

Syn

Allowed

NOSB NATIONAL LIST FILE CHECKLIST

PROCESSING

MATERIAL NAME: Ammonium bicarbonate

CATEGORY: Synthetic Allowed

Complete?: 3/16

NOSB Database Form

References

MSDS (or equivalent)

FASP (FDA)

Date file mailed out: 1/8/95

TAP Reviews from: Steve Taylor

Rich Thever

Bob Durst

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 Ammonium Bicarbonate

Type of Use: Crops; Livestock; Processing

TAP Review by:

1. S. Taylor
2. R. Zheuer
3. B. Durst

Comments/Questions:

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: Ammonium Bicarbonate

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:

Manufactured from ammonia and carbon dioxide.

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?

Sources of ammonia and carbon dioxide may be source of concern; could be byproduct (esp. CO₂) in some cases.

Any additional comments or references?

Signature Steve Taylor

Date 3-5-95

2.

USDA/TAP REVIEWER
COMMENT FORM

Original mailing date: 7 Jan 1995.

Name of Material: Ammonium Carbonate and Ammonium Bicarbonate
Reviewer Name: Richard C. Theuer

SYNTHETIC Ammonium carbonate and ammonium bicarbonate are produced from ammonia and carbon dioxide. Ammonia (NH₃) is produced by the reaction of hydrogen and nitrogen under high temperature and pressure. The hydrogen is synthetic; thus, the ammonia and the ammonium carbonates are synthetic as well.

To produce ammonium bicarbonate, carbon dioxide is bubbled through an ammonia solution. Crystals of ammonium bicarbonate precipitate from a saturated solution.

To produce ammonium carbonate, carbon dioxide is passed through an ammonia solution and allowing the vapors to distill. The resulting solid is ammonium carbonate.

COMMENTS RE SECTION 2119(m) CRITERIA:

1. Ammonium carbonates, and especially ammonium bicarbonate, are used as leavening agents in the production of certain baked foods. Ammonium bicarbonate gives off gaseous products - carbon dioxide and ammonia - and leaves no solid residue. The amounts of "acid" and "soda" are internally balanced so they are perfectly "neutralized." The amounts of carbon dioxide and ammonia given off are relatively small but should be vented since carbon dioxide and ammonia are toxic gases.
2. Ammonium carbonates are completely eliminated during the baking process so they are not consumed by the end user.
3. Other leavening agents exist. However, no alternative leaves no residue in the food and is internally neutralized. NOTE: Yeasts are not used in cakes, cookies, refrigerated doughs and quick breads. Ammonium bicarbonate is very desirable in commercial cookie manufacture.
4. Ammonium bicarbonate is used in relatively small amounts. It permits commercial production of processed food products created by sustainable agriculture.

The following substances should be added to the National List of Substances as allowed synthetic ingredients in Organic Food: ammonium carbonate, ammonium bicarbonate.

18 Feb 1995

USDA/TAP Reviewer Comment Form

3.

Material: Ammonium bicarbonate

Reviewer: Bob Durst

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

Synthetic.

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:

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

Must be listed on the ingredient label.

Any additional comments or references?

As with all synthetic inorganic salts, source must be 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



Date

3/4/95

NOSB Materials Database

4.

Identification

Common Name **Ammonium bicarbonate** **Chemical Name**
Other Names Ammonium acid carbonate
Code #: CAS 1066-33-7 **Code #: Other**
N. L. Category Synthetic Allowed **MSDS** yes no

Chemistry

Family
Composition NH_4HCO_3
Properties Colorless to white crystals with an ammonia odor. Specific gravity 1.59
How Made Reaction of ammonia and carbon dioxide. Ammonia is produced by the reaction of hydrogen and nitrogen under high temperature and pressure. Hydrogen in this use is synthetic. Carbon dioxide is bubbled through an ammonia solution. Crystals of ammonium bicarbonate precipitate from a saturated solution.

Use/Action

Type of Use Processing
Specific Use(s) Leavening agent, pH control agent, nutrient for fermentations.
Action Gives off gases (carbon dioxide and ammonia) during baking which helps the dough to rise. No solid residue is left in the food.
Combinations

Status

OFPA
N. L. Restriction
EPA, FDA, etc FDA-GRAS
Directions
Safety Guidelines
State Differences
Historical status
International status Allowed by European Union and Codex.

NOSB Materials Database

5.

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

No carcinogenicity. Contact with skin or eyes may cause irritation in concentrated form. Levels in food are GRAS.

2119(m)5: agroecosystem biology Not Applicable

2119(m)6: alternatives to substance

Other leavening agents. However no alternative leaves no residue in the food. Used in types of dough (cookies and cakes) where yeast is not used.

2119(m)7: Is it compatible?

References

AU: Izzo,-H.V.; Ho,-C.T.

TI: Ammonia affects maillard chemistry of an extruded autolyzed yeast extract: pyrazine aroma generation and brown color formation.
SO: J-Food-Sci-Off-Publ-Inst-Food-Technol. Chicago, Ill. : The Institute. May/June 1992. v. 57 (3) p. 657-659, 674. **CN:**

DNAL 389.8-F7322

AB: The effect of ammonia was studied by extruding mixtures of autolyzed yeast extract, glucose, and ammonium bicarbonate. Samples which contained ammonia exhibited a greater degree of brown color formation; however, ammonia adversely affected the total amount of pyrazines generated.

AU: Montville,-T.J.; Shih,-P.L.

TI: Inhibition of mycotoxigenic fungi in corn by ammonium and sodium bicarbonate.
SO: J-Food-Prot. Ames, Iowa : International Association of Milk, Food, and Environmental Sanitarians. Apr 1991. v. 54 (4) p. 295-297.

CN: DNAL 44.8-J824

AB: This study sought to determine if ammonium and sodium bicarbonate inhibit the naturally-occurring fungi in corn. Addition of 1 and 2% ammonium bicarbonate into cracked corn caused 5.9- and 5.1-log CFU/g, reductions, respectively, of corn's natural mycoflora. In addition, ammonium bicarbonate fully inhibited monocultures of *Aspergillus ochraceus*, *Fusarium graminearum*, and *Penicillium griseofulvum*.

AU: Depasquale,-D.A.; El-Nabarawy,-A.; Rosen,-J.D.; Montville,-T.J.

TI: Ammonium bicarbonate inhibition of mycotoxigenic fungi and spoilage yeasts.
SO: J-Food-Prot. Ames, Iowa : International Association of Milk, Food, and Environmental Sanitarians. Apr 1990. v. 53 (4) p. 324-328.

CN: DNAL 44.8-J824

AB: Sodium bicarbonate inhibits growth and aflatoxin production by *Aspergillus parasiticus*. This survey determined that other mycotoxigenic fungi were also sensitive to bicarbonates.

MSDS for AMMONIUM BICARBONATE

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: AMMONIUM BICARBONATE
FORMULA: NH₄HCO₃ FORMULA WT: 79.06
CAS NO.: 1066-33-7 NIOSH/RTECS NO.: BO8600000
COMMON SYNONYMS: AMMONIUM ACID CARBONATE; AMMONIUM HYDROGEN
CARBONATE
PRODUCT CODES: 3003
EFFECTIVE: 05/08/86 REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 1 SLIGHT
FLAMMABILITY - 0 NONE
REACTIVITY - 1 SLIGHT
CONTACT - 1 SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT
SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION DURING USE AVOID CONTACT WITH EYES, SKIN,
CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY
CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
NOT APPLICABLE		

3 - PHYSICAL DATA

BOILING POINT: N/A	VAPOR PRESSURE(MM HG): N/A
MELTING POINT: N/A	VAPOR DENSITY(AIR=1): 2.7
SPECIFIC GRAVITY: 1.59 (H ₂ O=1)	EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H₂O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: COLORLESS TO WHITE CRYSTALS WITH AN AMMONIA ODOR.

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

TOXIC GASES PRODUCED
AMMONIA, CARBON MONOXIDE, CARBON DIOXIDE

5 - HEALTH HAZARD DATA

TOXICITY: LD50 (IV-MOUSE) (MG/KG) - 245

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE: CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.

TARGET ORGANS: NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE IDENTIFIED

ROUTES OF ENTRY: NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES
INGESTION: IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION: IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT: IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, AIR

INCOMPATIBLES: STRONG ACIDS, ALKALI METALS

DECOMPOSITION PRODUCTS: AMMONIA, CARBON MONOXIDE, CARBON DIOXIDE

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME AMMONIUM BICARBONATE
HAZARD CLASS ORM-E
UN/NA NA9081
LABELS NONE
REPORTABLE QUANTITY 5000 LBS.

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

AMMONIUM BICARBONATE

AS#:	001066337	HUMAN CONSUMPTION:	6.3841	MG/KG BW/DAY/PERSON
ASP#:	1680	MARKET DISAPPEARANCE:	7533333.333	LBS/YR
AS#:	0013	MARKET SURVEY:	87	
AS#:	0013	JECFA:	NS	
AS#:		JECFA ADI:		MG/KG BW/DAY/PERSON
AS#:		JECFA ESTABLISHED:	1982	
AS#:		LAST UPDATE:	930715	
AS#:		DENSITY:		LOGP:

STRUCTURE CATEGORIES: B1

COMPONENTS:

NONYMS:

AMMONIUM ACID CARBONATE
 AMMONIUM HYDROGEN CARBONATE
 CARBONIC ACID, MONOAMMONIUM SALT
 MONOAMMONIUM CARBONATE

CHEMICAL FUNCTION: G

TECHNICAL EFFECT:

LEAVENING AGENT
 PH CONTROL AGENT
 DOUGH STRENGTHENER
 TEXTURIZER

REGISTRATION NUMBERS: 163.110 184.1135

MINIMUM TESTING LEVEL: 3

REMARKS: NO TOX STUDIES IN SCOGS-34

EX 3: GENETIC TOXICITY STUDIES

STUDY:	2A	COMPLETENESS:	SOURCE:	
TYPE:		YEAR:	LEL:	MG/KG BW/DAY
SPECIES:		FRATION:	HNEL:	
EFFECTS:				
REMARKS:				

ICNUM=1680

STUDY: 2B SOURCE: MG/KG BW/DAY
 TYPE: YEAR: LEL: HNEL:
 SPECIES: RATION: COMPLETENESS:
 EFFECTS: COMMENTS:

STUDY: 3A SOURCE: MG/KG BW/DAY
 TYPE: YEAR: LEL: HNEL:
 SPECIES: RATION: COMPLETENESS:
 EFFECTS: COMMENTS:

STUDY: 3B SOURCE: MG/KG BW/DAY
 TYPE: YEAR: LEL: HNEL:
 SPECIES: RATION: COMPLETENESS:
 EFFECTS: COMMENTS:

