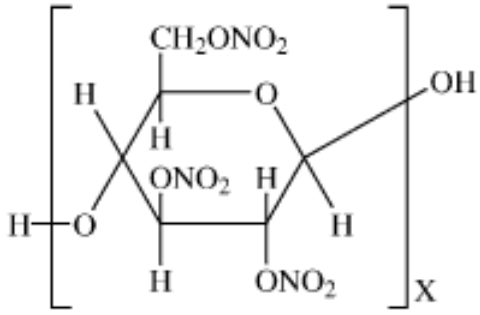
NITROCELLULOSE

SYNONYMS

Celex
Celloidin
Cellulose nitrate, Cellulose tetranitrate
Collodion, collodion cotton, collodion wool
Colloxylin, Colloxylin VNV
Corial RM finish F
Daicel RS 1
Fulmicoton
Guncotton
Nitrocel S, Nitrocotton, Nitron
Parlodion
Pirossilina
Piroxilina
Pyralin
Pyroxylin, Pyroxyline, Pyroxylinium
Shadolac MT
Synpor
Xyloidin

CHEMICAL STRUCTURE



CHEMICAL FORMULA

$$[\sim C_6H_7O_2(OH)_{3-x}(ONO_2)_x\sim]_n$$

IDENTIFIER DETAILS

CAS Number	:	9004-70-0
CoE Number	:	-
FEMA	:	-
EINECS Number	:	-
E Number	:	-

CLP CLASSIFICATION

Ingredient CLP Classification: No

Endpoint	Classification	Category
Acute Oral Toxicity	-	-
Acute Dermal Toxicity	-	-
Acute Inhalation Toxicity	-	-
Skin Corrosive/irritant	-	-
Eye Damage/Irritation	-	-
Respiratory Sensitisation	-	-
Skin Sensitisation	-	-
Mutagenicity/Genotoxicity	-	-
Carcinogenicity	-	-
Reproductive Toxicity	-	-
Specific Target Organ Toxicity	-	-
Aspiration Toxicity	-	-

SPECIFICATIONS

Melting Point: 160–170 °C (ignites)

Boiling point: -

STATUS IN FOOD AND DRUG LAWS

CoE limits:

Beverages (mg/kg)	Food (mg/kg)	Exceptions (mg/kg)
-	-	-

Acceptable Daily Intake:

ADI (mg/kg)	ADI Set by	Date Set	Comments
-	-	-	-

FDA Status:[CFR21]

Section Number	Comments
175.105 & 175.300	Indirect food additives: Adhesives & components of coatings
177.1200	Indirect food additives: Polymers
179.45	Irradiation in the production, processing and handling of food
181.30	Substances used in the manufacture of paper and paperboard products used in food packaging
358.103 & 358.503	Miscellaneous external drug products for over-the-counter human use

HUMAN EXPOSURE

Reported Uses: Nitrocellulose is used in the manufacture of lacquers, inks, adhesives, in electrotechnics, galvanoplasty, explosives, rocket propellant, leather finishing, embedding sections in microscopy. Nitrocellulose is also used as support in diagnostic/scientific applications where antigen-antibody binding occur, e.g., pregnancy tests, U-Albumin tests, western/northern/southern blotting [HSDB, 2003].

TOXICITY DATA

In Vivo Toxicity Status

Species	Test Type	Route	Reported Dosage
Rat	LD_{50}	Oral	> 5000mg/kg
Mouse	LD_{50}	Oral	> 5000mg/kg

[ChemIDplus, 2009]

Carcinogenicity and Mutagenicity

No data identified.

Dermal Toxicity

A man with no allergies injured his left forefoot. His foot was strapped with Collodion (nitrocellulose)-soaked lint. Twelve days later, the skin beneath the dressing was erythematous, vesicular and scaly; the plantar surface was covered by a large bulla. Tests were done on Colophony (open & closed). Since the results of open test were negative, it was commented that occlusion by nitrocellulose enhanced colophony penetration of the skin and hence sensitisation [Barth, 1981].

A case report of a 45 year old woman presented with contact sensitivity to 2 nail varnish products she was using was recommended a varnish, designed for patients allergic to nail varnishes. The patient used this new varnish and experienced an acute contact eczema at the application area. Patch testing revealed contact sensitivity was due to nitrocellulose. The purity of the sample was assessed by chromatography and did not detect triphenyl phosphate, a potential irritant contaminant. Adams & Maibach published a survey of the American experience of contact allergy to cosmetics over 5 years (1977-1983). Only 1 case of allergy to nitrocellulose is mentioned among 13,126 patients with contact sensitivity, no other case has previously been reported to the author's knowledge. It was concluded contact sensitivity is very rare, but as nitrocellulose is rarely tested as a potential allergen it would be appropriate to test in suspected allergy to nail varnishes [Castelain, 1997].

Reproductive and Developmental Toxicity

No data identified.

Inhalation Toxicity

Chemical analyses of the four bulk Cellulose insulation (CI) samples revealed only minor differences in additives. For all four CI samples, less than 0.1% by weight was collected as the small respirable particle fraction. The fractions consisted mainly of fire retardants and smaller quantities of clays and did not contain cellulose material. The respirable fraction from one CI sample was administered by intratracheal instillation to male Fischer 344 rats at doses of 0, 0.625, 1.25, 2.5, 5, or 10 mg/kg body weight; the bronchoalveolar lavage (BAL) fluid cellularity was evaluated 3 days later. Based upon the relatively mild severity of the inflammatory response, a dose of 5 mg/kg body weight was selected for use in a subsequent 28-day study. Rats received CI, titanium dioxide (particle controls), or sterile saline (controls). BAL fluid was evaluated 1, 3, 7, 14, and 28 days after instillation, and lung histopathology was evaluated 14 and 28 days after treatment. CI caused a greater influx of inflammatory cells than titanium dioxide and caused significant increases in BAL fluid protein and lactate dehydrogenase. These CI-induced changes in BAL fluid parameters were transient and by day 14 were not significantly different than those observed in rats treated with titanium dioxide or phosphate-buffered saline. Unlike titanium dioxide, CI treatment caused a minimal to mild nonprogressive, minimally fibrosing granulomatous pneumonitis characterized by nodular foci of macrophages and giant cells. These results indicated that few respirable particles or fibers are likely generated during the CI application and that the acute pulmonary toxicity is minimal [Morgan, 2006].

Other Relevant Studies

No data identified.

Behavioural data

No data identified.

***In Vitro* Toxicity Status**

Carcinogenicity and Mutagenicity

No data identified.

Other Relevant Studies

No data identified

REFERENCES

Adams & Maibach, (1985). A 5-year study of cosmetic reactions. *J Am Acad Dermatol* **13**, 1062-63.

Barth, (1981). Colophony sensitivity -a regional variant. *Contact Dermatitis* **7 (3)**: 165-6 .

Castelain *et al*., (1997). Contact dermatitis from nitrocellulose in a nail varnish. *Contact Dermatitis* **36**: 266.

ChemIDplus Chemical Identification/Dictionary (2009): Pyroxylin RN: 9004-70-0 (search carried out 09/09/09). Obtained from http://chem.sis.nlm.nih.gov

HSDB Hazardous Substances Databank Number: 1973 (search carried out 09/09/09). Last revision date 2003/02/14. Obtained from http://toxnet.nlm.nih.gov.

Morgan DL. (2006) NTP Toxicity Study Report on the atmospheric characterization, particle size, chemical composition, and workplace exposure assessment of cellulose insulation (CELLULOSEINS). *Toxic Rep Ser*. **74**:1-62