Toxicological profile for

Cellulose

This ingredient has been assessed to determine potential human health effects for the consumer. It was considered not to increase the inherent toxicity of the product and thus is acceptable under conditions of intended use.

1. Name of substance and physico-chemical properties

1.1. IUPAC systematic name

No data available to us at this time.

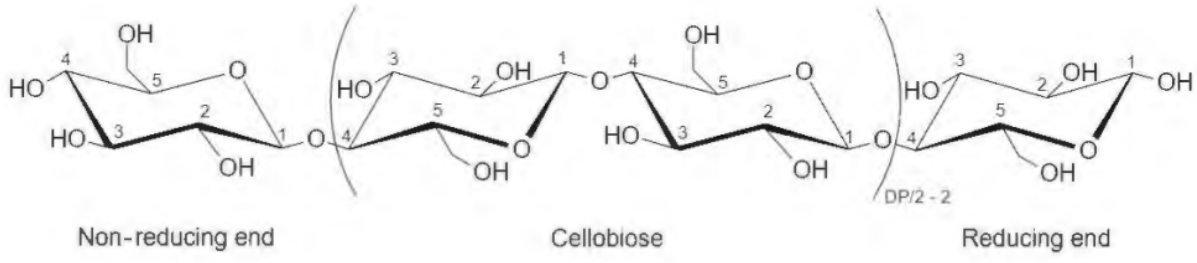
1.2. Synonyms

Pulp, cellulose; Bleached ground wood pulp; Cellulose chemical pulp; Cellulose cotton linter pulp; Cellulose pulp; Cellulose, chemical pulp; Cellulose,chemical pulp; Chemical pulp, non-sulfur; EINECS 265-995-8; Rags; (PubChem); pulp, wood (FDA 2023b)

1.3. Molecular formula

(C6 H10 O5)x

1.4. Structural Formula



(EFSA (2022)

1.5. Molecular weight (g/mol)

160,000-560,000

1.6. CAS registration number

65996-61-4

1.7. Properties

1.7.1. Melting point

(°C): 500; Thermogravimetric analysis showed a degradation onset at 280°C, with significant degradation taking place above 300°C.(EFSA, 2021)

1.7.2. Boiling point

(°C): Decomposes.

1.7.3. Solubility

Practically insoluble in water.

1.7.4. pKa

pH 5.0 (100 g/l, H2O, 20ºC)

1.7.5. Flashpoint

(°C): >290 (IGS, 2020)

1.7.6. Flammability limits (vol/vol%)

No data available to us at this time.

1.7.7. (Auto)ignition temperature

(°C): No data available to us at this time.

1.7.8. Decomposition temperature

(°C): No data available to us at this time.

1.7.9. Stability

Stable at normal temperatures and pressure.

1.7.10. Vapor pressure

Not applicable.

1.7.11. log Kow

No data available to us at this time.

2. General information

2.1. Exposure

Cellulose (CAS RN 65996-61-4) is listed as an ingredient (at given concentrations, where specified) in home maintenance (1-<10%), inside the home (15-40%), auto, personal care and pet care products by the CPID.

Used in food contact paper and dinnerware (Washington State Department of Ecology, 2021).

2.2. Combustion products

This ingredient was investigated in a pyrolysis study. Results are given in JTI Study Report (s).

Compound	Two stage heating		One stage heating	
	Abundance	Area%	Abundance	Area%
acetone	17205988	1.06	8355698	0.57
acetic acid	256330301	1.58	23513104	1.60

acetol	34103603	2.10	24177932	1.65
2-cyclopenten-1-one + unknown	34670406	2.14	22937462	1.56
furfural	47125884	2.90	56584048	3.86
1,2-cyclopentanedione	18899160	1.16	12472713	0.85
3-methyl-2,5-furandione + unknown	26846932	1.65	23115994	1.58
2H-pyran-2,6(3H)-dione	29606121	1.82	21465379	1.46
2-furancarboxylic acid	23045299	1.42	20692827	1.41
3,5-dihydroxy-2-methyl-4H-pyran-4-one	18322628	1.13	20068994	1.37
unknown	42470578	2.62	37686848	2.57
1,4:3,6-dianhydro-alpha-D-glucopyranose	23637096	1.46	20544754	1.40
5-hydroxymethylfurfural	78400335	4.83	81445343	5.55
unknown	17834203	1.10	10476614	0.71
unknown	17213131	1.06	12222776	0.83
unknown	57099159	3.52	44673662	3.05
levoglucosan	561411098	34.57	625527613	42.64
1,6-anhydro-beta-D-glucofuranose	40779397	2.51	34278165	2.34
Total ion chromatogram	1624677171	100	1464878846	100

This ingredient was investigated in a pyrolysis study. Results are given in Baker and Bishop (2005) J. Anal. Appl. Pyrolysis 74, 145–170.

Ingredient Name & CAS Number	Max. cig. appln. level (ppm)	Composition of pyrolysate (Compound, %)	Max. level in smoke (µg)
Cellulose fiber 65996-61-4	17000	Hydroymethylfurfural 9.9	840
		Acetol 7.6	650
		Methyl formate? and/or hydroxyacetaldehyde 6.3	540
			410
		Furfural 4.8	370
		Methyl pyruvate 4.3	260
		Benzene 3.1	220
		Acetic acid + 2-butenal 2.6	180

		Phenol + methylfuranone+ethyltoluene 2.1	

Cellulose has been pyrolysed many different ways. The pyrolysis products were phenol; pyrogallol; m-cresol; o-cresol; p-cresol; formaldehyde; acetaldehyde; propionaldehyde; n-butyraldehyde; 2-furaldehyde; 5-hydroxymethylfuraldehyde; 5-methyl-2-furaldehyde; acetone; methyl ethyl ketone; acrolein; 2-buten-3-one; 3-hydroxy-2-methylpyran-4-one; 3-methyl-2, 4-(3H, 5H)-furandione; 1,3-cyclopentanedione; glucopyranose; picene; benzo(a)pyrene; fluoranthrene; anthracene; 4, 5-methylenphenanthrene; phenanthrenequinone; anthraquinone; pyrenequinone; furfural; 5-hydroxymethylfurfural; furancarboxylic acid methyl ester; propionic acid methyl ester; 3-methylfuran; methanol; 2-furanmethanol; glyoxal; formic acid; acetic acid; lactic acid; carbon monoxide; carbon dioxide; water; levoglucosan (Bell et al 1966; Schlotzhauer et al 1967 & 1985; Sakuma et al 1981; Kroller 1964a; Lewin & Basch 1978).

Cellulose Pyrolysate contained more benzopyrene than tobacco pyrolysate (Gilbert & Lindsay 1957; Robb et al 1966).

Pyrolysis of cellulose yields a greater percentage of low molecular weight ketones and aldehydes, such as acetaldehyde and hydroxyacetaldehyde, relative to glucose, fructose and sucrose (Sanders et al. 2003).

2.3. Ingredient(s) from which it originates

21 CFR Section 186.1673: “Pulp is the soft, spongy pith inside the stem of a plant such as wood, straw, sugarcane, or other natural plant sources.”

As taken from FDA, 2023b

3. Status in legislation and other official guidance

The EU Scientific Committee on Food has placed cellulose in List 0, as a compound that can be used in food-contact materials without the need for establishing an ADI figure (Commission 2002).

High production volume (HPV) chemical; in excess of 1 million pounds produced in US annually (Scorecard).

Pulp, cellulose (CAS RN 65996-61-4) is listed in FDA’s Inventory of Food Contact Substances Listed in 21 CFR. It is approved under 21 CFR 177.1460 (indirect food additives: polymers; melamine-formaldehyde resins in molded articles), 177.1900 (indirect food additives: polymers; urea-formaldehyde resins in molded articles) and 177.2260 (indirect food additives: polymers; filters, resin-bonded). As taken from FDA, 2023a,b.

Approved under 21 CFR 186.1673 (Indirect food substances affirmed as generally recognized as safe. Pulp).

As taken from FDA, 2023b.

Pulp, cellulose is not registered under REACH (ECHA).

CAS RN 65996-61-4 is not classified for packaging and labelling under Regulation (EC) No. 1272/2008 (ECHA, 2023).

Pulp, cellulose (CAS RN 65996-61-4) is included on the Safer Chemical Ingredients list (US EPA, 2023).

Rags (CAS RN 65996-61-4) is listed in the US EPA Toxic Substances Control Act (TSCA) inventory, and also in the US EPA 2020 CDR and 2020 CDR Full Exempt lists. The Chemical Data Reporting (CDR) Rule requires companies that manufacture (including import) certain chemicals at certain volumes in the U.S. to report to EPA every four years through its CDR.

US EPA Substance Registry Services (SRS)

Pulp, cellulose (CAS RN 65996-61-4) is a “chemical identified as low concern to human health by application of expert validated rules under the NICNAS targeted tier I approach” and “poses no unreasonable risk to human health based on Tier I assessment under the NICNAS IMAP assessment framework” (AICIS, 2012).

Cellulose (E460) is authorized for use as a food additive in the EU under (EU) legislation 1129/2011 and, as a Group I Additive, also under (EU) legislation nos 438/2013, 2015/0647, 2015/1832 and 2018/1497. (European Commission, 2015, 2019)

4. Metabolism/Pharmacokinetics

4.1. Metabolism/metabolites

“A double-blind cross-over trial of the effects of guar gum and microcrystalline cellulose on metabolic control and serum lipids in 22 Type 2 diabetic patients has been carried out. The fibre preparations were given at 15 g/day for a 2-week period and then at 5 g/day for the remaining 10-week period of each treatment phase. There was no effect of the microcrystalline cellulose diet on fasting blood glucose level, glycosylated haemoglobin, serum HDL-cholesterol, serum triglycerides, serum zinc or ferritin, or urinary magnesium excretion” As taken from WHO Food Additives Series 40 available at http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

4.2. Absorption, distribution and excretion

“Groups of male and female Sprague-Dawley CD rats (20 per group) from Charles River Laboratories were administered, by gavage, suspensions of a special fine particle-size microcrystalline cellulose (median particle size 6 µm). The rats were dosed orally daily for 90 consecutive days at a level of 5000 mg/kg bw per day by means of a 25% suspension in tap water. The animals were killed on study days 91-94 and necropsies were carried out under conditions that reduced the possibility of contamination of tissues with fine particulates. The birefringent microcrystalline cellulose particles were not detected in any organ or tissue, including gut-associated lymphoid tissue, liver, lung, spleen and brain.”

“In another study, dyed plant foods (oatmeal, creamed corn) were fed to human subjects, and blood and urine were examined for coloured fibres. Dyed fibres were shown to be present (Schreiber, 1974). Lycopodium spores and pollen grains have also been shown to be persorbed by humans.”

“Rats, pigs and dogs were used to study the persorption of microcrystalline cellulose. The animals were not fed for 12 hours prior to oral administration of the test compound. Rats, dogs and pigs were given 0.5, 140 and 200 g, respectively, of the test compound. Venous blood was taken from the animals 1-2 hours after administration of the test compound, and examined for particles. Persorbed particles were demonstrated in the blood of all three species. The average maximum diameter for persorbed particles was greater in rats than in dogs or pigs.”

“In another study, eight healthy males received 30 g microcrystalline cellulose daily as supplement to their diet for 15 days. D-xylose absorption varied between pretest, test and post-test periods, being lower during microcrystalline cellulose ingestion. The absorption of 131I-triolein was unaffected by microcrystalline cellulose ingestion. No change was noted in the faecal flora nor was there any significant effect on blood chemistry during ingestion of microcrystalline cellulose. Examination of urine, blood and faecal levels of vitamin B1 during microcrystalline cellulose ingestion showed no difference from control periods.”

“Four rats were fed 14C-labelled microcrystalline cellulose at 10 or 20% of their diet. No evidence

of degradation or digestion was noted. Faecal recoveries of radioactivity ranged from 96-104% and were complete for all labelled material. No radioactivity appeared in the urine"

"One human subject received 150 g of microcrystalline cellulose daily in two portions for a 15-day adaptation period. He then received 14C-labelled microcrystalline cellulose (47.6 μCi) in two portions on one day. Supplementation of the diet with unlabelled microcrystalline cellulose continued for 10 days. Twenty-four-hour faecal and urine collections were examined for radioactivity. No radioactivity appeared in the urine or in the expired CO2. All administered radioactivity (98.9 ± 3.0%) was recovered from the faeces within two days."

"Most (87%) of the radiolabel associated with 131I-labelled alpha-cellulose fibres (retained by a sieve with pores of 1 mm diam) was excreted by 4 male and 4 female volunteers within 5 days of ingestion. Less than 2% of the faecal radiolabel was unbound; urinary excretion of unbound radio-iodine accounted for another 1.9% of the total dose." As taken from WHO Food Additives Series 40 available at http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

4.3. Interactions

No data available to us at this time.

5. Toxicity

5.1. Single dose toxicity

Species	**Sex**	**Route**	**LD_{50}(g/kg bw)**
Rat	M	Oral	>3.16
Rat	M+F	Oral	>5.00
Rat	M+F	Oral	>5.00
Rat	M	Intraperitoneal	>3.16
Rat	M+F	Dermal	>2.00
Rat	M+F	Dermal	>2.00
Rat	M+F	Dermal	>2.00

Rat	M+F	Inhalation	>5.35-5.8

“[…] there was no evidence of toxicity of microcrystalline cellulose preparations administered either orally or dermally to rats at doses of 5000 or 2000 mg/kg bw, respectively. The observations seen at necropsy in animals treated intraperitoneally with Cellan 300 at 3160 mg/kg bw are consistent with an irritant reaction caused by the presence of foreign material. An inhalation toxicity study showed only transient effects at a concentration of 5.35mg/litre.”

“Groups of five male Sprague-Dawley rats received a single oral dose, by stomach tube, of 10.0, 31.6, 100, 316, 1000 or 3160 mg/kg bw of a suspension of Cellan 300 (refined alpha-cellulose) in either distilled water or Mazola corn oil. The animals were observed for 7 days following administration. No differences were observed among the groups as regards the average body weight, appearance and behaviour compared to untreated rats. No observable gross pathology was revealed at autopsy in animals dosed with either suspension. Therefore,the acute oral LD50 was >3160 mg/kg.”

“Similar single doses of refined alpha-cellulose were given i.p. in distilled water suspension to five male rats. During 7 days observation there were no abnormalities in the rats given 316 mg/kg bw or less. At 1000 and 3160 mg/kg bw inactivity, laboured respiration and ataxia were observed 10 min after administration and, at 3160 mg/kg bw, ptosis and sprawling of the limbs were observed. These animals appeared normal after 24 hours and for the remainder of the observation period. At sacrifice body weights were higher than normal and gross autopsy revealed adhesions between the liver, diaphragm and peritoneal wall and congestion of the kidneys. Masses resembling unabsorbed compound were also observed and these were found to a small extent in the mesentery of the animals administered 316 mg/kg bw. There were no deaths and therefore the acute i.p. LD50 was >3160 mg/kg bw.”

“Ten male and ten female Sprague-Dawley rats fasted overnight were fed Avicel RCN-15 (a mixture of 85% microcrystalline cellulose with 15% guar gum) at a dose level of 5000 mg/kg bw mixed with parmesan cheese. Six of ten males and five of ten females consumed the mixture within 24 hours. After a 14-day period during which all rats gained weight normally they were killed. There were no gross lesions at necropsy. Under the specified conditions of administration the LD50 was >5000 mg/kg bw.”

As taken from WHO Food Additives Series 40 available at http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

5.2. Repeated dose toxicity

“Groups of four male rats were kept on diets containing 0.25, 2.5 or 25% of various edible celluloses for 3 months. No differences were observed among the groups with regard to growth and faecal output. Histopathology of the gastrointestinal tract revealed no treatment-related abnormalities.”

“Three groups of five male rats received 0.5 or 10% microcrystalline cellulose in their diet for 8 weeks. Growth was comparable to controls but the 10% group showed slightly lower body weights. Haematology, serum chemistry and vitamin B1 levels in blood and faeces showed no differences from controls.”

“Groups of five male weanling Sprague-Dawley rats received 0, 5, 10 or 20% of acid-washed cellulose in their diet during three consecutive nutrient balance trials over a period of 17 days. Absorption of magnesium and zinc were significantly lower in the animals that were receiving the 10 and 20% cellulose diets. Histopathology of the gastrointestinal tract revealed increased mitotic activity and the presence of increased numbers of neutrophils in crypt epithelial cells, particularly of the duodenum and jejunum.”

“A mixture of four types of Elceme (in the ratio of 1:1:1:1) was fed to groups of Wistar rats for 30 days at a dietary level of 50%, and for 90 days at a dietary level of 10% (Elceme is a microcrystalline cellulose, and the four types are identified by particle size, namely, 1-50 (powder), 1-100 (powder), 1-150 (fibrillar), 90-250 (granulate)). All test animals were observed for food intake and weight gain. For animals in the 10% group, urinalysis, haematological tests and serum biochemical tests were carried out at weeks 6 and 13 of the test. A complete autopsy including histopathology was carried out at the end of the study. Animals in the 50% group were subjected to a persorption test, on the last day of the study, by addition of a cellulose staining dye (Renal, Wine-red) to the food of the test animals at a level equivalent to 5% of the Elceme. The animals were sacrificed 24 hours after administration of the diet, and a careful histological examination was made of the gastrointestinal tract, spleen, liver, kidney and heart for stained particles. Animals in the 10% group gained significantly less weight than those in the control group; the marked decrease commenced in the third or fourth week of the study. Food intake was similar in test and control groups. Urinalysis, haematological values and biochemical values were similar for test and control group 1. At autopsy some of the rats on the test diet had distended stomachs, which often contained considerable amounts of the test diet. The absolute liver and kidney weights and the ratio of the weight of these organs to brain weight was increased in test animals when compared with control animals. No compound-related pathology was reported. Animals in the 50% group showed considerable less weight gain than control animals in spite of a marked increase in food consumption. No persorption of dyed fibres was observed.”

“Randomly bred rats of both sexes were divided into groups that received a control diet or the control diet with 330 mg/kg microcrystalline cellulose for a period of 6 months. Six rats in each group were then killed, their organs were examined, and tissues were taken for histopathology. No effects of the treatment were observed.”

“Groups of Crl:CD(R) BR/VAF/Plus rats (20/sex per group) were administered 0 (control), 25 000 or 50 000 mg/kg Avicel RCN-15 in the diet for 90 days. A few test animals were noted as having chromodacryorrhea/ chromorhinorrhea, but this was not considered to be biologically significant. In some early weeks the rats increased diet consumption, probably to allow for the increased dietary fibre content. Body weight gain was unaffected. During the study and at necropsy there was no evidence of treatment-related changes. Clinical chemistry, haematology and organ weights were unaffected by treatment. Histopathology of 34 organs or tissues, including gastrointestinal tract and gut-associated lymphoid tissue of the ileum, provided no evidence of toxicity of microcrystalline cellulose. The calculated daily consumption of microcrystalline cellulose was 3769 mg/kg bw per day for males and 4446 mg/kg bw per day for females. The author noted that the NOEL exceeded

50 000 mg/kgdiet ."

"Three groups of 50 male and 50 female rats received in their diet for 72 weeks either 30% ordinary cellulose or dry microcrystalline cellulose or micro-crystalline cellulose gel. Appearance and behaviour was comparable in all groups. No adverse effects were noted. The body weights of males given microcrystalline cellulose gel were higher than those of the controls. Food efficiency, survival and haematology were comparable in all groups. The liver and kidney weights of males receiving microcrystalline cellulose gel were higher than the controls. Gross and histopathology showed some dystrophic calcification of renal tubules in females on microcrystalline cellulose but all other organs appeared unremarkable. Tumour incidence did not differ between the groups."

"More studies have been done in which a group of rats was fed with a normal diet was compared to a second one fed with microcrystalline cellulose. The general conclusion is that cellulose addition to the normal diet has no effects on body weight (sometimes just a little weight gain for male rats in some studies), food consumption."

As taken from WHO Food Additives Series 40 available at http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

5.3. Reproduction toxicity

"Groups of eight male and 16 female rats were used to produce P, F1a, F1b, F2 and F3 generations after having been fed on diets containing 30% crystalline cellulose flour or gel or ordinary cellulose as a control. The presence in the diet of such an amount of non-nutritious material, which contributed no calories, had an adverse effect on reproduction. Fertility and numbers of live pups were relatively depressed, and lactation performances in all three generations, as well as survival and the physical condition of the pups, were unsatisfactory throughout the study. The new-born pups appeared smaller, weak and showed evidence of disturbed motor coordination. Liver weights were increased in the group receiving microcrystalline cellulose gel in all generations but other organ weights showed no consistent patterns. […]"

"Seventy-two rats (Sprague-Dawley CD) divided into eight groups were fed a mixture of four types of Elceme in the ratio of 1:1:1:1 in the diet at a level of 0, 2.5, 5 or 10% for 10 days, between days 6 and 15 of pregnancy. Rats of four test groups were killed on day 21 of pregnancy and the following parameters studied: number of fetuses and resorption sites, litter size and average weight of rats, average weight of fetuses and average backbone length. Fetuses were also examined for soft tissue or skeletal defects. The remaining groups were allowed to bear young, which were maintained to weaning (21 days). The following parameters were studied: litter size, weight of pups at days 7 and 21, and there was a histological study of the offspring. Although there is some suggestion that administration of dietary Elceme resulted in a dose-dependent increase in resorption sites, as well as a change in sex ratio, and possible defects such as opaque crystalline

lenses, the data has not been presented in a manner that permits a meaningful interpretation. However, the author concluded that Elceme is non-teratogenic."

"Groups of 25 presumed pregnant Crl:CD(R) BR VAF/Plus rats were administered 0 (control), 25 000 or 50 000 mg Avicel RCN-15/kg diet (equal to 2.1 and 4.5 g/kg bw per day, respectively) ad libitum on days 6 to 15 of gestation. Animals received basal diet at all other times. In the group receiving 50 000 mg/kg the food consumption on days 6 to 15 was significantly higher than that of controls, probably because of the increased fibre content. On day 20 of gestation the dams were killed by carbon dioxide inhalation and the following parameters studied: number and distribution of implantation sites, early and late resorptions, live and dead fetuses and corpora lutea. External, visceral and skeletal examinations of the fetuses were also performed. There was no evidence of any adverse effects of the test material on either the dams or the fetuses."

"[…] The parameters studied and examinations performed were the same as in the study of Freeman (1992b). There was no evidence of any effects of the Avicel treatment on the fetuses, and there was no evidence of a change of sex ratio in the pups or of eye defects. Under the conditions of the study, the maternal and fetal NOEL was > 50 000 mg/kg diet (equal to 4.6 g/kg bw per day)."

"At autopsy female rats of all generations showed kidney changes comprising pitting, occasional enlargement and zonation of the cortex. Other organs showed no consistent changes. No teratological deformities were seen."

As taken from WHO Food Additives Series 40 available at http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

"No adverse effects were found on reproduction or neonate development in rats and mice. Therefore, no adverse health effects in humans are expected from exposure to purified cellulose." As taken from Anderson RL et al. Cancer Lett., 1992, Apr 15, 63(2):83-92 available at http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1562993&query_hl=30&itool=pubmed_docsum

5.4. Mutagenicity

"Various microcrystalline cellulose preparations have been tested for genotoxicity in several different assay systems. The results, all of which were negative" As taken from WHO Food Additives Series 40 available at http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

5.5. Cytotoxicity

"Cytotoxicity and CYP1A induction properties of celluloses and wood chips were studied with a teleost liver cell line, PLHC-1. Cells were exposed to acetone extracts of celluloses produced using new bleaching techniques (elemental chlorine free, ECF; totally chlorine free, TCF) in two sulphate

mills or without any bleaching (unbleached, UB) in a sulphite mill. In another set of exposures, celluloses (ECF and TCF bleached) and wood chips (from pine and birch) were collected from a sulphate mill, extracted with acetone, and the extracts used to treat the cells. After exposure, O-deethylation of 7-ethoxyresorufin (EROD, a measure of cytochrome P4501A (CYP1A) catalytic activity), and total protein content, a measure of cytotoxicity, were assayed. The presence of the CYP1A protein in the exposed cells was assessed by immunoblotting. The cellulose and wood chip extracts were able to cause both cytotoxicity and EROD induction in the PLHC-1 cells. In the exposures conducted with the material from three different mills, the celluloses made of birch were more cytotoxic and more potent inducers of EROD activity than were the celluloses of pine. Further, UB celluloses increased EROD activity and caused cytotoxicity at lower doses than material bleached with modern bleaching techniques. In the exposures made with material from one single mill, there were no clear trends between the celluloses made of pine or birch. Wood chips of pine, however, were more cytotoxic than wood chips of birch. Especially with pine wood chips, cytotoxicity interfered with the induction of EROD activity, thus complicating the evaluation of CYP1A induction. CYP1A protein content was not detected in cells exposed to extracts of celluloses or wood chips, possibly due to low amounts of protein available for the assay. Wood and pulp processing, like bleaching, may change the chemical composition of the raw material in a way that reduces the potency for biological effects of the final product, cellulose. This could explain why both UB celluloses and wood chips were more potent in the cells than ECF or TCF bleached celluloses. In this study the PLHC-1 cell line showed its potential for use in evaluating the biological activity existing in pulp and paper mill products and raw materials. The identity and source of the compounds that were able to affect the PLHC-1 cell line remain to be determined" (Huuskonen et al., 1998).

5.6. Carcinogenicity

"The effect of artifical diets containing varied concentrations of either wheat bran or pure cellulose fibre on the induction of mammary tumours by N-nitrosomethylurea (i.v., 40 mg/kg) was studied in female F344 rats. The wheat bran diet appeared to possess anti-promotion properties that pure cellulose lacked. The concentrations of serum estrogens, urinary estrogens and faecal estrogens did not vary in a consistent, statistically significant manner."

"The effect of a high-fibre diet containing 45 000 mg/kg Avicel PH-105 on the development of colon tumours was investigated in male Wistar rats that were injected with 1,2-dimethylhydrazine dihydrochloride (25 mg/kg, s.c., once weekly for 16 weeks). The test and control diets were administered for 2 weeks prior to the first injection of the carcinogen. There was a reduction in the number of animals bearing colon tumours and a statistically significant reduction in the number of colon tumours/rat in the high-fibre dietary group. However, for small bowel tumours and tumours of the ear canal there was no significant difference between the dietary groups."

"Similarly, microcrystalline cellulose has been associated with the formation of granulomas in human lung when it has been injected intravenously during drug abuse. No such lesions have been described as a consequence of oral ingestion of microcrystalline cellulose by rats or humans."

As taken from WHO Food Additives Series 40 available at http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

“Most of the available cohort and case-control studies of cancer of the nasal cavities and paranasal sinuses have shown increased risks associated with exposure to wood dust. Very high relative risks for adenocarcinoma at this site, associated with exposure to wood dust, have been observed in many countries.”
Record for cellulose (CAS RN 9004-34-6):

Species:	RAT
Strain/Sex:	F344/FEMALE
Route:	SUBCUTANEOUS IMPLANT
Dose:	10 X 20 X 0.3 MM SHEETS IMPLANTED INTO 2 SITES IN LATERAL ABDOMINAL REGION AND 1 SITE ON THE BACK (STUDY DURATION: 741 D)
Results:	NEGATIVE
Reference:	[HATANAKA,S, ONEDA,S, OKAZAKI,K, SHONG,L, YOSHIDA,A, ISAKA,H AND YOSHIDA,H; INDUCTION OF MALIGNANT FIBROUS HISTIOCYTOMA IN FEMALE FISHER RATS BY IMPLANTATION OF CYANOACRYLATE, ZIRCONIA, POLYVINYL CHLORIDE OR SILICONE; IN VIVO 7(2):111-115, 1993]

Tumor Inhibition Studies:

Species:	RAT
Number of Animals Tested:	(30,28)/(20,19)
Strain/Sex:	SPRAGUE-DAWLEY/MALE
Dose (Inhibitor):	0; 1.5% IN DIET FOR 14 WK BEGINNING 3 D PRIOR TO CARCINOGEN TREATMENT (STUDY DURATION: 26 WK)
Route (Inhibitor):	ORAL
Carcinogen:	1,2-DIMETHYLHYDRAZINE ; 540-73-8
Route (Carcinogen):	SUBCUTANEOUS
Dose (Carcinogen):	20 MG/KG BW 1/WK FOR 12 WK
Promoter:	NONE USED
Target Tissue: Type of Lesion:	INTESTINE: CARCINOMA

Endpoint (Incidence):	23/28 (82%), 14/19 (74%), 10%, NOT SIGNIFICANT
Endpoint (Multiplicity):	1.1, 1.6, -45%, NOT SIGNIFICANT
Comments:	DIFFERENCES IN BODY WEIGHTS BETWEEN GROUPS WERE NOT SIGNIFICANT.
Reference:	[YAMAMOTO,I, MARUYAMA,H AND MORIGUCHI,M; EFFECT OF B-CAROTENE, SODIUM ASCORBATE AND CELLULOSE ON 1,2-DIMETHYLHYDRAZINE-INDUCED INTESTINAL CARCINOGENESIS IN RATS; CANCER LETT. 86(1):5-9, 1994]

As taken from CCRIS, 1996

5.7. Irritation/immunotoxicity

No data available to us at this time.

5.8. All other relevant types of toxicity

“Intravenous abuse of drugs available in tablet form has led to the detection of excipients, e.g., talc, magnesium stearate or microcrystalline cellulose, in the tissues of a series of 33 fatality cases of intravenous drug addicts. Microcrystalline cellulose (21 cases) and talc (31 cases) were detected most frequently and, in some cases, were associated with granulomatous lesions.”

“A double-blind cross-over trial of the effects of guar gum and microcrystalline cellulose on metabolic control and serum lipids in 22 Type 2 diabetic patients has been carried out. The fibre preparations were given at 15 g/day for a 2-week period and then at 5 g/day for the remaining 10-week period of each treatment phase. There was no effect of the microcrystalline cellulose diet on fasting blood glucose level, glycosylated haemoglobin, serum HDL-cholesterol, serum triglycerides, serum zinc or ferritin, or urinary magnesium excretion.”

“The effect of various dietary fibres, including microcrystalline cellulose (40 g), on the uptake of vitamin A (approximately sixty times the daily requirement) from a test meal was investigated in 11 female subjects aged 19 to 22. All the dietary fibres significantly increased the absorption of the vitamin A over a period of 9 hours.”

“A study of apparent mineral balance in a group of eleven men revealed that there was no significant effect of cellulose, added to the diet at 7.5 g per 1000 kcal for 4 weeks, on the mineral balance of calcium, magnesium, manganese, iron, copper or zinc. However, in this report the source of the cellulose fibre was not specified.”

“The addition of nutritional grade cellulose (21 g) to the daily diet of healthy adolescent girls resulted in reduction of the serum calcium, phosphorus and iron concentrations. The authors suggested that high-fibre diets may not be advisable.”

As taken from WHO Food Additives Series 40 available at

http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

The EFSA Panel on Food Contact Materials, Enzymes and Processing Aids assessed the safety of the substance bleached cellulose pulp, consisting of cellulose fibres (70–92%) and hemicellulose (8–30%) obtained from pine and spruce wood. The substance is intended to be used in polyethylene and polypropylene food contact materials. The final articles are intended to be used for all food types and for long-term storage at room temperature, with or without a short time at higher temperature, including hot-fill. Low-density polyethylene samples containing of the substance were subjected to a broad set of migration tests with food simulants and extraction tests with dichloromethane. The limits of detection ranged from (when specified). The Panel noted that they do not ensure the detection of genotoxic substances at a concentration leading to a human exposure above the Threshold of Toxicological Concern. Moreover, not all possibly migrating substances were identified or amenable to the analytical methods applied. No toxicological data were provided for the substance itself, as its migration into food is not expected. The safety of the potentially migrating substances of low molecular mass detected was addressed individually and was considered adequate. However, the Panel considered this approach insufficient owing to a substantial fraction of unidentified components. The Panel concluded that the information provided by the applicant does not allow the safety assessment of the substances below 1,000 Da from bleached cellulose pulp from pine and spruce wood used in plastic food contact materials potentially migrating into food. Therefore, the Panel could not conclude on the safety of the use of bleached cellulose pulp from pine and spruce wood as a plastic additive.

6. Functional effects on

6.1. Broncho/pulmonary system

“An acute inhalation toxicity study using a preparation of Avicel AC-815 (composed of 85% microcrystalline cellulose and 15% calcium alginate) with mass median aerodynamic diameter of 8.48-8.61 µm (range of measures) was dispersed and delivered at a mean concentration of 5.35 mg/litre in a nose-only inhalation exposure chamber to 5 male and 5 female Crl:CDBR VAF Plus rats for a period of 4 hours. The rats were observed over the 14 days after removal from the chamber. The only signs of toxicity were on removal from the chamber and consisted of chromodacryorrhea, chromorhinorrhea and, in one male rat, decreased locomotion; these signs had resolved by the next day. After 14 days no gross lesions were observed at necropsy.”

“[…] microcrystalline cellulose has been associated with the formation of granulomas in human lung when it has been injected intravenously during drug abuse. No such lesions have been described as a consequence of oral ingestion of microcrystalline cellulose by rats or humans […].”

“In one case intravenous abuse of the drug pentazocine, possibly for longer than six months, led to a fatal pulmonary granulomatosis.”

As taken from WHO Food Additives Series 40 available at http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

“The lung-damaging effect of intratracheally administered cellulose was studied by biochemical and histological methods. Cell count, protein, phospholipid, lactate dehydrogenase and acid phosphatase were determined in bronchoalveolar lavage fluid 1, 3 and 7 days after intratracheal instillation. Histological tests were performed after days 1, 3 and 30. In vitro, cellulose did not damage the macrophage cells. In vivo, interstitial oedema as well as the initial signs of inflammation could be detected in the lung after the first day. Inflammation after 1 week could be noted, partly interstitial and partly intra-alveolar and intrabronchial. In the bronchoalveolar lavage fluid, protein, lactate dehydrogenase, acid phosphatase, phospholipid and cell count were enhanced after days 1 and 3. After 1 month, the developing bronchioalveolitis is fibrous in character. Contrary to the in vivo study, cellulose did not damage rat peritoneal macrophages.” As taken from Adamis Z et al. J Appl Toxicol. 1997 Mar-Apr;17(2):137-41. PubMed available at http://www.ncbi.nlm.nih.gov/pubmed/9183058

6.2. Cardiovascular system

No data available at this time.

6.3. Nervous system

No data available at this time.

6.4. Other organ systems, dependent on the properties of the substance

“A number of clinical studies using refined cellulose as roughage in the human diet for the treatment of constipation showed no deleterious effects. Groups of 18 children received regular amounts of edible cellulose instead of normal cereal for three months. The only effect noted was an increase in bowel movements but no diarrhoea or other gastrointestinal disturbances were seen.” As taken from WHO Food Additives Series 40 available at http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

“Eight male and eight female volunteers supplemented their normal diet with 30 g microcrystalline cellulose per day as either dry powder or gel (15% aqueous) for 6 weeks followed by 2 weeks

without supplementation. No adverse findings were reported regarding acceptance or body weight but most subjects complained of fullness and mild constipation. Haematology was normal in all subjects. Biochemical blood values showed no differences between treatment and control periods, nor was there evidence of liver or kidney function disturbance. Urinalysis produced normal findings. The faecal flora remained unchanged. The cellulose content of faeces increases five to eight times during the test period. Microscopy revealed the presence of microcrystalline cellulose."

As taken from WHO Food Additives Series 40 available at http://www.inchem.org/documents/jecfa/jecmono/v040je03.htm

7. Addiction

JTI is not aware of any information that demonstrates that this ingredient has any addictive effect.

8. Burnt ingredient toxicity

This ingredient was considered as part of an overall safety assessment of ingredients added to tobacco in the manufacture of cigarettes. An expert panel of toxicologists reviewed the open literature and internal toxicology data of 5 tobacco companies to evaluate a composite list of ingredients used in the manufacture of cigarettes. The conclusion of this report was that these ingredients did not increase the inherent biological activity of tobacco cigarettes, and are considered to be acceptable under conditions of intended use (Doull et al., 1994 & 1998).

Tobacco smoke condensates from cigarettes containing cellulose and an additive free, reference cigarettes were tested in a battery of in vitro and/or in vivo test(s). Within the sensitivity and specificity of the bioassay(s) the activity of the condensate was not changed by the addition of cellulose. Table below provides tested level(s) and specific endpoint(s).

Endpoint	Tested level (ppm)	Reference
Smoke chemistry	9,625	Baker et al., 2004a
	50547	JTI NTM Study Report
In vitro genotoxicity	28,400	Baker et al., 2004c
	50547	JTI NTM Study Report
In vitro cytotoxicity	28,400	Baker et al., 2004c
	50547	JTI NTM Study Report
Inhalation study	28,400	Baker et al., 2004c

In comparison with a CSC of a reference cigarette with sideseam adhesives/cigarette paper corresponding to representative specifications for the majority of commercial cigarettes no differences were observed either in the bacterial mutagenicity, cytotoxicity or mammalian cell genotoxicity of the smoke condensate prepared from cigarettes with sideseam adhesives/cigarette paper containing Pulp, Cellulose at 27.2238 mg/cig. The smoke chemistry data between test and reference cigarette revealed small changes towards both higher and lower yields per cigarette over all analytical groups. These differences were well within the variability of the analytical methods (JTI NTM Study Report(s)).

Transfer studies:

"For cellulose in cigarette paper, transfer rates to TPM and gas phase were 9.7% and 20.4% respectively" (Jenkins et al 1980).

Cellulose applied to tobacco blend increased TPM yield and gas phase levels of furan, 2-methylfuran, dimethylfuran, furfuryl alcohol, furfural, 5-methylfurfural, acetaldehyde, propionaldehyde, isobutyraldehyde, crotonaldehyde, acrolein, 2-butanone, 3-butene-2-one, pentadiene and methyl acetate (Wakeham & Silberman 1966). A casing containing cellulose, glycerol and invert sugar, added to cigarettes made from tobacco sheet, reduced smoke yields of tar, water, nicotine, phenol, acetaldehyde, acrolein, isoprene, hydrogen cyanide, formaldehyde, carbon monoxide, carbon dioxide and catechol. Isoprene, nitrogen oxide, benzo(a)pyrene, indole and neophytadiene yields increased. Adding cellulose (10%) to cigarettes, did not affect the cytotoxicity or tumourigenicity of smoke condensate, or the ciliatoxicity of smoke (NCI Report No 4 1980). Tobacco sheets containing cellulose and other ingredients, reduced cigarette smoke yields of tar, nicotine, carbon monoxide, phenol, polyaromatic hydrocarbons and carbonyl compounds (Prouse et al 1977; Briskin 1979; Eicher & Muller 1985). Benzo(a)pyrene yield increased (Dontenwill et al 1976). Adding cellulose to reconstituted tobacco sheet did not increase cigarette smoke condensate bacterial mutagenicity (Burke 1979).

9. Heated/vapor emissions toxicity

Aerosol from heated tobacco stick(s) containing Cellulose was tested in aerosol chemistry and a battery of in vitro test(s). Under the test conditions and within the sensitivity and specificity of the bioassay(s), the activity of the total particulate matter (TPM) and/or gas vapor phase (GVP) were not increased by the addition of this ingredient when compared to TPM and/or GVP from reference combustible cigarettes. The table below provides the highest tested level(s) and specific endpoint(s):

Endpoint	Tested level (mg/stick)	Reference
Aerosol chemistry	103.5	Labstat International Inc. (2020a) Labstat International Inc. (2021a)
In vitro genotoxicity	103.5	Labstat International Inc. (2020b) Labstat International Inc. (2021b)
In vitro cytotoxicity	103.5	Labstat International Inc. (2020b) Labstat International Inc. (2021b)

10. Ecotoxicity

10.1. Environmental fate

The Ecological Categorization Results from the Canadian Domestic Substances List simply state that pulp, cellulose (CAS RN 65996-61-4) is of uncertain persistence in the environment.

Data accessed March 2017 on the OECD website: http://webnet.oecd.org/CCRWeb/Search.aspx

10.2. Aquatic toxicity

The Ecological Categorization Results from the Canadian Domestic Substances List simply state that pulp, cellulose (CAS RN 65996-61-4) is not inherently toxic to aquatic organisms and is of low ecotoxicological concern.

Data accessed March 2017 on the OECD website: http://webnet.oecd.org/CCRWeb/Search.aspx

10.3. Sediment toxicity

No data available at this time.

10.4. Terrestrial toxicity

No data available at this time.

10.5. All other relevant types of ecotoxicity

The Ecological Categorization Results from the Canadian Domestic Substances List simply state that pulp, cellulose (CAS RN 65996-61-4) is of uncertain bioaccumulative potential in the environment.

Data accessed March 2017 on the OECD website: http://webnet.oecd.org/CCRWeb/Search.aspx

Pulp, cellulose is a “substance that is derived from natural products or materials, and which is not bioaccumulative or toxic. The natural decay and/or breakdown of this substance is unlikely to cause harm in the environment.”

As taken from NICNAS, 2017

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13. Last audited

June 2023

I U C L I D

D a t a s e t

Existing Chemical	Substance ID: 65996-61-4
CAS No.	65996-61-4
EINECS Name	Pulp, cellulose
EINECS No.	265-995-8
Molecular Formula	(C6H10O5)n

Dataset created by: EUROPEAN COMMISSION – European Chemicals Bureau

This dossier is a compilation based on data reported by the European Chemicals Industry following 'Council Regulation (EEC) No. 793/93 on the Evaluation and Control of the Risks of Existing Substances'. All (non-confidential) information from the single datasets, submitted in the IUCLID/HEDSET format by individual companies, was integrated to create this document.

The data have not undergone any evaluation by the European Commission.

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1.0.2 Location of Production Site

–

1.0.3 Identity of Recipients

–

1.1 General Substance Information

Substance type: natural substance
Physical status: solid

Substance type: organic
Physical status: solid

1.1.1 Spectra

–

1.2 Synonyms

Linters cellulose, poly–ß–1.4–D–glucosane, cotton linters pulp.
Source: BUCKEYE CELLULOSE GMBH Glückstadt

Pasta Dissolving, Pasta Alfa
Source: UCB Films La Cellophane Española, S.A. Burgos

Zellstoff, Papierzellstoff
Source: Hannover Papier Alfeld
Nordland Papier AG Dörpen
Stora Spezialpapiere GmbH Flensburg
SCHWÄBISCHE ZELLSTOFF AG Ehingen

1.3 Impurities

–

1.4 Additives

-

1.5 Quantity

Quantity more than 1 000 000 tonnes

1.6.1 Labelling

-

1.6.2 Classification

-

1.7 Use Pattern

Type: type
Category: Use in closed system

Type: type
Category: Use resulting in inclusion into or onto matrix

Type: industrial
Category: Basic industry: basic chemicals

Type: industrial
Category: Chemical industry: used in synthesis

Type: industrial
Category: Paper, pulp and board industry

Type: use
Category: Intermediates

Type: use
Category: other

1.7.1 Technology Production/Use

-

1.8 Occupational Exposure Limit Values

Type of limit: MAK (DE)
Limit value: 6 mg/m3
Remark: The MAK-value cited above refers to dust in general and not concretely to clp dust (see TRGS 900).
Source: BUCKEYE CELLULOSE GMBH Glückstadt

Type of limit: TLV (US)
Limit value: 10 mg/m3
Source: UCB Films La Cellophane Española, S.A. Burgos

Type of limit:
Limit value:
Source: Hannover Papier Alfeld

1.9 Source of Exposure

Source: UCB Films La Cellophane Española, S.A. Burgos

Remark: Aus Zellstoff wird überwiegend Papier hergestellt, welches überall und zu allen möglichen Zwecken, bis hin zur Lebensmittelverpackung, verwendet wird. Mensch und Umwelt sind also praktisch unbegrenzt exponiert.
Source: Hannover Papier Alfeld

Remark: Aus Zellstoff wird ueberwiegend Papier hergestellt, welches ueberall und zu allen moeglichen Zwecken, bis hin zur Lebensmittelverpackung, verwendet wird. Mensch und Umwelt sind also praktisch unbegrenzt exponiert.
Source: Stora Spezialpapiere GmbH Flensburg

Remark: Aus Zellstoff wird überwiegend Papier hergestellt, welches überall und zu allen möglichen Zwecken, bis hin zur Lebens-mittelverpackung, verwendet wird. Zellstoff ist in weiter-verarbeiteter Form als Verbrauchsgut sehr verbreitet.
Source: SCHWÄBISCHE ZELLSTOFF AG Ehingen

Remark: Source of exposure is every mechanical desintegration of thefibrous material regardless its form produced (bulk or sheet).
As a respiratory protective equipment in dusty areas it is recommended to wear a dust protection mask (filter P1).
Source: BUCKEYE CELLULOSE GMBH Glückstadt

1.10.1 Recommendations/Precautionary Measures

-

1.10.2 Emergency Measures

-

1.11 Packaging

-

1.12 Possib. of Rendering Subst. Harmless

-

1.13 Statements Concerning Waste

-

1.14.1 Water Pollution

-

1.14.2 Major Accident Hazards

-

1.14.3 Air Pollution

-

1.15 Additional Remarks

Remark: Zellstoff wird bei Hannover Papier integriert weiterverarbeitet zu Papier. Andere Hersteller trocknen den Zellstoff und versenden ihn mit ca. 90 % Trockenanteil (Rest Wasser). Hannover Papier kauft große Mengen solchen fremd hergestellten Zellstoffs über Händler und Importeure ein und erzeugt daraus Papier. Der Transport erfolgt mit allen möglichen Transportmitteln (Schiff, Bahn, Auto/LKW) als normales Frachtgut ohne jede Einschränkung. Neben der weit verbreiteten Wiederverwendung zur erneuten Papierherstellung kann Papier über alle denkbaren Wege gefahrlos entsorgt werden, z. B. Verbrennung, Deponierung, Kompostierung.
Source: Hannover Papier Alfeld

Remark: Es handelt sich bei dem importierten Zellstoff um Sulfatzellstoff, während es sich bei dem des vorgenannten Herstellers um Sulfitzellstoff handelt. Da es sich bei den genannten Stoffen nur um unterschiedliche Aufschlußmethoden handelt, sind die chemischen und physikalischen Eigenschaften des Produktes (Zellstoff) vergleichbar. Der vollständige Datensatz des genannten Herstellers kann deswegen auch für die Importe verwendet werden.
Source: Stora Reisholz GmbH Düsseldorf

Remark: siehe Meldung Hannoversche Papierfabriken
Source: Nordland Papier AG Dörpen

Remark: Der Zellstoff wird bei Stora Spezialpapiere GmbH zu Papier weiterverarbeitet. Der Transport erfolgt mit allen moeglichen Transportmitteln (Schiff, Bahn, LKW) als normales Frachtgut ohne jede Einschraenkung. Neben der weitverbreiteten Wiederverwendung zur erneuten Papierherstellung kann Papier ueber alle denkbaren Wege gefahrlos entsorgt werden, z.B. durch Verbrennung, Deponierung oder Kompostierung.
Source: Stora Spezialpapiere GmbH Flensburg

Remark: Der bei SCHWABEN ZELL erzeugte Zellstoff wird zu ca. 70 – 75 % integriert zu Papier weiterverarbeitet. 25 – 30 % der Zellstoffproduktion werden für den Markt getrocknet und mit einem Trockenanteil von 83 – 90 % (Rest Wasser) an Weiterverarbeiter geliefert. SCHWABEN ZELL kauft auch fremd hergestellten Zellstoff über Händler und Importeure ein und erzeugt daraus Papier. Der Transport erfolgt mit allen möglichen Transportmitteln (Schiff, Bahn, Auto/LKW) als normales Frachtgut ohne jede Einschränkung. Neben der weit verbreiteten Wiederverwendung zur erneuten Papierherstellung kann Papier über alle denkbaren Wege gefahrlos entsorgt werden, z.B. Verbrennung, Deponierung, Kompostierung.
Source: SCHWÄBISCHE ZELLSTOFF AG Ehingen

Source: SCHWÄBISCHE ZELLSTOFF AG Ehingen

Remark: Linters cellulose is a polymeric natural substance. Since natural polymers should not be listed in EINECS only chapter 1 of this HEDSET questionnaire will be completed.
Source: BUCKEYE CELLULOSE GMBH Glückstadt

1.16 Last Literature Search

–

1.17 Reviews

–

1.18 Listings e.g. Chemical Inventories

–

2.1 Melting Point
-

2.2 Boiling Point
-

2.3 Density
-

2.3.1 Granulometry
-

2.4 Vapour Pressure
-

2.5 Partition Coefficient
-

2.6.1 Water Solubility
-

2.6.2 Surface Tension
-

2.7 Flash Point
-

2.8 Auto Flammability
-

2.9 Flammability
-

2.10 Explosive Properties
-

2.11 Oxidizing Properties
-

2.12 Additional Remarks

Remark: Cellulose is a natural occuring polymer.
Polymers should not have been included in EINECS, therefore only chapter 1 of the Hedset dossier will be submitted.

Source: Wolff Walsrode AG Walsrode

3.1.1 Photodegradation

–

3.1.2 Stability in Water

–

3.1.3 Stability in Soil

–

3.2 Monitoring Data (Environment)

–

3.3.1 Transport between Environmental Compartments

–

3.3.2 Distribution

–

3.4 Mode of Degradation in Actual Use

–

3.5 Biodegradation

–

3.6 BOD5, COD or BOD5/COD Ratio

–

3.7 Bioaccumulation

–

3.8 Additional Remarks

Remark: Cellulose is a natural occuring polymer.
Polymers should not have been included in EINECS, therefore only chapter 1 of the Hedset dossier will be submitted.
Source: Wolff Walsrode AG Walsrode

AQUATIC ORGANISMS

4.1 Acute/Prolonged Toxicity to Fish

–

4.2 Acute Toxicity to Aquatic Invertebrates

–

4.3 Toxicity to Aquatic Plants e.g. Algae

–

4.4 Toxicity to Microorganisms e.g. Bacteria

–

4.5 Chronic Toxicity to Aquatic Organisms

4.5.1 Chronic Toxicity to Fish

–

4.5.2 Chronic Toxicity to Aquatic Invertebrates

–

TERRESTRIAL ORGANISMS

4.6.1 Toxicity to Soil Dwelling Organisms

–

4.6.2 Toxicity to Terrestrial Plants

–

4.6.3 Toxicity to other Non–Mamm. Terrestrial Species

–

4.7 Biological Effects Monitoring

–

4.8 Biotransformation and Kinetics

–

4.9 Additional Remarks

Remark: Cellulose is a natural occuring polymer.
Polymers should not have been included in EINECS, therefore only chapter 1 of the Hedset dossier will be submitted.
Source: Wolff Walsrode AG Walsrode

5.1 Acute Toxicity

5.1.1 Acute Oral Toxicity
-

5.1.2 Acute Inhalation Toxicity
-

5.1.3 Acute Dermal Toxicity
-

5.1.4 Acute Toxicity, other Routes
-

5.2 Corrosiveness and Irritation

5.2.1 Skin Irritation
-

5.2.2 Eye Irritation
-

5.3 Sensitization
-

5.4 Repeated Dose Toxicity
-

5.5 Genetic Toxicity 'in Vitro'
-

5.6 Genetic Toxicity 'in Vivo'
-

5.7 Carcinogenicity
-

5.8 Toxicity to Reproduction
-

5.9 Developmental Toxicity/Teratogenicity
-

5.10 Other Relevant Information

Type:
Remark: Cellulose is a natural occuring polymer.
Polymers should not have been included in EINECS, therefore only chapter 1 of the Hedset dossier will be submitted.
Source: Wolff Walsrode AG Walsrode

5.11 Experience with Human Exposure

-

7.1 Risk Assessment

-

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

1.1 Product identifiers

Product name : Northern Softwood Bleached Kraft Pulp

Product Number : NIST8495
Brand : Sigma-Aldrich
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 65996-61-4

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

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Merck Life Science UK Limited
New Road
The Old Brickyard
GILLINGHAM
Dorset
SP8 4XT
UNITED KINGDOM

Telephone : +44 (0)1747 833-000
Fax : +44 (0)1747 833-313
E-mail address : TechnicalService@merckgroup.com

1.4 Emergency telephone

Emergency Phone # : +44 (0)870 8200418 (CHEMTREC)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.2 Label elements

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : (C6H10O5)x
CAS-No. : 65996-61-4

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

none

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
No special precautionary measures necessary.

6.3 Methods and materials for containment and cleaning up
Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

Storage stability
Recommended storage temperature
15 - 25 °C

Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact

Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Respiratory protection
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.
Recommended Filter type: Filter type P1

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Control of environmental exposure
No special precautionary measures necessary.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	No data available

o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	Viscosity, kinematic: No data available Viscosity, dynamic: No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
no information available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Endocrine disrupting properties

Product:

Assessment	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties
Product:

Assessment	:	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission

Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Notice Directive on waste 2008/98/EC. Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

Further information

Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

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

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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