Now 9
Syn 5

Allowed

# NOSB NATIONAL LIST
# FILE CHECKLIST

## PROCESSING

**MATERIAL NAME:** Carrageenan

**CATEGORY:** Non-agricultural **Complete?:** 3/16

✓ **NOSB Database Form**

✓ **References**

**MSDS (or equivalent)**

✓ **FASP (FDA)**

✓ **Date file mailed out:** 1/8/95

✓ **TAP Reviews from:** Steve Taylor
Steven Harper
Richard Theuer

✓ **Supplemental Information:**
Industry information from unknown source

**MISSING INFORMATION:** no MSDS available.

# NOSB/NATIONAL LIST COMMENT FORM/BALLOT

**Use this page to write down comments and questions regarding the data presented in the file of this National List material. Also record your planned opinion/vote to save time at the meeting on the National List.**

**Name of Material** Carrageenan

**Type of Use:** ____ **Crops;** ____ **Livestock;** ✓ **Processing**

**TAP Review by:**

1. Steve Harper
2. Steve Taylor
3. Richard Theuer

**Comments/Questions:**

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**My Opinion/Vote is:**

**Signature** _____ **Date** _____

# USDA/TAP REVIEWER COMMENT FORM

**Use this page or an equivalent to write down comments and summarize your evaluation regarding the data presented in the file of this potential National List material. Attach additional sheets if you wish.**

**This file is due back to us within 30 days of:** Jan 7

**Name of Material:** Carrageenan

**Reviewer Name:** Steven Harper

**Is this substance Natural or Synthetic? Explain (if appropriate)**

Natural.

**Please comment on the accuracy of the information in the file:**

Good.

**This material should be added to the National List as:**

____ **Synthetic Allowed** ____ **Prohibited Natural**

**or,** __x__ **This material does not belong on the National List because:** Carrageenan is a naturally derived substance.

**Are there any restrictions or limitations that should be placed on this material by use or application on the National List?**

Because some carrageenan is processed by drum drying and may contain polysorbate 80, attempts should be made by processors to use carrageenan processed in other ways.

**Any additional comments or references?**

Because carrageenan is purified using isopropyl alcohol, there may be traces of isopropyl alcohol remaining in the carrageenan.

**Signature** Steven Harper **Date** 3/10/95

# USDA/TAP REVIEWER COMMENT FORM

**Use this page or an equivalent to write down comments and summarize your evaluation regarding the data presented in the file of this potential National List material. Attach additional sheets if you wish.**

**This file is due back to us within 30 days of:** Jan 7

**Name of Material:** Carrageenan

**Reviewer Name:** Steve Taylor

**Is this substance Natural or Synthetic? Explain (if appropriate)**

Natural

**Please comment on the accuracy of the information in the file:**

**This material should be added to the National List as:**

____ **Synthetic Allowed** ____ **Prohibited Natural**

**or,** ____ **This material does not belong on the National List because:**

**Are there any restrictions or limitations that should be placed on this material by use or application on the National List?**

Methods of extraction and refinement must be monitored. "Natural Grade" materials is less refined but sometimes residues

**Any additional comments or references?** of epichlorohydrin have been found in "Natural Grade" from use of chlorinated materials as antimicrobials.

**Signature** Steve Taylor **Date** 3-5-95

3.

# USDA/TAP REVIEWER COMMENT FORM

Original mailing date: 6 Feb 1995.

Material: Carrageenan
Reviewer: Richard C. Theuer

**NATURAL** Carrageenan is the refined hydrocolloid prepared by aqueous extraction of various types of red seaweed [21CFR172.620]. The CFR reference does not mention solvent extraction. Carrageenan has a high molecular weight and must be distinguished from lower molecular weight "degraded carrageenan" which may have adverse health effects.

COMMENTS RE SECTION 2119(m) CRITERIA:

1. Carrageenan has unique properties in stabilizing liquid milk-based products.

The following natural substances should be allowed as ingredients in organic foods. They should not be added to the National List of natural substances prohibited for use as ingredients or processing aids in Organic Food:

carrageenans that comply with 21CFR172.620.

18 Feb 1995

# NOSB Materials Database

## Identification

| | | | |
|---|---|---|---|
| **Common Name** | **Carrageenan** | **Chemical Name** | |
| **Other Names** | Irish Moss | | |
| **Code #: CAS** | 9000-07-1 | **Code #: Other** | |
| **N. L. Category** | Non-agricultural | **MSDS** | O yes O no |

## Chemistry

| | |
|---|---|
| **Family** | |
| **Composition** | Hydrocolloid consisting mainly of the potassium, sodium, magnesium, calcium, and ammonium sulfate esters of galactose and 3,6-anhydrogalactose copolymers. |
| **Properties** | Yellowish tan to white, fine or coarse powder that is practically odorless and has a mucilagenous taste. Soluble in water but disperses more readily if first moistened with alcohol, glycerin or saturated solution of sucrose. |
| **How Made** | Extraction by water or aqueous alkali from certain members of the class Rhodophyceae (red seaweeds). Carrageenan is recovered by alcohol precipitation, by drum drying, or by freezing. It contains inorganic salts that originate from the seaweed. There may be residues of polysorbate 80 from drum drying and isopropyl alcohol from precipitation. "Natural grade" material may have epichlorohydrin residues from the use of chlorinated materials as anti-microbials. |

## Use/Action

| | |
|---|---|
| **Type of Use** | Processing |
| **Specific Use(s)** | Emulsifier, stabilizer, thickener, gelling agent. Especially useful for stabilizing liquid milk-based products. |
| **Action** | Interacts with kappa fraction of the milk protein casein to form gels. Prevents milk protein from separating into two layers. |
| **Combinations** | When recovered by drum roll drying, it may contain mono- & diglycerides or up to 5% polysorbate 80 used as roll stripping agents. |

## Status

| | |
|---|---|
| **OFPA** | |
| **N. L. Restriction** | |
| **EPA, FDA, etc** | FDA-GRAS |
| **Directions** | |
| **Safety Guidelines** | |
| **State Differences** | |
| **Historical status** | |
| **Internationl status** | Allowed by IFOAM. Other seaweed products, kelp and agar, are allowed by Codex and EU. |

# NOSB Materials Database

## OFPA Criteria

**2119(m)1: chemical interactions** **Not Applicable**

**2119(m)2: toxicity & persistence** **Not Applicable**

**2119(m)3: manufacture & disposal consequences**

There are no disposal problems associated with the substance itself. Manufacturing consequences are those consistent with food additive processing operations.

**2119(m)4: effect on human health**

GRAS; less refined material may contain epichlorhydrin; should specify to be free of epichlorohydrin.(ST)

**2119(m)5: agroecosystem biology** **Not Applicable**

**2119(m)6: alternatives to substance**

Alginates; agar-agar; gelatin; modified celluloses. Locust bean gum, guar gum, and xanthan gum have similar actions but there are some specific interactions which are only associated with carrageenan.

**2119(m)7: Is it compatible?**

## References

AU: Kishore,-V.; Wokocha,-B.; Fourcade,-L.
TI: Effect of nutritional copper deficiency on carageenin edema in the rat. A quantitative study.
SO: Biol-Trace-Elem-Res. Clifton, N.J. : Humana Press. Winter 1989/1990. v. 23 p. 97-107.
**CN: DNAL QP534.B56**
LA: English

AU: Weischer,-C-H
TI: Histochemical study of acid phosphomonoesterase activity during experimental inflammation of rats' paws produced by carrageenin
SO: Arch-Exp-Veterinarmed, 1975, 29 (4): 519-530. Ref. Eng. sum.
**CN: DNAL 41.8-EX7**
LA: German

# NOSB Materials Database

# Carrageenan

**Common Name:** carrageenan
**Other Names:** Irish moss
**Code #: CAS:** 9000-07-1
**N.L. Category:** not applicable
**Chemical Name:** not applicable
**Code #: Other :** unknown
**Historical:** Carrageenan has been used for over 600 years. Commercial extraction began in the 1800's.
**Organic Status:** not applicable

## Chemistry

**Composition:** sulfated polysaccharides. Carbohydrate backbone is galactose residues linked with alternating $\alpha$ (1→3) and $\beta$ (1→4) bonds. Degree of sulfation depends on the type of carrageenan. See attached.

**How is it made? (Manufactured/Extracted):** see attached. Please note that flow chart indicated that chemicals may be added when blending unstandardized carrageenan. The chemicals referred to are all food grade materials such as sodium chloride, potassium chloride, phosphate salts, and may also include other hydrocolloids. This is done to get specific functional effects, such as increased gel strength.

## Use/Action

**Type of use: Processing:** Most industrial applications of carrageenan involve elevated temperatures, such as pasteurization, baking, retorting, frying, etc. Carrageenans typically require heat for complete activation. Cold-soluble carrageenan is available for very specific uses, such as instant puddings, salad dressings, etc.

**Specific Use(s)/Food Categories:** General properties of carrageenans include gel formation, syneresis control, suspending, thickening, stabilizing, cling, emulsion stabilization. In dairy products, these properties are used in soft serve and shake mixes, hard pack frozen desserts, egg nog, coffee creamers, whipping cream, cultured products such as sour creams and yogurts, cottage cheese dressings, chocolate milk, other dairy drinks, evaporated milk, lowfat cheeses, and others. Other products where carrageenans are used are puddings, flans, water gels, fruit preparations, bakery fillings, low fat meat products, salad dressings, candy, sauces, infant formula, syrups, beverages, hot cocoa, and many others.

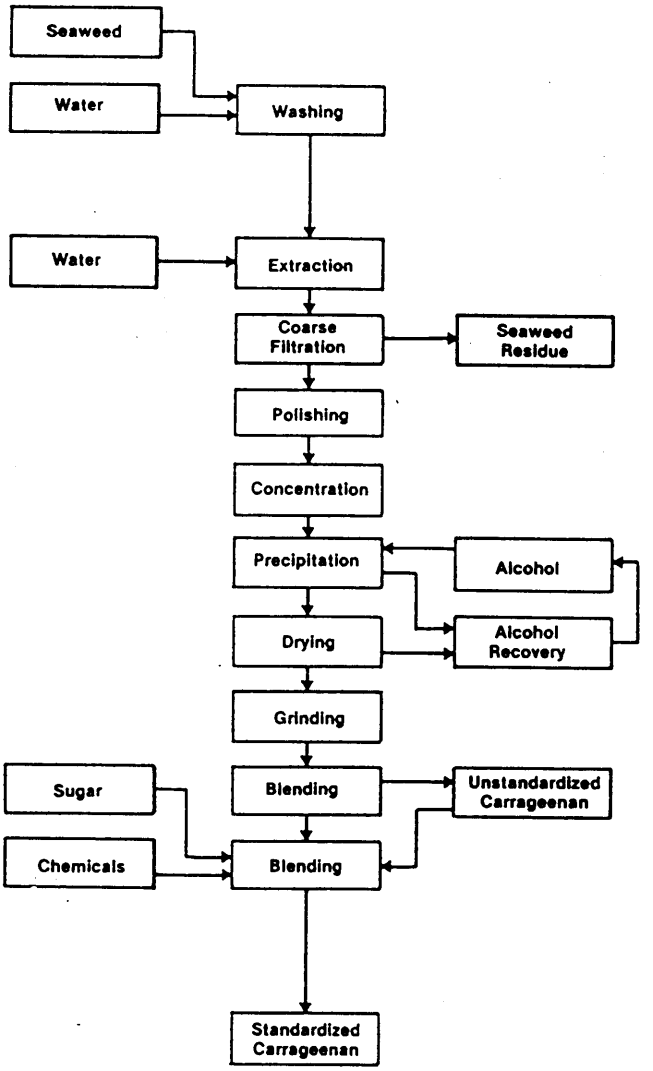
**How does it work? (Functional Effect):** The most important characteristic of carrageenan in dairy products is its interaction with the kappa fraction of the milk protein casein to form gels. ( It can also complex with divalent cations such as calcium.) These interactions prevent 'whey-off'. Whey-off is the undesirable separation of the milk protein from the serum, resulting in two layers.

## OFPA Criteria

**Are there any environmental consequences from the manufacture, use or disposal?:** none known

**Is there any cause for concern about human health effects of the substance?:** not for food grade materials.

**What are the alternatives (both natural and synthetic) to use of this material?:** Other hydrocolloids may be used, but eating properties will differ. For the prevention of whey-off in dairy products, there is not a substitute. Alginates have been used, but require special incorporation techniques.




**Carrageenan manufacturing process**

OCNUM=199

U.S. FOOD AND DRUG ADMINISTRATION
FOOD ADDITIVE SAFETY PROFILE

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CARRAGEENAN AND SALTS OF CARRAGEENAN

| | | | | |
|---|---|---|---|---|
| AS#: | 977043698 | HUMAN CONSUMPTION: | 1.4630 | MG/KG BW/DAY/PERSON |
| ASP#: | 199 | MARKET DISAPPEARANCE: | 1726350 | LBS/YR |
| YPE: | ASP | MARKET SURVEY: | 87 | |
| AS#: | | JECFA: | | |
| EMA#: | | JECFA ADI: | | MG/KG BW/DAY/PERSON |
| RAS#: | | JECFA ESTABLISHED: | | |
| OTENTIAL BEVERAGE USE | | LAST UPDATE: | 931215 | |
| W: | | DENSITY: | LOGP: | |

TRUCTURE CATEGORIES: B3 B8

OMPONENTS:

YNONYMS:

HEMICAL FUNCTION: D

ECHNICAL EFFECT: STABILIZER OR THICKENER
EMULSIFIER OR EMULSIFIER SALT

FR REG NUMBERS: 172.626 172.620 176.170

INIMUM TESTING LEVEL: 3

OMMENTS: DIFFERENT KINDS OF CARRAGEENAN USED IN DIFFERENT STUDIES
FOR DISCUSSION OF TERATOLOGIC EFFECTS SEE MEMO 05/06/86 IN FASP
SECTION A

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OX 4A: LOWEST EFFECT LEVEL OBSERVED IN ALL AVAILABLE RAT OR MOUSE STUDIES

| | | | |
|---|---|---|---|
| TUDY: | 28 | COMPLETENESS: C | RANKING FACTOR: 2.926E-3 |
| PECIES: | RAT | LEL: 500 | MG/KG BW/DAY |
| FFECTS: | BODY WEIGHT DECREASE | | |
| | ORGAN WEIGHT DECREASE | | |
| ITES: | LIVER | | |
| OMMENTS: | SOURCE OF CARRAGEENAN USED FOR THIS STUDY HYPNEA(RE-7063) AND IRIDAEA (RE-7064) | | |
| | HYPNEA AND IRIDAEA DERIVED CARRAGEENAN NOT FREQUENTLY USED AS FOOD ADDITIVES | | |

OCNUM=199

DECREASE IN LIVER WEIGHT IN FEMALES ONLY

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OX 4C: LOWEST EFFECT LEVEL OBSERVED IN ALL AVAILABLE STUDIES

TUDY: 28 COMPLETENESS: C RANKING FACTOR: 2.926E-3
PECIES: RAT LEL: 500 MG/KG BW/DAY
FFECTS: BODY WEIGHT DECREASE
ORGAN WEIGHT DECREASE
ITES: LIVER
OMMENTS: SEE BOX 4A
CARRAGEENAN SOURCE= EXTRACT OF HYPNEA AND IRADEA

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OX 6: HIGHEST OBSERVED NO-EFFECT LEVEL IN SPECIES OF BOX 4C

TUDY: 72 COMPLETENESS: B LEL: > MG/KG BW/DAY
PECIES: RAT HNEL: 2500 MG/KG BW/DAY
FFECTS: NO EFFECTS
OMMENTS: EFFECTS NOT CONSISTENT IN DIFFERENT STUDIES
TEST COMPOUND = NATIVE CARRAGEENANS; KAPPA, IOTA, AND LAMBDA

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OX 7: ACUTE TOXICITY INFORMATION

TUDY: 3 SOURCE: GRP 3T0107 2:416-417
PECIES: RAT YEAR: 1971
LD50: 5400 MG/KG BW
OMMENTS: STUDY #3 TEST COMPOUND = CA CARRAGEENAN
STUDY #4 LD50 = 5950 MG/KG, TEST COMPOUND = NA CARRAGEENAN

TUDY: 3 SOURCE: GRP 3T0107 2:418-419
PECIES: MOUSE YEAR: 1971
LD50: 9150 MG/KG BW
OMMENTS: STUDY #3 TEST COMPOUND = CA CARRAGEENAN
STUDY #4 LD50 = 9200 MG/KG, TEST COMPOUND = NA CARRAGEENAN

TUDY: 3 SOURCE: GRP 3T0107 2:414-415
PECIES: HAMSTER YEAR: 1971
LD50: 6750 MG/KG BW
OMMENTS: STUDY #3 TEST COMPOUND = CA CARRAGEENAN
STUDY #4 LD50 = 8000 MG/KG, TEST COMPOUND = NA CARRAGEENAN

TUDY: 3 SOURCE: GRP 3T 0107 2:412-413
PECIES: RABBIT YEAR: 1971
LD50: 2640 MG/KG BW
OMMENTS: STUDY #3 TEST COMPOUND = CA CARRAGEENAN

CNUM=199

STUDY #4 LD50 = 5050 MG/KG, TEST COMPOUND = NA CARRAGEENAN

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X 8: HIGH CONCERN EFFECTS

FECT: HYPERPLASIA
TE: LIVER
ECIES: RAT RANKING FACTOR: 2.926E-3
LSTUDY: 57 COMPLETENESS: A LEL: 500 MG/KG BW/DAY
ELSTDY: 72 COMPLETENESS: B HNEL: 250 MG/KG BW/DAY
MMENTS:

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X 9: ORAL TOXICITY STUDIES (OTHER THAN ACUTE)

UDY: 17 COMPLETENESS: C SOURCE: TOXICOL APPL PHARMACOL 38:265-282
PE: SHORT TERM YEAR: 1976
ECIES: GUINEA PIG LEL: > MG/KG BW/DAY
RATION: 70 DAYS HNEL: 1500 MG/KG BW/DAY
FECTS: NO EFFECTS
TES:
MMENTS: NO EFFECT WITH DIETARY ADMINISTRATION
TEST COMPOUND = IOTA CARRAGEENAN

TUDY: 96 COMPLETENESS: C SOURCE: J PHARM PHARMACOL 41:423-426
PE: SHORT TERM YEAR: 1989
ECIES: GUINEA PIG LEL: 5500 MG/KG BW/DAY
RATION: 7 DAYS HNEL:
FFECTS: ULCERATION
LYMPHOCYTIC INFILTRATION
DILATION
HISTOPATHOLOGY OBSERVATION(S) NOT ELSEWHERE CLASSIFIED
TES: COLON CECUM
MMENTS: ONE DOSE LEVEL ONLY
MALES ONLY
HISTOPATH OTHER = CRYPT ABSCESSES IN CECUM AND ASCENDING COLON

TUDY: 92 COMPLETENESS: C SOURCE: FOOD CHEM TOXICOL 28:807-811
YPE: SHORT TERM YEAR: 1990
PECIES: GUINEA PIG LEL: > MG/KG BW/DAY
URATION: 56 DAYS HNEL: 226 MG/KG BW/DAY
FFECTS: NO EFFECTS
ITES:
OMMENTS: TEST COMPOUND=KAPPA AND IOTA UNDEGRADED CARRAGEENAN
ONE DOSE LEVEL ONLY; NO CHARTS OR GRAPHS PROVIDED FOR BODY AND ORGAN WEIGHTS
UNDEGRADED IOTA AND KAPPA CARRAGEENAN CAUSED INCREASED SMALL INT

)CNUM=199

P-450 AND -
BENZOPYRENE HYDROXYLASE ACTIVITY; IOTA CARRAGEENAN CAUSED INCREASED SMALL INT
UDP-GLUCURONOSYL TRANSFERASE AND COLON AMINOPURINE N-DEMETHYLASE ACTIVITIES

| | | | |
|---|---|---|---|
| TUDY: | 93 | COMPLETENESS: C | SOURCE: FOOD CHEM TOXICOL 28:807-811 |
| YPE: | SHORT TERM | | YEAR: 1990 |
| PECIES: | GUINEA PIG | | LEL: > MG/KG BW/DAY |
| URATION: | 56 DAYS | | HNEL: 1130 MG/KG BW/DAY |
| FFECTS: | NO EFFECTS | | |
| ITES: | | | |
| OMMENTS: | TEST COMPOUND = KAPPA AND IOTA CARRAGEENAN | | |
| | ONE DOSE LEVEL ONLY | | |
| | NO CHARTS OR GRAPHS PROVIDED FOR BODY AND ORGAN WEIGHTS | | |

| | | | |
|---|---|---|---|
| TUDY: | 67 | COMPLETENESS: C | SOURCE: J PHARMACY PHARMACOL 2:187-185 |
| YPE: | SHORT TERM | | YEAR: 1969 |
| PECIES: | GUINEA PIG | | LEL: 1500 MG/KG BW/DAY |
| URATION: | 20 DAYS | | HNEL: |
| FFECTS: | ULCERATION | | |
| ITES: | COLON | | CECUM |
| OMMENTS: | TEST COMPOUND = UNDEGRADED AND DEGRADED CARRAGEENAN | | |

| | | | |
|---|---|---|---|
| TUDY: | 95 | COMPLETENESS: B | SOURCE: J PHARM PHARMACOL 41:423-426 |
| YPE: | SHORT TERM | | YEAR: 1989 |
| PECIES: | GUINEA PIG | | LEL: 2000 MG/KG BW/DAY |
| URATION: | 14 DAYS | | HNEL: |
| FFECTS: | ULCERATION | | |
| ITES: | CECUM | | COLON |
| OMMENTS: | ULCERATION OF THE TRANSVERSE AND DISTAL COLON AND RECTUM AT 2000 MG/KG | | |
| | DECREASED WEIGHT GAIN AT 2000 MG/KG | | |
| | MALES ONLY | | |

| | | | |
|---|---|---|---|
| TUDY: | 81 | COMPLETENESS: C | SOURCE: FOOD COSMET TOXICOL 11:565-575 |
| YPE: | SHORT TERM | | YEAR: 1973 |
| PECIES: | MONKEY | | LEL: > MG/KG BW/DAY |
| URATION: | 84 DAYS | | HNEL: 1250 MG/KG BW/DAY |
| FFECTS: | NO EFFECTS | | |
| ITES: | | | |
| OMMENTS: | EXPOSURE DOSE ESCALATED FROM 50 TO 1250 MG/KG DAILY | | |
| | TEST COMPOUND = NATIVE CARRAGEENAN | | |
| | ONE DOSE LEVEL ONLY | | |
| | REPORTING INCOMPLETE | | |

| | | | |
|---|---|---|---|
| TUDY: | 30 | COMPLETENESS: C | SOURCE: GRP 3T0107 26:6092 |
| YPE: | CHRONIC RODENT | | YEAR: 1980 |
| PECIES: | RAT | | LEL: > MG/KG BW/DAY |
| URATION: | 600 DAYS | | HNEL: 2500 MG/KG BW/DAY |

)CNUM=199

:UDY: 73 COMPLETENESS: C SOURCE: ECOTOXIC ENVIRON SAFETY 10:173-183
(PE: CHRONIC RODENT YEAR: 1985
)ECIES: RAT LEL: 2500 MG/KG BW/DAY
JRATION: 273 DAYS HNEL:
'FECTS: SOFT STOOL
[TES:
)MMENTS: TEST COMPOUND = UNDEGRADED CARRAGEENAN (GELCARIN HMR)
ONE DOSE LEVEL ONLY

TUDY: 74 COMPLETENESS: C SOURCE: ECOTOXIC ENVIRON SAFETY 10:173-183
(PE: CHRONIC RODENT YEAR: 1985
)ECIES: RAT LEL: 2500 MG/KG BW/DAY
JRATION: 273 DAYS HNEL:
'FECTS: SOFT STOOL
[TES:
)MMENTS: TEST COMPOUND = UNDEGRADED CARRAGEENAN (GELCARIN HMR)
ONE DOSE LEVEL ONLY

TUDY: 33 COMPLETENESS: C SOURCE: GRP 3T0107 13:3098
(PE: CHRONIC MAMMAL (NON-RODENT) YEAR: 1973
)ECIES: MONKEY LEL: 50 MG/KG BW/DAY
JRATION: 2190 DAYS HNEL:
'FECTS: SOFT STOOL
[TES:
)MMENTS: NO HISTOPATH; LIVER BIOPSY ONLY
TEST COMPOUND = NATIVE UNDEGRADED CARRAGEENAN

TUDY: 70 COMPLETENESS: B SOURCE: ECOTOXIC ENVIRON SAFETY 10:173-183
(PE: SUBCHRONIC RODENT YEAR: 1985
)ECIES: RAT LEL: 5000 MG/KG BW/DAY
JRATION: 91 DAYS HNEL: 1000 MG/KG BW/DAY
'FECTS: SOFT STOOL
[TES:
)MMENTS: TEST COMPOUND = NATIVE IRIDAEA
COUNCILMAN BODIES IN LIVER
NO CHARTS OR GRAPHS PROVIDED

TUDY: 71 COMPLETENESS: B SOURCE: ECOTOXIC ENVIRON SAFETY 10:173-183
(PE: SUBCHRONIC RODENT YEAR: 1985
)ECIES: RAT LEL: > MG/KG BW/DAY
JRATION: 91 DAYS HNEL: 5000 MG/KG BW/DAY
'FECTS: NO EFFECTS
[TES:
)MMENTS: TEST COMPOUND = KAPPA, IOTA AND LAMBDA NATIVE CARRAGEENANS
NO ORGAN WEIGHTS
NO CHARTS OR GRAPHS PROVIDED

)CNUM=199

'UDY: 26 COMPLETENESS: B SOURCE: GRP 3T0107 5:1026, 1111
'PE: SUBCHRONIC RODENT YEAR: 1974
)ECIES: RAT LEL: > MG/KG BW/DAY
JRATION: 90 DAYS HNEL: 4000 MG/KG BW/DAY
'FECTS: NO EFFECTS
:TES:
)MMENTS: ELEVATED TO B ALTHOUGH NO EFFECT AND NO ORGAN WEIGHT

'UDY: 29 COMPLETENESS: B SOURCE: GRP 3T0107 14:3214
'PE: SUBCHRONIC RODENT YEAR: 1978
)ECIES: RAT LEL: > MG/KG BW/DAY
JRATION: 90 DAYS HNEL: 5000 MG/KG BW/DAY
'FECTS: NO EFFECTS
:TES:
)MMENTS: ELEVATED TO B ALTHOUGH NO EFFECT
TEST COMPOUND = IRIDAEA CARRAGEENAN

'UDY: 49 COMPLETENESS: C SOURCE: GRP 3T0107 21:4930
(PE: SUBCHRONIC RODENT YEAR: 1974
)ECIES: RAT LEL: > MG/KG BW/DAY
JRATION: 90 DAYS HNEL: 2500 MG/KG BW/DAY
'FECTS: NO EFFECTS
[TES:
)MMENTS: 3 TYPES OF CARRAGEENAN TESTED

TUDY: 22 COMPLETENESS: C SOURCE: FOOD COSMET TOXICOL 11:565-575
(PE: SUBCHRONIC MAMMAL (NON-RODENT) YEAR: 1973
)ECIES: MONKEY LEL: > MG/KG BW/DAY
JRATION: 90 DAYS HNEL: 1300 MG/KG BW/DAY
'FECTS: NO EFFECTS
[TES:
)MMENTS: TEST COMPOUND = NATIVE KAPPA CARRAGEENAN

TUDY: 9 COMPLETENESS: B SOURCE: GRP 3T0107 5:1214
(PE: SUBCHRONIC MAMMAL (NON-RODENT) YEAR: 1973
)ECIES: MONKEY LEL: > MG/KG BW/DAY
JRATION: 112 DAYS HNEL: 400 MG/KG BW/DAY
'FECTS: NO EFFECTS
[TES:
)MMENTS: ELEVATED TO B ALTHOUGH NO EFFECT; INFANT BABOONS

TUDY: 36 COMPLETENESS: A SOURCE: FOOD COSMET TOXICOL 15:539
(PE: TERATOGENICITY YEAR: 1977
)ECIES: RAT LEL: > MG/KG BW/DAY
JRATION: 20 DAYS HNEL: 2500 MG/KG BW/DAY
FFECTS: NO EFFECTS
[TES:
)MMENTS: TEST COMPOUND = CA CARRAGEENAN

:NUM=199

ΓES:
ΜMENTS: TEST COMPOUND = CA CARRAGEENAN; GAVAGE ROUTE IN CORN OIL
INCREASED RESORPTIONS, DECREASED NUMBER OF LIVE FETUSES, DECREASED
PUP WEIGHT, SCOLOSIS, AND WAVY RIBS AT 600 MG/KG
DAMS EXPOSED DAYS 6-15 OF GESTATION

JDY: 38A COMPLETENESS: A SOURCE: GRP 3T0107 2:480-494
PE: TERATOLOGY (GAVAGE) YEAR: 1972
ECIES: MOUSE LEL: 45 MG/KG BW/DAY
RATION: 10 DAYS HNEL: 10 MG/KG BW/DAY
FECTS: GROSS SKELETAL ABNORMALITIES
ΓES: BONE
ΜMENTS: TEST COMPOUND = CA CARRAGEENAN
EFFECT NOT REPRODUCED, NOT ENTERED IN BOX 8
DAMS EXPOSED DAYS 6-15 OF GESTATION
GAVAGE ROUTE IN CORN OIL

UDY: 37C COMPLETENESS: A SOURCE: GRP 3T0107 3:566-580
PE: TERATOLOGY (GAVAGE) YEAR:
ECIES: MOUSE LEL: 470 MG/KG BW/DAY
RATION: 10 DAYS HNEL: 45 MG/KG BW/DAY
FECTS: RESORPTIONS INCREASE
LATE FETAL DEATHS INCREASE
TES:
MMENTS: EFFECT NOT REPRODUCED, NOT ENTERED IN BOX 8
TEST COMPOUND = NA CARRAGEENAN
DAMS EXPOSED DAYS 6-15 OF GESTATION
GAVAGE ROUTE IN CORN OIL

UDY: 40B COMPLETENESS: A SOURCE: GRP 3T0107 4:842-858
PE: TERATOLOGY (GAVAGE) YEAR: 1973
ECIES: MOUSE LEL: 470 MG/KG BW/DAY
RATION: 10 DAYS HNEL: 45 MG/KG BW/DAY
FECTS: RESORPTIONS INCREASE
GROSS SKELETAL ABNORMALITIES
TES: BONE
MMENTS: EFFECT NOT REPRODUCED, NOT ENTERED IN BOX 8
TEST COMPOUND = CA CARRAGEENAN
DAMS EXPOSED DAYS 6-15 OF GESTATION
GAVAGE ROUTE IN CORN OIL

'UDY: 37B COMPLETENESS: A SOURCE: GRP 3T0107 3:553-564
'PE: TERATOLOGY (GAVAGE) YEAR: 1972
'ECIES: HAMSTER LEL: > MG/KG BW/DAY
'RATION: 5 DAYS HNEL: 900 MG/KG BW/DAY
'FECTS: NO EFFECTS
:TES:
)MMENTS: TEST COMPOUND = NA CARRAGEENAN
DAMS EXPOSED DAYS 6-10 OF GESTATION
GAVAGE ROUTE IN CORN OIL

14

)CNUM=199

TUDY: 40C COMPLETENESS: A SOURCE: GRP 3T0107 4:878-898
'PE: TERATOLOGY (GAVAGE) YEAR: 1973
)ECIES: HAMSTER LEL: > MG/KG BW/DAY
JRATION: 5 DAYS HNEL: 600 MG/KG BW/DAY
'FECTS: NO EFFECTS
:TES:
)MMENTS: HAMSTER LEAST SENSITIVE SPECIES FOR TERATOLOGY
TEST COMPOUND = CA CARRAGEENAN
DAMS EXPOSED DAYS 6-10 OF GESTATION
GAVAGE ROUTE IN CORN OIL

TUDY: 38C COMPLETENESS: A SOURCE: GRP 3T0107 3:511-523
(PE: TERATOLOGY (GAVAGE) YEAR: 1972
)ECIES: HAMSTER LEL: 600 MG/KG BW/DAY
JRATION: 5 DAYS HNEL: 240 MG/KG BW/DAY
'FECTS: RESORPTIONS INCREASE
[TES:
)MMENTS: TEST COMPOUND = CA CARRAGEENAN
EFFECT NOT REPRODUCED, NOT ENTERED IN BOX 8
DAMS EXPOSED DAYS 6-10 OF GESTATION
GAVAGE ROUTE IN CORN OIL

TUDY: 82 COMPLETENESS: B SOURCE: FOOD COSMET TOXICOL 17:443-449
(PE: TERATOLOGY (GAVAGE) YEAR: 1979
)ECIES: HAMSTER LEL: > MG/KG BW/DAY
JRATION: 5 DAYS HNEL: 200 MG/KG BW/DAY
'FECTS: NO EFFECTS
[TES:
)MMENTS: TEST COMPOUND = CA CARRAGEENAN (KAPPA AND LAMBDA)
DAMS EXPOSED DAYS 6-10 OF GESTATION
GAVAGE ROUTE IN DISTILLED WATER

TUDY: 83 COMPLETENESS: B SOURCE: FOOD COSMET TOXICOL 17:443-449
YPE: TERATOLOGY (GAVAGE) YEAR: 1979
)ECIES: HAMSTER LEL: > MG/KG BW/DAY
JRATION: 5 DAYS HNEL: 200 MG/KG BW/DAY
'FECTS: NO EFFECTS
ITES:
)MMENTS: TEST COMPOUND = NA CARRAGEENAN (KAPPA AND LAMBDA)
DAMS EXPOSED DAYS 6-10 OF GESTATION
GAVAGE ROUTE IN DISTILLED WATER

TUDY: 84 COMPLETENESS: C SOURCE: FOOD COSMET TOXICOL 17:443-449
YPE: TERATOLOGY (GAVAGE) YEAR: 1979
)ECIES: HAMSTER LEL: > MG/KG BW/DAY
JRATION: 5 DAYS HNEL: 200 MG/KG BW/DAY
FFECTS: NO EFFECTS
ITES:
OMMENTS: TEST COMPOUND = IOTA CARRAGEENAN