

# Liquorice

For other uses, see Liquorice (disambiguation).

**Liquorice** or **licorice** (/ˈlɪk(ə)rɪʃ/ ***LIK**-(ə-)*rish* or*



*Glycyrrhiza glabra* - *MHNT*

/ˈlɪk(ə)rɪʃ/ ***LIK**-(ə-)*ris*; see spelling differences)<sup>[2]</sup> is the root of ***Glycyrrhiza glabra*** from which a somewhat sweet flavour can be extracted. The liquorice plant is a legume that is native to southern Europe, India and parts of Asia. It is not botanically related to anise, star anise, or fennel, which are sources of similar flavouring compounds. The word *liquorice* / *licorice* is derived (via the Old French *licoressa*) from the Greek γλυκύριζα (*glukurrhiza*), meaning “sweet root”,<sup>[3]</sup> from γλυκός (*glukus*), “sweet”<sup>[4]</sup> + ῥίζα (*rhiza*), “root”,<sup>[5][6]</sup> the name provided by Dioscorides.<sup>[7]</sup> It has been traditionally known and used as medicine in Ayurveda for rejuvenation.<sup>[8]</sup> It is called as Adhimadhuram (அதிமதுரம்) in Tamil, Yastimadhu (यस्तिमधु) in Sanskrit, Mulethi (मुलेठी) in Hindi, Jethimadh (જેઠીમધ) in Gujarati language.<sup>[9]</sup>*

## 1 Description

It is a herbaceous perennial, growing to 1 m in height, with pinnate leaves about 7–15 cm (3–6 in) long, with 9–17 leaflets. The flowers are 0.8–1.2 cm (1⁄3–1⁄2 in) long, purple to pale whitish blue, produced in a loose inflorescence. The fruit is an oblong pod, 2–3 cm (1 in) long, containing several seeds.<sup>[10]</sup> The roots are stoloniferous.<sup>[11]</sup>

## 2 Chemistry

The scent of liquorice root comes from a complex and variable combination of compounds, of which anethole is the most minor component (0–3% of total volatiles). Much of the sweetness in liquorice comes from glycyrrhizin, which has a sweet taste, 30–50 times the sweetness of sugar. The sweetness is very different from sugar, being less instant, tart, and lasting longer.

The isoflavene glabrene and the isoflavane glabridin, found in the roots of liquorice, are phytoestrogens.<sup>[12][13]</sup>

## 3 Cultivation and uses

Liquorice, which grows best in well-drained soils in deep valleys with full sun, is harvested in the autumn two to three years after planting.<sup>[10]</sup> Countries producing liquorice include Iran, Afghanistan, the People’s Republic of China, Pakistan, Iraq, Azerbaijan, Uzbekistan, Turkmenistan, and Turkey.<sup>[14]</sup>

The world’s leading manufacturer of liquorice products is M&F Worldwide, which manufactures more than 70% of the worldwide liquorice flavours sold to end-users.<sup>[15]</sup>

### 3.1 Tobacco

Most liquorice is used as a flavouring agent for tobacco. For example, M&F Worldwide reported in 2011 that approximately 63% of its liquorice product sales are to the worldwide tobacco industry for use as tobacco flavour enhancing and moistening agents in the manufacture of American blend cigarettes, moist snuff, chewing tobacco, and pipe tobacco.<sup>[14]</sup> American blend cigarettes made up a larger portion of worldwide tobacco consumption in earlier years,<sup>[16]</sup> and the percentage of liquorice products used by the tobacco industry was higher in the past. M&F Worldwide sold approximately 73% of its liquorice products to the tobacco industry in 2005.<sup>[17]</sup> A consultant to M&F Worldwide’s predecessor company stated in 1975 that it was believed that well over 90% of the total production of liquorice extract and its derivatives found its way into tobacco products.<sup>[18]</sup>

Liquorice provides tobacco products with a natural sweetness and a distinctive flavour that blends readily with the natural and imitation flavouring components employed in the tobacco industry. It represses harshness and is

not detectable as liquorice by the consumer.<sup>[18]</sup> Tobacco flavourings such as liquorice also make it easier to inhale the smoke by creating bronchodilators, which open up the lungs.<sup>[19]</sup> Chewing tobacco requires substantially higher levels of liquorice extract as emphasis on the sweet flavour appears highly desirable.<sup>[18]</sup>

### 3.2 Food and candy

See also: Liquorice (confectionery)

Liquorice flavour is found in a wide variety of liquorice candies or sweets. In most of these candies the taste is reinforced by aniseed oil so that the actual content of liquorice is very low. Liquorice confections are primarily purchased by consumers in the European Union.<sup>[14]</sup>

In the Netherlands, where liquorice candy (“drop”) is one of the most popular forms of sweets, only a few of the many forms that are sold contain aniseed, although mixing it with mint, menthol, or with laurel is quite popular. Mixing it with ammonium chloride (‘salmiak’) is also popular. The most popular liquorice, known in the Netherlands as *zoute drop* (salty liquorice), actually contains very little table salt, i.e., sodium chloride.<sup>[20]</sup> The salty taste is probably due to ammonium chloride and the blood pressure raising effect is due to glycyrrhizin (see below). Strong, salty candies are popular in Scandinavia.

Pontefract in Yorkshire was the first place where liquorice mixed with sugar began to be used as a sweet in the same way it is in the modern day.<sup>[21]</sup> Pontefract cakes were originally made there. In County Durham, Yorkshire, and Lancashire it is colloquially known as *Spanish*, supposedly because Spanish monks grew liquorice root at Rievaulx Abbey near Thirsk.<sup>[22]</sup>



Liquorice root

Liquorice is popular in Italy (particularly in the South) and Spain in its natural form. The root of the plant is simply dug up, washed, and chewed as a mouth freshener. Throughout Italy unsweetened liquorice is consumed in the form of small black pieces made only from 100%

pure liquorice extract; the taste is bitter and intense. In Calabria a popular liqueur is made from pure liquorice extract. Liquorice is also very popular in Syria where it is sold as a drink. Dried liquorice root can be chewed as a sweet. Black liquorice contains approximately 100 calories per ounce (15 kJ/g).

### 3.3 Medicine

See also: Glycyrrhizin

See also: Enoxolone

The compound glycyrrhizin (or glycyrrhizic acid), found in liquorice, has been proposed as being useful for liver protection in tuberculosis therapy, however evidence does not support this use which may in fact be harmful.<sup>[23]</sup> Glycyrrhizin has also demonstrated antiviral, antimicrobial, anti-inflammatory, hepatoprotective, and blood-pressure increasing effects *in vitro* and *in vivo*, as is supported by the finding that intravenous glycyrrhizin (as if it is given orally very little of the original drug makes it into circulation) slows the progression of viral and autoimmune hepatitis.<sup>[24][25]</sup> Liquorice has also demonstrated promising activity in one clinical trial, when applied topically, against atopic dermatitis.<sup>[26]</sup> Additionally liquorice has also proven itself effective in treating hyperlipidaemia (a high amount of fats in the blood).<sup>[27]</sup> Liquorice has also demonstrated efficacy in treating inflammation-induced skin hyperpigmentation.<sup>[28][29]</sup> Liquorice may also be useful in preventing neurodegenerative disorders and dental caries.<sup>[30][31][32]</sup>

The anti-ulcer, laxative, anti-diabetic, anti-inflammatory, immunomodulatory, antitumour and expectorant properties of liquorice have been investigated.<sup>[33]</sup>

### 3.4 Folk medicine

In traditional Chinese medicine, liquorice (मुलेटी, 甘草, شىرىن بىان) is believed to “harmonize” the ingredients in a formula and to carry the formula to the twelve “regular meridians”.<sup>[34]</sup>

### 3.5 Toxicity

Its major dose-limiting toxicities are corticosteroid in nature, due to the inhibitory effect its chief active constituents, glycyrrhizin and enoxolone, have on cortisol degradation and include oedema, hypokalaemia, weight gain or loss, and hypertension.<sup>[35][36]</sup>

## 4 Gallery

- Sliver of liquorice root

- Various licorice root slivers
- Licorice root with bark
- Inflorescence of *Glycyrrhiza glabra*
- Various licorice products
- Different flavoured licorice sticks
- Foliage
- *Glycyrrhiza glabra* from Koehler's *Medicinal-Plants*

## 5 References

- [1] "Glycyrrhiza glabra information from NPGS/GRIN". [www.ars-grin.gov](http://www.ars-grin.gov). Retrieved 6 March 2008.
- [2] licorice. Merriam-Webster's Medical Dictionary, © 2007 Merriam-Webster, Inc.
- [3] γλυκώριζα, Henry George Liddell, Robert Scott, *A Greek-English Lexicon*, on Perseus
- [4] γλυκός, Henry George Liddell, Robert Scott, *A Greek-English Lexicon*, on Perseus
- [5] ῥίζα, Henry George Liddell, Robert Scott, *A Greek-English Lexicon*, on Perseus
- [6] licorice, on Oxford Dictionaries
- [7] google books Maud Grieve, Manya Marshall - A modern herbal: the medicinal, culinary, cosmetic and economic properties, cultivation and folk-lore of herbs, grasses, fungi, shrubs, & trees with all their modern scientific uses, Volume 2 Dover Publications, 1982 & Pharmacist's Guide to Medicinal Herbs Arthur M. Presser Smart Publications, 1 Apr 2001 2012-05-19
- [8] Balakrishna, Acharya (2006). *Ayurveda: Its Principles & Philosophies*. New Delhi, India: Divya prakashan. p. 206. ISBN 8189235567.
- [9] "Top 10 health benefits of Mulethi or Licorice".
- [10] Huxley, A., ed. (1992). *New RHS Dictionary of Gardening*. ISBN 0-333-47494-5
- [11] Brown, D., ed. (1995). "The RHS encyclopedia of herbs and their uses". ISBN 1-4053-0059-0
- [12] Somjen, D.; Katzburg, S.; Vaya, J.; Kaye, A. M.; Hendel, D.; Posner, G. H.; Tamir, S. (2004). "Estrogenic activity of glabridin and glabrene from licorice roots on human osteoblasts and prepubertal rat skeletal tissues". *The Journal of Steroid Biochemistry and Molecular Biology* **91** (4–5): 241–246. doi:10.1016/j.jsbmb.2004.04.008. PMID 15336701.
- [13] Tamir, S.; Eizenberg, M.; Somjen, D.; Izrael, S.; Vaya, J. (2001). "Estrogen-like activity of glabrene and other constituents isolated from licorice root". *The Journal of steroid biochemistry and molecular biology* **78** (3): 291–298. doi:10.1016/S0960-0760(01)00093-0. PMID 11595510.
- [14] M & F Worldwide Corp., Annual Report on Form 10-K for the Year Ended December 31, 2010.
- [15] M & F Worldwide Corp., Annual Report on Form 10-K for the Year Ended December 31, 2001.
- [16] Erik Assadourian, Cigarette Production Drops, *Vital Signs* 2005, at 70.
- [17] M & F Worldwide Corp., Annual Report on Form 10-K for the Year Ended December 31, 2005.
- [18] Marvin K. Cook, The Use of Licorice and Other Flavoring Material in Tobacco (Apr. 10, 1975).
- [19] *Boeken v. Phillip Morris Inc.*, 127 Cal. App. 4th 1640, 1673, 26 Cal. Rptr. 3d 638, 664 (2005).
- [20] the online Dutch food composition database]
- [21] "Right good food from the Ridings". AboutFood.com. 25 October 2007.
- [22] "Where Licorice Roots Go Deep". Northern Echo. Retrieved 9 December 2008.
- [23] Liu Q, Garner P, Wang Y, Huang B, Smith H (2008). "Drugs and herbs given to prevent hepatotoxicity of tuberculosis therapy: systematic review of ingredients and evaluation studies". *BMC Public Health* (Systematic review) **8**: 365. doi:10.1186/1471-2458-8-365. PMC 2576232. PMID 18939987.
- [24] Chien, CF; Wu, YT; Tsai, TH (January 2011). "Biological analysis of herbal medicines used for the treatment of liver diseases.". *Biomedical Chromatography* **25** (1-2): 21–38. doi:10.1002/bmc.1568. PMID 21204110.
- [25] Yasui, S; Fujiwara, K; Tawada, A; Fukuda, Y; Nakano, M; Yokosuka, O (December 2011). "Efficacy of intravenous glycyrrhizin in the early stage of acute onset autoimmune hepatitis.". *Digestive Diseases and Sciences* **56** (12): 3638–47. doi:10.1007/s10620-011-1789-5. PMID 21681505.
- [26] Reuter, J; Merfort, I; Schempp, CM (2010). "Botanicals in dermatology: an evidence-based review.". *American Journal of Clinical Dermatology* **11** (4): 247–67. doi:10.2165/11533220-000000000-00000. PMID 20509719.
- [27] Hasani-Ranjbar, S; Nayebi, N; Moradi, L; Mehri, A; Larjani, B; Abdollahi, M (2010). "The efficacy and safety of herbal medicines used in the treatment of hyperlipidemia; a systematic review.". *Current pharmaceutical design* **16** (26): 2935–47. doi:10.2174/138161210793176464. PMID 20858178.
- [28] Callender, VD; St Surin-Lord, S; Davis, EC; Maclin, M (April 2011). "Postinflammatory hyperpigmentation: etiologic and therapeutic considerations.". *American Journal of Clinical Dermatology* **12** (2): 87–99. doi:10.2165/11536930-000000000-00000. PMID 21348540.

- [29] Leyden, JJ; Shergill, B; Micali, G; Downie, J; Wallo, W (October 2011). "Natural options for the management of hyperpigmentation.". *Journal of the European Academy of Dermatology and Venereology* **25** (10): 1140–5. doi:10.1111/j.1468-3083.2011.04130.x. PMID 21623927.
- [30] Kannappan, R; Gupta, SC; Kim, JH; Reuter, S; Aggarwal, BB (October 2011). "Neuroprotection by spice-derived nutraceuticals: you are what you eat!" (PDF). *Molecular Neurobiology* **44** (2): 142–59. doi:10.1007/s12035-011-8168-2. PMC 3183139. PMID 21360003.
- [31] Gazzani, G; Daglia, M; Papetti, A (April 2012). "Food components with anticaries activity.". *Current Opinion in Biotechnology* **23** (2): 153–9. doi:10.1016/j.copbio.2011.09.003. PMID 22030309.
- [32] Messier, C; Epifano, F; Genovese, S; Grenier, D (January 2012). "Licorice and its potential beneficial effects in common oro-dental diseases.". *Oral Diseases* **18** (1): 32–9. doi:10.1111/j.1601-0825.2011.01842.x. PMID 21851508.
- [33] Shibata, S (October 2000). "A drug over the millenia: pharmacognosy, chemistry, and pharmacology of licorice.". *Yakugaku Zasshi* **120** (10): 849–62. PMID 11082698.
- [34] Bensky, Dan; et al. (2004). *Chinese Herbal Medicine: Materia Medica, Third Edition*. Eastland Press. ISBN 0-939616-42-4.
- [35] Olukoga, A; Donaldson, D (June 2000). "Liquorice and its health implications.". *The Journal of the Royal Society for the Promotion of Health* **120** (2): 83–9. doi:10.1177/146642400012000203. PMID 10944880.
- [36] Armanini, D; Fiore, C; Mattarello, MJ; Bielenberg, J; Palermo, M (September 2002). "History of the endocrine effects of licorice.". *Experimental and Clinical Endocrinology & diabetes* **110** (6): 257–61. doi:10.1055/s-2002-34587. PMID 12373628.

## 6 External links

- *Glycyrrhiza glabra* (licorice), Kew plant profile
- Licorice, Medline, National Institutes of Health
- What's That Stuff?: Licorice, *Chemical & Engineering News*



## 7 Text and image sources, contributors, and licenses

### 7.1 Text

- **Liquorice** *Source:* <http://en.wikipedia.org/wiki/Liquorice?oldid=633183644> *Contributors:* Danny, Roadrunner, SimonP, Heron, Hephaestos, Frecklefoot, Fred Bauder, Mahjongg, Liftarn, Ixfd64, Paul A, Mkweise, Ahoerstemeier, Ronz, Den fjättrade ankan, Kimiko, Cimon Avaro, Emperorbma, Wikiborg, Lfh, Ike9898, Marshman, Nickshanks, Sandman, Shafei, Pollinator, Fcrozat, Hankwang, Jredmond, Sharkey, WormRunner, Rfc1394, Leedar, UtherSRG, MPF, BenFrantzDale, Bfinn, Alison, Chinasaur, Jfdwolff, Utcursch, Kusunose, PDH, Grstain, Mattman723, Discospinster, Rich Farmbrough, Randee15, LindsayH, ESKog, Spinal83, CanisRufus, Kwamikagami, Fremsey, AndyBrandt, Nk, RaffiKojian, Alansohn, Atlant, Axl, AndreasPraefcke, Lerdsuwa, Sleigh, Iustinus, Yurivict, Kay Dekker, Killing Vector, Stemonitis, Robert K S, Myrtlegroggins, GregorB, BD2412, Scottkeir, Rjwilmsi, Salix alba, Eubot, Backin72, GJ, BjKa, Travis.Thurston, Preslethe, Lemmikkipu, Silversmith, Jared Preston, Gdrbot, WriterHound, Roboto de Ajvol, YurikBot, Jimp, Pip2andahalf, Robert Will, Ericorbit, Aaron Walden, Mkatan, Blacksilmari, Janke, Badagnani, Trovatore, Mgsinc, Rim23shot, Jkelly, Kaelorr, Emijrp, Symon, Radiobuzzer, Curpsbot-unicodify, David Biddulph, Mdwyer, Asterion, Groyolo, SmackBot, Snickersnee, Espresso Addict, Brya, Bill3000, Ultramandk, Delldot, Kintetsubuffalo, Shai-kun, M stone, Stephan202, Ohnoitsjamie, Indium, MPD01605, Rkitko, Malenien, Deli nk, Bazonka, Uthbrian, Kotra, Weeddude, Nick125, Dantadd, Takowl, ArglebargleIV, JackLumber, Mathias-S, Christoffer von Schwerin, Noah Salzman, Martinp23, Bendzh, Holly Phaneuf, DFurlani, Twas Now, Freelancer685, Tawkerbot2, Martynemh, CmdrObot, JohnCD, Nunquam Dormio, Kochas, ShelfSkewed, WeggeBot, John M Baker, Hojasmuertas, Cydebot, Stefangingerich, DanieleProcida, Chatriwala, Gogo Dodo, Indeterminate, Bsd daemon, Damianrafferty, Garik, Yorkshiresky, PamD, Tmune, Jon C., Dizzymontega, Headbomb, James086, Bjornstar, AntiVandalBot, Coyets, Nipisiquit, Daniel Kellis, Annakitali, Aelwyn, Riodeplata, JAnDbot, Defective, Plantsurfer, Instinct, Haydn01, Ronaldwebb, Dream Focus, Mr. G. Williams, Bencherlite, VoABot II, BrightGirl, Mbc362, Soulbot, Confitoerdeo, Jmelendez, Jimjamjak, NicolaiLang, Eastsideastings, SlamDiego, Ksvaughan2, DerHexer, JaGa, WLU, Gloome, Quintesse, MartinBot, CommonsDelinker, AlexiusHoratius, J.delanoy, Yrtgm, Choihei, Acalamari, St.daniel, Jameschristopher, Licorice International, Squid-fryerchef, Mahir78, Dacrycarpus, Treisijs, Adsomvilay, Idioma-bot, VolkovBot, Macedonian, Dqeswn, Mightyhansa, TXiKiBoT, Cosmic Latte, Sankalpdravid, Qachee, CanOfWorms, Raymondwin, Lo Andrew, Feudonym, Fotek, Jadine, Falcon8765, Crispy park, Insanity Incarnate, AlleborgoBot, Browne-Windsor, CMBJ, Davidsjones, SieBot, Chronic The Wedgehog, Majesteit, Sav vas, Tezal234, Alexbrn, Czap42, Maderibeyza, Florentino floro, Wahrmund, Denisarona, RobinHood70, ClueBot, TinyMark, Swedish fusilier, MikeVitale, Firth m, Dylan620, Madgenberyl, Wawot1, Pointillist, IVP, Yorkshirian, Jotterbot, CowboySpartan, 7, Ofawkes, Katanada, Testtest21, Omegaepsilon, Chemgirl131, Vianello, Addbot, ConCompS, Willking1979, Some jerk on the Internet, Ziaazamrana, DOI bot, Tim 1601, Cuaxdon, DrJos, BenTrotsky, MrOllie, Favonian, Pharaoh han, Campolongo, Flappyhappy, Tide rolls, Lightbot, अशीष भटनागर, Yobot, EdwardLane, Nghtwlkr, TaBOT-zerem, Sirsparksalot, Manayunkmarika, JackMill, Iroony, Kulmalukko, Oqtay, AnomieBOT, EryZ, Flewis, Materialschemist, Citation bot, ArthurBot, LilHelpa, Cameron Scott, Xqbot, Nappyrootslistener, Aatray06, Loveless, Nneer8, Cyfraw, Hamamelis, JuJuBee2, Truehistoryjvba, RetiredWikipedian789, Poopypantsface, MayFlowerNorth, Koolaidpimp, Alxeedo, Harjasusi, Craig Pemberton, ენსიკლოპი, Citation bot 1, BColeKid, Krish Dulal, Chenopodiaceous, Pinethicket, Fleurblack, Markuss1, TobeBot, Edwardhwang, Srschu273, Vrenator, THE SMUT, RjwilmsiBot, Phlegat, Infinitesimus, Coolassman, Lennyfield, Fipblizip, EmausBot, Immunize, Lucas Thoms, Brothernight, Myriddin, Rosexelx, AManWithNoPlan, Erianna, Demiurge1000, Шиманський Василь, ClueBot NG, Gilderien, Satellizer, Helveteshunden, Januarythe18th, Don'tyoulookatmelikethat, Vago, Helpful Pixie Bot, Boneman95, Curb Chain, Blahdenoma, BernieW650, Vagobot, M0rphzone, Northamerica1000, Arionstone, Jahnvisatyan, Writ Keeper, NotWith, Ερμής, Danielsilveira321, Shisha-Tom, Fuse809, Odurvesh, Dominkov, SparklinSapphire, Gallic, RikSchuiling, Brison09, Mrsgrits, Dexbot, UseTheCommandLine, SFK2, Nomen ambiguu, Jmvernay, Chaimara, Ercé, Alvingeo, Finnusertop, Gavelboy, Iliektotalminer, Ben-TenBatman, Nikki Louladdl, Library Guy, Ahgent omega, Craigrottman, Meemo16, Monkbot, Wofome, Fish storm, AdjectiveAnnie, Spellingguy, Medgirl131, Sandipmsu, Jjamer98 and Anonymous: 327

### 7.2 Images

- **File:Commons-logo.svg** *Source:* <http://upload.wikimedia.org/wikipedia/en/4/4a/Commons-logo.svg> *License:* ? *Contributors:* ? *Original artist:* ?
- **File:Glycyrrhiza\_glabra\_MHNT.BOT.2011.3.43.jpg** *Source:* [http://upload.wikimedia.org/wikipedia/commons/f/f9/Glycyrrhiza\\_glabra\\_MHNT.BOT.2011.3.43.jpg](http://upload.wikimedia.org/wikipedia/commons/f/f9/Glycyrrhiza_glabra_MHNT.BOT.2011.3.43.jpg) *License:* CC-BY-SA-3.0 *Contributors:* Own work *Original artist:* Roger Culos
- **File:Liquiritiae\_radix\_suessholzswurzel.jpg** *Source:* [http://upload.wikimedia.org/wikipedia/commons/e/e0/Liquiritiae\\_radix\\_suessholzswurzel.jpg](http://upload.wikimedia.org/wikipedia/commons/e/e0/Liquiritiae_radix_suessholzswurzel.jpg) *License:* Public domain *Contributors:* Own work *Original artist:* Alcibiades
- **File:Wikisource-logo.svg** *Source:* <http://upload.wikimedia.org/wikipedia/commons/4/4c/Wikisource-logo.svg> *License:* CC-BY-SA-3.0 *Contributors:* *Original artist:* Nicholas Moreau

### 7.3 Content license

- Creative Commons Attribution-Share Alike 3.0