period of taking the supplement.

Fuangchan A et al. J Ethnopharmacol. (2011)



**Momordica Charantia** 

### CuraLife



Ingredient #2

# Gymenema Sylvestre

# Gymnema Sylvestre



**Colloquially** Asclepiadaceae

#### Habitat

Tropical Asia, China, the Arabian Peninsula, Africa, and Australia.

#### **Traditional medicinal usage**

Antidiabetic, asthma, eye complaints, inflammations, and more.

#### **Active phytoconstituents**

Saponin, Gymnemic acid, Stigmasterol, Quercitol, Choline, Triethylamine, and the amino acid betaine derivatives.



Komalavalli, N et al. PCTOC (2000) | Porchezhian E et al. Chemistry, pharmacology and patents. (2003)

### Mechanism Of Action

Phytoconstituents found in Gymenema Sylvestre may have a beneficial impact on diabetes:

#### Saponin

Connects to sweet taste receptors found on the tongue and prevents their activity, thereby lowering the intense craving for sweet foods.



- Hastens the release of insulin from the pancreatic cells.
- The absorption rate of carbohydrates slows from the digestive system. Allowing more prolonged satiety feeling and indirectly weight loss.

#### **Gymnema treatment**

Decrease blood glucose to normal level values, without cases of hypoglycemia.

Pothuraju R et al. J Sci Food Agric. (2014) Porchezhian E et al. chemistry, pharmacology and patents. (2003) Patel DK et al. Asian Pac J Trop Biomed.(2012)



# **Clinical Study**

### **PRR Eligibility Criteria**

#### 65 diabetic patients, man and woman. Pre-study measurements (patients average):

- Fasting glucose: 163 mg/dl
- Postprandial blood glucose: 212 mg/dl
- Base HbA1c: 8.8%

### **Q** Findings

#### 90 days of the Gymnema Sylvestre supplementation

- statistically significant decrease in fasting blood glucose levels.
- Statistically significant decrease in glucose measured two hours after a meal.
- Statistically significant decrease in HbA1C levels (The formation of the sugar-Hb linkage indicates excessive sugar levels in the bloodstream).

Celia Garau et al. Int J Diabetes & Metabolism (2003)

# **Clinical Study**

### **PRR Eligibility Criteria**

22 Indian men and women, age 40-62. Diagnosed with Diabetes Diseases duration: 1-12 years.

### **Q** Findings

#### 18-20 months of Gymnema Sylvestre supplementation

• A decrease of approximately 28% was seen in fasting blood glucose levels.

Reductions in the levels of conventional drug treatment.

• In the control group (without the supplement) there was an increase in conventional treatment use, due to rise in fasting glucose.

Baskaran K. et al. . J Ethnopharmacol (1990)





Ingredient #3

# Trigonella Foenum-Graecum

### Trigonella Foenum-Graecum



**Colloquially** Fenugreek, Greek hay.

Habitat Asia, Middle East, and European countries.

#### **Traditional medicinal usage**

respiratory infections, also known to possess antimicrobial, antioxidant, antidiabetic, and antitumorigenic activities.

#### **Active phytoconstituents**

fiber and alkaloids (such- Trimethylamine, Neurin, Trigonelline), Saponin.











Celia Garau et al. Int J Diabetes & Metabolism (2003)

### Mechanism Of Action

Phytoconstituents and nutrients found in Trigonella Foenum-Graecum may have a beneficial impact on diabetes:



Improves the ability of the pancreas to produce and release insulin





regulates blood glucose levels

4-hydroxylisoleucine (amino acid) regulates the release rate of insulin from the pancreas



Fenugreek seeds also have been attributed with the property of slowing down the absorption rate of carbohydrates from the digestive system, healthier flora, positive effects on weight, glycemic control, and liver  $\beta$  oxidation.



Gupta A et al.Physicians India (2001)

# **Clinical Study**

### **PRR Eligibility Criteria**

### 25 men and women. Newly diagnosed patients with type 2 diabetes:

fasting glucose < 200 mg/dl

### **Q** Findings

#### 2 months treatment: 1. 1 mg/day of hydroalcoholic extract of fenugreek seeds or the usual care (dietary control, exercise)

- The results demonstrate a lower level of plasmatic glucose over time.
- Significantly higher levels of insulin secretion.
- No significant difference was found in either the fasting blood glucose level or glucose levels two hours after a meal.

Gupta A et al.Physicians India) 2001(



Reductions in weight gain

- Reductions in fasting glucose levels
- Reductions in total serum cholesterol

- AMPK activation
  - Beneficial alternations in microbiota population
- Enhanced levels of the short-chain fatty acid (SCFA)

Shtriker MG,Madar Z et al. Nutrition. (2018)





Ingredient #4 **Curcuma Longa** 

# Curcuma Longa



**Colloquially** Turmeric

#### Habitat

Curcuma longa is cultivated in tropical and subtropical regions. The largest worldwide producer of turmeric is India

#### **Traditional medicinal usage**

has been used for thousands of years in Indian and Chinese medicine to treat diabetes.

#### **Active phytoconstituents**

Curcumin (diferuloyImethane) and various volatile oils, including Tumerone, Atlantone, and Zingiberone.



Zhang DW et al. Evid Based Complement Alternat Med. (2013) | ROM. J. BIOL. – PLANT BIOL (2010)

#### Curcuma Longa

### Mechanism Of Action

Phytoconstituents and nutrients found in Curcuma longa may have a beneficial impact on diabetes:

Moderate immune activity by reducing levels of substances which secreted from the immune cells (NFk-B, TNF)

Enhance sensitivity to insulin by the enzymatic activity of PPAR γ in muscle cells and fat

Reduce glucose levels and treat complications of diabetes.

Zhang DW et al. Evid Based Complement Alternat Med. (2013) Chuengsamarn S et al. Diabetes Care. (2012)



# **Clinical Study**

### **PR Eligibility Criteria**

### Group of 120 people pre-diabetics, baseline parameters:

- Fasting plasma glucose (mg/dL) 102-125
- Oral glucose tolerance at 2h (mg/dL) 128-199
- HbA1C (%) 5.9-6.4
- Body weight (kg) 66-95
- Waist circumference (cm.) 86-106

### **Q** Findings

### 9 months of supplementation versus control group (received a placebo).

- There was no event of diabetes deterioration occurring in the supplementary group. While in the control group over 16% were diagnosed as diabetic.
- The control group presented lower levels of insulin secretion and higher resistance to insulin
- Curcumin intervention in a prediabetic population may be beneficial.

Chuengsamarn S et al. Diabetes Care. (2012)





Ingredient #5
Phylantus
Emblica

# Emblica Officinalis / Phyllanthus Emblica



**Colloquially** Amla

Habitat Asia and Africa

#### **Traditional medicinal usage**

anorexia, constipation, piles, leucorrhea, inflammatory, bowls, cough, hemorrhoids, fever, and more.

#### **Active phytoconstituents**

Tannoid



Qureshi. Pakistan Journal of Nutrition (2009)

### Mechanism Of Action



Tannoid affects pancreatic cells and restore their function.



Qureshi. Pakistan Journal of Nutrition (2009)

**Phylantus Emblica** 



+ pharmacological treatment + Induced type-II diabetes The mice were divided into seven groups; each group received different plant doses



Significant decrease in fasting blood glucose

- Increased insulin level
- A restorative effect on the pancreas was observed (histological change)

Parminder N. et al. International Journal of Natural Product Science (2012)







Colloquially Chiretta.

Habitat mainly in the Himalayas.

#### Traditional medicinal usage

liver disorders, malaria, and diabetes.

#### **Active phytoconstituents**

Chirtin, Ophelic acid, and Mangiferin.



Ophelic acid



Mangiferin

C<sub>26</sub>H<sub>48</sub>O<sub>15</sub>

Chiratin

Singh, R.L et al. NPAIJ 8.6 (2012) | P. Joshi et al., CURRENT SCIENCE (2005)

### Mechanism Of Action

Phytoconstituents and nutrients found in Swertia Chirayita may have a beneficial impact on diabetes:

Direct activation of pancreatic cells, which results in the secretion of insulin.

Reduction of glucose absorption from the digestive system.

Improvement of the breakdown process of cellular glucose (glycolysis).

Increase in the peripheral use of glucose by skeletal muscles and its storage in the liver and muscles.



P. Joshi et al. CURRENT SCIENCE (2005)

# **Mechanism Of Action**



Swertia Chirayita



Plant extract administration (measurements at: 0, 1 hour, 3 hours, 4 hours)

Among the all the treatment groups, the Swertia Chirayita plant extract produced significant blood sugar lowering potential

Saxena, A. M. et al. Flora Fauna 13 (2007)



Blood glucose levels were measured at the start of the trial, after 3 days, 7 days, 14 days.

Significant decrease in glucose levels from day 3 in the diabetes group (all three of them).



Kavitha K.N. et alJ Pub Health Med Res (2013)



Ingredient #7 **Neopicrorhiza Scrophulariiflora** 

# Neopicrorhiza, Picrorhiza scrophulariiflora



**Colloquially** Picrorhiza, Gentian, Nepalese kutki, or Hellebore.

#### Habitat

Nepal, northeast India, China (Southwest Tibet, Western China), Bhutan, and northern Myanmar.

#### **Traditional medicinal usage**

fever, urinary, respiratory, blood, skin, gastrointestinal, liver and heart diseases, and more.

#### **Active phytoconstituents**

Nonglycosidic iridoids, Iridoid glycoside, Cucurbitacin glycoside



Rokaya, Maan B., et al.(2020) | Wang, Hao, et alChemical and pharmaceutical bulletin (2006)

### Mechanism Of Action

Phytoconstituents and nutrients found in Neopicrorhiza scrophulariiflora may have a beneficial impact on diabetes:

Increases insulin secretion plant rhizomes may contain some hypoglycemic principles that probably act by initiating insulin release from pancreatic βcells.

**Reducing glycogenolysis in the liver**, which reflects in reducing the blood glucose level.







dose of 1.25g/kg body weight of plant extract (water and ethanol) for 21 days



#### Treatment Improved oral glucose tolerance

The effect was shown in The water extract and ethanol extracts of the plant

Manandhar, Nayan. Journal of Nepal Pharmaceutical Association (2014)

# Ingredient #8 Eugenia Jambolana – Syzygium Cumini



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Eugenia Jambolana-Syzygium Cumini



**Colloquially** Jambolan

Habitat tropical America and Australia

#### **Traditional medicinal usage**

diabetes, sore throat, bronchitis, asthma, biliousness, dysentery, blood impurities, ulcers, diuretic, stops urinary discharge, wound healing, and more.

#### **Active phytoconstituents**

Anthocyanins, Glucoside, Ellagic acid, Isoquercetin, Kaemferol Myricetin, Quercetin, and Delphinidin.

Quercetin



Kaemferol

Delphinidin



Sharma, S. B., et al. Journal of Ethnopharmacology (2003)

Eugenia Jambolana – Syzygium Cumini



#### Liver and muscle glycogen content increased in both groups

Sharma, S. B., et al. Journal of Ethnopharmacology (2003)

Eugenia Jambolana – Syzygium Cumini



#### **15 days supplementation**



**Intervention group in comparison to the diabetic control showed lower fasting blood glucose levels** 75±11.9 vs 123±14.4 mg/dL, respectively.

Sridhar, S. B., et al. Brazilian Journal of Medical and Biological Research (2005)

Eugenia Jambolana – Syzygium Cumini

### CuraLife



Ingredient #9 Cinnamomum Verum/Zeylanicum

# Cinnamomum Zeylanicum / Verum

**Colloquially** Cinnamon

Habitat Sri Lanka and southern parts of India

#### **Traditional medicinal usage**

remedy for respiratory, digestive and gynecological ailments.

#### **Active phytoconstituents**

Cinnamtannin B1



Cinnamtannin B1

Ranasinghe, Priyanga, et al. "BMC complementary and alternative medicine (2013)

### Mechanism Of Action

Phytoconstituents and nutrients found in Cinnamomum Verum/Zeylanicum may have a beneficial impact on diabetes:



- Attenuation of weight loss associated with diabetes.
- Reduction of Fasting Blood Glucose.
- Reducing LDL and increasing HDL cholesterol.
- Reducing HbA1c levels.
- Increasing circulating insulin levels.
- Beneficial effects against diabetic neuropathy and, nephropathy.

### Those beneficial anti-diabetic effects were demonstrated both In vivo and in vitro

Ranasinghe P. et al. Diab Med (2012). | Bandara T. et al. Int J Food Sci Nutr. (2012)



Cinnamomum Zeylanicum / Verum



### CuraLife

### Thank You

Thank you for reviewing the scientific literature on the ingredients in CuraLin. Even at 50 slides, this presentation represents just a fraction of the body of knowledge on these ingredients.

If you have any questions or would like more information, please email <u>education@curalife.com</u>