NOSB NATIONAL LIST
FILE CHECKLIST

PROCESSING

MATERIAL NAME: **#16 Nutrient Minerals**

✓ NOSB Database Form

✓ References

____ MSDS (or equivalent)

____ FASP (FDA)

✓ TAP Reviews from: Joe Montecalvo, Rich Theuer

NOSB/NATIONAL LIST
COMMENT FORM
PROCESSING

Material Name: #16 Nutrient Minerals

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: Nutrient minerals - Several materials

Reviewer Name: R. C. Theuer

Is this substance Synthetic or non-synthetic? Explain (if appropriate) SYNTHETIC UNLESS SPECIFICALLY NATURA

If synthetic, how is the material made? (please answer here if our database form is blank) (EX: POTASSIUM IODIDE FROM BRINE)

Reaction of sulfuric acid, phosphoric acid or hydrochloric acid with metal oxides to form mineral salts.

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?

AS REQUIRED BY REGULATION OR INDEPENDENT PROFESSIONAL RECOMMENDATION

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

SHOULD HAVE SPECIFIC MATERIALS IDENTIFIED. FOR EXAMPLE, ZINC SULFATE RATHER THAN THE NUTRIENT "ZINC."

Any additional comments? (attachments welcomed)

SPECIFIC PROCESSING USES SHOULD BE SEPARATELY EVALUATED. NOSB HAS VOTED POTASSIUM IODIDE AS OK ONLY FOR "FOODS MADE WITH ORGANIC INGRE

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

Signature [signature] **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;

N/A

(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;

VERY SMALL AMOUNTS ARE USED; MATERIALS ARE ESSENTIAL FOR LIFE OF ANIMALS (INCL. MAN) AND PLANTS

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

MINERALS ARE MINED WHICH MEANS ENVIRONMENT IS DISTURBED. QUANTITIES USED ARE VERY SMALL

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

ESSENTIAL AT PHYSIOLOGICAL LEVELS
TOXIC ONLY IF IN GROSS EXCESS

(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;

POSITIVE

(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.

POSITIVE

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: Nutrient Minerals

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) none

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

Signature Dr. Joe Montecalvo **Date** 8/22/95

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

NOSB Materials Database

Identification

Common Name	**Nutrient minerals**	Chemical Name	
Other Names	Calcium, phosphorus, magnesium, sulfur, copper, iodine, iron, manganese, zinc		
Code #: CAS		Code #: Other	
N. L. Category	Synthetic Allowed	MSDS	O yes O no

Chemistry

Family	
Composition	Inorganic homogenous substance which remains as ash after organic compounds are burned away. While several other minerals are essential to humans, only the following are used as additions to food because the others do not have established RDAs: calcium, phosphorus, magnesium, sulfur, copper, iodine, iron, manganese, zinc
Properties	Minerals serve as structural components of tissues and function in basal metabolism and water and pH balance. See attached chart for itemized properties.
How Made	Most minerals come from a mined or animal source (bones), but several may have gone through steps in their extraction and purification that would render them synthetic.

Use/Action

Type of Use	Processing
Specific Use(s)	Dietary supplement. Specific minerals also affect the color, texture, flavor, pH, and nutritive value of foods. Used in processed vegetables to stabilize color, in baked goods to stabilize texture, as anticaking agents for powdered foods. Sulfur is used as an antioxidant.
Action	various. see attached chart.
Combinations	Minerals easily bind with proteins, polyphenols in food, and other factors, often rendering them insoluble.

Status

OFPA	
N. L. Restriction	
EPA, FDA, etc	FDA-GRAS
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

Total amount of mineral in a food does not necessarily reflect the amount that is available for absorption into the body. For this reason, and because food grown on depleted soils is often depleted in mineral content, the minerals often need to be supplemented in the diet.

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

2119(m)6: alternatives to substance

2119(m)7: Is it compatible?

References

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

Brown, M., ed., 1990. Present Knowledge in Nutrition, 6th edit., International Life Sciences Institute, Washington, DC.

Freeland-Graves, J, 1985. Mineral adequacy of vetegarian diets, *American Journal of Clinical Nutrition* 48: 859-862.

Shils, M.E., and Young, V. (eds.), 1988. Modern Nutrition in Health and Disease, 7th edition, Lea & Febiger, Philadelphia.

Giese, James, 1995. Vitamin and Mineral Fortification of Foods. Food Technology, May 1995.

Table 2. Food sources, physiological functions, deficiency symptoms, and requirements of essential trace minerals

Mineral	Food sources	Physiological functions	Deficiency symptoms	Requirements[a]
Zinc	Meats, egg yolk, liver, legumes	Reproduction, growth, skin integrity, wound healing, taste acuity, immune response	Reduced sexual development and growth, skin lesions, hair loss, anorexia, behavioural disturbances	15 mg
Iron	Liver, meats, molasses, prunes	Haemoglobin formation, cellular oxidation	Anaemia, impaired psychomotor and intellectual performance, impaired body temperature regulation	10 mg
Silicon	Pectin, grains, beer, cereals	Bone calcification and cartilage formation, growth	Depressed growth and skeletal development (chick)	5–20 mg[b]
Manganese	Tea, nuts, oatmeal, bran, pineapple	Cartilage and bone integrity, brain function, lipid and carbohydrate metabolism	Rash, nervous disorders, hypocholesterolaemia, skeletal and mitochondrial abnormalities	2·0–5·0 mg
Copper	Nuts, shellfish, liver, raisins	Iron utilization, healthy nervous system, neovascularization, pigmentation, immune defence	Neutropenia, anaemia, decreased pigmentation, neurological, skeletal and cartilage abnormalities, cardiovascular disorders	1·5–3·0 mg
Fluoride[c]	Fluoridated water, fish, tea	Precipitates calcium and phosphorus in bone and teeth	Increased dental caries	1·5–4·0 mg
Iodine	Saltwater fish, iodized salt	Thyroid hormones in basal metabolism	Goitre, myxoedema, cretinism, hypothyroidism	150 μg
Chromium	Mushrooms, yeast, prunes, nuts	Glucose metabolism, nucleic acid stability	Glucose intolerance, neuropathy, elevated serum insulin and lipids	50–200 μg

[a] Daily recommendations for an adult male from National Research Council (1989).
[b] Daily estimate for an adult based on animal studies or usual dietary intakes.
[c] May be beneficial rather than essential.

Table 1. Food sources, physiological functions, deficiency symptoms, and requirements of major minerals

Mineral	Food sources	Physiological functions	Deficiency symptoms	Requirements[a]
Calcium	Milk, cheese, turnip, greens	Bone calcification, blood clotting, muscle contraction, nerve transmission, cell wall permeability	Rickets, osteoporosis, osteomalacia, tetany	800 mg
Phosphorus	Cheese, meats, peanuts, soft drinks	Bone calcification, energy release, membrane structure, acid–base balance	Fatigue, anorexia, bone demineralization, muscle weakness	800 mg
Magnesium	Spices, nuts, coffee, cocoa, vegetables	Cellular metabolism, muscle relaxation, nerve transmission	Nervous disorders, muscle weakness, tetany	350 mg
Sulphur	Meat, fish, eggs, cheese, legumes	Energy transfer (constituent of sulphur-containing amino acids, insulin and some vitamins)	Unknown	—
Potassium	Molasses, milk, legumes, bananas	Electrolyte in fluid balance, nerve transmission, muscle contraction, blood pressure	Weakness, anorexia, cardiac dysrhythmia, irrational behaviour	2000 mg
ride	Salt	Electrolyte in fluid balance, gastric acidity, acid–base balance	Hypochloraemic metabolic alkalosis	750 mg
Sodium	Salt, cured meats, processed foods	Electrolyte in fluid balance, membrane potential of cells, drowsiness, active transport, blood pressure	Hyponatraemia, nausea, anorexia, weakness, confusion, convulsions	500 mg