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DANIELS
It All Begins With A Seed™
Plant Food

August 19, 2003

National Organic Standards Board-USDA
Mr. Richard Matthews
P.O. Box 96456
Washington, D.C. 20090-6456

Dear Mr. Matthews:

Thank you for the information you shared with me on the petitioning process for the board to review the use of Sulfuric Acid as a stabilizing agent for our product Oilseed Extract.

Oilseed Extract is currently being reviewed by OMRI. In fact, Ms. Cindy Douglas referred me to your office to have Oilseed Extract included with Fish Emulsion as being allowed to use Sulfuric Acid as a stabilizing agent for the fertilizer under exception 205.601 (j) (7).

Please find attached the official petition to include Oilseed Extract on the list of sources allowed to use Sulfuric Acid, which is otherwise prohibited in all other uses except as a stabilizing agent for fish emulsion.

Once again, thank you for the information and direction you provided. I look forward to hearing from you and the review committee.

Sincerely,

Catherine Brooks

Catherine Brooks
Daniels Plant Food, Inc.
509 W. Crawford Street
Denison, TX 75020
903-463-3800 ext. 102
903 463-3819 (fax)
cbrooks@danielsplantfood.com
www.danielsplantfood.com

## Formal Petition Information

*Daniels Plant Food, Inc.*
*509 West Crawford Street*
*Denison, Texas 75020*
*903-463-3800 ext. 102*
*903-463-3819 (fax)*

### ITEM A

Please Indicate within which of the following categories your substance is being petitioned for inclusion on or removal from the National List:

- Synthetic substance's allowed for use in organic crop production- requested change is to be included under exception 205.601 (j) (7).

-Our product, Oilseed Extract uses Sulfuric Acid as a stabilizing agent just as Fish Emulsion is required to use.

### ITEM B

1. The Substance's common name.
   - Sulfuric Acid-used as a processing aid for Oilseed Extract.

2. The manufacturer's name, address, and telephone number.
   - Daniels Plant Food, Inc. 509 West Crawford Street Denison, Texas 75020 (903)463-3800 ext. 102 (903)463-3819 (fax)

3. The intended or current use of the substance such as use as a pesticide, animal feed additive, processing aid, nonagricultural ingredient, sanitizer or disinfectant.
   - Sulfuric Acid is used as a processing aid for Oilseed Extract.

4. A list of the crop, livestock or handling activities for which the substance will be used. If used for cops or livestock, the substance's rate and method of application must be described. If used for handling (including processing), the substance's mode of action must be described.
   - Sulfuric Acid is used to hydrolyze soapstock in order to release useful crop nutrients. The mode of action is similar to that of processing fish emulsion with Sulfuric Acid. Sulfuric Acid also acts as a pH adjuster, product stabilizer, and nutrient releaser.

5. The source of the substance and a detailed description of its manufacturing or processing procedures from the basic components(s) to the final product. Petitioners with concerns for confidential business information can follow the guidelines in the Instructions for Submitting Confidential Business Information (CBI) listed in #13.

- Oilseed Extract is derived from soapstock or refining byproduct lipid, (RBL) a byproduct of oilseed crushing and refining. When Sulfuric Acid is added to lower pH to approximately 5 the soapstock emulsion is split and nutrients are released into the soluble aqueous phase. Please see AAPFCO official definition and original submission to OMRI dated June 24, 2003 and July 21, 2003.

6. A summary of any available previous reviews by State or private certification programs or other organizations of the petitioned substance.
   - Please see AAPFCO official definition and original submission paperwork to OMRI dated June 24, 2003 and July 21, 2003.

7. Information regarding EPA, FDA, and Stated regulatory authority registrations, including registration numbers.
   - Please see page 60 item # [T-51 in the AAPFCO book.

8. The Chemical Abstract Service (CAS) number or other product numbers of the substance and labels of product that contains the petitioned substance.
   - The change/addition of Oilseed Extract would be included under exception 205.601(j) (7) for use of Sulfuric Acid in an endorsed organic product.

9. The substance's physical properties and chemical mode of action including (a) chemical interactions with other substances, especially substances used in organic production; (b) effects on human health; and, (e) effects on soil organisms, crops, or livestock.
   - (a)-Sulfuric Acid, within Oilseed Extract has no known chemical interactions with other substances.
   - (b)-Oilseed Extract has been accepted as non-toxic by Fertilizer Regulatory Agencies.
   - (e) Oilseed extract is a liquid concentrate source of plant nutrition. Plants, soil organisms, and crops all reap the nutrient benefits from Oilseed Extract.
   - Please see attached MSDS form regarding Oilseed Extract, which contains Sulfuric Acid.

10. Safety information about the substance including a Material Safety Data Sheet (MSDS) and a substance report from the National Institute of Environmental Health Studies.
    - Please see attached MSDS form regarding Oilseed Extract, and its components, which contains Sulfuric Acid as a stabilizing agent.

11. Research information about the substance which includes comprehensive substance research reviews and research bibliographies, including reviews and bibliographies which present contrasting positions to those presented by the petitioner in supporting the substance's inclusion on or removal from the National List.
    - Please see attached information provided to OMRI dated June 24, 2003 and July 21, 2003.
    - Please review information pertaining to uses of Sulfuric Acid in Fish Emulsion in exclusion 205.601 (j) (7).

12. A "Petition Justification Statement" which provides justification for one of the following actions requested in the petition:
    - ❖ Petitioning for the inclusion of a synthetic substance on the National List:
        i. Exclusion 205.601 (j) (7) –We are requesting that Oilseed Extract be included with Fish Emulsion as allowable sources to use Sulfuric Acid. Sulfuric Acid is the material (acid) of choice for the commercial processing of Oilseed Extract and other organic materials. While other acids such as Phosphoric, Nitric and Hydro- Chloric could be utilized, Sulfuric Acid does a better job and much less of it is required when compared to above listed alternatives.

13. A commercial Confidential Information Statement which describes the specific required information contained in the petition that is considered to be Confidential Business Information (CBI) or confidential commercial information and the basis for that determination. Petitioners should limit their submission of confidential information to that needed to address the areas for which this notice requests information. Instructions for submitting are as follows:
    - ❖ Not Applicable to this petition.

# OMRI Application Fee Worksheet

*The information you submit here will be kept confidential. Dollar figures are in U.S.$.*

Your Company Name: Daniels Plant Food, Inc.

## Annual Supplier Application Fee

*Your company's total annual gross sales (not just for products in this category) are:*

- [x] Under $1 million (Enter $300 on line 1a)
- [ ] $1 - 5 million (Enter $500 on line 1a)
- [ ] Over $5 million (enter $1,000 on line 1a)
- [ ] We do not wish to disclose (enter $1,000 on line 1a)

1a) Supplier Application Fee $ 300.00

1b) We are an Organic Suppliers Advisory Council member of the Organic Trade Association
*(OSAC members qualify for a 25% discount on this annual fee)* $ -0-

**Line 1) Total Supplier Fee *(subtract 1b from 1a)*** $ 300.00

## Per Product Application Fee

Product fees are set in categories based on the category and the complexity of the formulation. These fees represent base rates for routine applications that are within the allotted staff and Review Panel time. If your product requires more review time, and this rarely happens, you have the choice to be billed at an hourly rate in order to complete the review, or to withdraw the product and forfeit the review and fees.

Category S—*Single ingredient crop products or single ingredient livestock products. Water does not count as an ingredient. Compost is considered Category 1, even if it has one ingredient. Alternate formulations (i.e., exact same ingredients or exact same ingredients minus one or more ingredient, plus each ingredient from the exact same sources) of Category 1 or 2 products are also considered Category S provided at least one formulation has applied as Category 1 or 2.*

Category 1—*Compost products. Blended fertilizers are Category 2.*

Category 2—*Multi-ingredient crop products, including blended fertilizers. Single ingredient processing and handling materials. Multi-ingredient livestock products, including health care products exempt from FDA regulation. See Category S for alternate formulations. Water does not count as an ingredient.*

Category 3—*EPA-registered pesticides, external parasiticides, and FDA regulated farm animal drugs; processing cleansers/sanitizers/disinfectants; processing and handling aids; and blends of non-organic ingredients. Crop protection materials exempt from EPA registration under 40 CFR 25(b) are considered Category S or Category 2 depending on whether they have one or more than one ingredient.*

| | | | |
|---|---|---|---|
| 2a) Number of Category S Products | 1 | x $100 = | $ 100.00 |
| 2b) Number of Category 1 Products | | x $200 = | $ |
| 2c) Number of Category 2 Products | | x $400 = | $ |
| 2d) Number of Category 3 Products | | x $600 = | $ |

**Line 2) Total Product Fees (add 2a, 2b, 2c, and 2d)** $

## Total Fees Due

**Line 3) Total Fees Due with Application (add lines 1 and 2)** $ 400.00

All fees are non-refundable. (See the most current *OMRI Operating Manual* "Annual and Per Product Fees" section for details and NSF charges.)

Make check payable in U.S.$ to:

**Organic Materials Review Institute**

Box 11558, Eugene, OR 97440-3758 USA

***I declare the above to be true and understand that sales information is subject to independent verification. I am an officer or expressly recognized agent of the applicant.***

| Signature | Print Name | Date |
|---|---|---|
| R. S. Allen, CEO | RALPH S. DANIELS | JUNE 24, 2003 |

**For OMRI Use Only**

Paid _____ Received _____ updated Jan. '02

# OMRI Supplier Application

*This is a public document. Complete and sign this form to open an account for OMRI to review your brand name products. Any confidential information must be attached separately. Attach the product application, the application fee worksheet, all information required in the most current OMRI Operating Manual, and the appropriate fees. Please type or print carefully. Incomplete or illegible applications delay review.*

Supplier/Company Name exactly as you would like it to appear (e.g., capitals, dashes) Daniels® Plant Food, Inc.

Supplier is a (check one only): ☐ sole proprietorship, ☐ partnership, ☒ corporation, ☐ limited partnership, ☐ LLP, ☐ LLC, ☐ other (list) _____

Contact person to be listed in the *OMRI Brand Name Products List* ☒ Mr. ☐ Ms. ☐ Mrs. ☐ Dr. Ralph S. Daniels

Title President + CEO

Address to be listed in the *OMRI Brand Name Products List* 509 West Crawford Street Denison, Texas 75020

Phone (903) 463-3800 Fax (903) 463-3819

Toll-free number 888-839-8722

E-mail to be listed in the OMRI list Seedextract@texoma.net for contact person information

WebsiteURL www.danielsplantfood.com and www.danielsagrosciences.com

Review Contact Person (if different) _____

Address _____ Phone _____ Fax _____

Billing Contact Person or Address (if different) ~~Deborah Stewart~~ Debra Stewart

*I agree to abide by OMRI's policies as contained in the current and future versions of the* OMRI Operating Manual for Review of Brand Name Products. *I also agree to be bound by all of the terms and conditions stated in that Operating Manual (which are incorporated into this agreement by this reference) including, without limitation, the obligations to indemnify, hold harmless and defend OMRI. I also agree to not use OMRI's name or logo to advertise or promote any product that has not yet completed OMRI review. OMRI shall be entitled to its full attorney's fees if I am found to violate any terms of this agreement. I am an officer or expressly recognized agent of the applicant.*

| R. S. Klein, CEO | RALPH S. DANIELS | JUNE 24, 2003 |
|---|---|---|
| Signature | Print Name | Date |

**For OMRI Use Only**

Code _____

Notes

updated Jan. '02

# OMRI Product Application

*This page is a public document. Any confidential information must be attached separately. Please read the* OMRI Operating Manual *before completing.*

Company: Daniels® Plant Food, Inc.

Product's full brand name in U.S.: Seed extract

Brand name in any other country it is sold: Seed extract Name of country: Canada

## STEP 1

*Refer to the* OMRI Generic Materials List *for definitions. Check only one that applies to your product. If a second use catagory is desired, please submit a separate application and fee for each use catagory. One product per application.*

### Crop Production

- [x] Crop Fertility, Plant Food, Soil Amendment
- [ ] Crop Production Aid
- [ ] Crop Protection Material

### Livestock Production

- [ ] Livestock Feed Supplement/Additive
- [ ] Livestock Health Product
- [ ] Livestock Production Aid

### Processing and Handling

- [ ] Non-organic Ingredient, 95%+
- [ ] Non-organic Ingredient, 50-95%
- [ ] Processing Production Aid
- [ ] Pest Control
- [ ] Cleanser, Disinfectant, or Sanitizer

**Generic catagory as listed in the most current *OMRI Generic Materials List*:** Crop Production Materials

## STEP 2

*Before completing this section, please read the current* OMRI Operating Manual *for the disclosure and confidentiality policy (page 23). OMRI requires* ***full ingredient disclosure*** *to review a product. Do not include confidential business information on this form. Attach additional sheets and supporting documentation marked confidential as necessary.*

| Ingredient | Supplier and address | Percent by weight |
|---|---|---|
| Oilseed Extract | Agrotech, Inc. - 491 North walnut Street Sherman, Texas 75090 | 100% |
| Oilseed Extract | Riceland Feeds, Inc. - Stuttgart, AR | 100% |
| | | 100% |

## STEP 3

*I declare that all of the information above and attached is complete and accurate to the best of my knowledge. I agree to abide by all of OMRI's policies as stated in the most current* OMRI Operating Manual. *I am an officer or expressly recognized agent of the applicant.*

R. S. Daniels, CEO — Signature

PRESIDENT/CEO — Title

JUNE 24, 2003 — Date

RALPH S. DANIELS — Print Name

For OMRI Use Only

Received _____

**Daniels Plant Food, Inc.**
**Testing and Analyses Used**
**Contractor: Quality Analytical Laboratory**
**Contact: Mr. Mike Duemmel**

**The following methods are used to analyze our standard seed extract samples for N, P and K.**

**NH4(Ammonia)=(Method # 10-107-06-1-D) Ammonia reacts with alkaline phenol, then with sodium hypochlorite to form indophenol blue. Sodium nitroprusside (nitroferricyanide) is added to enhance sensitivity. The absorbance of the reaction product is measured at 630 nm, and is directly proportional to the ammonia concentration.**

**NO# (Nitrate)=(Method 10-107-04-1-E) Nitrate is quantitatively reduced to nitrate by passage of the sample through a copperized cadmium column. The nitrate (reduced nitrate plus original nitrate) is then determined by diazotizing with sulfanilamide followed by coupling with n-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water-soluble dye has magenta color, which is read at 520nm. Nitrate alone also can be determined by removing the cadmium column.**

**P2o5 and k20(phosphate and potash)=(Method 6010) Liquid samples are introduced into the plasma discharge as an aerosol suspended in argon gas. This sample aerosol is carried through the center tube of three quartz tubes that comprise the torch assembly. The sample aerosol stream passes through the center of the torroidal atoms that comprised the sample emit light at their characteristic wavelengths. This light is transmitted to the optical system. Light from the plasma emission source is focused onto the entrance slit of the optical system. After passing through the entrance slit, the light is dispersed by a diffraction grating a narrow range of dispersed wavelengths pass though an exit slit and falls onto a photomultiplier tube detector. The detector converts light energy to electrical current. The current is integrated over a predefined time period, and this integrated change is measured by the detector circuit and passed on to a host computer.**

# *Daniels® Seed Extract*

**2.0-2.0-3.0-1.0-0.3-0.3**

## *For Continuous Liquid Feeding*

### Guaranteed Analysis

| | By Weight |
|---|---|
| **Total Nitrogen** | 2.0% |
| 1.0% Ammonaical Nitrogen | |
| 1.0% Other Water Soluble Nitrogen | |
| **Available Phosphate($P_2O_5$)** | 2.0% |
| **Soluble Potash ($K_2O$)** | |
| 3.0% | |
| **Sulphur** | 1.0% |
| 1.0% Combined Sulphur | |
| **Calcium** | 0.01% |
| **Magnesium** | 0.05% |
| 0.002% Boron | |
| 0.001% Copper | |
| Soluble Copper 0.001% | |
| 0.01% Iron | |
| Soluble Iron 0.01% | |
| 0.005% Manganese | |
| Soluble Manganese 0.005% | |
| 0.0003% Molybdenum | |
| 0.004% Zinc | |
| Soluble Zinc 0.004% | |

F1503

**FOR COMMERCIAL USE ONLY**

When applied as directed, this product meets the guidelines for metals adopted by the AAPFCO (1999). *Information regarding the contents and levels of metals in this product is available on the Internet at* http //www.danielsplantfood.com

***It All Begins With A Seed™***

The process by which Daniels Plant Food has extracted NPK, Sulfur, Calcium, Magnesium and all other trace elements from oilseeds, is a unique plant food blend that has been patented world wide.

**Manufactured for: Daniels Plant Food, Inc.**
**509 W. Crawford Street, Denison, Texas 75020**

VOLUME 2.5 GALLONS (9.5 LITERS) NET WEIGHT 25 POUNDS (11.3 KILOGRAMS)

Daniels Plant Food, Inc.
509 West Crawford Street
Denison, Texas 75020

Daniels® Organic/Natural Seed Extract
Flow Sheet of Manufacturing Process

Oilseeds are crushed→Oil contained and all germination compounds (organic & metallic) are extracted from the crushed seed

↓

This is done by means of a solvent

↓

Solvent is reclaimed leaving a crude vegetable oil that contains all of the natural organic copounds that were present to foster germination & production

↓

Natural/organic germination compounds are serperated from vegetable oil by use of:

↓ Heat ↓ Stirring ↓ 15% Pottasium Hydroxide Solution

↓

This causes all compounds to be concentrated up to 25 times in a form known as soapstock

↓

Sulphuric Acid is added to release these nutrients

↓

10% Sulphuric Acid is added to stabalize solubility and concentrate the natural organic nutrients

↓

The nutrients become concentrated in an aqueous (water) phase by a factor of 2

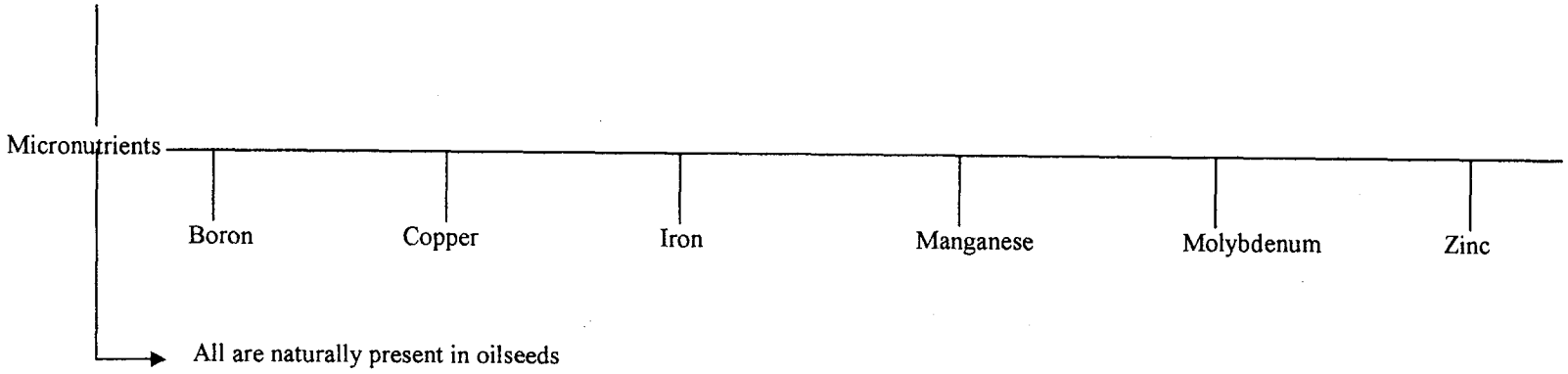
↓

Therefore the natural organic nutrients (germination compounds) present in oilseeds are extracted, stabalized and concentated by about 50 times in a soluble water based mixture.

↓

Macronutrients

- Nitrogen → Amino Acid, Protein
- p2o5 → Natural Phospholipids
- K20 → From Seed, Extractent
- Sulphur → Seed Compounds, stabilizing agent, solubilizing agent
- Calcium → Phospholipids → Plant, Seed
- Magnesium → Phospholipids → Plant, Seed




The Above aqueous soluble mixture of organic and metallic compounds/nutrients has the official AAPCFCO name/designation "Oilseed Extract". (see attached documentation)

Daniels Plant Food, Inc.
Daniels® Seed Extract
Material Safety Data Sheet

1. **Product Identification:**

| | |
|---|---|
| Trade Name (as labeled): | Seed Extract |
| Chemical names, common names: | none/mixture |
| Synonyms: | none/mixture |
| Manufacturer's Name: | Daniels Plant Food, Inc. |
| Address: | 509 West Crawford Street<br>Denison, TX 75020 |
| Emergency Telephone: | 1-800-424-9300 |
| Business Telephone: | 903-463-3800 |

2. **Composition and Information on Ingredients:**

| Chemical Name | CAS# | Exposure Limits In Air | | | |
|---|---|---|---|---|---|
| | | ACGIH | | OSHA | |
| | | TLV | STEL | PEL | STEL |
| | | $mg/m_3$ | $mg/m_3$ | $mg/m_3$ | $mg/m_3$ |
| Oilseed Extract | None | none | none | none | none |

3. **Personal Protection Information:**

Respiratory Protection-

None required under normal conditions. Confined space entry procedures should be followed when entering vessels that have contained Daniels Seed Extract.

Skin Protection-

Rubber coated gloves and suitable clothing are recommended.

Eye Protection-

Wear chemical splash goggles if exposed to splashing material.

Other Protective Equipment-

Washing facilities should be available.

4. **Health Hazard Information:**

Storage-

Store product in its original labeled container in a cool dry place out of reach of children.

Storage Temperatures-

No Requirements

Disposal-

This product is bio-degradable. Dispose of this product by diluting it with water and apply to soil, plants, turf, ect.

Container Disposal-

Completely empty container before disposal.

Spill Procedures-
Dike for containment. Use standard absorbent and/or dilute with water.

5. Fire and Explosion Hazard Information-

| | |
|---|---|
| Flash Point- | Non-combustible |
| Auto ignition Temperature- | Not applicable |
| Flammable Limits- | Non-Combustible |

6. First Aid Measures-
If spilled on skin and irritation occurs wash with soap and water. IF in contact with eyes, promptly flush with water for a t least 15 minutes.

If product is swallowed, give patient ample water. Never give water to someone who is unconscious or who cannot swallow.

7. Physical and Chemical Properties:

| | |
|---|---|
| Appearance and Color: | Dark Brown Clear Liquid |
| Specific Gravity: | 1.2 |
| Solubility in water: | 100% |
| Boiling Point $^{o}$F: | XXX |
| Freezing Point $^{o}$F: | XXX |

8. Stability and Reactivity:
Stability: Stable at normal temperatures
Conditions to avoid: Excessive heat, contact with strong alkalis, oxidizers, and reducing agents, fuels and other combustible materials.

9. Other Information:
Prepared By- Daniels Plant Food, Inc.
509 West Crawford Street
Denison, TX 75020

Date of Preparation: August 9, 1996

The information and recommendations presented in this document are made in good faith and believed to be correct as of the above date; however, Daniels Plant Food Inc. makes no representations as to completeness or accuracy. In no event will Daniels Plant Food, Inc. be held liable for any damages resulting from the use of or reliance upon this information. No representation or warranties, either expressed or implied, are made with respect to this information provided on the product to which the information refers.

No. 53 2000

# OFFICIAL PUBLICATION

# AAPFCO

Published by
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West Lafayette, Indiana

Copies may be purchased from
Joel M. Padmore, Treasurer
NC Dept. of Agriculture
4000 Reedy Creek Road
Raleigh, NC 27607-6468

T-46. N-(n-butyl) thiophosphoric triamide (NBPT) - A compound that is the normal butyl derivative of thiophosphoric triamids and is a urease inhibitor. (CAS No 94317-64-3, N-(n-butyl phosphorothiole triamide). (Official 1997)

T-47. Greensand - The naturally occurring mineral, glauconite, which is a hydrated silicate of iron and potassium. (Official 1997)

T-48 Biosolids - A primary organic solid material produced by wastewater treatment processes that can be beneficially recycled for its plant nutrient content and soil amending characteristics (Official 1998)

*[T-49 Nitrification inhibitor - A substance that inhibits the biological oxidation of ammoniacal nitrogen to nitrate nitrogen.] (Tentaive 1999)*

*[T-50 Phosphorous Acid is a stable aqueous solution of phosphorous acid ($H_3PO_3$) where the phosphorus atom is in the oxidation state of III. The concentration of phosphorous acid shall be stated as part of the brand name, for example, Brand A 40% Phosphorous Acid. It does not contain any significant amount of available phosphate.] (Tentative 1999)*

*[T-51 Oilseed Extract is the aqueous phase obtained from the separation of Refining Byproduct Lipid emulsion (RBL, soapstock) which results from the extraction and caustic refining of vegetable oilseeds.] (Tentative 1999)*

DEFINITIONS

## NITROGEN PRODUCTS

N-1. Ammoniated Superphosphate is a product obtained when superphosphate is treated with ammonia or with solutions which contain ammonia and other compounds of nitrogen. The guaranteed percentages of nitrogen and of Available Phosphate shall be stated as part of the name (Official 1993)

N-2. Ammonium Nitrate is chiefly the ammonium salt of nitric acid. It shall contain not less than thirty-three percent (33%) nitrogen, one-half of which is in the ammonium form and one-half in the nitrate form. (Official 1951)

N-3. Calcium Nitrate (fertilizer grade) is chiefly the hydrated calcium salt of nitric acid. It shall contain not less than twelve percent (12)% nitrate nitrogen. (Official 1999)

N-4. Nitrate of Potash (potassium nitrate) is chiefly the potassium salt of nitric acid. It shall contain not less than twelve percent (12%) nitrogen and forty-four percent (44%) Soluble Potash (Official 1951)

N-5. Nitrate of Soda (sodium nitrate) is chiefly the sodium salt of nitric acid. It shall contain not less than sixteen percent (16%) nitrate nitrogen and twenty-six percent (26%) sodium. (Official 1952)

N-6. Nitrate of Soda and Potash (sodium and potassium nitrate) is chiefly the sodium and potassium salts of nitric acid. It shall contain not less than fifteen percent (15%) nitrate nitrogen, ten percent (10%) soluble potash and eighteen percent (18%) sodium. (Official 1952)

N-7. Sulfate of Ammonia (ammonium sulfate) is chiefly the ammonium salt of sulfuric acid. It shall contain not less than twenty and five-tenths percent (20.5%) nitrogen. (Official 1951)

N-8. Ammonium Sulfate Nitrate is a double salt of ammonium sulfate and ammonium nitrate which are present in equal molecular proportions. It shall contain not less than twenty-six percent (26%)

# FERTILIZER FROM OILSEED EXTRACTS

Ralph S. Daniels, AGROTECH, INC.

AAPFCO Subcommmittee Meeting

August 6, 1997

# FERTILIZER
# FROM
# OILSEED EXTRACTS

Presented by Ralph Daniels, President, AGROTECH, INC.
at the AAPFCO Byproducts and Recycled Materials
Subcommittee Meeting, August 6, 1997

Oilseeds, as their name implies, contain high levels of oil in their seeds. The major oilseeds in world commerce are: canola (rapeseed), corn, cottonseed, peanut, safflower, soybeans and sunflower. Of these, soybeans account for fully one third of total world production. For the purposes of this presentation, soybeans and oilseeds may be used interchangeably.

Soybeans are processed to yield two coproducts: soybean meal and soybean oil. The seeds are crushed and the oil is extracted with solvent. This maximizes the protein level in the meal. Since the solvent extraction is nonspecific, virtually the entire organic fraction in the seed is extracted with the oil. The primary non-oil components are phosphotides/phospholipids or lecithins, as they are commonly referred to, carbohydrates (primarily sugars), free fatty acids, protein fragments, color bodies (beta carotene) and mucilaginous substances or gums. After reclaiming the solvent, the extract at this point is known as crude vegetable oil/crude soybean oil.

In order to utilize vegetable oils for edible purposes (cooking oils, shortenings, mayonaisses and margarines), the non oil or

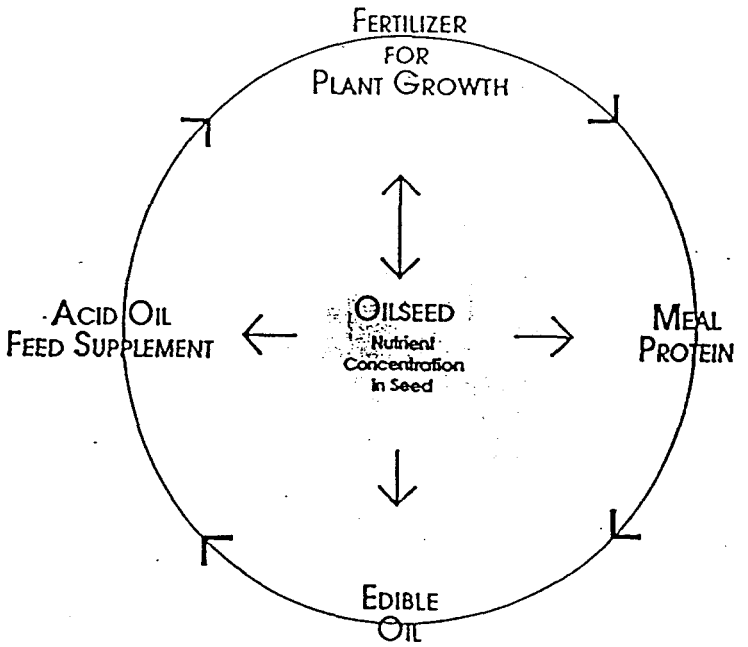
"undesirable components" (natural organic compounds and mineral elements) must be extracted from the crude oil with alkali and the process is referred to as refining or purification.

In this process, the caustic or alkali refining method, a dilute aqueous solution of alkali (usually caustic soda, sodium hydroxide, ca. 15%) is employed to react with the free fatty acids present to form soaps. The phosphatides and gums absorb alkali and together with the other organic and mineral substances which are dissolved or coagulated through hydration are collectively separated from the refined oil by means of a continuous centrifuge. This alkali extract of vegetable oil refining is commonly referred to as soapstock. The official NOPA designation is "refining byproduct lipid" (RBL) which was adopted in 1992 to more closely conform with AAFCO's feed ingredient definition criteria.

Refining byproduct lipid (soapstock) can be directly incorporated into feeds or defatted meals however most is processed further to recover the fatty acids removed during refining. The recovery process is called acidulation as an acid, usually sulfuric, is used to split the soapstock emulsion into its oil and water component parts. After splitting, the oil phase is termed acid oil (AAFCO official definition - hydrolyzed vegetable oil - feed grade) and the aqueous phase is called acid water because of the low pH (1.5). Acid oil is a well known poultry and animal feed

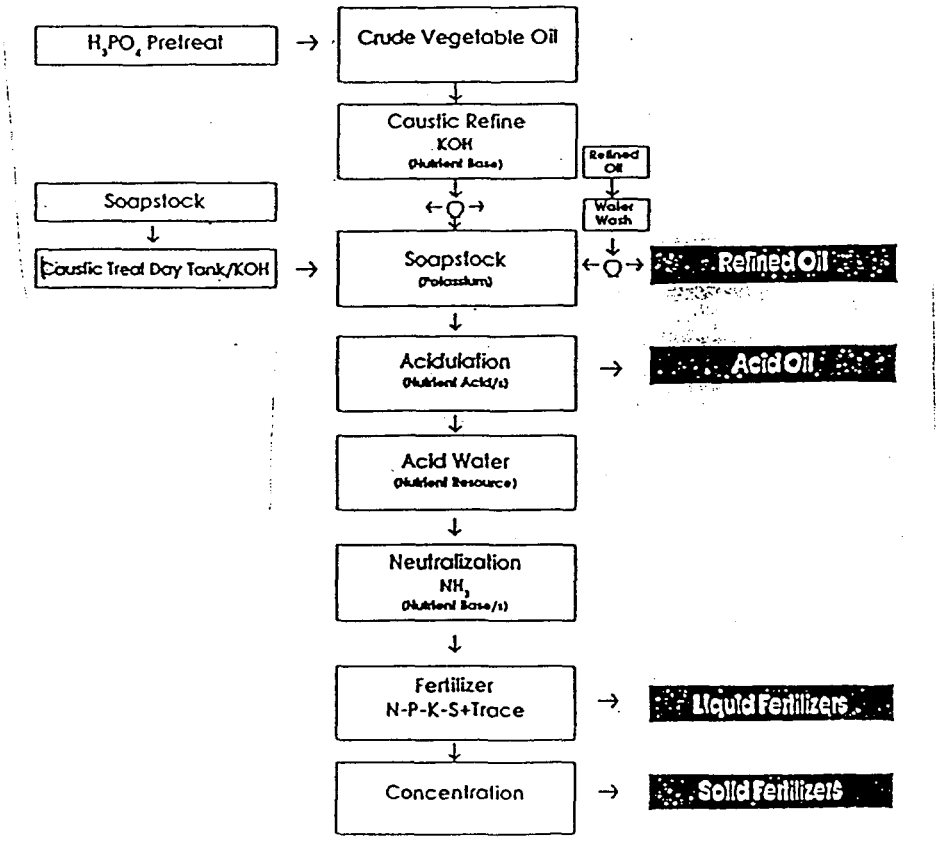
ingredient while acid water from the conventional technology in use constitutes a waste product.

A new technology has been developed to produce acid oil from RBL/soapstock without any accompanying waste, i.e. a zero-discharge process. The technology, currently implemented in full commercial scale, creates a second, new coproduct from the acidulation process. All traces of the erstwhile waste are eliminated as the acid water is transformed into a multinutrient liquid fertilizer. It allows oilseed processing to become a closed loop, elegant nutrient recycling system.




- NUTRIENTS ARE ABSORBED FROM THE SOIL, CONCENTRATED IN THE OILSEED, REMOVED DURING REFINING, RETURNED FOR THE NEXT CROP CYCLE
- FERTILIZER BECOMES A RENEWABLE RESOURCE

Oilseed plants absorb nutrients from the soil and concentrate them in their seeds as energy for reproduction. Crushers extract the nutrients with the oil and refiners target them for removal as "undesirable constituents". They ultimately end up in the RBL or soapstock. Acidulation releases them for reuse in replenishing the soil for the next crop cycle. Virtually everything present in the seed extracted fertilizer is beneficial to plant propagation and soil fertility. Let me now discuss how a simple change or two in processing can promote such a revolution.



If caustic potash (potassium hydroxide) is used in place of caustic soda in the vegetable oil refining process, potassium soaps and potassium RBL/soapstock will be formed. When potassium RBL is acidified with sulfuric or other acids, singly or in combination, potassium salts of that acid are formed in the aqueous (acid water) phase rather than sodium salts. Using ammonia or ammonium hydroxide in place of caustic soda to neutralize the potassium enriched solution further enriches it with nitrogen. In a series of acid-base reactions, the sodium which has little or no nutritive value and can be harmful to soils and plants has been replaced by potassium and nitrogen, both primary plant nutrients. Upon analysis the fertilizer solution will be shown to contain the three primary plant nutrients: nitrogen, phosphorus and potassium. The nitrogen is derived from natural seed protein and ammonia. The phosphorus is derived from natural seed phosphorus compounds (lecithins) as well as from food grade phosphoric acid which is added to the crude oil to facilitate lecithin extraction from the crude oil. Potassium is derived from natural seed sources as well as from the alkaline crude oil refining extractant, potassium hydroxide. The fertilizer solution also contains the three secondary plant nutrients: sulfur, calcium and magnesium. The sulfur is primarily derived from sulfuric acid which forms sulfate salts. Calcium and magnesium are entirely derived from the lecithin complexes naturally present in the seed. Most, if not all, of the trace element micronutrients are also present and are derived

directly from the seed. In addition, the solution contains soluble, beneficial organic matter which improves soil fertility and encourages microflora growth in the growing media. The nutrient content of the fertilizer solution is typically 2-3-4-2 (N, $P_2O_5$, $K_2O$, S), although this can vary somewhat depending upon the seed and the refining extraction conditions.

This new fertilizer from oilseed extracts has been used to grow a wide variety of agricultural and horticultural crops and found to equal or outperform traditional commercial fertilizers in comparative fertility trials. (See Iowa State preliminary results, attached)

In summary, by modifying the chemistry of vegetable oil refining and the chemistry of RBL/soapstock processing, a new liquid multi-nutrient fertilizer can be produced from the natural nutrients extracted from oilseeds. We would appreciate the consideration of this subcommittee in officially recognizing oilseed extracts as bona fide sources of plant nutrients and its assistance in defining it for the trade.

Thank you for your kind attention. Are there any questions?

# 45TH OILSEED CONFERENCE

## "Oilseed Products in the 21st Century"

March 10-12, 1996

POYDRAS A&B
HYATT REGENCY HOTEL
NEW ORLEANS, LOUISIANA
U.S.A.

Sponsored by
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and
Southern Regional Research Center
Agricultural Research Service
United States Department of Agriculture

# VALUE -ADDED PRODUCTS FROM SOAPSTOCK

Ralph S. Daniels*, President & CEO
Agrotech, Inc. Sherman, Texas

Abstract: Soapstock, the reaction product from the caustic refining of vegetable oils, can be processed to yield two readily marketable coproducts. This paper will discuss the process for converting soapstock into fatty acids and fertilizers and the commercial markets for the above.

We appreciate and wish to thank the National Cottonseed Products Association and the USDA ARS/SRRC for the opportunity to present what, we feel, represents a major technological advance in oilseed processing, agriculture and the environment.

The preferred and predominant method for purifying crude vegetable oils for edible use is the caustic refining method. The process employs a dilute aqueous solution of alkali, usually caustic soda (sodium hydroxide), to react with (saponify) the free fatty acids present to form soaps. Additional undesirable constituents, which include phosphatides, gums and prooxidant metals, are also removed as part of the aqueous phase. The reaction mixture is separated from the refined oil as the heavy phase discharge from the refining centrifuge and is known as soapstock.

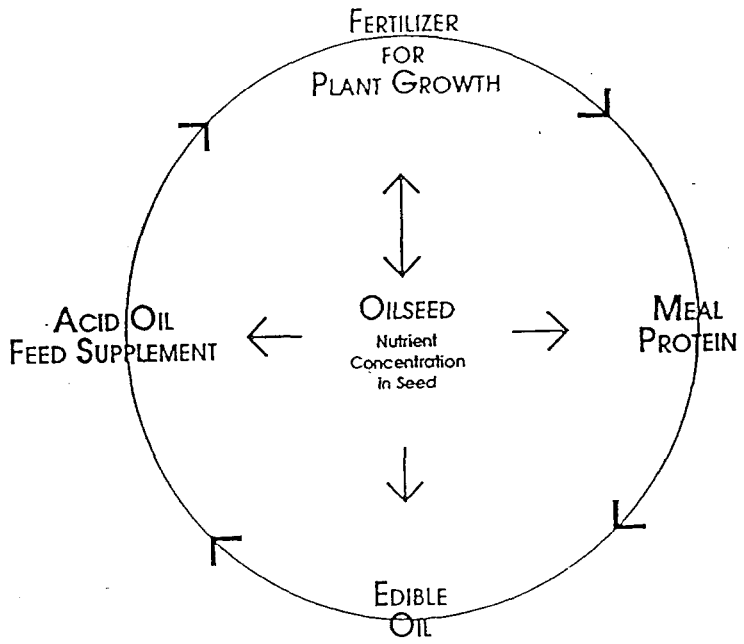
Soapstock, ca 35% total fatty acid (TFA), can be directly incorporated into feeds or defatted meals. It is far more desirable, however, to utilize the fatty acids in concentrated form, ca 95% TFA. Problems in handling a high moisture material are minimized and meal protein levels are maximized when fat is concentrated.

Fatty acids can be recovered from soapstock as a 95% concentrate for sale as a high energy feed ingredient. The process for producing this value-added product is called acidulation as an acid, usually sulfuric, is used to split the soapstock into its oil and aqueous component parts. The fatty acid or oil phase is termed acid oil while the aqueous or water phase is called acid water.

Conventional acidulation techniques possess an inherent major disadvantage. They generate large quantities of acid water waste which has become increasingly more difficult and costly to treat. Acid water is high in biological oxygen demand (BOD), phosphorus and other matter subject to discharge limits or prohibitions. In many locations throughout the United States, and, indeed, the world, the cost of acid water treatment exceeds the value of acid oil thereby rendering the process uneconomic. Environmental regulation has relegated soapstock to waste product status from that of byproduct.

A new technology has been developed to produce acid oil from soapstock without any accompanying waste, i.e. a zero discharge process. The technology, currently implemented in full commercial scale, creates a second, new coproduct from the acidulation process. All traces of the erstwhile waste are eliminated as the acid water is completely converted into a multinutrient value-added liquid fertilizer. This approach - waste reduction at the source - is the philosophy most favored by environmentalists and regulators. It allows oilseed processing to become a closed loop, elegant recycling system.

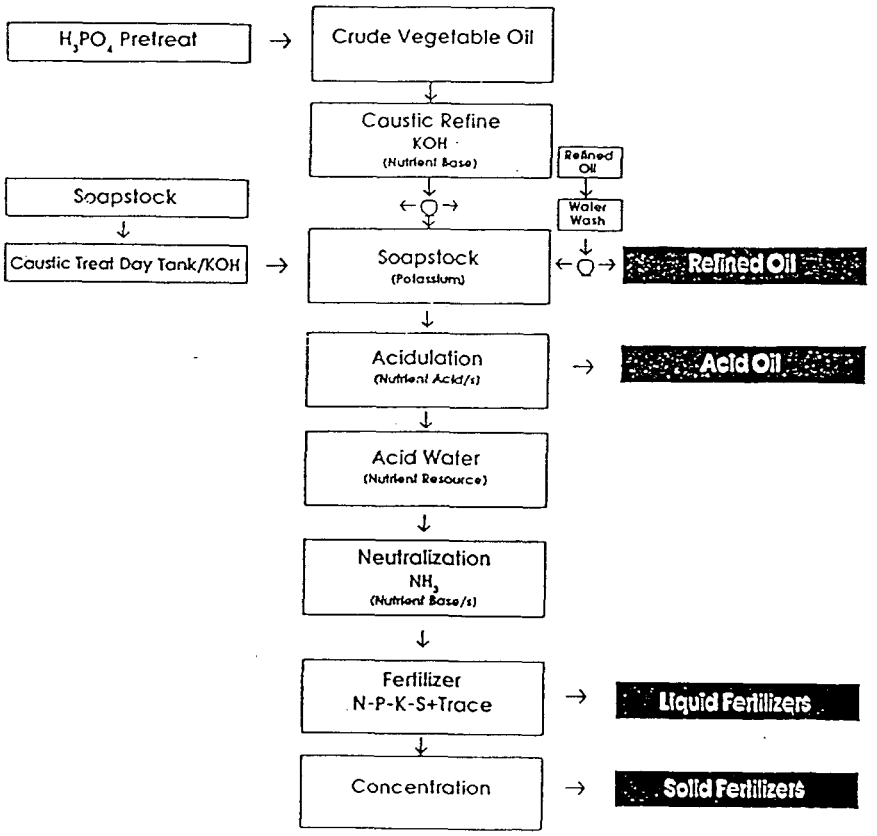
Oilseed plants absorb nutrients from the soil and concentrate them in their seeds as energy for reproduction. Crushers extract the nutrients with the oil and refiners target them for removal as "undesirable constituents". They ultimately end up in the soapstock. Acidulation releases them for re-use in replenishing the soil for the next crop cycle. Virtually everything present in the fertilizer solution is beneficial to plant propagation and soil fertility. Let me now discuss how a simple change or two can promote such a revolution.




- NUTRIENTS ARE ABSORBED FROM THE SOIL, CONCENTRATED IN THE OILSEED, REMOVED DURING REFINING, RETURNED FOR THE NEXT CROP CYCLE
- FERTILIZER BECOMES A RENEWABLE RESOURCE

If caustic potash (potassium hydroxide) is used in place of caustic soda (sodium hydroxide) as the refining caustic in the refining process to saponify the free fatty acids, potassium soaps/soapstock will be formed. When potassium soapstock is acidulated with sulfuric or other acids, singly or in combination, potassium salts are formed in the aqueous phase (acid water) rather than sodium salts. Using ammonia (ammonium hydroxide) in place of caustic soda to neutralize the potassium enriched acid water further enriches the solution by adding nitrogen. Lo and behold, the neutralized acid water has been transformed into a multinutrient fertilizer and all traces of acid water waste disappear. In essence the sodium, which has no nutritive value, is replaced by potassium and nitrogen, which are

valuable, primary, plant nutrients. Upon analysis the solution will be shown to contain: the three primary plant nutrients - nitrogen, phosphorus and potassium; the nitrogen is derived from plant protein fragments (amino acids) and ammonia, phosphorus is derived from hydrolyzed phosphatides and phosphoric acid pretreatment to the crude oil to facilitate removal of the nonhydratable phosphatides, potassium is derived primarily from the refining caustic, caustic potash (potassium hydroxide); the three secondary plant nutrients - sulfur, from the sulfuric acid acidulant, calcium and magnesium from the nonhydratable phosphatide complexes; and most, if not all, of the trace element micronutrients required for peak plant metabolism. These are the very same prooxidant metals requiring removal from the edible oil. The fertilizer solution also contains soluble, beneficial organic matter which increases soil fertility and encourages microorganism growth in the growing media. Their source is the identical organic matter previously viewed as high BOD waste water effluent with conventional technology.



The multinutrient fertilizer solution may be used as is or supplemented to increase the concentration of one or more of its components. Testing on a wide variety of crops has shown this product to outperform leading branded commercial products and it has been demonstrated to increase the value and crop yield of cut roses. Its value-added attributes have been recognized in the professional floriculture market.

In summary, let me review the two (2) value-added products derived from (potassium) soapstock and their commercial markets:

1.) Acid Oil - A high energy feed supplement sold to feed blenders.

2.) Fertilizer - A multinutrient plant food sold to farmers of field crops and growers of horticultural specialty crops.

A third and, perhaps, the greatest value-added product to be derived from (potassium) soapstock is the enhanced public image benefit realized from implementation of such an environmentally responsible process.

Thank you for your kind attention. Are there any questions?

United States Department of Agriculture
Agricultural Research Service
Mid South Area
Southern Regional Research Center
1100 Robert E. Lee Boulevard
P. O. Box 19687
New Orleans, Louisiana
70179-0687

March 20, 1996

Mr. Ralph S. Daniels
President and CEO
Agrotech, Inc.
P. O. Box 1851
Sherman, Texas 75091

Dear Mr. Daniels:

I would like to thank you on behalf of the Southern Regional Research Center and National Cottonseed Products Association, sponsors of the 45th Oilseed Conference, for your participation in the meeting. It was apparent that the presentations were all well received. Your participation obviously played an important part in the success of the meeting, and we appreciate your valuable input.

Thank you also for providing the writeup for the Proceedings. It is quite likely that the Cotton Gin & Oil Mill Press and Oil Mill Gazetteer will want to print some of the papers from the meeting. If you want to change anything in yours, or if there is any part of it that you prefer not to have printed in those journals, please let me know immediately.

You probably completed one of the questionnaire forms at the meeting. However, if you have any other thoughts on the meeting or on program topics for future meetings, we would appreciate your letting us have them. It is our sincere wish to make this annual meeting as informative and worthwhile as possible.

Thanks again for your excellent presentation.

Sincerely,

PETER J. WAN
Cochairman, Oilseed Conference

DANIELS

It All Begins With A Seed™

Plant Food

OMRI
Ms. Cindy Douglas
Product Review Coordinator
Box 11558
Eugene, OR 97440-3758

July 21, 2003

Dear Ms. Douglas:

I have received your request for further information regarding our submission. I have enclosed the information you requested in order to proceed/complete the review of our product.

1. Two sources of oilseed extracts are not used to make this product. Only one (1) source is used. That source is soybean. However, anyone of the oilseed extracts in Commerce may be used such as-soybean, corn, canola, cottonseed, peanut, etc.
2. Each source manufactures the oilseed extract in the exact same identical manner. The crops used to make the oilseed extract are those listed above.
3. The chemical reactions that occur at each step of the manufacturing process are as follows:

    a. Free fatty acids (FFA) are neutralized with a dilute (15%) caustic potash solution. The reaction is a acid-base neutralization.
    b. After the vegetable oil is refined with caustic potash (i.e.) germination compounds are extracted.
    c. The extracted compounds are physically separated by means of a centrifuge.
    d. The final step is to add sulfuric acid as a stabilizer to lower ph and to release available nutrients. Fish emulsion is stabilized the same way.

4. The nutrient claims made on the label are all a guaranteed analyses based on standard methodology approved by AAFCO.
5. The materials used in the extraction are used to stabilize the product. This is the exact same process which is used for stabilizing fish emulsion.

I hope that the preceding information will answer any/all questions you have regarding our submission for review. Please feel free to contact me if you have any further questions during the review process.

Sincerely,

Ralph S. Daniels
President & CEO
Daniels Plant Food, Inc.
RD/cb

(903) 463-3800 Fax (903) 463-3819 509 W. Crawford Street Denison, Texas 75020 USA
1-888-839-8722 www.danielsplantfood.com

Organic Materials Review Institute

# OMRI Generic Materials List

## with Reference to the National Organic Program Rule 7 CFR Part 205

April 21, 2002

OMRI™

| OMRI Status | NAME of MATERIAL | OMRI Class | OMRI ANNOTATION | NOP RULE |
|---|---|---|---|---|
| R – | **sulfate of iron** | F | See iron products, regulated. | See iron products, regulated. |
| A – | **sulfate of potash magnesia** | F | From langbeinite or other nonsynthetic mineral sources. See mined minerals, unprocessed. | See mined minerals, unprocessed. |
| R – | **sulfate of zinc** | F | See zinc products, regulated. | See zinc products, regulated. |
| R – | **sulfur dioxide†** | V | For use in sulfur smoke bombs for control of underground rodents. | Synthetic and allowed as a rodenticide under 205.601(g)(1): underground rodent control only (smoke bombs). |
| R – | **sulfur, elemental†** | F<br>D<br>I | Regulated as insecticides, plant disease control, and plant or soil amendment. | Synthetic and allowed as an insecticide (including acaricides or mite control) at 205.601(e)(3). Synthetic and allowed as plant disease control at 205.601(i)(8). Synthetic and allowed as plant or soil amendment at 205.601(j)(2). |
| P – | **sulfuric acid** | CPA<br>F | Prohibited. See fish products for use as a pH adjuster. | Synthetic and prohibited under 205.105, except under 205.601(j)(7) for liquid fish products as pH adjuster. |
| | **summer oils** | D<br>I | See oils, narrow range and oils, nonsynthetic sources. | See oils, narrow range and oils, nonsynthetic sources. |
| P – | **super phosphate** | F | Prohibited. | Synthetic and prohibited under 205.105. |
| | **surfactants** | CPA | See adjuvants listings, soap, and detergents. | See adjuvants and soap. |
| A – | **tankage** | F | The rendered, dried, and ground by-products that are largely meat and bone from animals that are slaughtered or that have died otherwise. See meat by-products and waste. | Nonsynthetic*. |
| R – | **tetracycline** | D | Oxytetracycline calcium complex. See antibiotics, tetracycline. | See antibiotics, tetracycline. |
| P – | **tobacco dust** | I<br>F | Prohibited. | Nonsynthetic and prohibited under 205.602(f). Lists as tobacco dust (nicotine sulfate). |
| P – | **tobacco tea†** | I | Prohibited. | Nonsynthetic and prohibited under 205.602(f). Lists as tobacco dust (nicotine sulfate). |
| A – | **trace minerals, nonsynthetic†** | F | See mined minerals and micronutrients. | See mined minerals and micronutrients. |
| P – | **transpiration blockers, synthetic** | CPA | Prohibited. | Synthetic and prohibited under 205.105. |

F=Fertilizer; CPA=Crop Production Aids; V=Vertebrate animal pest control; D=Disease control; I=Invertebrate pest control; W = Weed control;
* = not prohibited under 205.105; ± = not allowed under Japanese Agricultural Standard of Organic Agricultural Products;
† = see IFOAM Appendix; (1) = see NOSB Appendix.

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Organic
Materials
Review
Institute

July 21, 2003

Ralph Daniels
Daniels Plant Food Inc
509 W Crawford St
Denison, TX 75020

Dear Mr. Daniels:

Thank you for providing the Organic Materials Review Institute some of the additional information requested for your product, Seedextract. Sulfuric acid is a prohibited ingredient in soil crop production inputs used on organic farms (refer to the *OMRI Generic Materials List* and the National Organic Program). The only exception to this prohibition is for fish products. Therefore, the product will most likely be prohibited. You have the option to withdraw from review.

The product will be referred to the Review Panel during its next quarterly meeting. You will be promptly informed of any decision the Review Panel makes.

Products are reviewed in the order in which files are completed. It is rare for the Review Panel to run out of time during a meeting, but if this does occur, then those products at the end of the agenda are moved to the next review.

OMRI's staff or Review Panel may require additional information or request an on-site visit to your facility to verify production claims after evaluating the product. You have the option to withdraw your product from review at any time. Product withdrawal results in ending the review process and a forfeiture of the review fees.

Once again, thank you for your application. Please call if you have any questions.

Sincerely,

Cindy Douglas
Product Review Coordinator

ext. #304

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*PO Box 11558 • Eugene, OR 97440-3758 U.S.A.*
*Phone 541-343-7600 • Fax 541-343-8971*
*E-mail info@omri.org • www.omri.org*

August 19, 2003

OMRI
Organic Materials Review Institute
MS. Cindy Douglas
Product Review Coordinator
P.O. Box 115588
Eugene, OR 97440

Dear Ms. Douglas:

This letter is confirmation to our previous telephone conversation that Daniels Plant Food, Inc. would table the application and put the application on a "hold" status with OMRI until the petition was reviewed by USDA.

We are currently in the middle of petitioning the USDA for use of Sulphuric Acid as a stabilizing agent for our plant food, which is currently accepted as a stabilizing agent for fish emulsion.

I am forwarding you the copy of the petition to the USDA so that you may include the documentation with our file.

Please keep our application on "hold" until further notice as which was requested via our telephone conversation in July of 2003. Please do not publish any prohibited uses associated with Daniels Plant Food until review is completed.

Sincerely,

Catherine Brooks

Catherine Brooks
Director of Marketing & Sales
Daniels Plant Food, Inc.
509 W. Crawford Street
Denison, TX 75020

July 9, 2003

Ralph Daniels
Daniels Plant Food Inc
509 W Crawford St
Denison, TX 75020

Dear Mr. Daniels:

Thank you for submitting your product, Seedextract, to the Organic Materials Review Institute. As is required by the OMRI *Operating Manual for Review of Brand Name Products,* we need the following information before we can complete review of your product:

- The Product Application Form indicates that 2 sources of oilseed extracts are used to make this product. Please clarify how each source manufactures the oilseed extract. Be sure to include the crops used to make the oilseed extract. Also, include the chemical reactions that occur at each step of the manufacturing process.
- Provide an independent analysis that verifies the nutrient claims made on the label for N, P, K, S, Ca, MG, B, Cu, Fe, Mn, Mo, and Zn.

Be aware that the materials used in the extraction are, themselves, prohbited ingredients (eg. potassium hydroxice, sulfuric acid). Therefore, OMRI must determine if these extractants are in the final product. Any information on that issue would be appreciated.

Please send the requested information to the Organic Materials Review Institute at P.O. Box 11558, Eugene, OR 97440-3758 by **September 09, 2003.** Information may be faxed to 541-343-8971 up to the deadline if the original is also postmarked the same day or earlier.

If you wish to receive an extension, please request one in *writing before* the deadline. To be granted, a request must be accompanied with a valid reason for the extension and an estimate of the additional time required. Please note that any extension is at OMRI's discretion and that requests will not be automatically granted. Failure to meet the deadline will end the review process and result in forfeiture of the review fee.

Also, while we hope that you are able to complete the file by providing the documentation requested in this letter, OMRI's staff or Review Panel may require additional information after evaluating your response to this letter or any other documentation on file.

Please call me if you have any questions. I look forward to your reply.

Sincerely,

Cindy Douglas
Product Review Coordinator


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Albuquerque, NM

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New Castle, VA

Affiliations listed for identification



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