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

**Note:** 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 are synonyms or that the statements are synonymous. Either term or statement may be selected by the applicant.

**Compliance with Precursor Control Regulations:**

The *Precursor Control Regulations* (PCR) (JC 2010) allows Canada to fulfill its international obligations with respect to the *United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, 1988*, and provides a framework for the regulation of activities involving precursor chemicals which can be used in the production of illicit drugs and substances. Under the PCR, regulated chemicals are grouped into two classes: Class A and Class B. For Class A precursors such as ephedrine and/or products containing them, persons wishing to be involved in activities such as importation, exportation, production, packaging, selling, and/or providing must first obtain a licence.

Further information regarding compliance with the PCR, including application forms and guidance documents pertaining to the application for a Class A precursor licence, is available at http://www.healthcanada.gc.ca/precursors.

**Date:** July 6, 2010

**Proper name(s):**

- (alphaR)-alpha-[(1S)-1-(Methylamino)ethyl]-benzenemethanol (NLM 2009; O’Neil et al. 2009)
- (1R,2S)-2-Methylamino-1-phenylpropan-1-ol (O’Neil et al. 2009)
- [R-(R*,S*)]-alpha-[1-(Methylamino)ethyl]-benzenemethanol (NLM 2009; USP 32)
- l-Ephedrine (NLM 2009; O’Neil et al. 2009)

**Common name(s):**

- l-Ephedrine (NLM 2009; O’Neil et al. 2009)
- Ephedrine (NLM 2009; USP 32)
Source material(s):

- l-Ephedrine hydrochloride (NLM 2009; O’Neil et al. 2009) CAS No. 50-98-6

Route(s) of administration: Oral

Dosage form(s):

- The acceptable pharmaceutical dosage forms for oral administration include, but are not limited to, chewables (e.g. gummies, tablets), caplets, capsules, strips, lozenges, powders or liquids where the dose is measured in drops, teaspoons or tablespoons.
- 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(s) to the effect of:

Used as a decongestant/ to relieve nasal congestion (Hoffman 2003; Williamson 2003) (due to hay fever/allergic rhinitis/allergies (Mills and Bone 2005; Blumenthal et al. 2000; BHP 1983), common cold (Hoffman 2003; Blumenthal et al. 2000), sinusitis (Hoffman 2003), and/or flu (Blumenthal et al. 2000)).

Dose(s):

Subpopulation(s): Adolescents and Adults ≥ 12 years

Quantity(ies): Preparations equivalent to 8-32 mg l-Ephedrine per day; not to exceed 8 mg per dose (HC 2007; US FDA 2004; HC 2003; Pickup et al. 1976).

See Appendix 1 for dosage information.

Duration(s) of use: Consult a health care practitioner for use beyond 7 days (Mills and Bone 2005; US FDA 2004; Blumenthal et al. 2000).
Risk information: Statement(s) to the effect of:

Caution(s) and warning(s):
- Keep out of reach of children.
- Consult a health care practitioner if symptoms persist or worsen.
- Consult a health care practitioner prior to use if you are pregnant or breastfeeding (Hackman et al. 2006; Mills and Bone 2005; Coffey et al. 2004; Greenway et al. 2004; Haller et al. 2004; Kuczkowski 2004; Hoffman 2003; Boozer et al. 2002; Boozer et al. 2001; Brinker 2001; Kalman et al. 2000).
- Consult a health care practitioner prior to use if you have:
  - glaucoma (Hackman et al. 2006; Mills and Bone 2005; Coffey et al. 2004; Greenway et al. 2004; Brinker 2001; Blumenthal et al. 2000)
  - difficulty in urination due to prostate enlargement (Hackman et al. 2006; Mills and Bone 2005; Coffey et al. 2004; Greenway et al. 2004; Brinker 2001; Blumenthal et al. 2000; Kalman et al. 2000)
  - seizure disorders (Hackman et al. 2006; Mills and Bone 2005; Coffey et al. 2004; Greenway et al. 2004; Haller et al. 2004; Mehendale et al. 2004; Brinker 2001)
  - pre-existing psychiatric conditions (Brinker 2008; Hackman et al. 2006; Mills and Bone 2005; Coffey et al. 2004; Greenway et al. 2004; Hioki et al. 2004; Brinker 2001; Kalman et al. 2000).
- Consult a health care practitioner prior to use if you are taking medication and/or natural health products for:
  - allergy symptoms (Hackman et al. 2006; Mills and Bone 2005; Boozer et al. 2001)
  - asthma (Hackman et al. 2006; Mills and Bone 2005)
  - cough/cold (Hackman et al. 2006; Naik and Freudenberger 2004)
  - weight control (Hackman et al. 2006; Mills and Bone 2005; Naik and Freudenberger 2004; Boozer et al. 2002).
Consult a healthcare practitioner prior to use if you are taking other products which contain:

- caffeine (Brinker 2008; Hackman et al. 2006; Boozer et al. 2002; Brinker 2001; Kalman et al. 2000; Haller and Benowitz 2000),
- ephedrine (Brinker 2008; Mills and Bone 2005; Greenway et al. 2004; Naik and Freudenberger 2004)
- pseudoephedrine (Mills and Bone 2005; Naik and Freudenberger 2004)
- phenylpropanolamine (Mills and Bone 2005; Haller and Benowitz 2000).

**Contraindication(s):**

Do not use if you are taking, or have taken in the past two weeks monoamine oxidase inhibitors (Brinker 2008; Greenway et al. 2004; Hoffman 2003; Brinker 2001; Blumenthal et al. 2000; Kalman et al. 2000; Dingemanse et al. 1996; Dawson et al. 1995; Elies et al. 1967).

**Known adverse reaction(s):** Restlessness (Bensky et al. 2004; McGuffin et al. 1997), irritability, dizziness, tremor (Bensky et al. 2004; McGuffin et al. 1997; Astrup et al. 1992), severe headache (Boozer et al. 2001), insomnia (Bensky et al. 2004; Boozer et al. 2001; McGuffin et al. 1997; Astrup et al. 1992), loss of appetite, nausea (McGuffin et al. 1997), rapid heartbeat (Bensky et al. 2004; Mehendale et al. 2004; Shekelle et al. 2003; Boozer et al. 2001; Astrup et al. 1992), shortness of breath and/or disturbance of urination have been known to occur; in which case, discontinue use (Mills and Bone 2005; Blumenthal et al. 2000).

**Non-medicinal ingredients:** Must be chosen from the current NHPD *Natural Health Products Ingredients Database* and must meet the limitations outlined in the database.

**Storage condition(s):** Store protected from light and moisture (BP 2009; USP 32; Ph. Eur. 2007).

**Specifications:**

- The finished product must comply with the minimum specifications outlined in the current NHPD *Compendium of Monographs*.
- The medicinal ingredient may comply with the specifications outlined in the pharmacopoeial monographs listed in Table 1 below.
Table 1: Monographs published in the European Pharmacopoeia (Ph. Eur.) and the U.S. Pharmacopoeia (USP 32)

<table>
<thead>
<tr>
<th>Pharmacopoeia</th>
<th>Monograph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph. Eur. 2007</td>
<td>Ephedrine, Anhydrous Ephedrine Hydrochloride Ephedrine Hydrochloride, Racemic</td>
</tr>
<tr>
<td></td>
<td>Ephedrine Ephedrine Hydrochloride Ephedrine Sulfate</td>
</tr>
</tbody>
</table>

References cited:


Coffey CS, Steiner D, Baker BA, Allison DB. 2004. A randomized double-blind placebo-controlled clinical trial of a product containing ephedrine, caffeine, and other ingredients from


**References reviewed:**


Appendix 1: Derivation of dosage quantities for \( l \)-ephedrine

Single maximal dose of \( l \)-ephedrine: 8 mg (US FDA 2004; HC 2003).

Minimum dose per day of \( l \)-ephedrine: 8 mg (US FDA 2004; HC 2003)

Maximum dose per day of \( l \)-ephedrine: 32 mg
  - Obtained as follows: 24 h daily \( \div \) 6 h half life of \( l \)-ephedrine x 8 mg per single dosage (HC 2003; Pickup et al. 1976)