Drug Standardisation

Iberis amara

Botanical name : *Iberis amara* Linn.

Synonym : *Iberis coronaria Hort.*

Family : Brassicaceae

Common names

Hindi : Chandeni

English : Common Garden, Candytuft; Rocket candytuft

German : Bitter, Schleifenblume, Bauernsenf

Distribution

Cultivation in Indian gardens.

Description

An annual ornamental herb. Stem erect, cylindrical, glabrous, branched, solid, about 30 cm high. Leaves alternate, oblanceolate to spathulate, 2.5 cm to 10 cm long, distantly pinnatifid or toothed, sometimes entire. Flowers in corymbs, later elongating into recemes, white or mauve, pedicellate, ebracteate, bisexual, zygomorphic, hypogynous, complete, tetramerous; sepals 4, polysepalous, imbricate; petals 4, polypetalous, cruciform, 2 outer petals larger than 2 inner, imbricate; stamens 6, arranged in two whorls- an outer whorl of 4 long stamens, tetradynamous, anthers basifixed; gynoecium bicarpellary, ovary superior, unilocular but becomes bilocular due to formation of false septum called replum, placentation parietal, style short. Fruit a small suborbicular, flat, papery, bilocular, dehiscent siliqua with an appendage at the top, almost round. Seeds slightly winged and oval.

Part used: Seeds

Macroscopical

The seeds are 2-3.5 mm long and 1-2.5 mm wide, somewhat brownish, slightly winged, flattened, broad and narrowly elliptical, narrowing towards whitish hilum cotyledons oily. Taste very bitter.

Microscopical

Testa of single layer of epidermis of rectangular, thin walled, brown cells becoming palisade like at hilar and chalazal region; cuticle thick; mesophyll of collapsed thin- walled cells and inner epidermis of tangentially elongated compressed cells containing brown pigments. Endosperm single layered (aleurone layer), cell walls cellulosic containing aleurone grains. Radicle composed of oval and isodiametric parenchyma cells; cotyledons consists of 3-4 layers of palisade and oval storage parenchyma cells.

Powdered Plant Material

It contains fragments of epidermis of rectangular, thin walled epidermal cells; parenchyma cells of various sizes, some containing starch grains; collapsed cells with brought pigments; polygonal cells of endosperm rich in aleurone grains and starch.

Raw Drug Standardization

Moisture content and extractive values in different solvents of air dried raw material were determined by the standard methods already described in Homoeopathic Pharmacopoeia of India. Vol. 1.

1. Loss of weight on drying of air dried material at 105° - 11%
2. Extractive values in:
   - i) Water - 12.5%
   - ii) Alcohol - 7.6%
   - iii) Chloroform - 11.6%
   - iv) Benzene - 12.2%
   - v) Petroleum ether (60-80°C) - 10.2%
3. Ash content Not more than 6%

Mother Tincture Preparation

Homoeopathic mother tincture of *Iberis amara* was prepared according to the method prescribed in Homoeopathic Pharmacopoeia of India Vol. IV, from moderately coarse powder (Sieve size No. 22/60) by percolation method. The following formula was used for the preparation of mother tincture.

- Drug strength = 1/10
- Iberis amara seeds in coarse powder containing solids 10 g. and moisture 1.1 ml = 11.1 g.
- Strong alcohol = 63.5 ml
- Purified water = 40.0 ml

Add purified water to make on hundred milliliter of the tincture.

Mother Tincture Standardisation

1. Appearance: Reddish yellow translucent liquid
2. Odour: Faint varnish like fruity
3. Total solids: Not less than 1.4%
4. Wt. per ml.: Not less than 0.90
5. pH at 25°: 5.25 to 6.20
6. Refractive index: 1.3612 to 1.3632
7. Alcohol content: 58.2 to 62.8%
8. Colour index
   - Red: 9.5 to 10.2
   - Yellow: 13.7 to 15.0
   - Blue: 2.0
9. Max (1:99) in distilled water: 334 nm

Identification

20 ml of mother tincture was evaporated on water bath to remove alcohol. The residue was extracted with 3x20 ml chloroform and the chloroform extract was concentrated to 2 ml.

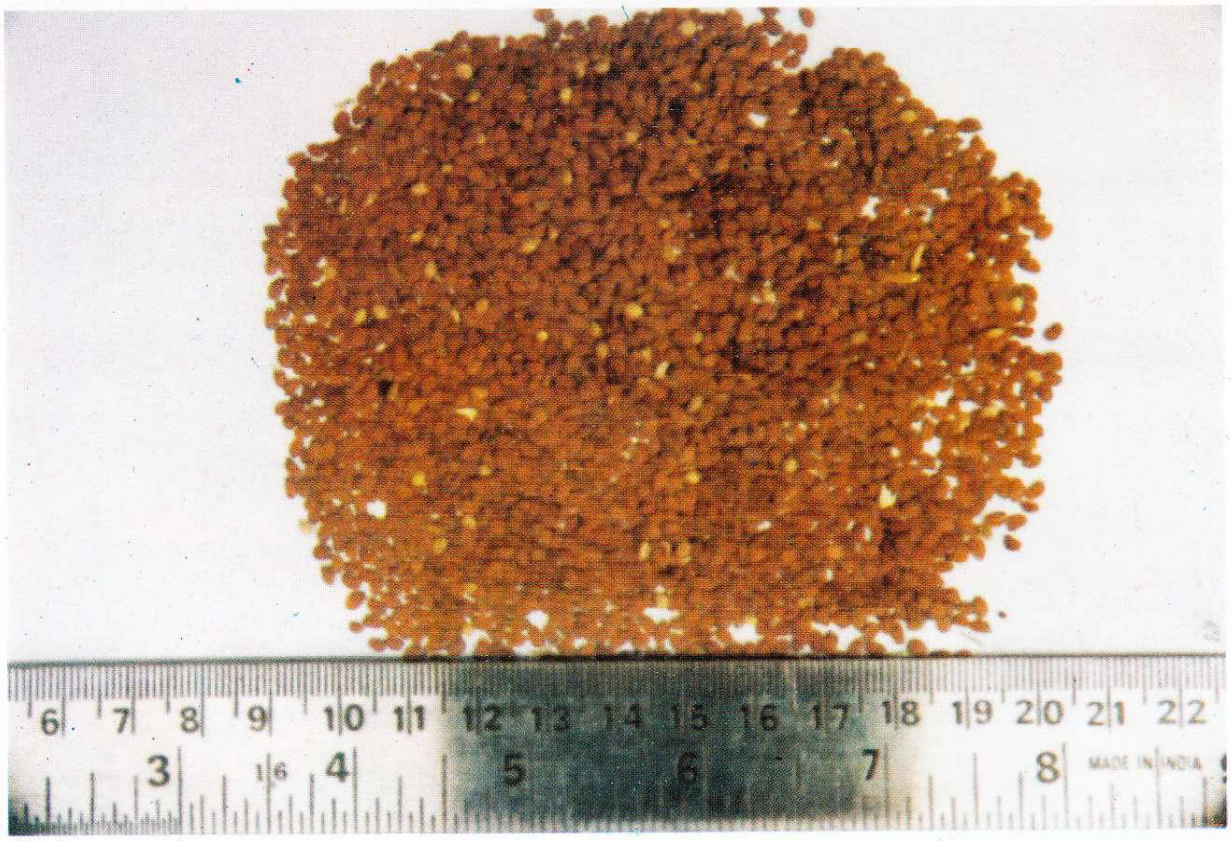
i) To 1 ml. of extract, 0.5 ml. of perchloric acid was added. Development of black colour on heating indicates the presence of glycoside.

ii) TLC study was carried out with aqueous extract on silica gel 'G' using Benzene: Ethanol (7:3 v/v) as mobile phase. Viewing the plate under UV light (365 nm), 1 spot appeared at Rf (0.06) (Blue). After spraying T.L.C. plate with Perchloric acid and on heating for few minutes at 100° C, 1 spot appeared at Rf (0.06) (Black).

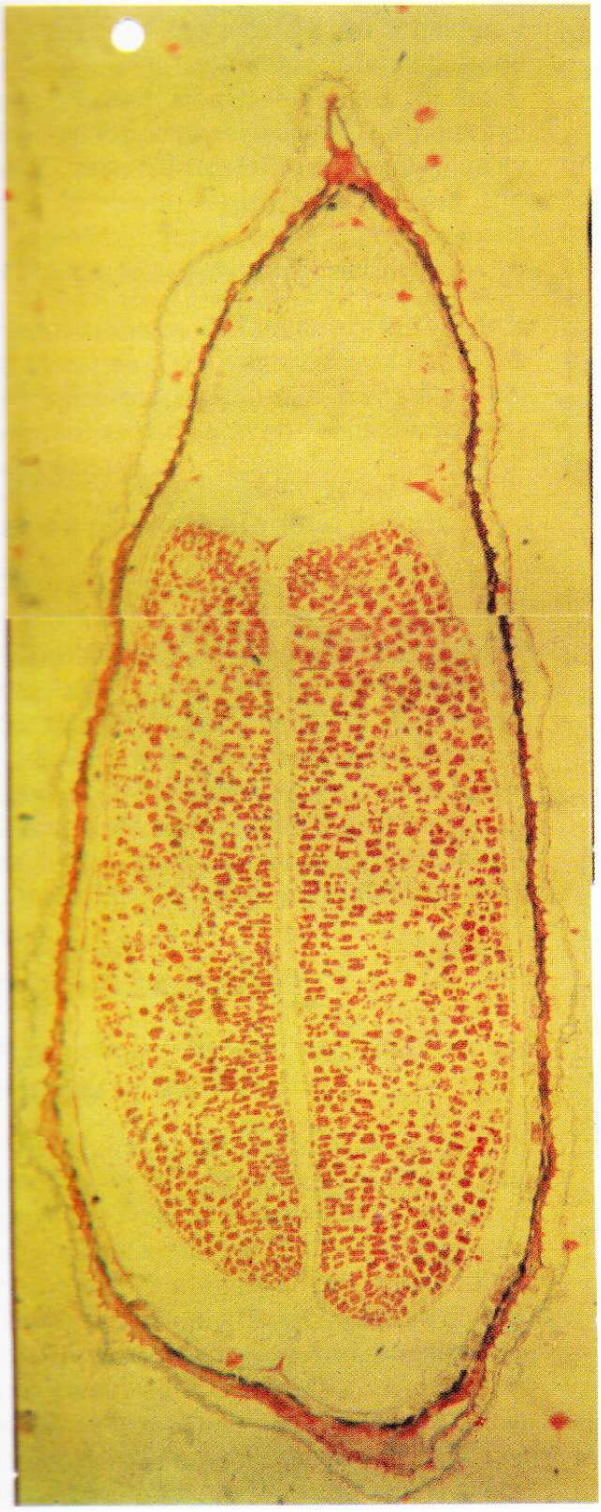
Chemical constituents

The seeds of *Iberis amara* are reported to contain mustard oil, a cardiac glycoside and gluco-iberin. Eight flavonoid glycosides have been isolated from fruits, four of which are identified as kaemphferol-3-arabino-7-rhamnoside, kaemphferol-3-gluco-7-rhamnoside , kaempferol-7-rhamnoside, and quercetin-3-gluco-7-rhamnoside. Later on, two constituents cucurbitacins E (3-methyl-thioprophylamine) and cucurbitacins I ((R)-3-methylsulfinylpropylamine) have also been reported.

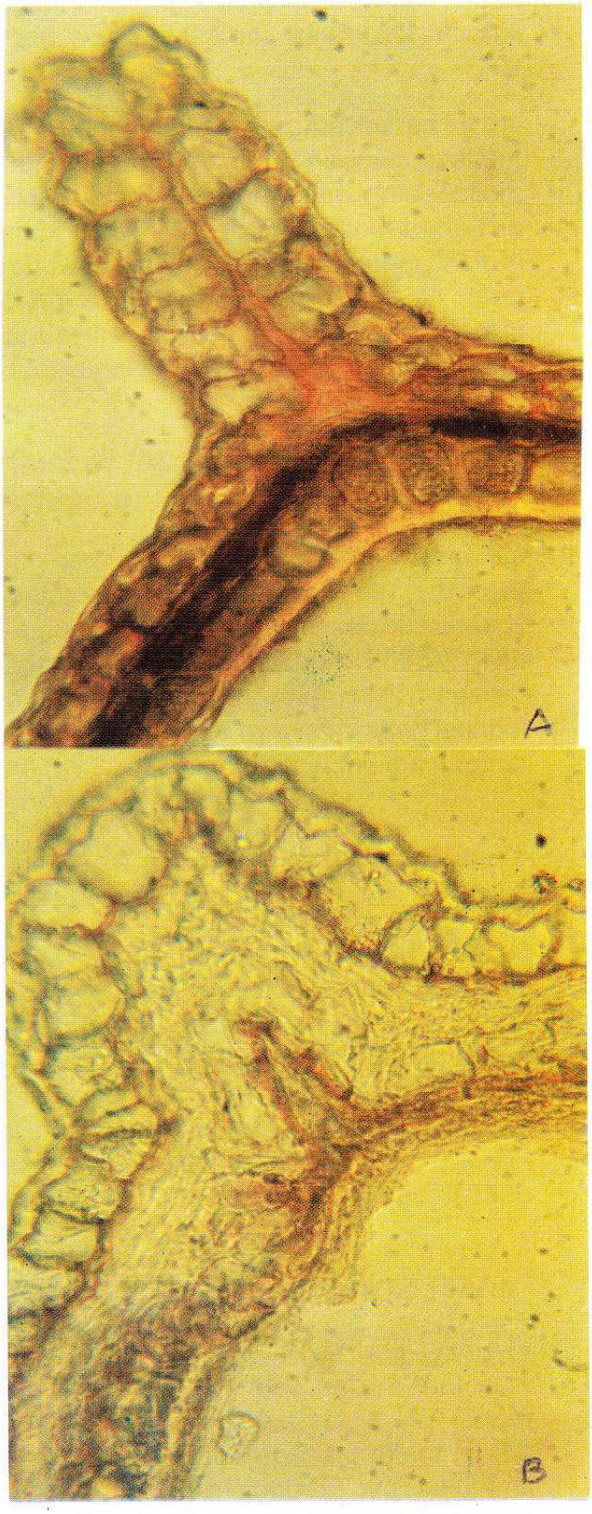
Iberis amara



Iberis amara



L.S. of seed showing testa, endosperm, radicle and cotyledons



T.S. of seed a portion magnified showing testa, pigment layer and aleurone layer at (A) micropylar end (B) chalazal region

Medicinal uses

The seeds of *Iberis amara* are considered to be very useful for asthma, bronchitis and dropsy. It has also been used for gout, rheumatism and as a rubefacient. The medicinal usage of *I. amara* is two fold e.g. mainly motility regulating and tonic effects on the gastrointestinal tract secondly it is valued for its antiphlogistic and spasmolytic activity.

In homoeopathy, the tincture of the seeds is used in treatment of hypertrophy of heart. Its initial depressing action is transient, but subsequent exciting action is considered to be more persistent.

Reported pharmacological effects

Okpanyi and co-workers (1996) had reported that *I. amara* extract increased the basal resting tone and contraction of atonic and slightly contracted gut segment of the guinea pig ileum *in vitro*. Okpanyi (1993) had also studied that anti--inflammatory activity of *I. amara* extract in carrageenan-induced paw oedema and reported that *I. amara* extract reduced the inflammatory response dose-dependently and increasingly in a graded manner within 3 to 6 hours post-induction.

EXPERIMENTAL STUDY

a. Preliminary acute and sub acute toxicity in Rabbits:

Preliminary Acute and sub acute toxicity study of *Iberis amara* homoeopathic mother tincture was carried out according to the method already described earlier (Singh, 2003) in adult albino rabbits maintained on green vegetables and water *ad libitum*. The rabbits were divided into two groups of two each. The rabbits of first group were administered *Iberis amara* homoeopathic mother tincture orally at a dose of 0.2 ml thrice daily for the period of 5 days while control rabbits received equivalent volume of alcohol for same duration. The doses beyond this could not be tested as mortality was observed with equivalent volume of alcohol itself.

The influence of test drug was noted for the gross effects on the central nervous system, behavious, lacrimation, urination, defaecation, locomotor activity, heart and respiration. The study showed that *Iberis amara* mother tincture did not have any significant observable effect upon any of the above mentioned parameters in the doses employed and therefore appears to be safe.

b. Effect of *Iberis amara on frog heart perfusion:*

Frog heart perfusion technique was set up as described by Trivedi et al (1969). Effect of *Iberis amara* on frog heart perfusion has already been described earlier (Singh, 2003). The aqueous extract of *Iberis amara* was prepared from its mother tincture by evaporating alcohol content (by 3/4th) and then making the original volume by adding distilled water.

i) Effect of aqueous extract of *Iberis Amara*

Table 1 and fig. I shows the effect of aqueous extract of *I amara* on heart rate, force of contraction and on perfusion rate. Aqueous extract in doses of 0.2 ml had depressant effect on all the three parameters, while in doses of 0.4 ml, heart stopped beating initially for about 45 seconds. Thereafter, both heart rate and force of contraction were accelerated, lasting for a short period.

ii) Effect of mother tincture of *Iberis amara*

Table 1 and fig 1 also shows that very similar to the aqueous extract, *Iberis amara* mother tincture had depressant effect on the heart rate and force of contraction. The 0.4 ml of the mother tincture was more depressant

than equal volume of aqueous extract. *I. amara* mother tincture also showed an intermittent stoppage of the heart at 6 and 9 minutes interval after its infusion though its effect on heart rate and on perfusion rate was variable. The results obtained for mother tincture on frog heart are presented in table I.

c. Effect of aqueous extract of *Iberis amara on* rat blood pressure

Effect of aqueous extract of *Iberis amara* blood pressure has already been described earlier in pentobarbitone sodium anaesthetized adult albino male rats (Singh, 2003).

Aqueous extract of Iberis amara mother tincture in doses of 0.2, 0.5 and 1.0 ml produced dose dependent fall in rat blood pressure, being 8 mm, 20 mm & 25 mm of Hg respectively. The fall in blood pressure is very transient lasting for approximately 30 seconds.

It was a pilot study carried out by using 2-3 animals in each group in order to find out the possibility of cardiovascular effects of *Iberis amara* mother tincture in experimental animals in order to avoid unnecessary killing of the animals. Further, detailed study is needed to confirm such finding authentically.

Table 1. Effect of *Iberis amara* on Frog Heart Perfusion

Test drug	Volume Injected	Force of contraction		Heart rate		Perfusion rate	
		Before drug	After drug	Before drug	After drug	Before drug	After drug
Aqueous extract	0.2 ml	16 mm	12 mm	44 beats/ min	38 beats/ min	92 drops/ min	72 drops/ min
	0.4 ml	16 mm	Initially stopped during diastole, gradually reaches to 20 mm.	40 beats/ min	52 beats/ min	90 drops/ min	104 drops/ min
Mother tincture	0.2 ml	18 mm	14 mm	28 beats/ min	32 beats/ min	76 drops/ min	70 drops/ min
	0.4 ml	18 mm	Initially stopped for 1.5 min. Also stopped for 1.5 min and 30 sec. after 6 and 9 min interval respectively	30 beats/ min	26 beats/ min	80 drops/ min	100 drops/ min

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