



## COPPER

**Date:** November 8, 2007

**Proper name(s):** Copper (Sweetman 2007; O'Neil et al. 2001)

**Common name(s):** Copper (Sweetman 2007; O'Neil et al. 2001)

**Source material(s):**

- ▶ Calcium copper edetate (Sweetman 2007)
- ▶ Copper (II) acetate/Cupric acetate (O'Neil et al. 2001)
- ▶ Copper (II) bisglycinate/Cupric bisglycinate (Albion 2000)
- ▶ Copper (II) carbonate/Cupric carbonate (O'Neil et al. 2001)
- ▶ Copper (II) chloride/Cupric chloride (Sweetman 2007; O'Neil et al. 2001)
- ▶ Copper (II) chloride dihydrate/Cupric chloride dihydrate (Sweetman 2007; O'Neil et al. 2001)
- ▶ Copper (II) citrate/Cupric citrate (O'Neil et al. 2001)
- ▶ Copper (II) fumarate/Cupric fumarate (HC 2007)
- ▶ Copper (II) gluconate/Cupric gluconate (Sweetman 2007; IOM 2003; O'Neil et al. 2001)
- ▶ Copper (II) glutarate/Cupric glutarate (HC 2007)
- ▶ Copper (II) hydrolyzed animal protein (HAP) chelate/Cupric HAP chelate (Albion 1993)
- ▶ Copper (II) hydrolyzed vegetable protein (HVP) chelate/Cupric HVP chelate (Albion 1993)
- ▶ Copper (II) malate/Cupric malate (HC 2007)
- ▶ Copper (II) succinate/Cupric succinate (HC 2007)

- ▶ Copper (II) sulfate/Cupric sulfate (Sweetman 2007; IOM 2003; O’Neil et al. 2001)
- ▶ Copper (II) sulfate pentahydrate/Cupric sulfate pentahydrate (Sweetman 2007; IOM 2003; O’Neil et al. 2001)

Note: The slash (/) indicates that the terms are synonyms. Either term may be selected by the applicant.

**Route(s) of administration:** Oral

**Dosage form(s):** Those pharmaceutical dosage forms suited to oral administration, including but not limited to chewable tablets, caplets, capsules, strips, lozenges, powders or liquids where the dose is measured in drops, teaspoons, or tablespoons are acceptable. This monograph is not intended to include food-like dosage forms such as bars, chewing gums or beverages.

**Use(s) or Purpose(s):** Statement(s) to the effect of:

**General:** A factor in the maintenance of good health (IOM 2006; IOM 2001).

**Specific:**

- ▶ Helps to produce and repair connective tissue (Shils et al. 2006; IOM 2001; Groff and Gropper 2000).
- ▶ Helps to form red blood cells (IOM 2006; Shils et al. 2006; IOM 2001; Groff and Gropper 2000).

**Dose-specific:** For products providing daily doses of copper at or above the Recommended Dietary Allowance (RDA) (adjusted for the life stage groups), the following use or purpose is acceptable: Helps to prevent copper deficiency (IOM 2006; Shils et al. 2006; IOM 2001; Groff and Gropper 2000).  
[Note: Copper deficiency is rare in North America (IOM 2006; Shils et al. 2006; IOM 2001; Groff and Gropper 2000).]

See Appendix 1 for definitions and Table 2 in Appendix 2 for RDA values.

**Dose(s):**

Table 1: Dose information for copper presented as dose per day

Life stage group		Copper (µg/day)	
		Minimum <sup>1</sup>	Maximum <sup>2</sup>
Children	1-3 y	35	700
	4-8 y	35	2,500
Adolescents	9-13 y	35	4,000
	14-18 y	65	6,500
Adults <sup>3</sup>	≥ 19 y	65	8,000

<sup>1</sup>Based on approximately 5% of the highest RDA (IOM 2006). See Appendix 1 for definitions and Table 2 in Appendix 2 for RDA values.

<sup>2</sup>Maximum dose based on the Tolerable Upper Intake Level (UL) less average dietary intake (adapted from IOM 2006).

<sup>3</sup>Includes pregnant and breastfeeding women.

**Duration of use:** No statement required.

**Risk information:** Statement(s) to the effect of:

**Caution(s) and warning(s):** When copper HAP or HVP chelate is used as a source material:  
For an adult subpopulation only.

**Contraindication(s):** No statement required.

**Known adverse reaction(s):** No statement required.

**Non-medicinal ingredients:** Must be chosen from the current NHPD *List of Acceptable Non-medicinal Ingredients* and must meet the limitations outlined in the list.

**Specifications:** Must comply with the minimum specifications outlined in the current NHPD *Compendium of Monographs*.

**References:**

Albion 2000: Implications of the “other half” of a mineral compound. Albion Research Notes 2000;9(3) [Accessed 2007-05-18]. Available from: <http://www.albion-an.com/human/Newsletter/2000October.pdf>

Albion 1993: A few words about copper. Albion Research Notes 1993;2(3) [Accessed 2007-05-18]. Available from: <http://www.albion-an.com/human/Newsletter/1993May.pdf>

Groff J, Gropper S. Advanced Nutrition and Human Metabolism, 3<sup>rd</sup> edition. Belmont (CA): Wadsworth/Thomson Learning; 2000.

HC 2007: Health Canada. Drug Product Database. Ottawa (ON): Health Canada; 2007. [Accessed 2007-03-21]. Available from: <http://search.hc-sc.gc.ca/cgi-bin/query?mss=dpd/english/active/simple>

IOM 2006: Institute of Medicine. Otten JJ, Pitz Hellwig J, Meyers LD, editors. Institute of Medicine Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. Washington (DC): National Academies Press; 2006.

IOM 2003: Institute of Medicine. Committee on Food Chemicals Codex, Food and Nutrition Board, Institute of Medicine. Food Chemicals Codex, 5<sup>th</sup> edition. Washington (DC): National Academies Press; 2003.

IOM 2001: Institute of Medicine. Panel on Micronutrients, Subcommittees on Upper Reference Levels of Nutrients and Interpretation and Uses of Dietary Reference Intakes, and the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Washington (DC): National Academy Press; 2001.

O'Neil MJ, Smith A, Heckelman PE, Budavari S, editors. The Merck Index: An Encyclopedia of Chemicals, Drugs, and Biologicals, 13<sup>th</sup> edition. Whitehouse Station (NJ): Merck & Co., Inc; 2001.

Shils ME, Olson JA, Shike M, Ross AC, editors. Modern Nutrition in Health and Disease, 10<sup>th</sup> edition. Philadelphia (PA): Lippincott Williams and Wilkins; 2006.

Sweetman SC, editor. Martindale: The Complete Drug Reference, 35<sup>th</sup> edition. London (UK): Pharmaceutical Press; 2007.

## Appendix 1: Definitions

**Recommended Dietary Allowances (RDA):** The average daily dietary nutrient intake level sufficient to meet the nutrient requirements of nearly all (97-98%) healthy individuals in a particular life stage and gender group (IOM 2006).

**Tolerable Upper Intake Level (UL):** The highest average daily nutrient intake level that is likely to pose no risk of adverse health effects to almost all individuals in the general population. As intake increases above the UL, the potential risk of adverse effects may increase (IOM 2006).

## Appendix 2: RDA Values

The RDA values for copper are provided below. For the purpose of this monograph, these values are intended to:

- ▶ provide targets for setting appropriate supplement dosage levels;
- ▶ provide the minimum dose for the use of the dose specific use or purpose: “Helps to prevent copper deficiency”;
- ▶ facilitate the optional labelling of % RDA values.

Table 2: Recommended Dietary Allowance for copper based on life stage group (IOM 2006)

Life stage group		Copper (µg/day)
Children	1-3 y	340
	4-8 y	440
Adolescents	9-13 y	700
	14-18 y	890
Adults	≥ 19 y	900
Pregnancy	14-50 y	1,000
Breastfeeding	14-50 y	1,300