

*Non*

*allowed*

# NOSB NATIONAL LIST FILE CHECKLIST

## PROCESSING

**MATERIAL NAME:** **Diatomaceous earth**

**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

Bob Durst

Richard Theuer

\_\_\_\_\_

**Supplemental Information:**

**MISSING INFORMATION:** \_\_\_\_\_

# 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 Diatomaceous Earth

Type of Use:  Crops;  Livestock;  Processing

TAP Review by:

1. Steve Taylor
2. Bob Durst
3. Richard Theven

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: Diatomaceous Earth

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?

Calcined powder is subjected only to air-drying, heating, and classification; flux-calcined material is calcined in presence of Any additional comments or references? soda ash or alkaline salt.

Both forms are natural. Residues of alkaline salts probably OK but calcined form is most natural.

Signature Steve Taylor

Date 3-5-95



# USDA/TAP Reviewer Comment Form

2.

Material: Diatomaceous earth (DE)

Reviewer: Bob Durst

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

It is a natural substance.

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

The file is accurate.

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: This is used as a filtration aid, and is completely removed from the product. As long as the source is checked as listed below in the comments section, there should be no detectable traces of its use in the finished product.

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

Any additional comments or references?

There is some concern about the disposal of used DE. Some states currently classify it as a hazardous waste, requiring special handling and waste disposal practices. Others consider it to be no more innocuous than dirt. The concern comes from the inhalation risk and the toxic properties of similar inert materials, such as asbestos, and silica. None of the references listed have anything to do with toxicological potential, nor could I find any that directly addressed human exposure concerns.

There are processing alternatives to the use of DE. These are often being implimented in those places where disposal is expensive due to its hazardous classification.

As with all natural minerals, the source and processing must be of food grade. In addition each lot should be analyzed for toxic element concentrations (mercury, lead, cadmium, arsenic, thallium and antimony) and a near zero tolerance adopted.

Signature Robert W. Durst

Date 3/11/85



USDA/TAP REVIEWER  
COMMENT FORM

Original mailing date: 14 Feb 1995.

Material: Diatomaceous earth  
Reviewer: Richard C. Theuer

21CFR182.90

**NATURAL** Diatomite (diatomaceous earth, Kieselguhr) is a sedimentary rock of marine or fresh water deposition. It consists mainly of accumulated shells of hydrous silica secreted by diatoms, which are microscopic, one-celled, flowerless plants.

Deposits of diatomite are known to exist in every continent. The most common method of mining diatomite is by quarrying or open-pit operation. Crude diatomite, with up to 60% moisture, is broken up and dried at relatively low temperature. This material is natural. Some diatomite is calcined in a kiln at very high temperature. This latter material might be considered synthetic.

**COMMENTS RE SECTION 2119(m) CRITERIA:**

1. Diatomite is a natural mined resource. Mining usually has negative environmental impact.
2. Diatomite is allowed as a GRAS indirect human food ingredient in paper and paperboard packaging that contacts food.
3. Diatomite is used as a processing aid (filtering aid), but not as an ingredient.
4. Current good manufacturing practice results in no significant residue in the food.

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

diatomaceous earth

12 Mar 1995





## Identification

<b>Common Name</b>	<b>Diatomaceous earth</b>	<b>Chemical Name</b>	
<b>Other Names</b>	Diatomaceous silica; Diatomite; D.E.		
<b>Code #: CAS</b>	91063-39-3 (calcined)	<b>Code #: Other</b>	
<b>N. L. Category</b>	Non-agricultural	<b>MSDS</b>	<input checked="" type="radio"/> yes <input type="radio"/> no

## Chemistry

### Family

**Composition** Accumulated shells of hydrous silica secreted by diatoms, which are microscopic, one-celled, flowerless plants.

**Properties** White to gray or buff colored powder consisting of processed siliceous skeletons of diatoms. Insoluble in water, in acids (except hydrofluoric), and in dilute alkalis.

**How Made** Diatomite is mined in quarries or open-pit. Natural powder is air dried and classified by particle size, calcined powder is air dried, classified, calcined at a high temperature(1500 to 1800o F), and again classified; and the flux-calcined powder is air dried, classified, calcined in the presence of suitable flux (soda ash or other alkaline salt) , and classified.

## Use/Action

**Type of Use** Processing

**Specific Use(s)** Filter aid in food processing.

**Action** There is none left in the finished product, therefore it is not an "ingredient".

**Combinations**

## Status

### OFPA

### N. L. Restriction

**EPA, FDA, etc** FDA-GRAS

### Directions

### Safety Guidelines

### State Differences

**Historical status** Allowed by a wide majority of certification groups.

**International status** Allowed by IFOAM, EU, and Codex.

## OFPA Criteria

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

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

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

As with all mine operations, processors must effectively mitigate locally variable environmental impacts including runoff, erosion, and dust.

Some concern about disposal of used DE. Some states currently classify it as a hazardous waste, requiring special handling and waste disposal practices.

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

Avoid breathing dust.

No health effects from ingestion.

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

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

Other filter aids; diatomaceous earth and bentonite are the two most natural filter aids but bentonite has some impurities of concern. DE is best choice (ST)

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

## References

See attached.

## DIATOMACEOUS EARTH REFERENCES

AU: Sapers,-G.M.

TI: Control of enzymatic browning in raw fruit juice by filtration and centrifugation.

SO: J-Food-Process-Preserv. Trumbull, Conn. : Food & Nutrition Press. 1992. v. 15 (6) p. 443-456.

CN: DNAL TX599.J6

AB: Filtration and centrifugation were investigated as means of preventing enzymatic browning in minimally processed fruit juices. The capacity of raw juices to undergo browning was associated with particulate fractions that could be removed by filtration with Bentonite and/or diatomaceous earth, microfiltration or ultrafiltration, depending on the commodity and cultivar.

AU: Zhang,-W.B.; Addis,-P.B.

TI: Evaluation of frying oil filtration systems.

SO: J-Food-Sci-Off-Publ-Inst-Food-Technol. Chicago, Ill.: The Institute. May/June 1992. v. 57 (3) p. 651-654.

CN: DNAL 389.8-F7322

AB: Three heated oil filtration systems were evaluated: (1) paper filter; (2) paper filter plus diatomaceous earth (DE); and (3) depth filtration with a filter pad under positive pressure. Results on tallow-cottonseed oil (90:10) and hydrogenated soybean shortening indicated that depth filtration was more effective at maintaining lipid oxidation products at low levels than methods 1 and 2.

AU: Hopper,-M.L.; King,-J.W.

TI: Enhanced supercritical fluid carbon dioxide extraction of pesticides from foods using pelletized diatomaceous earth.

SO: J-Assoc-Off-Anal-Chem. Arlington, Va. : The Association. July/Aug 1991. v. 74 (4) p. 661-666.

CN: DNAL 381-AS7

AU: La-Hue,-D.-W. (Delmon William), 1911-

TI: Evaluation of malathion, synergized pyrethrum, and diatomaceous earth on shelled corn as protectants against insects in small bins.

SO: Washington, D.C. : Agricultural Research Service, U.S. Dept. of Agriculture, 1966. 10 p.

CN: DNAL 1-Ag84Mr-no.768

AU: Hill,-S.B.

TI: Diatomaceous earth: a non toxic pesticide.

SO: Macdonald-J. Anne de Bellevue, Quebec : Macdonald Ext. Serv., Faculty of Agric, Macdonald Campus of McGill Univ. May 1986. v. 47 (2) p. 14, 42. ill.

CN: DNAL 101-M144

AU: White,-G-D; Berndt,-W-L; Wilson,-J-L

TI: Evaluating diatomaceous earth, silica-aerogel dusts, and malathion to protect stored wheat from insects

SO: Mark-Res-Rep-U-S-Dep-Agric, 1975, 1038, 18 p.

CN: DNAL 1-AG84MR

AU: McGauchey,-W-H

TI: Diatomaceous earth for confused flour beetle and rice weevil control in rough, brown, and milled rice.

SO: J-Econ-Entomol, Oct 16, 1972, 65 (5): 1427-1428.

CN: DNAL 421-J822

AU: La-Hue,-Delmon-Williams, 1911

TI: Evaluation of malathion, diazinon, a silica aerogel, and a diatomaceous earth as protectants on wheat against lesser grain borer attack in small bins

SO: [Washington, U.S. Govt. Print. Off. 1970], 12 p. illus.

CN: DNAL 1-Ag84Mr-No.860

MATERIAL SAFETY DATA SHEET  
DIATOMACEOUS EARTH

SECTION I - Product Identification

PRODUCT NAME: KIESELGUHR  
FORMULA: SIO2  
FORMULA WT: 60.1  
CAS NO.:  
COMMON SYNONYMS: DIATOMACEOUS EARTH, SILICON DIOXIDE

Precautionary Labeling

N/A

SECTION II - Hazardous Components

N/A

SECTION III - Physical Data

BOILING POINT: 2230C VAPOR PRESSURE @ 20C (MM HG): N/A  
MELTING POINT: 1710C VAPOR DENSITY (AIR=1): N/A  
SPECIFIC GRAVITY: 2.2 EVAPORATION RATE: N/A  
(H2O=1) (BUTYL ACETATE=1)  
SOLUBILITY(H2O): INSOLUBLE PERCENT VOLATILES BY VOLUME: N/A  
APPEARANCE & ODOR: LIGHT GRAY POWDER ODORLESS

SECTION IV - Fire and Explosion Hazard Data

FLASH POINT: N/A  
FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %  
FIRE EXTINGUISHING MEDIA  
SPECIAL FIRE-FIGHTING PROCEDURES  
NONCOMBUSTIBLE  
UNUSUAL FIRE AND EXPLOSION HAZARDS  
EMITS TOXIC FUMES WHEN HEATED TO DECOMPOSITION

SECTION V - Health Hazard Data

THRESHOLD LIMIT VALUE (TLV/TWA): 20 MG/M3  
TOXICITY: ORL-RAT LD 50 3.16 GM/KG  
EFFECTS OF OVEREXPOSURE  
CAN BE DRYING AND ABRASIVE TO THE SKIN.  
EMERGENCY AND FIRST AID PROCEDURES  
SKIN: WASH WITH SOAP AND WATER.  
INHALATION: REMOVE TO FRESH AIR.  
EYES: FLUSH WITH WATER; GET MEDICAL ASSISTANCE.  
INGESTION: GET MEDICAL ASSISTANCE.

SECTION VI - Reactivity Data

STABILITY: STABLE  
CONDITIONS TO AVOID: CAN ABSORB WATER. CAN REACT EXPLOSIVELY WITH CHLORINE TRIFLUORIDE.

INCOMPATIBLES: HF, ALKALI CARBONATES  
DECOMPOSITION PRODUCTS: MERCURY VAPOR

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SECTION VII - Spill and Disposal Procedures

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STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE  
SWEEP UP AND CONTAINERIZE

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SECTION VIII - Protective Equipment

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PROVIDE ADEQUATE GENERAL VENTILATION.  
PROTECT EYES AND SKIN WITH SAFETY GOGGLES AND GLOVES.

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SECTION IX - Storage and Handling Precautions

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STORE IN COOL, DRY AREA.  
AVOID INHALATION OF DUST.

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SECTION X - Transportation Data and Additional Information

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ELEVATED TEMPERATURES (900C) FORMS THE CRYSTALLINE MATERIAL  
WHICH IS MORE ACTIVE IN FORMING SILICOSIS OF THE LUNG.

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(TM) and (R) : Registered Trademarks

N/A = Not Applicable OR Not Available

The information published in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the user's responsibility to determine the suitability of this information for adoption of necessary safety precautions. We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available.

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

DIATOMACEOUS EARTH

S#: 061790532 HUMAN CONSUMPTION: 0 MG/KG BW/DAY/PERSON  
SP#: 2016 MARKET DISAPPEARANCE: 0 LBS/YR

PE: NUL MARKET SURVEY: 87 DL  
S#: 0272 JECFA: DL

MA#: JECFA ADI: 1977 MG/KG BW/DAY/PERSON  
AS#: JECFA ESTABLISHED: 1977  
LAST UPDATE:

DENSITY: LOGP:

STRUCTURE CATEGORIES:

COMPONENTS:

- ONYMS: DIATOMACEOUS EARTH
- DIATOMACEOUS SILICA
- INFUSORIAL EARTH
- KIESELGUHR
- DIATOMITE
- CELATOM
- CELITE
- SILICEOUS EARTH
- FOSSIL FLOUR
- DIATOMACEOUS EARTH FILLER

CHEMICAL FUNCTION: G

- TECHNICAL EFFECT: PROCESSING AID
- FLAVOR ENHANCER
- FLAVORING AGENT OR ADJUVANT
- FUMIGANT

DR REG NUMBERS: 573.340 182.90 176.170

MINIMUM TESTING LEVEL:

COMMENTS: CHEMLINE EQUATES THIS WITH SILICON DIOXIDE, BUT MERCK DOES NOT

