

SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier CITROFLEX* A-4

Synonyms: ATBC, ATC IV

Chemical Abstracts Registry No: 77-90-7

REACH Registration Number: 01-2119457265-36-0007

1.2. Relevant identified uses of the substance or mixture and uses advised against

Plasticizer, Use in formulation of flavors and fragrances, Use as a pharmaceutical excipient

1.3. Details of the supplier of the safety data sheet

Vertellus LLC
201 North Illinois Street, Suite 1800
Indianapolis, Indiana 46204 USA
1-336-292-1781

e-mail Address: SDS@Vertellus.com, REACH@Vertellus.com

1.4. Emergency telephone number **Vertellus:** 1-336-292-1781

CHEMTREC (USA): +1-800-424-9300 (collect calls accepted)

CHEMTREC (International): +1-703-527-3887 (collect calls accepted)

NRCC (China): +86 25 85477110

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture (According to Regulation (EC) No 1272/2008, 29 CFR 1910.1200 and the Globally Harmonized System)

Not classified as hazardous under this directive.

2.2. Label elements

Signal Word: Not required.

Hazard Precautions: Not classified as hazardous under this directive.

Prevention Precautionary Statements: Note: These precautionary statements are not prescribed by directive 1272/2008 as this product is not classified as hazardous under this directive. Wash hands thoroughly after handling with soap and water. Wear protective gloves, protective clothing, eye protection and face protection. If swallowed, in eyes, on skin or inhaled call a poison center or doctor/physician if you feel unwell. If inhaled, remove victim to fresh air and keep at rest in a comfortable position for breathing. Take off contaminated clothing before reuse. Store in a well-ventilated place. Keep container tightly closed.

First Aid Precautionary Statements: Not required.

2.3. Other hazards

Other Hazards: Not applicable.

SECTION 3: Composition/information on ingredients

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3.1. Substances or 3.2. Mixtures

Ingredient	CAS Number	Concentration (weight %)	EC Number	CLP Inventory/ Annex VI	EU CLP Classification (1272/2008)
Acetyltri-n-butyl Citrate	77-90-7	~ 100	201-067-0	Not listed.	Not applicable.

NOTE: See Section 8 for exposure limit data for these ingredients. See Section 15 for trade secret information (where applicable).

SECTION 4: First aid measures

4.1. Description of first aid measures

Skin Contact:	Immediately flush with water for 15 minutes. Wash the contaminated skin with soap and water. If irritation develops, call a physician.
Eye Contact:	Immediately flush eyes with plenty of water. Get medical attention, if irritation persists.
Inhalation:	If symptoms are experienced, remove affected person to fresh air and obtain medical attention.
Ingestion:	If swallowed, contact physician or poison control center immediately.

4.2 Most important symptoms and effects, both acute and delayed

Acute:	Contact with citrate esters may cause mild irritation to skin, eyes and mucous membranes. This material is not expected to be toxic by inhalation, ingestion or dermal exposure. Although it has been observed that health effects related to this substance are minimal, as with any chemical, use appropriate precautions during handling.
Delayed Effects:	None known.

4.3. Indication of any immediate medical attention and special treatment needed

Note to Physician:	No specific indications. Treatment should be based on the judgment of the physician in response to the reactions of the patient.
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SECTION 5: Firefighting measures

5.1. Extinguishing media

Appropriate Extinguishing Media:	Foam, Dry chemical, Carbon dioxide, Water spray
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5.2. Special hazards arising from the substance or mixture

Hazardous Products of Combustion:	As with other organic materials, combustion will produce carbon monoxide and carbon dioxide.
Potential for Dust Explosion:	Not applicable.
Special Flammability Hazards:	Not applicable.

5.3. Advice for firefighters

Basic Fire Fighting Guidance:	Wear self-contained breathing apparatus and protective clothing. Normal firefighting procedures may be used.
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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- Evacuation Procedures:** Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
- Special Instructions:** See Section 8 for personal protective equipment recommendations. Remove all contaminated clothing to prevent further absorption. Decontaminate affected personnel using the first aid procedures in Section 4. Leather shoes that have been saturated must be discarded.

6.2. Environmental precautions

Prevent releases to soils, drains, sewers and waterways.

6.3. Methods and material for containment and cleaning up

Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Remove all ignition sources. Ventilate the area of spill or leak. Wear protective equipment during clean-up. For small spills, use suitable absorbent material and collect for later disposal. For large spills, the area may require diking to contain the spill. Material can then be collected (eg., suction) for later disposal. After collection of material, flush area with water. Dispose of the material in accordance with standard practice for disposal of potentially hazardous materials as required by applicable federal, state or local laws.

6.4. Reference to other sections

Refer to section 8 for information on selecting personal protective equipment. Refer to section 13 for information on spilled product, absorbent and clean up material disposal instructions.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for Unique Hazards:** Not applicable.
- Practices to Minimize Risk:** Wear appropriate protective equipment when performing maintenance on contaminated equipment. Wash hands thoroughly before eating or smoking after handling this material. Do not eat, drink or smoke in work areas. Prevent contact with incompatible materials. Avoid spills and keep away from drains. Handle in a manner to prevent generation of aerosols, vapors or dust clouds.
- Special Handling Equipment:** Not applicable.

7.2. Conditions for safe storage, including any incompatibilities

- Storage Precautions & Recommendations:** This product should be stored at ambient temperature in a dry, well-ventilated location. Keep container closed when not in use.
- Dangerous Incompatibility Reactions:** Oxidizing materials
- Incompatibilities with Materials of Construction:** None known

7.3. Specific end use(s)

If a chemical safety assessment has been completed an exposure scenario is attached as an annex to this Safety Data Sheet. Refer to this annex for the specific exposure scenario control parameters for uses identified in subsection 1.2.

SECTION 8: Exposure controls/personal protection

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8.1. Control parameters

Occupational Exposure Limit	Not established
Air Monitoring Method:	Not required

8.2. Exposure controls

Also see the annex to this SDS (if applicable) for specific exposure scenario controls.

Other Engineering Controls:	All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided.
Personal Protective Equipment:	Safety glasses or goggles Work uniforms or impervious clothing and boots. Latex rubber gloves are recommended where contact is likely. Where overexposures are a concern, use NIOSH-approved chemical cartridge respirator or supplied-air breathing equipment as necessary.
Respirator Caution:	Observe OSHA regulations for respirator use (29 CFR 1910.134). Air-purifying respirators must not be used in oxygen-deficient atmospheres.
Thermal Hazards:	Not applicable.
Environmental Exposure Controls:	The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance, State & Odor (ambient temperature):	Clear, oily, essentially odorless liquid		
Vapor Pressure:	0.8 mm Hg @ 170°C	Evaporation Rate:	< 1 (Butyl Acetate = 1)
Specific Gravity or Density:	1.048 @ 25°C	Vapor Density (air = 1):	14.1
Boiling Point:	327 °C (621 °F)	Freezing / Melting Point:	- 59 °C (- 75 °F)
Solubility in Water:	< 0.1%	Octanol / Water Coefficient:	Log Kow = 4.92
pH:	No data available.	Odor Threshold:	No data available.
Viscosity:	53.7 cps @ 25°C	Autoignition Temperature:	No data available.
Flash Point and Method:	400°F (204°C) TCC	Flammable Limits:	No data available.
Flammability (solid, gas):	Not applicable.	Decomposition Temperature:	No data available.
Explosive Properties:	Not explosive.	Oxidizing Properties:	Not an oxidizer.

9.2. Other information

Not applicable.

SECTION 10: Stability and reactivity

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<u>10.1. Reactivity</u>	Not classified as dangerously reactive.
<u>10.2. Chemical stability</u>	Stable
<u>10.3. Possibility of hazardous reactions</u>	Will not occur.
<u>10.4. Conditions to avoid</u>	Avoid static discharge and uncontrolled exposure to high temperatures.
<u>10.5. Incompatible materials</u>	Oxidizing materials
<u>10.6. Hazardous decomposition products</u>	Decomposition products may include carbon monoxide, carbon dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute Oral LD ₅₀ :	Oral LD50 (rat) = 31400 mg/kg	Finkelstein & Gold 1959
Acute Dermal LD ₅₀ :	Application to guinea pig skin resulted in no pathological effects.	Larionov 1977
Acute Inhalation LC ₅₀ :	No data available.	
Skin Irritation:	Non-irritating to both intact and abraded skin.	
Eye Irritation:	Slight to moderate erythema observed in eyes in contact with material over 20 minutes to 3 hours.	
Skin Sensitization:	Not a sensitizer	
Mutagenicity:	This product has been shown not to be mutagenic based on a battery of assays.	
Reproductive / Developmental Toxicity:	No evidence of reproductive or developmental toxicity in 90 day dietary rat study.	
Carcinogenicity:	This material is not listed by IARC, NTP or OSHA as a carcinogen. No test data is available that indicates this material is a carcinogen.	
Target Organs:	None known	
Aspiration Hazard:	No data available.	
Primary Route(s) of Exposure:	Skin contact and absorption, eye contact, and inhalation. Ingestion is not likely to be a primary route of exposure.	
Most important symptoms and effects, both acute and delayed	Contact with citrate esters may cause mild irritation to skin, eyes and mucous membranes. This material is not expected to be toxic by inhalation, ingestion or dermal exposure. Although it has been observed that health effects related to this substance are minimal, as with any chemical, use appropriate precautions during handling. Delayed Effects: None known.	
Additive or Synergistic effects:	None known.	

SECTION 12: Ecological information

<u>12.1. Toxicity</u>	LC50(96h) Fish = 38 - 60 mg/L	Foulds 1974
	NOEC (96-hr) Fish = 10 mg/L	Warbritton & Leak 2001
	Aquatic EC50 (48h) Ceriodaphnia dubia = 7.82 mg/L	Jenkins 2008
	NOEC (48-HR) Ceriodaphnia dubia = 4.82 mg/L	

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<p><u>12.2. Persistence and degradability</u></p> <p><u>12.3. Bioaccumulative potential</u></p> <p><u>12.4. Mobility in soil</u></p> <p><u>12.5. Results of PBT and vPvB assessment</u></p> <p><u>12.6. Other adverse effects</u></p>	<p>NOEC Pseudokirchneriella subcapitata 0.109 mg/L</p> <p>Material is inherently biodegradable</p> <p>Bioconcentration is not expected to occur.</p> <p>No data available</p> <p>This substance is not a PBT or vPvB.</p> <p>No data available.</p>
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SECTION 13: Disposal considerations

13.1. Waste treatment methods

<p>US EPA Waste Number:</p> <p>Waste Classification: (per US regulations)</p> <p>Waste Disposal:</p>	<p>Non-Hazardous</p> <p>The waste may be classified as "special" or hazardous per State regulations.</p> <p>NOTE: Generator is responsible for proper waste characterization. State hazardous waste regulations may differ substantially from federal regulations. Dispose of this material responsibly, and in accordance with standard practice for disposal of potentially hazardous materials as required by applicable international, national, regional, state or local laws, and environmental protection duty of care principles. Do NOT dump into any sewers, on the ground, or into any body of water. For disposal within the EC, the appropriate classification code according to the European Community List of Wastes should be used. Note that disposal regulations may also apply to empty containers and equipment rinsates.</p>
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SECTION 14: Transport information

The following information applies to all shipping modes (DOT/IATA/ICAO/IMDG/ADR/RID/ADN), unless otherwise indicated:

<p>14.1. UN number</p> <p>14.3. Transport hazard class(es)</p> <p>14.5. Environmental hazards</p> <p>14.6. Special precautions for user</p> <p>NA Emergency Guidebook Numbers:</p> <p>14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</p>	<p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable.</p> <p>Not applicable</p> <p>Not applicable</p>	<p>14.2. UN proper shipping name</p> <p>14.4. Packing group</p> <p>IMDG EMS:</p>	<p>Chemicals, n.o.s. (Acetyltri-n-Butyl Citrate)</p> <p>Not applicable</p> <p>Not applicable; Not applicable.</p> <p>Not applicable.</p>
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SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

<p>Chemical Inventory Lists:</p> <p>USA TSCA:</p>	<p>Status:</p> <p>Listed</p>	<p>EINECS:</p>	<p>201-067-0</p>
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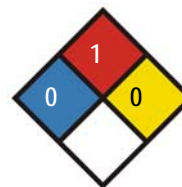
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Canada(DSL/NDSL):	DSL	Japan:	(2)-1327
Korea:	KE-00158	Australia:	Listed
China:	Listed	Philippines:	Listed
Taiwan:	Listed	New Zealand:	Listed
German Water Hazard Classification:	ID Number 5228, hazard class 2 - hazard to waters (<i>Tributyl-o-acetylcitrat</i>)		
SARA 313:	Not listed.		
Reportable Quantities:	Not applicable.		
State Regulations:	Not applicable.		

HMIS IV:

HEALTH	0
FLAMMABILITY	1
PHYSICAL HAZARD	0

NFPA:



15.2. Chemical safety assessment

Not applicable.

SECTION 16: Other information

Key Data Sources:

- Finkelstein, Murray, and Harry Gold. "Toxicology of the citric acid esters: tributyl citrate, acetyl tributyl citrate, triethyl citrate, and acetyl triethyl citrate." *Toxicology and Applied Pharmacology* 1.3 (1959): 283-298.
- Larionov, A. G., and T. E. Cherkasova. "Hygienic evaluation of acetyltributylcitrate]." *Gigiena i sanitariia* 4 (1977): 102.
- Chase, KR and Willoughby, CR. "Citroflex® A-4: Toxicity Study by Dietary Administration to Han Wistar Rats for 13 Weeks with an In Utero Exposure Phase Followed by a 4-Week Recovery Period"; Performing Laboratory: Huntingdon Life Sciences, Sponsor: Morflex; Report#: MOX 002/013810; Date: 1 August 2002; GLP, OECD 408.
- Foulds, G. "Report on Potential Environmental Impact of Citroflexes", Performing Laboatory: Pfizer; Sponsor: Pfizer; Report #: unnumbered; Date: 29 May 1974, non-GLP, non-OECD.
- Warbritton, R and Leak, T. "Acute Toxicity Test of CITROFLEX A-4 to the Water Flea, *Ceriodaphnia dubia*, Determined Under Static Test Conditions", Performing Laboratory: ABC Laboratories Inc., Sponsor: Mead Corporation, Report #: 46891, Date: 11 Dec 2001, GLP, USEPA OPPTS 850.1010.
- Jenkins, CA. "CITROFLEX A-4: Algal Growth Inhibition Assay", Performing Laboratory: Huntingdon Life Sciences Ltd., Sponsor: Vertellus Performance Materials Inc., Report #: , MOX0010/073183, Date: 20 August 2008, GLP, OECD 201.

Classification Method: On basis of test data

Legend of Abbreviations:

ACGIH = American Conference on Governmental Industrial Hygienists.

CAS = Chemical Abstracts Service.

CFR = Code of Federal Regulations.

DSL/NDSL = Domestic Substances List/Non-Domestic Substances List.

EC = European Community.

EINECS = European Inventory of Existing Commercial Chemical Substances.

ELINCS = European List of Notified Chemical Substances.

LD = Lethal Dose.

NFPA = National Fire Protection Association.

NIOSH = National Institute of Occupational Safety and Health.

NTP = National Toxicology Program.

OSHA = Occupational Safety and Health Administration

PEL = Permissible Exposure Limit.

RQ = Reportable Quantity.

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*EU = European Union.
GHS = Globally Harmonized System.
LC = Lethal Concentration.*

*SARA = Superfund Amendments and Reauthorization Act of 1986.
TLV = Threshold Limit Value.
WHMIS = Workplace Hazardous Materials Information System.*

Important Note: Please note that the information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. The information contained herein may change without prior notice. **THIS SAFETY DATA SHEET SUPERSEDES ALL PREVIOUS EDITIONS.**

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