

# MATERIAL SAFETY DATA SHEET

March 18, 1996

## I. Identity:

- A. Trade/Common Names: Alkanet, Alkanna.
- B. Origin: Dried roots of the perennial plant *Alkanna tinctoria*, a.k.a. *Anchusa tinctoria*.  
Botanical Family: Boraginaceae.
- C. Chemical Family:
  - 1. 93% - 95% Plant biomass.
  - 2. 5% - 7% Alkannin: A derivative of 5,8-dihydroxy-1,4-naphthoquinone; Empirical Formula:  $C_{16}H_{16}O_5$ .

## II. Physical Data:

- A. Boiling Point: Not applicable.
- B. Melting Point: (1) Biomass: decomposes above 250° C.  
(2) Alkannin: 149° C.
- C. Specific Gravity: approx. 1.1 g./ml.
- D. Vapor Density: Not applicable.
- E. Reactivity in Water: Unreactive.
- F. Solubility: Biomass insoluble in water and usual organic solvents. Alkannin insoluble in water; soluble in aqueous alkaline solutions; slightly soluble in selected organic solvents (alcohol, acetone, oilseed oils, etc.).
- G. Appearance: Irregular solid with cellulosic layers which break up into thin flakes.
- H. Flash Point: Not known: Above 250° C.
- I. Auto-ignition Temperature: Not applicable.
- J. pH: 7.0 - 7.3.

## III. Hazardous Ingredients: None known.

## IV. Physical Hazards:

- A. Stability: Stable under dry conditions. Decomposes slowly with microbial growth (molds, etc.) after long-term contact with liquid water or in high atmospheric moisture.
- B. Incompatibility (Materials to Avoid): No unusual incompatibilities. As with all biomass materials, contact with strong oxidizing agents (nitrates, chlorates, oxygen, etc.) should be avoided.
- C. Hazardous Decomposition Products: None known.
- D. Hazardous Polymerization: Will not occur.
- E. Unusual Fire and Explosion Hazards: None known.
  - 1. Fire fighting media: Water, foam, or dry chemical.
  - 2. Fire fighters should wear self-contained breathing apparatus, to protect from potentially hazardous fumes.

**MATERIAL SAFETY DATA SHEET:  
ALKANET**

**V. Health Hazards:** No toxic effect known from dust inhalation or ingestion.

- A. Threshold Limit Value: None known.
- B. Signs or Symptoms of Exposure: None expected.
- C. Effects of Chronic Overexposure: None known.
- D. Medical Conditions Generally Aggravated by Exposure: None known.
- E. Chemicals Listed as Carcinogen or Potential Carcinogen: No listing.
- F. OSHA Permissible Exposure Limit: None known.
- G. Emergency and First Aid Procedures:
  - 1. Inhalation: Remove person to fresh air. If breathing difficulty occurs or coughing persists, get prompt medical attention.
  - 2. Eyes: Flood with water.
  - 3. Skin: Wash with soap and water.
  - 4. Ingestion: Gastric lavage.

**VI. Special Protection Information:**

- A. Respiratory Protection: Use dust respirator when handling product.
- B. Ventilation: No special ventilation required.
- C. Protective Gloves: Wear leather or heavy cloth gloves to avoid direct contact of hands with product.
- D. Eye Protection: Use safety eyewear.
- E. Waste Disposal Methods: Normal septic type of disposal is recommended, due to ease with which microorganisms can grow in the material. pH adjustment is not necessary.

**VIII. Special Notes:**

- A. As with all biomass materials, incomplete combustion may result in the formation of volatile toxic compounds. In case of fire, precautions should be taken to avoid breathing evolved gases and vapors.
- B. Literature references indicate that this material has long been used as a coloring agent in cosmetic preparations. However, this only indicates that it is not immediately toxic to the skin. As a reasonable precautionary measure, care should be taken to avoid prolonged skin contact.

# MATERIAL SAFETY DATA SHEET

November 19, 1996

## I. Identity:

- A. Trade/Common Names: Annatto Seeds, Achiote.
- B. Origin: Dried seeds of the tropical tree *Bixa orellana*.  
Botanical Family: Bixaceae.
- C. Chemical Family:
  - 1. 93% - 95% Plant biomass.
  - 2. 5% - 7% Bixin: A monomethyl ester of a long-chain, conjugated poly-unsaturated, dibasic carboxylic acid; Empirical Formula:  $C_{25}H_{30}O_4$ .

## II. Physical Data:

- A. Boiling Point: Not applicable.
- B. Melting Point: (1) Biomass: decomposes above 250° C.  
(2) Bixin: 173° C.
- C. Specific Gravity: approx. 1.2 g./ml.
- D. Vapor Density: Not applicable.
- E. Reactivity in Water: Unreactive.
- F. Solubility: Biomass insoluble in water and usual organic solvents. Bixin insoluble in water; soluble in aqueous alkaline solutions; slightly soluble in selected organic solvents (alcohol, acetone, oilseed oils, etc.).
- G. Appearance: Deep reddish granules, about 3 mm. average size.
- H. Flash Point: Not known: Above 250° C.
- I. Auto-ignition Temperature: Not applicable.
- J. pH: 6.8 - 7.0.

III. Hazardous Ingredients: None known. This product has not been classified as a health hazard.

## IV. Physical Hazards:

- A. Stability: Stable under dry conditions. Decomposes slowly with microbial growth (molds, etc.) after long-term contact with liquid water or in high atmospheric moisture.
- B. Incompatibility (Materials to Avoid): No unusual incompatibilities. As with all biomass materials, contact with strong oxidizing agents (nitrates, chlorates, oxygen, etc.) should be avoided.
- C. Hazardous Decomposition Products: None known.
- D. Hazardous Polymerization: Will not occur.
- E. Unusual Fire and Explosion Hazards: None known.
  - 1. Fire fighting media: Water, foam, carbon dioxide, or dry chemical.
  - 2. Fire fighters should wear self-contained breathing apparatus, to protect from potentially hazardous fumes.

**MATERIAL SAFETY DATA SHEET:  
ANNATTO SEEDS:**

**V. Health Hazards:** No toxic effect known from dust inhalation or ingestion.

A. Threshold Limit Value: None known.

B. Signs or Symptoms of Exposure: None expected.

C. Effects of Chronic Overexposure: None known.

D. Medical Conditions Generally Aggravated by Exposure: None known.

E. Chemicals Listed as Carcinogen or Potential Carcinogen: No listing.

F. OSHA Permissible Exposure Limit: None known.

G. Emergency and First Aid Procedures:

1. Inhalation: Remove person to fresh air. If breathing difficulty occurs or coughing persists, get prompt medical attention.

2. Eyes: Flood with water.

3. Skin: Remove contaminated clothing. Wash with mild soap and water.

4. Ingestion: Gastric lavage.

**VI. Special Protection Information:**

A. Respiratory Protection: Use dust respirator when handling product.

B. Ventilation: No special ventilation required.

C. Protective Gloves: Wear leather or heavy cloth gloves to avoid direct contact of hands with product.

D. Eye Protection: Use safety eyewear.

E. Waste Disposal Methods: Normal septic type of disposal is recommended, due to ease with which microorganisms can grow in the material. pH adjustment is not necessary.

**VIII. Special Notes:**

A. Incomplete combustion may result in the formation of dense, acrid smoke, containing volatile toxic compounds. In case of fire, precautions should be taken to avoid breathing any evolved smoke, gases, or vapors.

B. Literature references indicate that extracts of this material have long been used as coloring agents in foods and cosmetic preparations. However, as a reasonable precautionary measure, care should be taken to avoid prolonged skin contact.

**MATERIAL SAFETY DATA SHEET**

March 19, 1996

**I. Identity:**

A. Trade/Common Names: Brazilwood, Pernambuco Wood.

B. Origin: Heartwood of the tree *Caesalpinia echinata*.

Botanical Family: Leguminosae.

C. Chemical Family:

1. 88% - 94% Plant biomass.

2. 6% - 12% Brasilin and Brasilein.

**II. Physical Data:**

A. Boiling Point: (1) Biomass: Not applicable.

(2) Brasilin: Decomposes above 275° C.

Brasilein: Decomposes above 230° C.

B. Melting Point: (1) Biomass: Decomposes above 250° C.

(2) Brasilin: 290° C.

Brasilein: Softens 130 - 140° C.

C. Specific Gravity: &gt;1.15 g./ml. when air is removed from biomass.

D. Vapor Density: Not applicable.

E. Reactivity in Water: Unreactive.

F. Solubility: Biomass insoluble in water and usual organic solvents. Brasilin and brasilein are slightly soluble in neutral water; both are soluble in aqueous alkaline solutions; both are very soluble in usual organic solvents.

G. Appearance: An orangish-red wood when freshly cut; surfaces turn darker and deeper in color when exposed to air and moisture.

H. Flash Point: Not known: Above 300° C.

I. Auto-ignition Temperature: Not applicable.

J. pH: 7.2 - 7.6.

**III. Hazardous Ingredients: None known.****IV. Physical Hazards:**

A. Stability: Stable under dry conditions. Decomposes slowly with microbial growth (molds, etc.) after long-term contact with liquid water or in high atmospheric moisture.

B. Incompatibility (Materials to Avoid): No unusual incompatibilities. As with all biomass materials, contact with strong oxidizing agents (nitrates, chlorates, oxygen, etc.) should be avoided.

C. Hazardous Decomposition Products: None known.

D. Hazardous Polymerization: Will not occur.

**MATERIAL SAFETY DATA SHEET:  
BRAZILWOOD****IV. Physical Hazards—cont.:**

E. Unusual Fire and Explosion Hazards: None known.

1. Fire fighting media: Water, foam, carbon dioxide, or dry chemical.
2. Fire fighters should wear self-contained breathing apparatus, to protect from potentially hazardous fumes.

**V. Health Hazards: No toxic effect known from dust inhalation or ingestion.**

A. Threshold Limit Value: None known.

B. Signs or Symptoms of Exposure: None expected.

C. Effects of Chronic Exposure: None known.

D. Medical Conditions Generally Aggravated by Exposure: None known.

E. Chemicals Listed as Carcinogen or Potential Carcinogen: No listing.

F. OSHA Permissible Exposure Limit: None known.

G. Emergency and First Aid Procedures:

1. Inhalation: Remove person to fresh air. If breathing difficulty occurs or coughing persists, get prompt medical attention.
2. Eyes: Flood with water.
3. Skin: Wash with soap and water.
4. Ingestion: Gastric lavage.

**VI. Special Protection Information:**

A. Respiratory Protection: Use dust respirator when handling product.

B. Ventilation: No special ventilation required.

C. Protective Gloves: Wear leather or rubber-covered cloth gloves to avoid direct contact of hands with product.

D. Eye Protection: Use safety eyewear.

E. Waste Disposal Methods: Normal septic type of disposal is recommended, due to ease with which microorganisms can grow in the material. pH adjustment is not necessary.

**VIII. Special Notes:**

A. As with all biomass materials, incomplete combustion may result in the formation of volatile toxic compounds. In case of fire, precautions should be taken to avoid breathing evolved gases and vapors.

B. Literature references indicate that this material has long been used as a dye for textile fibers and as an ingredient in cosmetics. However, as a reasonable precautionary measure, care should be taken to avoid breathing dust and to avoid prolonged skin contact.

## MATERIAL SAFETY DATA SHEET

October 30, 1995

## I. Identity:

- A. Trade/Common Names: Cochineal, Gray Cochineal.
- B. Origin: Consists of whole dried female insects of the species Dactylopius coccus. Superfamily: Coccidae.
- C. Chemical Family:
  - 1. Approximately 95% Biomass.
  - 2. Approximately 5% Carminic Acid: Glycoside of a hydroxylated anthraquinonecarboxylic acid; Empirical formula:  $C_{22}H_{20}O_{13}$ .

## II. Physical Data:

- A. Boiling Point: Not applicable.
- B. Melting Point: (1) Biomass: Decomposes above 250° C.  
(2) Carminic Acid: 136° C with decomp.
- C. Specific Gravity: Approx. 1.2 g./ml.
- D. Vapor Density: Not applicable.
- E. Reactivity in Water: Unreactive.
- F. Solubility: Biomass insoluble in water. Carminic acid soluble in water and alcohols.
- G. Appearance: Gray granular solid, with a slight characteristic odor.
- H. Flash Point: Not known.
- I. Autoignition Temperature: Not applicable.
- J. pH: 6.5 - 7.1.

## III. Hazardous Ingredients: None known.

## IV. Physical Hazards:

- A. Stability: Stable under dry conditions. Decomposes with microbial growth (molds) after long-term contact with liquid water or in high atmospheric moisture.
- B. Incompatibility (Materials to Avoid): None known.
- C. Hazardous Decomposition Products: None known.
- D. Hazardous Polymerization: Will not occur.
- E. Unusual Fire and Explosion Hazards: None known.

Material Safety Data Sheet

V. Health Hazards: No toxic effect known from dust inhalation or ingestion.

A. Threshold limit value: Not known.

B. Signs or symptoms of exposure: None expected.

C. Effects of Chronic Overexposure: None known.

D. Medical Conditions Generally Aggravated by Exposure:  
None known.

E. Chemical Listed as Carcinogen or Potential Carcinogen:  
No listing.

F. OSHA Permissible Exposure Limit: None known.

G. Emergency and First Aid Procedures:

1. Inhalation: Remove person to fresh air. If breathing difficulty occurs or coughing persists, get prompt medical attention.
2. Eyes: Flood with water.
3. Skin: Wash with soap and water.
4. Ingestion: Gastric lavage.

VI. Special Protection Information:

- A. Respiratory Protection: Use dust respirator when handling product.
- B. Ventilation: No special ventilation required.
- C. Protective Gloves: Wear leather or heavy cloth gloves to avoid direct contact of hands with product.
- D. Eye Protection: Wear safety glasses.

VII. Special Precautions and Spill/Leak Procedures:

- A. Precautions in Handling and Storage: Store away from oxidizing agents (bleach, elevated temperatures, etc.)
- B. Other Precautions: Store in a dry place. Avoid excessive heat. Avoid excessive atmospheric humidity.
- C. Steps to be Taken if Material is Released or Spilled: Avoid inhalation of dust. Use gloves when handling.
- D. Waste Disposal Methods: Normal septic type of disposal is recommended, due to the ease with which microorganisms can grow in the media. pH adjustment is not necessary.

VIII. Special Notes:

- A. Unground material may contain a small number of cactus thorns, incidental to harvesting methods; leather or similar gloves should be used when handling directly, to avoid injury to hands by thorn points.
- B. Literature references indicate that this material is not immediately toxic to the skin. However, as a reasonable precautionary measure, care should be taken to avoid prolonged skin contact.



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Occupational Safety and Health Administration  
**MATERIAL SAFETY DATA SHEET**

**SECTION I**

EMERGENCY TELEPHONE NO.  
**916 - 920-8658**

CHEMICAL NAME AND SYNONYMS **A MIXTURE OF TANNIC ACID, GALLIC ACID, CATECHIN, & CATECHIN DERIVATIVES.** TRADE NAME AND SYNONYMS **CUTECH EXTRACT, CATECHU EXTRACT, KATHA TANNIN**

CHEMICAL FAMILY **FLAVONOLS, FLAVONOL DEHYDRATION PRODUCTS; POLYHYDROXY AROMATIC CARBOXYLIC ACIDS, & GLYCOSIDES OF POLYHYDROXY AROMATIC CARBOXYLIC ACIDS.** FORMULA  
CATECHIN: **C<sub>15</sub>H<sub>14</sub>O<sub>6</sub>**  
TANNIC ACID: **C<sub>14</sub>H<sub>10</sub>O<sub>9</sub>**

**SECTION II - HAZARDOUS INGREDIENTS**

| PAINTS, PRESERVATIVES, & SOLVENTS                                | % | TLV (Units) | ALLOYS AND METALLIC COATINGS                    | % | TLV (Units) |
|--|---|-------------|---|---|-------------|
| PIGMENTS <b>NONE</b>   |   |             | BASE METAL <b>NONE</b>                          |   |             |
| CATALYST <b>"</b>  |   |             | ALLOYS <b>"</b>                                 |   |             |
| VEHICLE <b>"</b>   |   |             | METALLIC COATINGS <b>"</b>                      |   |             |
| SOLVENTS <b>"</b>  |   |             | FILLER METAL PLUS COATING OR CORE FLUX <b>"</b> |   |             |
| ADDITIVES <b>"</b>   |   |             | OTHERS <b>"</b>                                 |   |             |
| OTHERS <b>"</b>  |   |             |   |   |             |
| <b>NONE</b> HAZARDOUS MIXTURES OF OTHER LIQUIDS SOLIDS, OR GASES |   |             |   | % | TLV (Units) |

**SECTION III - PHYSICAL DATA**

|                         |   |                                       |                     |
|-------------------------|---|---------------------------------------|---------------------|
| BOILING POINT (°F.)     | <b>NOT APPLICABLE</b>   | SPECIFIC GRAVITY (H <sub>2</sub> O=1) | <b>1.35</b>         |
| VAPOR PRESSURE (mm Hg.) | <b>" "</b>  | PERCENT, VOLATILE BY VOLUME (%)       | <b>NOT VOLATILE</b> |
| VAPOR DENSITY (AIR=1)   | <b>" "</b>  | EVAPORATION RATE (_____=1)            | <b>—</b>            |
| SOLUBILITY IN WATER     | <b>VERY SOLUBLE AT 100°C</b>  |                                       |                     |
| APPEARANCE AND ODOR     | <b>DARK BROWN RESINOUS SOLID WITH SLIGHT CHARACTERISTIC PUNGENT ODOR.</b> |                                       |                     |

**SECTION IV - FIRE AND EXPLOSION HAZARD DATA**

|                                    |  |                  |                |
|------------------------------------|--|------------------|----------------|
| FLASH POINT (Method Used)          | <b>NONE TO 250°C.</b>  | FLAMMABLE LIMITS | <b>NO DATA</b> |
| EXTINGUISHING MEDIA                | <b>WATER, FOAM, CO<sub>2</sub>, or DRY CHEMICAL.</b>   |                  |                |
| SPECIAL FIRE FIGHTING PROCEDURES   | <b>FIREFIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS, TO PROTECT FROM POTENTIALLY TOXIC FUMES.</b> |                  |                |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | <b>NONE - MODERATELY FLAMMABLE. NO EXPLOSION HAZARD IN GRANULAR RESIN FORM.</b>                              |                  |                |

## SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

NOT ESTABLISHED.

EFFECTS OF OVEREXPOSURE

NONE EXPECTED.

EMERGENCY AND FIRST AID PROCEDURES

EYES - FLUSH WITH WATER. SEE A PHYSICIAN IF IRRITATION PERSISTS.

## SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

✓

INCOMPATIBILITY (Materials to avoid)

STRONG OXIDIZING AGENTS.

HAZARDOUS DECOMPOSITION PRODUCTS

INCOMPLETE COMBUSTION MAY PRODUCE CARBON MONOXIDE.

HAZARDOUS  
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

✓

## SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

SWEEP UP - FLUSH AREA WITH WATER.

WASTE DISPOSAL METHOD

NO SPECIAL REQUIREMENTS. DISPOSAL SHOULD BE IN

ACCORDANCE WITH EXISTING GOVERNMENTAL AND ENVIRONMENTAL

CONTROL REGULATIONS.

## SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

NIOSH - APPROVED MASK FOR NUISANCE DUSTS, IF GROUND TO POWDER.

VENTILATION

LOCAL EXHAUST

YES - FOR DUSTS.

SPECIAL

MECHANICAL (General)

—

OTHER

PROTECTIVE GLOVES

LEATHER OR THICK PLASTIC.

EYE PROTECTION

GOGGLES OR SAFETY GLASSES.

OTHER PROTECTIVE EQUIPMENT

NONE REQUIRED.

## SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

WEAR GLOVES WHEN HANDLING TO AVOID

CUTTING HANDS ON SHARP EDGES OF RESIN.

OTHER PRECAUTIONS

STORE IN A CLEAN DRY PLACE.

JANUARY 7, 1994 Roger W. Wolfe.

# MATERIAL SAFETY DATA SHEET

## NATURAL INDIGO

August, 2002

### I. Identity:

- A. Trade/Common Names: Natural Indigo, Natural Indigo Blue, Vat Blue 1.
- B. Origin: Extract of leaves and stems of the plant *Indigofera tinctoria*.  
Botanical Family: Leguminosae.
- C. Chemical Family:
  - 1. 50% - 75% Plant biomass.
  - 2. 25% - 50% Indigotin: a complex organic heterocyclic compound: Empirical Formula:  
 $C_{16}H_{10}O_2N_2$ .

### II. Physical Data:

- A. Boiling Point: (1) Biomass: Not applicable.  
(2) Indigotin: Sublimes.
- B. Melting Point: (1) Biomass: Decomposes above 250° C.  
(2) Indigotin: 390 - 392° C.
- C. Specific Gravity: >1.2 g./ml.
- D. Vapor Density: Not applicable.
- E. Reactivity in Water: Unreactive.
- F. Solubility: Biomass insoluble in water and all common organic solvents.  
Indigotin insoluble in water and all common organic solvents.
- G. Appearance: Dark blue solid with a hard but somewhat chalky texture.
- H. Flash Point: Not known: Above 275° C.
- I. Auto-ignition Temperature: Not applicable.
- J. pH: 7.1 - 7.5.

### III. Hazardous Ingredients: None known.

### IV. Physical Hazards:

- A. Stability: Stable under dry conditions. Decomposes slowly with microbial growth (molds, etc.) after long-term contact with liquid water or in high atmospheric moisture.
- B. Incompatibility (Materials to Avoid): No unusual incompatibilities. As with all biomass materials, contact with strong oxidizing agents (nitrates, chlorates, oxygen, etc.) should be avoided.
- C. Hazardous Decomposition Products: None known.
- D. Hazardous Polymerization: Will not occur.
- E. Unusual Fire and Explosion Hazards: None known.
  - 1. Fire fighting media: Water, foam, or dry chemical.
  - 2. Fire fighters should wear self-contained breathing apparatus, to protect from potentially hazardous fumes.

**MATERIAL SAFETY DATA SHEET:  
NATURAL INDIGO**

**V. Health Hazards:** No toxic effect known from dust inhalation or ingestion.

A. Threshold Limit Value: None known.

B. Signs or Symptoms of Exposure: None expected.

C. Effects of Chronic Exposure: None known.

D. Medical Conditions Generally Aggravated by Exposure: None known.

E. Chemicals Listed as Carcinogen or Potential Carcinogen: No listing.

F. OSHA Permissible Exposure Limit: None known.

G. Emergency and First Aid Procedures:

1. Inhalation: Remove person to fresh air. If breathing difficulty occurs or coughing persists, get prompt medical attention.

2. Eyes: Flood with water.

3. Skin: Wash with soap and water.

4. Ingestion: Gastric lavage.

**VI. Special Protection Information:**

A. Respiratory Protection: Use dust respirator when handling product.

B. Ventilation: No special ventilation required.

C. Protective Gloves: Wear leather or rubber-covered cloth gloves to avoid direct contact of hands with product.

D. Eye Protection: Use safety eyewear.

E. Waste Disposal Methods: Normal septic type of disposal is recommended, due to ease with which microorganisms can grow in the material. pH adjustment is not necessary.

**VIII. Special Notes:**

A. As with all biomass materials, incomplete combustion may result in the formation of volatile toxic compounds. In case of fire, precautions should be taken to avoid breathing evolved gases and vapors.

B. Literature references indicate that this material has long been used as a dye for textile fibers. However, as a reasonable precautionary measure, care should be taken to avoid breathing dust and to avoid prolonged skin contact.

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**SECTION 4 - PHYSICAL DATA cont'd**

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Specific Gravity: Not applicable

Bulk Density: ca 35 lbs/ft<sup>3</sup>

Solubility: Insoluble in water, ether, alcohol and dilute acids.

Physical Appearance and Odor: Dark blue powder with a coppery luster.

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**SECTION 5 - FIRE AND EXPLOSION HAZARD DATA**

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Flash Point: None to 250°C

Flammable Limits: Not applicable

Extinguishing Media: Water, carbon dioxide or dry chemical.

Special Fire Fighting Procedures & Equipment: Respiratory protection against combustion products.

Unusual Fire & Explosion Hazards: Indigo Powder, like most finely ground powders, can present an explosion hazard. It is recommended that dust control equipment and material transport systems for handling Indigo Powder should be designed to eliminate this hazard. The following design features should be considered: non-sparking equipment; explosion relief vents; explosion suppression equipment; elimination of oxygen from the system; electrical bonding and grounding of all conductive equipment parts.

Hazardous Incomplete Combustion Products: Unknown. Probably carbon monoxide, oxides of nitrogen, organic acids, aniline, ammonia and hydrogen.

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**SECTION 6 - REACTIVITY DATA**

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Stability: At Ambient temperatures: stable.  
At elevated temperatures: stable to 250°C

Conditions to avoid: All sources of ignition or spark. (See Section 5)

Incompatibility (Materials to Avoid): Acid, strong oxidizers.

Hazardous polymerization will occur under the following conditions: Will not occur.

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**SECTION 7 - SPILL OR LEAK PROCEDURES**

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Steps To Be Taken If Material Is Spilled or Released:

Clean up spills and dust accumulation promptly. See Sections 8, 9, 10, & 11. Sweep and pick up for disposal. Hose area down with water.

On Highway: Call Chemtrec 1-800-424-9300. Local environmental agency should be notified.  
Within Manufacturing Area: Contact Environmental Control Department.

Disposal Methods: Deposit material in a separate, labeled, leak-proof container and take to an approved treatment, storage, or disposal facility.

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**SECTION 8 - HEALTH HAZARD DATA**

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Classification (29CFR 1910.1200): Essentially non-hazardous as defined by 29 CFR 1910.1200, Appendix A.



# MATERIAL SAFETY DATA SHEET

March 19, 1996

## I. Identity:

- A. Trade/Common Names: Madder Root, Dyer's Madder.
- B. Origin: Dried roots of the perennial plant *Rubia tinctorum*; also roots of related species, such as *Rubia cordifolia*.  
Botanical Family: Rubiaceae.
- C. Chemical Family:
  - 1. 96% - 98% Plant biomass.
  - 2. 2% - 4% Alizarin:  $\alpha,\beta$ -Dihydroxyanthraquinone: Empirical Formula:  $C_{14}H_8O_4$ .

## II. Physical Data:

- A. Boiling Point: (1) Biomass: Not applicable.  
(2) Alizarin: 430° C.
- B. Melting Point: (1) Biomass: Decomposes above 250° C.  
(2) Alizarin: 290° C.
- C. Specific Gravity: > 1.2 g./ml. when air is removed from biomass.
- D. Vapor Density: Not applicable.
- E. Reactivity in Water: Unreactive.
- F. Solubility: Biomass insoluble in water and usual organic solvents. Alizarin very slightly soluble in neutral water, soluble in aqueous alkaline solutions, very soluble in usual organic solvents.
- G. Appearance: Irregular small cellulosic roots with fibrous and/or pithy texture; light brown to pink color.
- H. Flash Point: Not known: Above 250° C.
- I. Auto-ignition Temperature: Not applicable.
- J. pH: 7.1 - 7.5.

## III. Hazardous Ingredients: None known.

## IV. Physical Hazards:

- A. Stability: Stable under dry conditions. Decomposes slowly with microbial growth (molds, etc.) after long-term contact with liquid water or in high atmospheric moisture.
- B. Incompatibility (Materials to Avoid): No unusual incompatibilities. As with all biomass materials, contact with strong oxidizing agents (nitrates, chlorates, oxygen, etc.) should be avoided.
- C. Hazardous Decomposition Products: None known.
- D. Hazardous Polymerization: Will not occur.
- E. Unusual Fire and Explosion Hazards: None known.
  - 1. Fire fighting media: Water, foam, or dry chemical.
  - 2. Fire fighters should wear self-contained breathing apparatus, to protect from potentially hazardous fumes.

**MATERIAL SAFETY DATA SHEET:  
MADDER ROOT**

**V. Health Hazards:** No toxic effect known from dust inhalation or ingestion.

A. Threshold Limit Value: None known.

B. Signs or Symptoms of Exposure: None expected.

C. Effects of Chronic Exposure: None known.

D. Medical Conditions Generally Aggravated by Exposure: None known.

E. Chemicals Listed as Carcinogen or Potential Carcinogen: No listing.

F. OSHA Permissible Exposure Limit: None known.

G. Emergency and First Aid Procedures:

1. Inhalation: Remove person to fresh air. If breathing difficulty occurs or coughing persists, get prompt medical attention.
2. Eyes: Flood with water.
3. Skin: Wash with soap and water.
4. Ingestion: Gastric lavage.

**VI. Special Protection Information:**

A. Respiratory Protection: Use dust respirator when handling product.

B. Ventilation: No special ventilation required.

C. Protective Gloves: Wear leather or rubber-covered cloth gloves to avoid direct contact of hands with product.

D. Eye Protection: Use safety eyewear.

E. Waste Disposal Methods: Normal septic type of disposal is recommended, due to ease with which microorganisms can grow in the material. pH adjustment is not necessary.

**VIII. Special Notes:**

A. As with all biomass materials, incomplete combustion may result in the formation of volatile toxic compounds. In case of fire, precautions should be taken to avoid breathing evolved gases and vapors.

B. Literature references indicate that this material has long been used as a dye for textile fibers and as an ingredient in pigment lakes. However, as a reasonable precautionary measure, care should be taken to avoid breathing dust and to avoid prolonged skin contact.



**MATERIAL SAFETY DATA SHEET**

October, 1998

**I. Identity:**

A. Trade/Common Names: Osage Orange, Hedge Apple, Bow Dock.

B. Origin: Heartwood of the tree *Maclura pomifera*.

Botanical Family: Moraceae.

C. Chemical Family:

1. 92% - 94% Plant biomass.

2. 6% - 8% Soluble isoflavone derivatives:

Osajin, empirical formula:  $C_{25}H_{26}O_5$ , and

Pomiferin, empirical formula:  $C_{25}H_{26}O_6$ .

Both compounds are isoflavones substituted by 2 isoprene units.

**II. Physical Data:**

A. Boiling Point: (1) Biomass: Not applicable.

(2) Isoflavone derivatives: decompose above 275 C.

B. Melting Point: (1) Biomass: Decomposes above 250° C.

(2) Isoflavone derivatives: approx. 225° C.

C. Specific Gravity: >1.2 g./ml. when air is removed from biomass.

D. Vapor Density: Not applicable.

E. Reactivity in Water: Unreactive.

F. Solubility: Biomass insoluble in water and usual organic solvents. Isoflavone derivatives moderately soluble in neutral water, soluble in aqueous alkaline solutions, very soluble in usual organic solvents.

G. Appearance: Close-grained, hard wood, wood shavings, or sawdust. All forms have a pronounced yellow color.

H. Flash Point: Not known: Above 300° C.

I. Auto-ignition Temperature: Not applicable.

J. pH: 7.1 - 7.5.

**III. Hazardous Ingredients: None known.****IV. Physical Hazards:**

A. Stability: Stable under dry conditions. Decomposes slowly with microbial growth (molds, etc.) after long-term contact with liquid water.

B. Incompatibility (Materials to Avoid): No unusual incompatibilities. As with all biomass materials, contact with strong oxidizing agents (nitrates, chlorates, oxygen, etc.) should be avoided.

C. Hazardous Decomposition Products: None known.

D. Hazardous Polymerization: Will not occur.

**MATERIAL SAFETY DATA SHEET:  
OSAGE ORANGE**

**IV. Physical Hazards--cont.:**

- E. Unusual Fire and Explosion Hazards: None known.
1. Fire fighting media: Water, foam, carbon dioxide, or dry chemical.
  2. Fire fighters should wear self-contained breathing apparatus, to protect from potentially hazardous fumes.

**V. Health Hazards:** No toxic effect known from dust inhalation or ingestion.

- A. Threshold Limit Value: None known.  
B. Signs or Symptoms of Exposure: None expected.  
C. Effects of Chronic Exposure: None known.  
D. Medical Conditions Generally Aggravated by Exposure: None known.  
E. Chemicals Listed as Carcinogen or Potential Carcinogen: No listing.  
F. OSHA Permissible Exposure Limit: None known.  
G. Emergency and First Aid Procedures:
1. Inhalation: Remove person to fresh air. If breathing difficulty occurs or coughing persists, get prompt medical attention.
  2. Eyes: Flood with water.
  3. Skin: Wash with soap and water.
  4. Ingestion: Gastric lavage.

**VI. Special Protection Information:**

- A. Respiratory Protection: Use dust respirator when handling product in sawdust or shaving form.  
B. Ventilation: No special ventilation required.  
C. Protective Gloves: Wear leather or rubber-covered cloth gloves to avoid direct contact of hands with product.  
D. Eye Protection: Use safety eyewear to avoid getting dust in eyes.  
E. Waste Disposal Methods: Normal septic type of disposal is recommended, due to ease with which microorganisms can grow in the material. pH adjustment is not necessary.

**VIII. Special Notes:**

- A. As with all biomass materials, incomplete combustion may result in the formation of volatile toxic compounds. In case of fire, precautions should be taken to avoid breathing evolved gases and vapors.  
B. Literature references indicate that this material has long been used as a dye for textile fibers and as a decorative wood in cabinet making, etc. However, as a reasonable precautionary measure, care should be taken to avoid breathing dust and to avoid prolonged skin contact.