Egyptian Herbal Monograph

Volume 1

Traditional wild medicinal plants

Egyptian Drug Authority (EDA)

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***Hibiscus sabdariffa* L.** كركديه

1. Names & Synonyms (1)

***Hibiscus sabdariffa* L.**

Syns.: *Sabdariffa rubra* Kostel., *Abelmoschus cruentus* (Bertol.) Walp., *Fucaria sabdariffa* Ulbr., *Hibiscus cruentus* Bertol., *H. fraternus* L., *H. palmatilobus* Baill.

Family: Malvaceae

Arabic: Karkade كركديه (2)

English name: Roselle, sorrel, red sorrel and sour-tea (2, 3).

2. Geographical distribution

The Nile region including the delta, valley and the oases of the Western Desert (4).

3. Parts used for medicinal purpose

Calyx (5).

4. Major chemical constituents (6)

- **Organic acids:** Citric, hydroxycitric, malic, tartaric and hibiscus (hibiscic) acids .
- **Phenolic acids:** Protocatechuic, chlorogenic and caffeic acids .
- **Anthocyanins:** Delphinidin and cyanidin-based anthocyanins, include delphinidin-3-sambubioside (hibiscin), cyanidin-3-sambubioside (gossypicyanin), cyanidin-3,5-diglucoside and delphinidin (anthocyanidin) .
- **Flavonoids:** Hibiscetin-3-glucoside (hibiscitrin), gossypitrin (7-glucoside of gossypetin), gossytrin, sabdaritrin, quercetin (and its glycoside), luteolin (and its glycoside), rutin and kaempferol .
- **Mucilage polysaccharides** .
- **Others:** Vitamin C (7), pectin, carbohydrates (arabinose, galactose, glucose, rhamnose) and volatile compounds (fatty acid derivatives and others).

5. Traditional Medicinal Uses

As adjuvant therapy for managing the hypertension (5).

***H. sabdariffa* is a traditional medicinal plant for use in the specified indications based exclusively upon long-standing use.**

6. Herbal preparations correlated to medicinal use

1. Comminuted herbal substance is added to boiling water as herbal tea in the form of infusion (8).

2. Dry aqueous extract (10:1).

Herbal preparation (2) is in pharmaceutical dosage forms. The pharmaceutical form should be described by the pharmacopoeia full standard term.

7. Posology and method of administration correlated to medicinal use

Preparation 1:
1.25 - 1.5 g of the comminuted herbal substance to make a tea. (Pour boiling 240 ml water over the drug and strain after 5 to 10 minutes) up to 3 times daily (720 ml).
(8-11).

Preparation 2:
Single dose: 300 mg, 3 times daily.

Duration of use: Up to 6 weeks (11).

Method of administration: Oral use.

8. Contraindications

- Hypersensitivity to active substances and to other plants of the same family.

9. Special warnings and precautions for use

- If the symptoms worsen during the use of the medicinal product, a doctor or a pharmacist should be consulted.
- *H. sabdariffa* may affect blood sugar levels, making blood sugar control difficult during and after surgery. Stop using *H. sabdariffa* at least 2 weeks before a scheduled surgery (11).

10. Interactions with other medicinal products and other forms of interaction (11, 12)

- **Medications for high blood pressure (antihypertensive drugs)**: *H. sabdariffa* might lower blood pressure. Taking *H. sabdariffa* along with medications that lower blood pressure may cause blood pressure to go too low. Blood pressure should be monitored closely.

- **Chloroquine (Aralen)**: Taking *H. sabdariffa* tea along with chloroquine may reduce its effect.

- **Simvastatin (Zocor)**
Taking *H. sabdariffa* with simvastatin may reduce its effect.

- Taking *H.sabdariffa* along with diabetes medications may reduce the effects of these medications. Blood sugar should be monitored closely.

11. Fertility, pregnancy and lactation

- Safety during pregnancy and lactation has not been established. In the absence of sufficient data, the use during pregnancy and lactation is not recommended.
- No fertility data available.

12. Effects on ability to drive and use machines

- No studies on the effect of hibiscus on the ability to drive and use machine.

13. Undesirable effects

- None known.
- If adverse reactions occur, a doctor or a pharmacist should be consulted.

14. Overdose

- No case of overdose has been reported.

15. Relevant biological activities

Numerous studies investigating the potential antihypertensive effect of H. sabdariffa have been identified within accessible databases. Presented below are some clinical studies conducted between 2010 and 2023 that validate the traditional use of this plant in treating hypertension.

- A randomized, double-blind, placebo-controlled clinical trial was conducted in 65 pre- and mildly hypertensive adults, age 30–70 years, not taking blood pressure (BP)-lowering medications, with either three 240- mL servings/d of brewed hibiscus tea or placebo beverage for 6 weeks. After 6 weeks, hibiscus tea lowered systolic BP (SBP) compared with placebo. Diastolic BP was also lower, although this change did not differ from placebo. The change in mean arterial pressure was of borderline significance compared with placebo. Participants with higher SBP at baseline showed a greater response to hibiscus treatment. No effects were observed regarding age, gender, or dietary supplement use. These results suggest daily consumption of hibiscus tea, in an amount readily incorporated into the diet, lowers BP in pre- and mildly hypertensive adults and may prove an effective component of the dietary changes recommended for people with these conditions (13).

- A randomized controlled clinical trial was conducted to evaluate the effect of the sour tea on the blood pressure of patients with essential hypertension. For this purpose, fifty-four patients (31 in the experimental group and 23 in control group) were evaluated. Instructions for the usage of sour tea were given. Boxes of 150 g of sour or ordinary tea were given to the patients, based on random numbers. They were instructed to use one glass of the decoction (two spoonful of blended tea in one glass of boiled water boiled for 20–30 min) at least 1 hour before measuring the blood pressure. None of the patients knew the type and effects of the tea they consumed. Blood pressure was recorded at days 4, 8 and 12, and 3 days after stopping its use (day 1591) by the described method. Statistical findings showed an 11.2% lowering of the systolic blood pressure and a 10.7% decrease of diastolic pressure in the experimental group 12 days after beginning the treatment, as compared with the first day. The difference between the systolic blood pressures and the diastolic pressures of the two groups was significant. Three days after stopping the treatment, systolic blood pressure was elevated by 7.9%, and diastolic pressure was elevated by 5.6% in the experimental and control groups. This difference between the two groups was also significant. This study proves the public belief and the results of in vitro studies concerning the effects of sour tea on lowering high blood pressure (14).

- A controlled and randomized clinical trial was done to compare the antihypertensive effectiveness and tolerability of a standardized extract from *H. sabdariffa* with captopril. Patients from 30 to 80 years old with diagnosed hypertension and without antihypertensive treatment for at least one month before were included. The experimental procedure consisted of the administration of an infusion prepared with 10 g of dry calyx from *H. sabdariffa* on 0.5 l water (9.6 mg anthocyanins content), daily before breakfast, or captopril 25 mg twice a day, for 4 weeks. The obtained data confirm that the *H. sabdariffa* extract, standardized on 9.6 mg of total anthocyanins, and Captopril® 50 mg/day, did not show significant differences relative to hypotensive effect, antihypertensive effectiveness, and tolerability (15).

- A multicentric comparative pilot intervention for 121 participants with high blood pressure (BP) (≥140/90 mmHg) was conducted to detect the effect *H. sabdariffa* to curb hypertension. Participants of the intervention group (with or without conventional medication) received *H. sabdariffa* decoction on a dose regimen starting from 10 grams per day. BP was measured five times over six weeks. After 6 weeks, 61.8% of participants from the intervention group (n = 76) reached the target BP < 140/90 mmHg, compared to 6.7% in the control group (n = 45). The chemical analysis of the starting dose indicated a content of 36 mg of total anthocyanins and 2.13 g of hibiscus acid. The study showed the feasibility of using *H. sabdariffa* decoction in IDP's problematic framework, as hibiscus is a safe, local, affordable, and culturally accepted food product (16).

- A study to specify the best method for water extraction of the antihypertensive metabolites of *H. sabdariffa* and to confirm their *in vivo* antihypertensive capabilities, was designed. The powdered dried calyces of *H. sabdariffa* were independently extracted with cold and hot water. A comparative study was performed between the cold and hot aqueous extracts of *H.*

sabdariffa based on evaluation of the *in vitro* renin and angiotensin-converting enzyme (ACE) inhibition activities. Additionally, both extracts were subjected to an *in vivo* study for the evaluation of their antihypertensive activities in L-Nw-Nitro arginine methyl ester (L-NAME)–induced hypertensive rats. The cold and hot extracts significantly reduced the angiotensin II, ACE, and aldosterone levels in the plasma, but better results were displayed with the hot extract, leading to a potential antihypertensive effect. Additionally, the cold and hot Hibiscus extracts induced a cardioprotective effect through reducing necrosis, inflammation, and vacuolization that results from the induction of hypertension, an effect that was more prominent with the hot extract. The extracts showed different anthocyanin and phenolic compounds, but the hot extract showed higher contents of specific phenolics to which the superior antihypertensive and cardioprotective activities could be related (17).

- The antihypertensive effect of sour tea (*H. sabdariffa*), on stage one hypertension was evaluated. A total of 46 patients with stage one hypertension has been included in the clinical trial after giving informed consent. The patients were divided into two groups. The control and case group received the same lifestyle and dietary advice for controlling blood pressure. The case group received two standard cup of sour tea every morning for one month. The blood pressure of both groups was documented at baseline and at the end of the study. There was a significant reduction in systolic blood pressure in both groups, but the mean reduction in systolic and diastolic blood pressure was significantly higher in the case group. Using *H. sabdariffa* as sour tea two times a day can be effective in managing blood pressure in stage one hypertension along with lifestyle and dietary modification (18).

- A randomized clinical trial in which 100 mildly hypertensive patients with diabetes were randomly assigned into sour tea group (ST) and green tea group (GT). They were instructed to drink sour tea or green tea infusion, three times a day 2 hr after each meal for 4 weeks. The participants' blood pressure was measured at days 1, 15, and at the end of study. The result showed that both the systolic and diastolic pressure of both groups statistically decreased at the end of the study. The therapeutic effectiveness of tea drinking by the end of intervention was 43.5% in the ST and 39.6% in the GT compared to the beginning. The study revealed that mildly hypertensive type 2 diabetic individuals who drink three glasses of green or sour tea daily for 4 weeks show significant decreased systolic and diastolic blood pressures (19).

- To compare therapeutic effectiveness, tolerability, and safety, as well as the effect on serum electrolytes and the ACE inhibitory effect of a herbal medicinal product prepared from the dried extract of *H. sabdariffa* calyces (HsHMP) with those of lisinopril on patients with hypertension (HT), a randomized, controlled, and double-blind clinical trial was conducted. Patients of either sex, 25 - 61 years of age, with hypertension stage I or II, were daily treated for 4 weeks with the HsHMP, 250 mg of total anthocyanins per dose (experimental group), or 10 mg of lisinopril (control group). Results showed that the experimental treatment decreased blood pressure (BP) from 146.48/97.77 to 129.89/85.96 mmHg, reaching an absolute reduction of 17.14/11.97 mmHg (11.58/12.21%, $p < 0.05$). In conclusion, the HsHMP exerted important antihypertensive effectiveness with a wide margin of tolerability and safety, while it also significantly reduced

plasma ACE activity and demonstrated a tendency to reduce serum sodium (Na) concentrations without modifying potassium (K) levels (20).

16. Additional Information

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17. Date of compilation/last revision

26/11/2023

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