



# Phytotherapy for the Endocrine System



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## ENDOCRINE SYSTEM

### Anti-diabetic herbs

- Many plants and foods lower blood glucose level by a variety of mechanisms.
- Type one diabetes (no insulin is produced) must be controlled.
- Phytomedicine plays an important role in this respect, is very popular in Asia.
- Complex carbohydrate preparations which have a high fiber content are very useful for diabetes and for cholesterol as well.

1

### Anti-diabetes herbs

- Treatment of diabetic rats with **1. fenugreek** *Trigonella foenum-graecum* significantly improved the fasting blood glucose levels to near normal.
- *Trigonella foenum-graecum*, apart from controlling the blood glucose levels, also has **antioxidant** potential to protect the organs such as liver and pancreas against the oxidative damage induced by diabetes.

3



5

## Anti-diabetic herbs

- The anti-diabetic effect of **2. *Cinnamomum cassia*** **القرفة** extract (Cinnamon bark: **Lauraceae**) in a type II diabetic animal model was studied.
- Cinnamon extract was administered at different dosages (50, 100, 150 and 200 mg/kg) for 6 weeks.
- It was found that blood glucose concentration **was significantly decreased in a dose-dependent manner** with the most in the 200 mg/kg group compared with the control.

7

- In addition, serum insulin levels and HDL-cholesterol levels were **significantly higher**, and the concentration of **triglyceride, total cholesterol** and **intestinal alpha-glycosidase** activity were **significantly lower** after 6 weeks of the administration.
- These results suggest that cinnamon extract **has a regulatory role in blood glucose level and lipids** and it may also exert a blood glucose-suppressing effect by improving insulin sensitivity or slowing absorption of carbohydrates in the small intestine.

9



11

### 3. Guar gum

- The gum is obtained from the seeds of the **guar plant** [Leguminosae family].
- The plant is indigenous to Africa and parts of Asia.
- The flour obtained is used as a diet supplement which contains high amounts of fibers.
- It also contains polycaccharides of D-galactose and D-mannose.

13



15



## Anti-diabetic plants

### Therapeutic uses:

- The flour given with meals seem to reduce the levels of both glucose and lipids.
- Alleviation of diarrhea.
- Aid in slimming.

**Dose:** 5 g added to meals.

- ❖ It has few side effects and it is considered by a lot of people as unpalatable when made into foods.

17

### 4. **Gymnema** (*Gymnema sylvestre*) = Cowplant

- Grows wild in India, Sri Lanka and tropical Africa as a large woody climber.

### Constituents:

- **Saponin glycosides** known collectively as gymnemic acid.
- **Gummarin**, a polypeptide responsible for desensitization of the palate to sweet tastes.

### Therapeutic uses:

- ❖ A traditional plant as antihyperglycemic. 1g/day for 60 days of a standardized extract significantly reduced glucose level. It stimulated insulin secretion from  $\beta$ -islet cells, a result that was consistent with in vivo results.
- ❖ Hypolipidemic effect.
- Cares should be taken when used with other hypoglycemic agents.

19

## Gymnema (*Gymnema sylvestre*)



21

## 5. Karela (*Momordica charantia*) = Bitter Melon = Bitter gourd يقطين = قرع

- The bitter melon or gourd belongs to the Cucurbitaceae القرعية .
- Grows in India, China, Africa and parts of America.
- A climbing plant.
- It has an intensely bitter taste.
- Widely used as anti-diabetic.
- The fruit is eaten as a vegetable, and the leaf can be made into a type of tea.



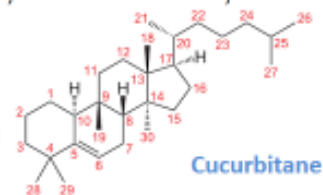
23

### Constituents:

- Contains triterpene (cucurbitane-type) glycosides called momordicosides A-L, goyaglycosides A-H, cucurbitanes, goyasaponins, proteins and lectins.

### Therapeutic uses:

- ❖ Both the fruit and leaf have **hypoglycemic** effect in both animals and humans as



was confirmed in several studies including **clinical** ones.

However, more studies are still needed to prescribe the plant as anti-diabetic for diabetes type 2.

- ❖ Has also been used in **asthma**, **skin infections** and **hypertension**.
- **Contraceptive** and **teratogenic** effects have been documented in animals, so care should be taken when used by pregnant women. However, cooking is thought to destroy a lot of the toxin.

25



## Phytoestrogens

- Many plants contain phytoestrogenic substances which act as a mild estrogens, as do **linseed** and **hops** **الجنجل**.
- The main chemical types of phytoestrogenes are the **isoflavonoids**, **coumestans** and **lignans**.
- Some other plants contain similar hormones (e.g. estrol) to those found in the human body.

27

# Phytoestrogens

## Red clover (*Trifolium pratense* L.) (برسيم احمر)

- The major actives are **isoflavones**: **genisten**, **malvidin**, **formononetin**, and **daidzein** and others.
- The plant also contains **coumestans** like **coumestrol** and **medicagol**.
- The plant proved its possession of an estrogenic in animals.
- The effect is **not** yet proved clinically for menopausal women.

29



القرطة

31

## Phytoestrogens

### Soya

#### Glycine max: فول الصويا

- It is an important crop plant item of diet in many countries like soya milk, soy sauce, the bean sprouts براعم eaten raw in salads and used in stir-fry (frying) dishes.
- It contains fixed oil composed of linoleic and linolenic acids and phytoestrogens:  $\beta$ -sitosterol and stigmasterol.

33



35

## Hormonal imbalance

- These are plants which **regulate the level of hormones** without being necessarily estrogenic, and the mechanism is generally not known.
- Black kohosh (*Cimicifuga racemosa*) - (قاتل البق)
- It contains **triterpene glycosides** such as **actein** and several **cimicifugosides**.

37

## *Origanum Vulgare* = Marjoram

- It has the following uses:
  1. **Anti-fungal.**
  2. To treat **indigestion, Heart burn and low stomach acidity.**
  3. **Anti-microbial:** due to thymol and carvacol. Has the activity against several bacteria strains and *Candida albicans*.
  4. **Anti-oxidant.**

39



41

## Benign prostate hyperplasia

- It is common in old men and can be considered as a normal part of aging.
- But severe cases need:
  1. Surgery which is not always entirely successful, **or**
  2. Drug treatment with:
    - a.  $\alpha$ -adrenergic-blocking agents, **or**
    - b. Testosterone 5- $\alpha$ -reductase inhibitors [Decrease the conversion of testosterone to dihydrotestosteron, DHT].



## Prostate enlargement

**Nettle** (*Urtica dioica*) قريص:

- The herb with the roots are used pharmaceutically.
- In vitro and in vivo studies measuring the **sex hormone binding globulin** [Sex hormone-binding globulin (SHBG) or sex steroid-binding globulin (SSBG) is a glycoprotein that binds to the two sex hormones: androgen and estrogen and is responsible for transporting the hormones while in active in blood] to human prostate membranes (at testosterone receptors, and interferes with that) or with testosterone itself, resulting in inhibition of the proliferation of human prostate epithelial.
- These results suggest that nettle root extract has a beneficial effect on BPH.

45



47

## Nettle

- Evidence from *in vivo* and *in vitro* studies suggests that nettle root extracts have beneficial effects on BPH tissue.
- It affects binding of **sex hormone-binding globulin** to human prostate membranes resulting in inhibition of the proliferation of the prostatic epithelial cells.
- Several compounds from the roots are also known to be **aromatase inhibitors**, and there is evidence from clinical trials to support the use of extracts from the roots to relieve the symptoms associated with BPH.

24

## Nettle

- Nettle **leaf** extracts exhibit the pro-inflammatory transcription of NF- $\kappa$ B (**nuclear factor kappa-light-chain-enhancer of activated B cells: a protein complex that controls transcription of DNA, cytokine production and cell survival**), partially inhibit cyclooxygenase and lipoxygenase, and inhibit tumor necrosis factor {TNF} and interleukin-1 $\beta$  secretion stimulated by lipopolysaccharide.
- **TNF, tumor necrosis factor alpha, TNF $\alpha$ , is a cell signaling protein (cytokine) involved in systemic inflammation and is one of the cytokines that make up the acute phase reaction.**
- Nettle preparations are generally thought to be safe, with few side effects.

25

## BPH

**SAW PALMETTO:** [a small palm with fan-shaped leaves that have sharply toothed stalks, native to the south-eastern US]

- It is now mainly used to treat BPH.
- It contains  **$\beta$ -sitosterol** , **stigmasterol** and other constituents as **fatty acids**.
- The extract inhibit **5- $\alpha$ -reductase** ( the enzyme which catalyses the conversion of testosterone to dihydrotestosterone).

49



51