



NATURAL HEALTH PRODUCT

LINDEN, LARGE-LEAF – *TILIA PLATYPHYLLOS*

This monograph is intended to serve as a guide to industry for the preparation of Product Licence Applications (PLAs) and labels for natural health product market authorization. It is not intended to be a comprehensive review of the medicinal ingredient.

Notes

- ▶ Text in parentheses is additional optional information which can be included on the PLA and product label at the applicant's discretion.
- ▶ The solidus (/) indicates that the terms and/or statements are synonymous. Either term or statement may be selected by the applicant.

Date: July 18, 2017

Proper name(s):

Tilia platyphyllos Scop. (Tiliaceae) (USDA 2008)

Common name(s):

- ▶ Linden (McGuffin et al. 2000; Wiersema and León 1999)
- ▶ Large-leaf linden (McGuffin et al. 2000; Wiersema and León 1999)
- ▶ Large-leaf lime (McGuffin et al. 2000; Wiersema and León 1999)
- ▶ Tilia (McGuffin et al. 2000; Wiersema and León 1999)

Source material(s):

Flower (Bradley 1992; Felter and Lloyd 1983 [1898])

Route(s) of administration:

Oral

Dosage form(s):

This monograph is not intended to include foods or food-like dosage forms such as bars, chewing gums or beverages.

Dosage forms by age group:

- **Children 2 years:** The acceptable dosage forms are limited to emulsion/suspension and solution/drops (Giacoaia et al. 2008; EMEA/CHMP 2006).
- **Children 3-5 years:** The acceptable dosage forms are limited to chewables, emulsion/suspension, powders and solution/drops (Giacoaia et al. 2008; EMEA/CHMP 2006).
- **Children 6-12 years, Adolescents 13-17 years, and Adults ≥ 18 years:** The acceptable dosage forms include, but are not limited to capsules, chewables (e.g., gummies, tablets), liquids, powders, strips or tablets.

Use(s) or Purpose(s):

- ▶ Traditionally used in Herbal Medicine as a nervine to help relieve nervousness (Wichtl 2004; Hoffmann 2003; Bradley 1992) and restlessness (Bradley 1992; Felter and Lloyd 1983[1898]).
- ▶ Traditionally used in Herbal Medicine to help relieve coughs and irritation of the throat in colds and catarrh of the respiratory tract (Wichtl 2004; Blumenthal et al. 2000; Bradley 1992; Felter and Lloyd 1983 [1898]).

Dose(s):

Table 1: Dose information for linden flower presented as dose per day

Subpopulation		Linden flower (g/day)	
		Minimum	Maximum
Children ¹	2-4 y	0.2	2
Children and adolescents ¹	5-9 y	0.4	3
Adolescents ¹	10-14 y	0.8	6
Adolescents and adults ^{1,2,3}	≥ 15 y	1.5	12

¹ Children and adolescent doses were calculated as a fraction of the adult dose (JC 2008). The use of linden in children and adolescents is supported by the following references: McIntyre 2005; Schilcher 1997; Bove 1996.

² Adult dose supported by the following references: Hoffmann 2003; Blumenthal et al. 2000; Bradley 1992; Felter and Lloyd 1983[1898].

³ Includes pregnant and breastfeeding women

See Appendix 1 for examples of appropriate dosage preparations, frequencies of use and directions for use, according to cited references. The purpose of Appendix 1 is to provide guidance to industry.

Duration of use:

No statement required.



Risk information:

Caution(s) and warning(s):

Consult a health care practitioner if symptoms persist or worsen.

Contraindication(s):

No statement required.

Known adverse reaction(s):

Hypersensitivity and/or an allergy are known to occur; in which case, discontinue use (Mills and Bone 2005; De Smet 1993).

Non-medicinal ingredients:

Must be chosen from the current Natural Health Products Ingredients Database (NHPID) and must meet the limitations outlined in the database.

Specifications:

- ▶ The finished product specifications must be established in accordance with the requirements described in the Natural and Non-prescription Health Products Directorate (NNHPD) *Quality of Natural Health Products Guide*.
- ▶ The medicinal ingredient must comply with the requirements outlined in the NHPID.

References cited:

BHP 1996: British Herbal Pharmacopoeia. Bournemouth (UK): British Herbal Medicine Association; 1996.

Blumenthal M, Goldberg A, Brinkmann J, editors. Herbal Medicine: Expanded Commission E Monographs. Boston (MA): Integrative Medicine Communications; 2000.

Bove M. An Encyclopedia of Natural Healing for Children and Infants. New Canaan (CT): Keats Publishing, Incorporated; 1996.

Bradley PR, editor. British Herbal Compendium: A Handbook of Scientific Information on Widely Used Plant Drugs, Volume 1. Bournemouth (UK): British Herbal Medicine Association; 1992.



De Smet PAGM, Keller K, Hansel R, Chandler RF, editors. *Adverse Effects of Herbal Drugs*, Volume 2. Berlin (DE): Springer-Verlag; 1993.

EMA/CHMP 2006: European Medicines Agency: Pre-authorization Evaluation of Medicines for Human Use. Committee for Medicinal Products for Human Use. Reflection Paper: Next link will take you to another Web site Formulations of choice for the paediatric population. Adopted September 2006. EMA/CHMP/PEG/194810/2005. [Accessed on 2013 June 29].

Felter HW, Lloyd JU. *King's American Dispensatory*, Volume 1, 18th edition. Sandy (OR): Eclectic Medical Publications; 1983 [Reprint of 1898 original].

Giacoa GP, Taylor-Zapata P, Mattison D. Eunice Kennedy Shriver National Institute of Child Health and Human Development Pediatric Formulation Initiative: selected reports from working groups. *Clinical Therapeutics* 2008; 30(11):2097-2101.

Hoffmann D. *Medical Herbalism*. Rochester (VT): Healing Arts Press; 2003.

JC 2008: Justice Canada. *Food and Drug Regulations*. (C.01.021). Ottawa (ON): Justice Canada; 2008. [Accessed 2008-01-18]. Available from: <http://laws.justice.gc.ca/en/F-27/C.R.C.-c.870/text.html>

McGuffin M, Kartesz JT, Leung AY, Tucker AO, editors. *Herbs of Commerce*, 2nd edition. Silver Spring (MD): American Herbal Products Association; 2000.

McIntyre A. *Herbal Treatment of Children - Western and Ayurvedic Perspectives*. Toronto (ON): Elsevier Limited; 2005.

Mills S, Bone K. *The Essential Guide to Herbal Safety*. St. Louis (MO): Elsevier Churchill Livingstone; 2005.

Schilcher H. *Phytotherapy in Paediatrics: Handbook for Physicians and Pharmacists*. Stuttgart (D): Medpharm Scientific Publishers; 1997.

USDA 2007: United States Department of Agriculture, Agricultural Research Service, National Genetic Resources Program. Germplasm Resources Information Network (GRIN). *Tilia platyphyllos* Scop. National Germplasm Resources Laboratory, Beltsville (MD). [Accessed 2008-01-23]. Available from: http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl

USDA 2005: United States Department of Agriculture, Agricultural Research Service, National Genetic Resources Program. Germplasm Resources Information Network (GRIN). *Tilia x europaea* L. National Germplasm Resources Laboratory, Beltsville (MD). [Accessed 2008-01-23]. Available from: http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl

USDA 2004: United States Department of Agriculture, Agricultural Research Service, National Genetic Resources Program. Germplasm Resources Information Network (GRIN). *Tilia cordata*



Mill. National Germplasm Resources Laboratory, Beltsville (MD). [Accessed 2008-01-23]. Available from: http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl

Wichtl M, editor. Herbal Drugs and Phytopharmaceuticals: A Handbook for Practice on a Scientific Basis, 3rd edition. Stuttgart (D): Medpharm GmbH Scientific Publishers; 2004.

Wiersema J, León B. World Economic Plants: A Standard Reference. Boca Raton (FL): CRC Press LLC; 1999.

References reviewed:

Barnes J, Anderson LA, Philipson JD. Herbal Medicines, 3rd edition. London (UK): The Pharmaceutical Press; 2007.

Hutchens AR. Indian Herbology of North America. Boston (MA): Shambhala Publications, Inc.; 1991.

McGuffin M, Hobbs C, Upton R, Goldberg A, editors. American Herbal Products Association's Botanical Safety Handbook. Boca Raton (FL): CRC Press; 1997.

Mills S, Bone K. Principles and Practice of Phytotherapy. Toronto (ON): Churchill Livingstone; 2000.



Appendix 1: Examples of appropriate dosage preparations, frequencies of use and directions for use

Dried flower: 2-4 g, per day (Blumenthal et al. 2000)

Infusion:

- ▶ 1.8 g dried flower, 3 times per day (Hoffmann 2003)
- ▶ 1.8-2 g dried flower, 1-2 times per day (Blumenthal et al. 2000)
- ▶ 2-4 g dried flower, 3 times per day (Bradley 1992)
- ▶ 2-2.6 g (30 or 40 grains) dried flower, per day (Felter and Lloyd 1983 [1898])

Directions for use: Pour 150 ml to 473 ml (1 pint) of boiling water over dried flowers and infuse for 10-15 minutes (Hoffmann 2003; Blumenthal et al. 2000; Felter and Lloyd 1983 [1898]).

1.8 g = 1 tsp. (Wichtl 2004)

Fluidextract:

- ▶ 2 g dried equivalent, 1-2 times per day (1:1, 2 ml) (Blumenthal et al. 2000)
- ▶ 2-4 g dried equivalent, 3 times per day (1:1, 25% alcohol, 2-4 ml) (Bradley 1992)

Tincture:

- ▶ 0.5-1 g dried equivalent, 3 times per day (1:5, 40% alcohol, 2.5-5 ml) (Hoffmann 2003)
- ▶ 2 g dried equivalent, 1-2 times per day (1:5, 10 ml) (Blumenthal et al. 2000)
- ▶ 0.8-2 g dried equivalent, 3 times per day (1:5, 25% alcohol, 4-10 ml) (Bradley 1992)