



## CINNAMON – *CINNAMOMUM VERUM*

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 the statements are synonymous. Either term or statement may be selected by the applicant.

### Date

February 8, 2013

### Proper name(s)

*Cinnamomum verum* J. Presl (Lauraceae) (USDA 2009; Blumenthal et al. 2000; McGuffin et al. 2000)

Synonym: *Cinnamomum zeylanicum* Blume (ITIS 2011; BHC 2006; API 2001[1990]; Blumenthal et al. 1998; McGuffin et al. 2000)

### Common name(s)

- ▶ Cinnamon (Merck 2012; ITIS 2011; USDA 2009; API 2001[1990]; McGuffin et al. 2000)
- ▶ Ceylon cinnamon (Merck 2012; BHC 2006; Blumenthal et al. 2000; McGuffin et al. 2000)
- ▶ True cinnamon (Blumenthal et al. 2000; McGuffin et al. 2000)
- ▶ Tvak (API 2001[1990]; McGuffin et al. 2000)

### Source material(s)

- ▶ Branch bark (Blumenthal et al. 2000, 1998)
- ▶ Shoot bark (API 2001[1990]; Blumenthal et al. 2000, 1998)

### Route(s) of administration

oral

## Dosage form(s)

- ▶ The acceptable pharmaceutical dosage forms include, but are not limited to capsules, chewables (e.g. gummies, tablets), liquids, powders, strips or tablets.
- ▶ This monograph is not intended to include foods or food-like dosage forms such as bars, chewing gums or beverages.

## Use(s) or Purpose(s)                      Statement to the effect of

- ▶ Provides antioxidants (Gruenwald et al. 2010; Roussel et al. 2009; Halvorsen et al. 2006; Shan et al. 2005).
- ▶ (Traditionally) used in Ayurveda for bowel complaints such as dyspepsia, flatulency, diarrhea and vomiting (Paranjpe 2005[2001]; Kapoor 2001).
- ▶ (Traditionally) used in Herbal Medicine for digestive disturbances/digestive complaints such as mild spasms/cramps of the gastrointestinal tract/gastrointestinal colic, feeling of repletion/bloating, and flatulence/carminative (Godfrey et al. 2010; BHC 2006; Wichtl 2004; Blumenthal et al. 2000, 1998).
- ▶ (Traditionally) used in Herbal Medicine for loss of appetite (BHC 2006; Wichtl 2004; Blumenthal et al. 2000, 1998).

## Note

A claim for a traditional use must include either the term “Herbal Medicine” or “Ayurveda”.

## Dose(s)    Statement to the effect of

### Subpopulation(s)

adults ( $\geq 19$  years)

### Quantity(ies)

FLUIDEXTRACT

Non-Ayurveda products, excluding antioxidants:

1:1 (g/ml) in 70% alcohol

0.5-1.3 ml (BHC 2006; Blumenthal et al. 2000).

## INFUSION AND DECOCTION

### Antioxidant:

Up to 1.5 g cut or ground bark, per day. Prepare with 150 ml of water (API 2001[1990]; Kapoor 2001).

### Non-Ayurveda products excluding antioxidant:

0.7-1.5 g cut or ground bark, per day. Prepare with 150 ml of water (BHC 2006; Wichtl 2004; Blumenthal et al. 2000, 1998).

## POWDER

### Antioxidant:

Up to 4 mg bark powder, per day (API 2001[1990]; Kapoor 2001).

### Ayurveda products:

1-3 g bark powder, per day (API 2001[1990]; Kapoor 2001)

### For non-Ayurveda products, excluding antioxidants:

2-4 g bark powder, per day (BHC 2006; Wichtl 2004; Blumenthal et al. 2000, 1998).

## TINCTURE

### Non-Ayurveda products, excluding antioxidants:

1:5 (g/ml) in 70% alcohol (Ph.Eur. 2012; BHC 2006)  
2-6.7 ml (BHC 2006; Blumenthal et al. 2000).

## Directions for use

### All products, excluding antioxidants:

Take three times daily.

### Loss of appetite:

Take a half hour before meals.

### Digestive discomfort:

Take after food/meal (Wichtl 2004).

## Note

Refer to Appendix 1 for examples of dosage preparations 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**

Statement to the effect of

### **Caution(s) and warning(s)**

All products:

- ▶ If you are breastfeeding, consult a health care practitioner prior to use (Blumenthal et al. 2000; WHO 1999).
- ▶ If you have diabetes, consult a health care practitioner prior to use (NS 2012; Brinker 2010)

Loss of appetite or digestive discomforts:

If symptoms persist or worsen, consult a health care practitioner.

### **Contraindication(s)**

If you are pregnant, do not use this product (Brinker 2010; BHC 2006; Blumenthal 2000, 1998).

### **Known adverse reaction(s)**

No statement required.

## **Storage conditions**

No statement required.

## **Non-medicinal ingredients**

Must be chosen from the current NHPD *Natural Health Products Ingredients Database* 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 NHPD *Quality of Natural Health Products Guide*.
- ▶ The medicinal ingredient must comply with the requirements outlined in the *Natural Health Products Ingredients Database* (NHPID). In addition, the medicinal ingredient may comply with the quality specifications outlined in the current Cinnamon - Cinnamomi cortex or the Cinnamon tincture - Cinnamomi corticis tinctura monographs in the European Pharmacopoeia.

## **References cited**

Al-Jamal AR. Effects of cinnamon on blood glucose and lipid levels in diabetic patients (type 1). *African Journal of Biochemistry Research* 2009;3(5):181-184.

API 2001[1990]: The Ayurvedic Pharmacopoeia of India. Part I, Volume I, First Edition. Delhi (IN): The Controller of Publications; 2001 [Reprint of 1990 publication]. [Accessed 2012 September 24]. Available from: <http://www.ccras.nic.in/>

Bandara T, Uluwaduge I, Jansz ER. Bioactivity of cinnamon with special emphasis on diabetes mellitus: a review. *International Journal of Food Sciences and Nutrition* 2012;63(3):380-386.

Blumenthal M, editor. *The Complete German Commission E Monographs: Therapeutic Guide to Herbal Medicines*. Austin (TX): American Botanical Council in cooperation with Integrative Medicine Communications; 1998.

Blumenthal M, Goldberg A, Brinckmann J. *Herbal Medicine: Expanded Commission E Monographs*. Boston (MA): American Botanical Council. 2000.

BHC 2006: Bradley PR, editor. *British Herbal Compendium Volume 2: A Handbook of Scientific Information on Widely Used Plant Drugs—Companion to the British Herbal Pharmacopoeia*. Bournemouth (GB): British Herbal Medicine Association; 2006.

Brinker 2010: Brinker F. Final updates and additions for Herb Contraindications and Drug Interactions, 3rd edition, including extensive Appendices addressing common problematic conditions, medications and nutritional supplements, and influences on Phase I, II & III metabolism with new appendix on botanicals as complementary adjuncts with drugs. [Internet]. Sandy (OR): Eclectic Medical Publications. [Updated July 13 2010; Accessed 2012 June 1]. Available from: <http://www.eclecticherb.com/emp/updatesHCIDI.html>

Brinker F. *The Toxicology of Botanical Medicines*. Sandy (OR): Eclectic Medical Publications; 2000.

Crawford P. Effectiveness of cinnamon for lowering hemoglobin A1C in patients with type 2 diabetes: a randomized, controlled trial. *Journal of the American Board of Family Medicine* 2009; 22(5):507-512.

Godfrey A, Saunders PR, Barlow K, Gilbert C, Gowan M, Smith F. *Principles and Practices of Naturopathic Botanical Medicine. Volume 1: Botanical Medicine Monographs*. Toronto (ON): CCNM Press; 2010.

Halvorsen BL, Carlsen MH, Phillips KM, Bohn SK, Holte K, Jacobs DR Jr, Blomhoff R. Content of redox-active compounds (i.e., antioxidants) in foods consumed in the United States. *American Journal of Clinical Nutrition* 2006;84(1):95-135.

ITIS 2011: *Cinnamomum verum* J. Presl [2011] Integrated Taxonomic Information System (ITIS) [Internet]. Accessed 2012 June 5]. Available from: <http://www.itis.gov>

Kapoor LD. *Handbook of Ayurvedic Medicinal Plants*. Baton Roca (FL): CRC Press LLC; 2001.

Merck 2012: O'Neil MJ, Heckelman PE, Koch CB, Roman KJ, editors. The Merck Index: An Encyclopedia of Chemicals, Drugs, and Biologicals (14th Edition - Version 14.9). Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc.; 2006, 2012. Available from: <http://www.knovel.com/>

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

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

NS 2012: Cinnamon (*Cinnamomum* spp.) Natural Standard Professional Monograph, Copyright © 2012 [Internet]. [Accessed 2012 July 31]. Available from: <http://www.naturalstandard.com/>

Paranjpe P. Indian Medicinal Plants: Forgotten Healers: A Guide to Ayurvedic Herbal Medicine. Delhi (IN): Chaukhamba Sanskrit Pratishthan; 2005.

Ph.Eur. 2012: European Pharmacopoeia. 7th edition. Strasbourg (FR): Directorate for the Quality of Medicines and HealthCare of the Council of Europe (EDQM); 2012.

Safdar M, Khan A., Khan MMA, Siddique M. Effect of various doses of cinnamon on blood glucose in diabetic individuals. Pakistan Journal of Nutrition 2004;3:268-272.

Shan B, Cai YZ, Sun M, Corke H. Antioxidant capacity of 26 spice extracts and characterization of their phenolic constituents. Journal of Agricultural and Food Chemistry 2005;53(20):7749-7759.

USDA 2009: USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN) [Internet]. National Germplasm Resources Laboratory, Beltsville (MD). [*Cinnamomum verum* J. Presl: (Lauraceae). Last updated: 05-Oct-2009; Accessed 2012 June 5]. Available from: <http://www.ars-grin.gov/>

WHO 1999: World Health Organization. WHO Monographs on Selected Medicinal Plants, Volume 1. Geneva (CH): World Health Organization; 1999.

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

## References reviewed

Anderson RA, Broadhurst CL, Polansky MM, Schmidt WF, Khan A, Flanagan VP, et al. Isolation and characterization of polyphenol type-A polymers from cinnamon with insulin-like biological activity. J Agric Food Chem. 2004;52(1):65-70.

Altschuler JA, Casella SJ, MacKenzie TA, Curtis KM. The effects of cinnamon on A1C among adolescence with type 1 diabetes. *Diabetes Care* 2007;30:813-816.

Baker W, Gutierrez-Williams G, White CM, Kluger J, Coleman CI. Effect of cinnamon on glucose control and lipid parameters. *Diabetes Care* 2008;31:41-43.

Blevins SM, Leyva MJ, Brown J, Wright J, Scofield RH, Aston CE. Effect of cinnamon on glucose and lipid levels in non-insulin dependent type 2 diabetes mellitus. *Diabetes Care* 2007;30:2236-2237.

Brinker F. *Herb Contraindications and Drug Interactions* (3rd Ed.). Sandy (OR): Eclectic Medical Publications; 2001.

Broadhurst CL, Polansky MM, Anderson RA. Insulin like biological activity of culinary and medicinal plant aqueous extracts in vitro. *J Agric Food Chem* 2000;48:849-852.

Canada Vigilance Adverse Reaction Online Database. Ottawa (ON): Marketed Health Products Directorate, Health Canada; 2011. [Accessed 2011 October 27]. Available from: <http://webprod3.hc-sc.gc.ca/arquery-rechercheei/index-eng.jsp>

Canadian Nutrient File (CNF), 2012 [Internet]. Ottawa (ON): Food and Nutrition, Health Canada. [Date Modified 2012 February 2; Accessed 2012 April 12]. Available from: <http://webprod3.hc-sc.gc.ca/cnf-fce/index-eng.jsp>

Carter JS, Pugh JA, Monterrosa A. Non-insulin-dependent diabetes mellitus in minorities in the United States. *Ann Intern Med.* 1996;125(1):221–232.

Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. *Canadian Journal of Diabetes* 2008;32(suppl 1).

Dugoua JJ, Seely D, Perri D, Cooley K, Forelli T, Mills E, Koren G. From type 2 diabetes to antioxidant activity: a systematic review of the safety and efficacy of common and cassia cinnamon bark. *Can. J. Physiol. Pharmacol* 2007;85:837-847.

Gruenwald J, Freder J, Armbruester N. Cinnamon and health. *Critical Reviews in Food Science and Nutrition* 2010;50(9):822-834.

Hlebowicz J, Darwiche G, Björgell O, Almé LO. Effect of cinnamon on postprandial blood glucose, gastric emptying, and satiety in healthy subjects. *American Journal of Clinical Nutrition* 2007;85:1552-1556.

Hlebowicz J, Hlebowicz A, Lindstedt S, Björgell O, Höglund P, Holst JJ, et al. Effects of 1 and 3g cinnamon on gastric emptying, satiety, and postprandial blood glucose, insulin, glucose-dependent insulintropic polypeptide, glucagon-like peptide 1, and ghrelin concentrations in healthy subjects. *American Journal of Clinical Nutrition* 2009;89:815-821.

Imparl-Radosevich J, Deas S, Polansky MM et al. Regulation of PTP-1 and insulin receptor kinase by fractions from cinnamon: implications for cinnamon regulation of insulin signalling. *Horm Res* 1998;50:177-182.

Jarvill-Taylor KJ, Anderson RA, Graves DJ. A hydroxychalcone derived from cinnamon functions as a mimetic for insulin in 3T3-L1 adipocytes. *J Am Coll Nutr*. 2001;20(4):327-236.

Summary of Evaluations Performed by the Joint FAO/WHO Expert Committee on Food Additives: Cinnamaldehyde. [Accessed 2011 October 31]. Available from [http://www.inchem.org/documents/jecfa/jecval/jec\\_418.htm](http://www.inchem.org/documents/jecfa/jecval/jec_418.htm)

Joint Food and Agriculture Organization of the United Nations (FAO)/World Health Organization (WHO) Expert Committee on Food Additives. WHO Food Additives Series: 60. Safety evaluation of certain food additives. Geneva (CH): World Health Organization. 2009. Available from <http://www.inchem.org/documents/jecfa/jecmono/v60je01.pdf>

Leung AY, Foster S. *Encyclopedia of Common Natural Ingredients: Used in Food, Drugs and Cosmetics*. Second edition. New York (NY): John Wiley & Sons; 1996.

Qin B, Nagasaki M, Ren M, Bajotto G, Oshida Y, Sato Y. Cinnamon extract (traditional herb) potentiates in vivo insulin-regulated glucose utilization via enhancing insulin signaling in rats. *Diabetes Res Clin Pract*. 2003;62:139-148.

Roussel AM, Hininger I, Benaraba R, Ziegenfuss TN, Anderson RA. Antioxidant effects of a cinnamon extract in people with impaired fasting glucose that are overweight or obese. *J Am Coll Nutr* 2009;28:16-21.

Solomon TPJ, Blannin AK. Effects of short-term cinnamon ingestion on in vivo glucose tolerance. *Diabetes Obes Metab* 2007;8:895-901.

Solomon TPJ, Blannin AK. Changes in glucose tolerance and insulin sensitivity following 2 weeks of daily cinnamon ingestion in healthy humans. *Eur J Appl Physiol*. 2009;105:969-976.

Soni R, Bhatnagar V. Effect of cinnamon (*Cinnamomum cassia*) intervention on blood glucose of middle aged adult male with non insulin dependent diabetes mellitus (NIDDM). *Ethno-Med* 2009;3:141-144.

United Kingdom Prospective Diabetes Study (UKPDS) Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet* 1998;352:837-853.

United States Department of Agriculture (USDA), Agricultural Research Service. Nutrient Data Laboratory. Spices, cinnamon, ground. NDB. No: 02010. 2011. [Accessed 2011-10-31]. Available from <http://www.nal.usda.gov/fnic/foodcomp/cgi-bin/measure.pl>



Vanschoonbeek K, Thomassen BJW, Senden JM, Wodzig WKWH, van Loon LJC. Cinnamon supplementation does not improve glycemic control in postmenopausal type 2 diabetic patients. *J Nutr* 2006;136:977-980.

WHO Food Additives Series 46: Cinnamyl Alcohol and Related Substances. 2010. [Accessed 2011-10-31]. Available from: <http://www.inchem.org/documents/jecfa/jecmono/v46je07.htm>

WHO Food Additives Series 14: Cinnamaldehyde. 2010. [Accessed 2011-10-31]. Available from: <http://www.inchem.org/documents/jecfa/jecmono/v14je07.htm>

Ziegenfuss TN, Hofheins JE, Mendel RW, Landis J., Anderson RA. Effects of a water-soluble cinnamon extract on body composition and features of the metabolic syndrome in pre-diabetic men and women. *J Int Soc Sports Nut.* 2006;3:45-53.

## **Appendix 1** Examples of dosage preparations and directions for use

### **Godfrey et al. 2010**

Powdered bark: 5-20 gr. (~0.3-1.2 g)

Tincture: 2-4 ml tid

### **BHC 2006**

Three times daily:

Dried bark: 0.5-1 g as an infusion

Liquidextract: 1:1 in 70% alcohol, 0.5-1 ml

Tincture: BPC 1949, 1:5 in 70% ethanol, 2-4 ml

### **Wichtl 2004**

2-4 g dried bark

### **API 2001[1990]**

1-3 g powdered bark, per day

### **Kapoor 2001**

0.5-1.5 g bark

### **Blumenthal 2000**

2-4 g per day of cut or ground bark

Infusion or decoction: 0.7-1.3 g in 150 ml of water, three times daily

Fluidextract: 1:1 (g/ml), 0.7-1.3 ml, three times daily

Tincture: 1:5 (g/ml): 3.3-6.7 ml, three times daily

### **Blumental 1998**

2-4 g bark