Spice Oleoresins

DESCRIPTION

Spice Oleoresins used in foods are derived from spices and contain the total sapid, odorous, and related characterizing principles normally associated with the respective spices. The oleoresins are produced by one of the following processes: (1) by extraction of the spice with any suitable solvent or solvents, in combination or sequence, followed by removal of the solvent or solvents in conformance with applicable residual solvent regulations (see General Requirements below), or (2) by removal of the volatile portion of the spice by distillation, followed by extraction of the nonvolatile portion, which after solvent removal is combined with the total volatile portion.

Spice Oleoresins are frequently used in commerce with added suitable food-grade diluents, preservatives, antioxidants, and other substances consistent with good manufacturing practice, as provided for under Added Substances (see General Provisions). When added substances are used, they must be declared on the label in accordance with current U.S. regulations or with the regulations of other countries that recognize the Food Chemicals Codex.

The Spice Oleoresins covered by this monograph are

- Oleoresin Angelica Seed Obtained by the solvent extraction of the dried seed of Angelica archangelica Linnaeus as a dark brown or green liquid.
- Oleoresin Anise Obtained by the solvent extraction of the dried ripe fruit of anise, Pimpinella anisum Linnaeus, or star anise, Illicium verum Hooker as a dark brown or green liquid.
- Oleoresin Basil Obtained by the solvent extraction of the dried plant of Ocimum basilicum Linnaeus as a dark brown or green semi-solid.
- Oleoresin Black Pepper Obtained by the solvent extraction of the dried fruit of Piper nigrum Linnaeus as a dark green, olive green, or olive drab extract usually consisting of an upper oily layer and a lower crystalline layer. It may appear as a homogeneous emulsion if examined shortly after the oleoresin has been homogenized, but the product separates on standing. It may be decolorized by partial removal of chlorophyll.
- Oleoresin Capsicum Obtained by the solvent extraction of dried pods of Capsicum frutescens Linnaeus or Capsicum annum Linnaeus as a clear red to dark red, somewhat viscous liquid of characteristic odor, flavor, and bite. It may be decolorized through good manufacturing practice. It is partly soluble in alcohol (with oily separation and/or sediment) and is soluble in most fixed oils. The bite is usually standardized according to the label declaration.
- Oleoresin Caraway Obtained by the solvent extraction of the dried seeds of Carum carvi Linnaeus as a green yellow to brown liquid.
- Oleoresin Cardamom Obtained by the solvent extraction of the dried seeds of Elettaria cardamomum Maton as a dark brown or green liquid.
Oleoresin Celery  Obtained by the solvent extraction of the dried ripe seed of *Apium graveolens* Linnaeus as a dark green, somewhat viscous, nonhomogeneous liquid with the characteristic odor and flavor of celery. It may be decolorized by the partial removal of chlorophyll. It is partly soluble in alcohol (with oily separation), and is soluble in most fixed oils.

Oleoresin Coriander  Obtained by the solvent extraction of the dried seeds of *Coriandrum sativum* Linnaeus as a brown yellow to green liquid.

Oleoresin Cubeb  Obtained by the solvent extraction of the dried fruit of *Piper cubeba* Linnaeus as a green or green brown liquid.

Oleoresin Cumin  Obtained by the solvent extraction of the dried seeds of *Cuminum cyminum* Linnaeus as a brown to yellow green liquid.

Oleoresin Dillseed  Obtained by the solvent extraction of the dried seeds of *Anethum graveolens* Linnaeus as a brown or green liquid.

Oleoresin Fennel  Obtained by the solvent extraction of the dried fruit of *Foeniculum vulgare* P. Miller as a brown green liquid.

Oleoresin Ginger  Obtained by the solvent extraction of the dried rhizomes of *Zingiber officinale* Roscoe as a dark brown, viscous to highly viscous liquid with the characteristic odor and flavor of ginger. It is soluble in alcohol (with sediment).

Oleoresin Hop  Obtained by the solvent extraction of the dried membranous cones of the female hop plants of *Humulus lupulus* L. or *Humulus americanus* Nutt. (Fam. Moraceae), using a food-grade solvent such as liquid carbon dioxide. It is light golden to black in color, and in consistency, a liquid to semi-solid having a characteristic odor. It is soluble in methanol and is slightly soluble in acidified water. It may be reduced with sodium borohydride or with hydrogen and palladium catalyst. It conforms to U.S. Food and Drug Administration regulations pertaining to the specifications for extraction solvents for modified hop extract.

Oleoresin Laurel Leaf  Obtained by the solvent extraction of the dried leaves of *Laurus nobilis* Linnaeus as a dark brown or green semi-solid.

Oleoresin Marjoram Sweet  Obtained by the solvent extraction of the dried herb of the marjoram shrub *Majorana hortensis* Moench as a dark green to brown viscous liquid or semi-solid.

Oleoresin Origanum  Obtained by the solvent extraction of the dried flowering herb *Origanum* spp. as a dark brown green semi-solid.

Oleoresin Paprika  Obtained by the solvent extraction of the pods of *Capsicum annuum* Linnaeus as a deep red to deep purplish red, somewhat viscous liquid of characteristic odor and flavor. It frequently occurs as a two-phase mixture. The color is usually standardized according to the label declaration. It is partly soluble in alcohol (with oily separation), and is soluble in most fixed oils.

Oleoresin Parsley Leaf  Obtained by the solvent extraction of the dried herb of *Petroselinum crispum* (P. Miller) Nyman ex A.W. Hill as a brown to green liquid.

Oleoresin Parsley Seed  Obtained by the solvent extraction of the dried seeds of *Petroselinum crispum* (P. Miller) Nyman ex A.W. Hill as a deep green semi-viscous liquid.

Oleoresin Pimenta Berries  Obtained by the solvent extraction of the dried fruit of *Pimenta officinalis* Lindl as a brown green to dark green liquid.

Oleoresin Rosemary  Obtained by the solvent extraction of the dried leaves of *Rosmarinus officinalis* Linnaeus. It is a thick green paste that can be diluted with food grade water- or oil-dispersible solvents. It may have a reduced chlorophyll content. The volatile oil content varies depending on its intended effect from a highly camphoraceous note to a subtle herbal note.

Oleoresin Thyme  Obtained by the solvent extraction of the dried flowering plant *Thymus vulgaris* Linnaeus or *Thymus zygis* Linnaeus and its var. gracelis Boissier as a dark brown to green, viscous semi-solid.

Oleoresin Turmeric  Obtained by the solvent extraction of the dried rhizomes of *Curcuma longa* Linnaeus as a yellow orange to red brown viscous liquid with a characteristic odor and flavor. The content of curcumin normally varies, and the product is generally standardized according to the label declaration.

Functional Use in Foods  Flavoring agent; color (oleoresins paprika and turmeric only).

GENERAL REQUIREMENTS
Identification  The volatile oil distilled from an oleoresin is similar in its physical and chemical properties, including its infrared spectrum to that distilled from the spice of the same origin. To obtain the volatile oil from the oleoresin, proceed as directed for Volatile Oil Content under Oleoresins, Appendix VIII.

Heavy Metals (as Pb)  Not more than 0.002%.
Lead  Not more than 5 mg/kg.
Residual Solvent  Chlorinated hydrocarbons (total): not more than 0.003%; acetone: not more than 0.003%; isopropanol: not more than 0.003%; methanol: not more than 0.005%; hexane: not more than 0.0025%.

ADDITIONAL REQUIREMENTS

Oleoresin Angelica Seed  Volatile Oil Content: between 2 mL and 7 mL/100 g.
Oleoresin Anise  Volatile Oil Content: between 9 mL and 22 mL/100 g.
Oleoresin Basil  Volatile Oil Content: between 4 mL and 17 mL/100 g.
Oleoresin Black Pepper  Piperine: not less than 36%; Volatile Oil Content: between 15 mL and 35 mL/100 g.
Oleoresin Capsicum  Scoville Heat Units: between 100,000 and 2,000,000, as specified on the label.
Oleoresin Caraway  Volatile Oil Content: between 10 mL and 20 mL/100 g.
Oleoresin Cardamom  Volatile Oil Content: between 50 mL and 80 mL/100 g.
Oleoresin Celery  Volatile Oil Content: between 7 mL and 20 mL/100 g.
Oleoresin Coriander  Volatile Oil Content: between 2 mL and 12 mL/100 g.
Oleoresin Cubeb  Volatile Oil Content: between 50 mL and 80 mL/100 g.
Oleoresin Cumin  Volatile Oil Content: between 10 mL and 30 mL/100 g.
Oleoresin Dillseed  Volatile Oil Content: between 10 mL and 20 mL/100 g.
Oleoresin Fennel  Volatile Oil Content: between 3 mL and 20 mL/100 g.
Oleoresin Ginger  Volatile Oil Content: between 18 mL and 35 mL/100 g.
Oleoresin Hop  Volatile Oil Content: not more than 30 mL/100 g.
Oleoresin Laurel Leaf  Volatile Oil Content: between 5 mL and 25 mL/100 g.
Oleoresin Marjoram Sweet  Volatile Oil Content: between 8 mL and 20 mL/100 g.
Oleoresin Origanum  Volatile Oil Content: between 20 mL and 45 mL/100 g.
Oleoresin Paprika  Color Value: between 500 and 4500 units, as specified on the label (according to the method of analysis); Scoville Heat Units (pungency): not more than 3000.
Oleoresin Parsley Leaf  Volatile Oil Content: between 2 mL and 10 mL/100 g.
Oleoresin Parsley Seed  Volatile Oil Content: between 2 mL and 7 mL/100 g.
Oleoresin Pimenta Berries  Volatile Oil Content: between 20 mL and 50 mL/100 g.
Oleoresin Rosemary  Volatile Oil Content: not more than 15 mL/100 g.
Oleoresin Thyme  Volatile Oil Content: between 5 mL and 12 mL/100 g.
Oleoresin Turmeric  Curcumin (or Color Value equivalent): between 1% and 45%, as specified on the label.

TESTS (GENERAL REQUIREMENTS)

Heavy Metals  Prepare and test a 1-g sample as directed in Method II under the Heavy Metals Test, Appendix IIIB, using 20 mg of lead ion (Pb) in the control (Solution A).
Lead  A Sample Solution prepared as directed for organic compounds meets the requirements of the Lead Limit Test, Appendix IIIB, using 5 mg of lead ion (Pb) in the control.
Residual Solvent  Determine as directed in the general method, Appendix VIII.

TESTS (ADDITIONAL REQUIREMENTS)

Color Value  Determine as directed for Color Value under Oleoresins, Appendix VIII.
Curcumin  Determine as directed in the general method, Appendix VIII.
Piperine  Determine as directed in the general method, Appendix VIII.
Scoville Heat Units  Determine as directed in the general method, Appendix VIII.
Volatile Oil Content  Determine as directed for Volatile Oil Content under Oleoresins, Appendix VIII.
Packaging and Storage  
Store in full, tight, preferably glass or other suitably lined containers in a cool place protected from light.