

**National Organic Standards Board  
Crops Subcommittee  
Petitioned Material Proposal  
Magnesium Oxide**

**August 6, 2013**

**\*Revised February 26, 2014 - Minority opinion added**

**Summary of Proposed Action:**

Magnesium oxide (MgO) has been petitioned for use under §205.601 Synthetic substances allowed for use in organic crop production. Specifically, the petition states “Magnesium oxide is intended to be used to control the viscosity of a clay suspension agent to prevent settling of materials suspended in water or other liquids.” The petitioner indicates they wish to use MgO for the application of finely ground humates, but the petition is written more broadly: “The substance is intended to be used in combination with other organic inputs applied as a liquid foliar on a wide variety of different agricultural, vegetable, fruit, and horticultural crops.”

The petitioner indicates they would use MgO at a very low level: at 0.074% of the humate suspension being applied, which would equate to 0.0007 to 0.0014 pounds of MgO applied per acre.

Magnesium oxide occurs as the mineral magnesite, and in its hydrated form – magnesium hydroxide -- is the naturally occurring mineral periclase. Magnesium oxide appears to be a fairly benign compound that has a wide range of uses, including as an antacid and laxative (milk of magnesite), and in lots of industrial processes such as in producing cement, abrasive materials and furnace linings.

There are several manufacturing processes used to produce MgO. It is commonly made from sea water or salt brines, but can also be made by heating MgCO<sub>3</sub> limestone to drive off CO<sub>2</sub> and produce MgO. (To produce MgO from sea water or salt brine uses the following procedure: The raw materials are lime and salt water -- either sea water or brine from salty wells. The lime is heated to produce calcium oxide. Fresh water is then added to the calcium oxide to produce calcium hydroxide. Sea water or salt brine from a well -- treated with a small amount of sulfuric or hydrochloric acid -- is then added to the calcium hydroxide, causing the magnesium chloride in the salt water to react with calcium hydroxide to produce magnesium hydroxide and calcium chloride. The magnesium hydroxide is then heated to produce magnesium oxide.)

The MgO manufactured using sea water or salt brine (and some acid) produces a purer and more refined form of MgO than that produced by heating magnesium carbonate limestone, and so is preferred by the petitioner.

**Evaluation Criteria (see attached checklist for criteria in each category)**

	<b>Criteria Satisfied?</b>		
1. Impact on Humans and Environment	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
2. Essential & Availability Criteria	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
3. Compatibility & Consistency	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A

**Subcommittee Action & Vote:**

**Classification Motion:**

**Motion** to classify Magnesium Oxide as petitioned as synthetic.

Motion by: Francis Thicke

Seconded by: Colehour Bondera

Yes: 8 No: 0 Absent: 0 Abstain: 0 Recuse: 0

**Listing Motion:**

Motion to list Magnesium Oxide at §205.601 with the following annotation: For use only to control the viscosity of a clay suspension agent for humates.

Motion by: Francis Thicke

Seconded by: Zea Sonnabend

Yes: 8 No: 0 Absent: 0 Abstain: 0 Recuse: 0

**Basis for annotation:**  To meet criteria above  Other regulatory criteria  Citation

Notes:

**Approved by Jay Feldman, Subcommittee Chair, to transmit to NOSB August 6, 2013**

**Minority position:** During Subcommittee discussions in January and February 2014, a member of the Crops Subcommittee made a motion for the following: To list Magnesium Oxide at §205.601 with the following annotation: Until May 1, 2019 [or 5 years after the date it is first allowed]. The motion did not pass. The justification for the minority opinion is as follows: A synthetic material used in organic production, even if used in small quantities, must meet all of the OFPA criteria. Current consideration of the material has raised issues relating to environmental impacts and alternatives. (1) The review in 5 years must be performed with the same standard for allowing continued use as is used to approve use in the first place; (2) the need for liquid humates and hence MgO should be re-evaluated; (3) the possibility of using nonsynthetic acids in place of synthetic sulfuric acid must be re-evaluated.

**Approved by Zea Sonnabend, Subcommittee Chair, to transmit to NOSB February 26, 2014**

## NOSB Evaluation Criteria for Substances Added To the National List: Crops

### Category 1. Adverse impacts on humans or the environment? Magnesium Oxide

Question	Yes	No	N/A	Comments/Documentation (TAP; petition; regulatory agency; other)
1. Is there a probability of environmental contamination during use or misuse? [§6518(m)(3)]		X		
2. Is there a probability of environmental contamination during manufacture or disposal? [§6518(m)(3)]		X		When MgO is produced using sea water or salt brine, a small amount of acid is used to lower the pH of the salt solution to prevent the formation of carbonates. When MgO is produced using magnesium carbonate limestone, carbon dioxide is released into the atmosphere. Additional carbon dioxide is produced through the burning of fossil fuels used to achieve the high heat required to decompose the limestone.
3. Does the substance contain inerts classified by EPA as 'inerts of toxicological concern'? [§6517 (c)(1)(B)(ii)]		X		
4. Is there potential for detrimental chemical interaction with other materials used in organic farming systems? [§6518(m)(1)]		X		
5. Is there a toxic or other adverse action of the material or its breakdown products? [§6518(m)(2)]		X		
6. Is there persistence or concentration of the material or breakdown products in the environment? [§6518(m)(2)]		X		
7. Would the use of the substance be harmful to human health or the environment? [§6517 (c)(1)(A)(i); §6517 (c)(2)(A)(i); §6518(m)(4)]		X		
8. Are there adverse biological and chemical interactions in the agro-ecosystem, including biodiversity? [§6518(m)(5)]		X		
9. Are there detrimental physiological effects on soil organisms, crops, or livestock? [§6518(m)(5)]		X		

## NOSB Evaluation Criteria for Substances Added To the National List: Crops

### Category 2. Is the Substance Essential for Organic Production? Magnesium Oxide

Question	Yes	No	N/A	Comments/Documentation (TAP; petition; regulatory agency; other)
1. Is the substance agricultural? [§6502(1)]		X		
2. Is the substance formulated or manufactured by a chemical process? [§6502(21)]	X			
3. Is the substance formulated or manufactured by a process that chemically changes a substance extracted from naturally occurring plant, animal, or mineral sources? [§6502(21)]	X			
4. Is the substance created by naturally occurring biological processes? [§6502(21)]		X		
5. Is there a natural source of the substance? [§ 205.600(b)(1)]			X	
6. Is there an organic substitute? [§205.600(b)(1)]			X	
7. Is there a wholly natural substitute product? [§6517(c)(1)(A)(ii)]		X		
8. Are there any alternative substances? [§6518(m)(6)]		X		None that have the desired functional properties, according to the petitioner.
9. Are there other practices that would make the substance unnecessary? [§6518(m)(6)]	X			MgO is not absolutely essential for the materials application it is petitioned for, but it makes application easier, and perhaps safer for the person applying the materials (reduces dust).

### Category 3. Is the substance compatible with organic production practices? Magnesium Oxide

Question	Yes	No	N/A	Comments/Documentation (TAP; petition; regulatory agency; other)
1. Is the substance consistent with organic farming and handling? [§6517(c)(1)(A)(iii); 6517(c)(2)(A)(ii)]	X			
2. Is the substance compatible with a system of sustainable agriculture? [§6518(m)(7)]	X			
3. If used in livestock feed or pet food, is the nutritional quality of the food maintained with the substance? [§205.600(b)(3)]			X	
4. If used in livestock feed or pet food, is the primary use as a preservative? [§205.600(b)(4)]			X	

5. If used in livestock feed or pet food, is the primary use to recreate or improve flavors, colors, textures, or nutritive value lost in processing (except when required by law)? [§205.600(b)(4)]			X	
6. Is the substance used in production, and does it contain an active synthetic ingredient in the following categories: [§6517(c)(1)(B)(i)];  copper and sulfur compounds		X		
toxins derived from bacteria		X		
pheromones, soaps, horticultural oils, fish emulsions, treated seed, vitamins and minerals	X			
livestock parasiticides and medicines		X		
production aids including netting, tree wraps and seals, insect traps, sticky barriers, row covers, and equipment cleansers		X		