

Humulus lupulus L.

Hops Flowers

Flos Lupuli

Cannabaceae

Use of hops as a flavoring for beer is well known. Since ancient times it has also been used for its sedative and hypnotic qualities and also as a digestive bitter. In more recent years it has been used as a painkiller. Its universal familiarity, widespread cultivation, and relatively low cost generally does not foster adulteration. There are numerous varieties of *Humulus lupulus*, which may be used interchangeably.

A. Flowers

Bracts: Abaxial epidermis consists of cells with sinuous anticlinal walls and frequent anomocytic stomata; adaxial epidermal cells similar in shape but walls slightly thickened and pitted; both surfaces have covering and glandular trichomes; covering trichomes unicellular, up to 300 μm in length, with enlarged base and thick wall, tapered, pointed, slightly bent or, particularly at the margin, bent at a right angle near base; two types of glandular trichomes occur: (a) large multicellular glands, yellow, up to 250 μm diameter, with a short bicellular, biseriate stalk and a

multicellular hemispherical head covered with a common cuticle; after boiling in chloral hydrate solution, the cuticle becomes somewhat detached and raised, forming a dome with the outline of the secretory cells visible beneath; (b) small multicellular glands up to 120 μm long, with a typically biseriate stalk, one or several cells long, and a multicellular head up to 70 μm diameter; towards the base of the bract numerous cluster crystals of calcium oxalate are present in the mesophyll.

Stigma: Covered with dark brown papillae, up to 100 μm long.

B. Fruit

Epidermis of the exocarp consists of cells with sinuous anticlinal walls, anomocytic stomata, and numerous small cluster crystals of calcium oxalate; testa cells considerably thickened, with sinuous anticlinal walls and an inner tangential wall having numerous minute pits.

Powder: Fragments of bracts with covering and glandular trichomes and cluster crystals of calcium oxalate; large multicellular glandular trichomes with a hemispherical head; few fragments of the testa and exocarp; rare papillae from the stigma.

