NOSB NATIONAL LIST
FILE CHECKLIST

PROCESSING

MATERIAL NAME: **#8 Cornstarch**

✓ NOSB Database Form

✓ References

____ MSDS (or equivalent)

✓ FASP (FDA)

✓ TAP Reviews from: Joe Montecalvo, Rich Theuer

NOSB/NATIONAL LIST
COMMENT FORM
PROCESSING

Material Name: #8 Cornstarch

Please use this page to write down comments, questions, and your anticipated vote(s).

COMMENTS/QUESTIONS:

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1. In my opinion, this material is:
_____ Synthetic _____ Non-synthetic.

2. Should this material be allowed in an "organic food" (95% or higher organic ingredients)? _____ Yes _____ No
(IF NO, PROCEED TO QUESTION 3.)

3. Should this substance be allowed in a "food made with organic ingredients" (50% or higher organic ingredients)? _____ Yes _____ No

TAP REVIEWER COMMENT FORM for USDA/NOSB

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. Complete both sides of page. Attach additional sheets if you wish.

This file is due back to us by: Sept 8, 1995

Name of Material: Cornstarch

Reviewer Name: DR. JOE MONTECALVO

Is this substance Synthetic or non-synthetic? Explain (if appropriate)

Synthetic

If synthetic, how is the material made? (please answer here if our database form is blank)

This material should be added to the National List as:

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

or, ____ **Non-synthetic (Allowed as an ingredient in organic food)**

____ **Non-synthetic (Allowed as a processing aid for organic food)**

or, ____ **this material should not be on the National List**

Are there any use restrictions or limitations that should be placed on this material on the National List? none

Please comment on the accuracy of the information in the file: O.K.

Any additional comments? (attachments welcomed)

Action – Should read – due to the number of exposed hydroxyl groups, water can easily hydrogen bond to the hydroxy groups therefore starches are hygroscopic.

Do you have a commercial interest in this material? ____ **Yes;** ✓ **No**

Signature [signature] **Date** 8/27/95

Please address the 7 criteria in the Organic Foods Production Act:
(comment in those areas you feel are applicable)

(1) the potential of such substances for detrimental chemical interactions with other materials used in organic farming systems;

None

(2) the toxicity and mode of action of the substance and of its breakdown products or any contaminants, and their persistence and areas of concentration in the environment; None

(3) the probability of environmental contamination during manufacture, use, misuse or disposal of such substance;

None

(4) the effect of the substance on human health;

None

(5) the effects of the substance on biological and chemical interactions in the agroecosystem, including the physiological effects of the substance on soil organisms (including the salt index and solubility of the soil), crops and livestock;

None

(6) the alternatives to using the substance in terms of practices or other available materials; and

None

(7) its compatibility with a system of sustainable agriculture.

O.K

TAP REVIEWER COMMENT FORM for USDA/NOSB

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. Complete both sides of page. Attach additional sheets if you wish.

This file is due back to us by: Sept 8, 1995

Name of Material: Cornstarch - NATIVE (NON-MODIFIED)

Reviewer Name: R Theuer

Is this substance Synthetic or non-synthetic? Explain (if appropriate) NON

If synthetic, how is the material made? (please answer here if our database form is blank)
SHOULD MENTION THAT SULFUR DIOXIDE IS USED AS A "TEMPORARY" PRESERVATIVE TO AVOID PUTREFACTION OF SOAKED CORN. LATER, FERMENTATION INHIBITS PUTREFACTIVE ORGANISMS.

This material should be added to the National List as:

____ Synthetic Allowed ____ Prohibited Natural

or, ✓ Non-synthetic (Allowed as an ingredient in organic food)
✓ Non-synthetic (Allowed as a processing aid for organic food)

or, ____ this material should not be on the National List

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

NO

Please comment on the accuracy of the information in the file:
O/K

Any additional comments? (attachments welcomed)

Do you have a commercial interest in this material? ____ Yes; ✓ No

Signature Richard C Theuer **Date** 8/28/95

Please address the 7 criteria in the Organic Foods Production Act:
(comment in those areas you feel are applicable)

(1) the potential of such substances for detrimental chemical interactions with other materials used in organic farming systems;

(2) the toxicity and mode of action of the substance and of its breakdown products or any contaminants, and their persistence and areas of concentration in the environment;

(3) the probability of environmental contamination during manufacture, use, misuse or disposal of such substance;

(4) the effect of the substance on human health;

(5) the effects of the substance on biological and chemical interactions in the agroecosystem, including the physiological effects of the substance on soil organisms (including the salt index and solubility of the soil), crops and livestock;

(6) the alternatives to using the substance in terms of practices or other available materials; and

(7) its compatibility with a system of sustainable agriculture.

NOSB Materials Database

Identification

Common Name	**Cornstarch**	Chemical Name	
Other Names	Waxy corn starch		
Code #: CAS		Code #: Other	
N. L. Category	Synthetic Allowed	MSDS	○ yes ◉ no

Chemistry

Family	
Composition	Mixture of two glucose polymers: amylopectin and amylose. Mixtures can be physical but are usually genetically determined. Waxy starch is 100% amylopectin.
Properties	Starch has polyhedral granules whose mean diameter is 35 microns. Swell when exposed to water and upon heating undergo a process of irreversible swelling and crystalline melting called gelatinization. Have a substantial surface area and a strong affinity for moisture.
How Made	Obtained by wet milling. After the endosperm is disrupted the starch is collected by washing and centrifugation. Can be chemically modified by introducing hydrophobic ester groups at low levels, but is then generally called "modified starch".

Use/Action

Type of Use	Processing
Specific Use(s)	Thickener, Formulation aid, bulking agent, diluents, fluidifying agents, and moisture adsorbing agents. Used in baking powder, confectioner's sugar, bulking agent for enzyme preparations and flavorings. Waxy corn may be used for thickening to keep ingredients suspended but tends to have a temporary effect.
Action	Adsorbs moisture because of an abundance of hydroxyl sites for moisture to cling to.
Combinations	

Status

OFPA	
N. L. Restriction	
EPA, FDA, etc	
Directions	
Safety Guidelines	
State Differences	
Historical status	
Internationl status	

OFPA Criteria

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

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

2119(m)3: manufacture & disposal consequences

2119(m)4: effect on human health

Starch is a main form of carbohydrates in the diet.

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

2119(m)6: alternatives to substance

Other starches.

2119(m)7: Is it compatible?

References

Furia, T.E. (ed.). CRC Handbook of Food Additives. 2nd ed. Cleveland: the Chemical Rubber Co., 1972.

Encyclopedia of Food Science, Food Technology and Nutrition. 1993. Academic Press, Ltd., San Diego, CA

See also attached.

CORN STARCH REFERENCES

AU: Lim,-S.; Seib,-P.A.
TI: Preparation and pasting properties of wheat and corn starch phosphates.
SO: Cereal-chem. St. Paul, Minn. : American Association of Cereal Chemists, 1924-. Mar/Apr 1993. v. 70 (2) p. 137-144.
CN: DNAL 59.8-C33

AU: Strantz,-A.A.; Zottola,-E.A.
TI: Bacterial survival on lean beef and bologna wrapped with cornstarch-containing polyethylene film.
SO: J-Food-Prot. Des Moines, Iowa : International Association of Milk, Food, and Environmental Sanitarians. Oct 1992. v. 55 (10) p. 782-786.
CN: DNAL 44.8-J824
AB: Cornstarch-containing plastic films could be used to package foods if the presence of cornstarch had no adverse effect on food safety. The survival of pathogenic bacteria on meat samples that had been wrapped with cornstarch-containing plastic film was evaluated. Bacterial recovery from meat samples indicated that survival was not enhanced by the presence of cornstarch. No migration through polyethylene film or cornstarch-containing polyethylene film into lean meat or bologna was observed. These results indicated that, from a microbiological viewpoint, cornstarch-containing polyethylene film could be successfully used to package foods.

AU: Strantz,-A.A.; Zottola,-E.A.
TI: Bacterial survival on cornstarch-containing polyethylene film held under food storage conditions.
SO: J-Food-Prot. Des Moines, Iowa : International Association of Milk, Food, and Environmental Sanitarians. Sept 1992. v. 55 (9) p. 681-686.
CN: DNAL 44.8-J824
AB: Plastics in which cornstarch is incorporated into the polymer network have been developed. The effect of cornstarch in plastic film on the survival of spoilage and pathogenic bacteria was evaluated. Cornstarch-containing polyethylene film (CSPE) and control polyethylene film (PE) were inoculated with Salmonella typhimurium, Aeromonas hydrophila, Bacillus cereus, and Pseudomonas fragi and held under various combinations of temperature and relative humidity to mimic food storage conditions. Bacterial recovery from film samples indicated that, in general, survival was not enhanced by the presence of cornstarch. These results indicated that, from a microbiological viewpoint, cornstarch-containing polyethylene film could be successfully used to package foods.

AU: Imam,-S.H.; O'Kura,-R.H.; Gould,-J.M.
TI: Adhesive interactions between amylolytic bacteria and cornstarch granules.
SO: Corn Utilization Conference III proceedings / National Corn Growers Association sponsored by CIBA-GEIGY Seed Division. [s.l. : s.n.], 1990.. 2 p.
CN: DNAL HD9049.C8U6-1990

AU: Mueller,-R.; Iannotti,-G.; Bajpai,-R.; Cheng,-P.; Jaeger,-S.
TI: Lactic acid production from liquefied corn starch using Lactobacillus amylovorus and newly isolated lactobacilli.
SO: Corn Utilization Conference III proceedings / National Corn Growers Association sponsored by CIBA-GEIGY Seed Division. [s.l. : s.n.], 1990.. 4 p.
CN: DNAL HD9049.C8U6-1990

AU: Coble,-K.H.; Chang,-C.C.; McCarl,-B.A.; Eddleman,-B.R.
TI: Assessing econmic implications of new technology: the case of cornstarch-based biodegradable plastics.
SO: Rev-Agric-Econ. East Lansing, Mich. : Michigan State University. Jan 1992. v. 14 (1) p. 33-43.
CN: DNAL HD1773.A3N6
AB: A nonlinear mathematical programming model of the agricultural sector is utilized to examine the potential economic impacts of producing cornstarch-based biodegradable plastics. The results indicate that biodegradable plastics production, even under optimistic scenarios, does not have major impacts on the agricultural sector. A net welfare cost to the agricultural sector would need to be met by consumer and environmental gains due to biodegradable plastics use.

AU: Dauphin,-J.-F.
TI: Irradiated corn starch.
SO: [1976?] 4 leaves
CN: DNAL TP416.S3
PY: 1976

AU: Allen,-W.
TI: USDA cornstarch research gives rise to steady stream of new products.
SO: Gen-Eng-News. New York, N.Y. : Mary Ann Liebert. Mar 1988. v. 8 (3) p. 18, 31.
CN: DNAL QH442.G456

TI: Thickening and gelling science.
SO: Portland, Or. : Northwest Regional Educational Laboratory, 1981. 1 film loop (Fairchild) (20 min.) : sd., col. study guide and tests. --
CN: TX945.E29-FandN-AV-ser.-5-no.-1
AB: Abstract: Ingredients that are commonly used as thickening agents (starches for puddings, cream pies, and fruit fillings, and gelatin) are described for foodservice workers. Characteristics of the starches (wheat flour, cornstarch, tapioca, and rice) are described along with gelatinization principles. A pre- and post-test are included. (kbc).

AU: Owusu-Ansah,-J.; Voort,-F.R.-van-de; Stanley,-D.W.
TI: Physicochemical changes in cornstarch as a function of extrusion variables.
SO: Cereal-Chem. St. Paul : American Association of Cereal Chemists. July/Aug 1983. v. 60 (4) p. 319-324.
CN: DNAL 59.8-C33

AU: Hertzler,-Ann.
TI: Thickening sauces and gravies with starch.
SO: 1974 1 sheet : ill.
CN: 1283
AB: This publication discusses starch sources, starch granules, and starch cookery. The effect of added ingrediants and storage is covered.

AU: Hofreiter,-B.T.; Boundy,-J.A.; Smiley,-K.L.; Boundy,-J.A.; Swanson,-C.L.; Fecht,-R.J.
TI: Novel modification of cornstarch by immobilized alpha-amylase.
SO: Cereal-Chem. St. Paul, American Association of Cereal Chemists Nov/Dec 1978. v. 55 (6) p. 995-1006.
CN: DNAL 59.8-C33

AU: Butler,-L-G; Squires,-R-G; Kelly,-S-J
TI: The enzyme-catalyzed synthesis of sucrose from starch [Cornstarch]
SO: Sugar-Azucar, Apr 1977, 72 (4): 31-32.
CN: DNAL 65.8-F11

AU: Vechtomova,-M-N; Lovacheva,-G-N
TI: Study of the structural and mechanical properties of amylopectin starch paste [Cornstarch analysis]
SO: Sakh-Prom-st', Aug 1974, 8: 69-73.
CN: DNAL 65.8-SA2

AU: Dauphin,-J-F; Athanassiadis,-H; Berger,-G; Saint-Lebe,-L
TI: Presence of formic acid in irradiated cornstarch
SO: Starke, Jan 1974, 26 (1): 14-17. Ref. Eng. sum.
CN: DNAL 309-ST22

AU: Suzuki,-T; Sugimoto,-M
TI: Studies on the stepping agents for preparing cornstarch
SO: Denpun-Kagaku-J-Jap-Soc-Starch-Sci, 1973, 20 (4): 161-166. Eng. sum.
CN: DNAL TP415.D4

CNUM=3018

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

CORNSTARCH

S#:	977050513	HUMAN CONSUMPTION:	187.6621	MG/KG BW/DAY/PERSON
SP#:	3018	MARKET DISAPPEARANCE:	221441383	LBS/YR
PE:	ASP	MARKET SURVEY:	FDA	
S#:	0411	JECFA:		
MA#:		JECFA ADI:		MG/KG BW/DAY/PERSON
AS#:		JECFA ESTABLISHED:		
		LAST UPDATE:	940115	
:		DENSITY:	LOGP:	

RUCTURE CATEGORIES: A9

MPONENTS:

NONYMS: STARCH, CORN
CORN STARCH

EMICAL FUNCTION: G

CHNICAL EFFECT: STABILIZER OR THICKENER
NON-NUTRITIVE SWEETENER
NUTRITIVE SWEETENER
FORMULATION AID
ANTICAKING AGENT OR FREE-FLOW AGENT
DRYING AGENT
HUMECTANT
TEXTURIZER
SOLVENT OR VEHICLE
FLAVORING AGENT OR ADJUVANT

R REG NUMBERS:

NIMUM TESTING LEVEL: 3

MMENTS: STUDIES 1-2 FROM SCOGS-115; DATA INSUFFICIENT FOR PRIORITY RANKING
SEE ALSO CORNSTARCH WAXY FASP 3019, SEE ALSO ARROWROOT STARCH FASP 3020
SEE ALSO POTATO STARCH FASP 3021, SEE ALSO RICE STARCH FASP 3022
SEE ALSO TAPIOCA STARCH FASP 3023, SEE ALSO WHEAT STARCH FASP 3024

X 9: ORAL TOXICITY STUDIES (OTHER THAN ACUTE)

)CNUM=3018

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'UDY:     1            COMPLETENESS:     SOURCE: J NUTR 80:291-298
'PE:      SHORT TERM                     YEAR:  1963
'ECIES:   RAT                            LEL:   >       MG/KG BW/DAY
'RATION:  28 DAYS                        HNEL:  77000   MG/KG BW/DAY
'FECTS:   NO EFFECTS
:TES:
)MMENTS:  TEST COMPOUND = RAW UNMODIFIED CORNSTARCH

'UDY:     2            COMPLETENESS:     SOURCE: J NUTR 99:191-195
'PE:      SHORT TERM                     YEAR:  1969
'ECIES:   MOUSE                          LEL:   >       MG/KG BW/DAY
'RATION:  28 DAYS                        HNEL:  106500  MG/KG BW/DAY
'FECTS:   NO EFFECTS
:TES:
)MMENTS:  TEST COMPOUND = RAW UNMODIFIED CORNSTARCH
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