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Petition to
The National Organic Program and
National Organic Standards Board to
Add Ammonium Nonanoate to the
USDA - National Organic Standards - National List

Date:

September 27, 2016

Submitted by:

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Agro Green Business
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Cincinnati, Ohio 45232
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Phone: 513-762-2500

30 United States Department of Agriculture
31 Agricultural Marketing Service
32 National Organic Program
33 1400 Independence Avenue S.W.
34 Room 2642-South Building
35 Washington, D.C. 20250
36

37 **Regarding:** Petition to The National Organic Standards Board (NOSB) to Amend the National
38 List of Allowed and Prohibited Substances at 7 C.F.R. §§ 205.600-205.606.

39
40 We hereby petition the National Organic Standards Board to amend the National List (7 C.F.R.
41 §§ 205.600-205.606) to include ammonium nonanoate as a non-selective herbicide for use in
42 organic agricultural practices for production of food and fiber. Specifically, we propose that
43 ammonium nonanoate be added to 7 C.F.R. § 205.601 (Synthetic substances allowed for use in
44 organic crop production) of the National Organic Standards National List as follows:

45
46 7 C.F.R. § 205.601(b)(3) Ammonium nonanoate, a soap-based, non-selective weed control agent
47 for use in food and ornamental crops for control of weeds and crop desiccation as a harvest aid.

48
49 While a non-selective, synthetic substance petitioned for use as an herbicide has not been
50 approved to date by the NOSB, this petition will provide justification for that approval. We
51 understand that this material has been petitioned for similar uses in the past. The primary
52 objection to past petitions for ammonium nonanoate was the suggestion that it is not needed in
53 organic agriculture and that the existing methods of weed control are sufficient. With this petition,
54 we intend to provide justification for reconsideration of this material as a crop production aid for
55 organic growers.

56
57 Our justification for reconsideration includes the following factors:

- 58 • Data published by the EPA in 2015 further clarified the safety of ammonium nonanoate to
59 the soil, non-target organisms (including honey bees and aquatic invertebrates), workers and
60 the environment through a thorough assessment of the environmental fate and potential
61 ecological risks;
- 62 • Organic growers across the United States have expressed the need for weed control
63 alternatives to approved traditional organic methods (as outlined in **Appendix A**);
- 64 • Fatty acids, the foundation of ammonium nonanoate, are ubiquitous in nature. They are
65 excellent and efficient sources of energy for living cells;
- 66 • Any potential unfavorable effects on the environment from manufacture, use, misuse, or
67 disposal are mitigated by careful environmental protection practices during manufacture,
68 comprehensive label instructions and a 24-hour half-life in the environment;
- 69 • There is no level of concern (LOC) by the EPA regarding non-target aquatic and terrestrial
70 animals and plants when ammonium salts are applied to terrestrial crop sites and this
71 substance is non-toxic to birds and mammals; and
- 72 • Carbon dioxide emissions, fossil fuel burning and the breakdown of soil from methods such
73 as tillage and flaming operations all negatively affect soil microorganisms, structure, fertility

74 and soil biological systems despite both of these being approved organic weed control
75 methods.

76
77 Outlined in **Appendix A** is detailed organic grower input from an ammonium nonanoate sample
78 trial program Emery Oleochemicals' Agro Green Business implemented nationally in June 2016.
79 The results clearly indicate that current organic weed control methods are ineffective and that
80 these organic growers would use ammonium nonanoate in their organic crop production if it was
81 approved for use and would highly recommend it to other organic farmers.

82
83 We will also describe the environmental benefits of ammonium nonanoate and the absence of
84 unfavorable environmental impacts or harm to soil microbes and biological diversity when
85 ammonium nonanoate is used compared to the negative impacts of tillage.

86
87 We will discuss the problems associated with current weed control options and resulting loss of
88 crop production due to ineffective weed control in the organic cropping system. In addition, we
89 will address the use of mulches (including cover crop mulching) and the inefficiency and lack of
90 efficacy of mulching in some production systems.

91
92 Further, it should be noted that ammonium nonanoate is already allowed with limitations in
93 organic production by annotation under 7 C.F.R § 205.601(b)(1) Soaps - Pesticide for use as a
94 herbicide in farmstead maintenance (roadways, ditches, right of ways, building perimeters) and
95 ornamental crops after the requirements of §205.206(e) have been met. Ammonium nonanoate is
96 currently allowed as an insecticide in organic applications for food and fiber production as
97 included in 7 C.F.R § 205.601(e)(8) Soap - Pesticide. This insecticidal use introduces the material
98 to the same general location (between the crop row and not in contact with the crop or harvestable
99 produce) in organic cropping systems. Further, if used on the crop leaves for insect control
100 purposes it will contact the plant similarly for desiccation purposes (as a harvest aid). This means
101 that ammonium nonanoate is already approved in ways that should support approval of this
102 current petition for ammonium nonanoate to also be approved for weed control use in food and
103 fiber production.

104
105 Weed control in most cropping systems is complicated and typically employs multiple strategies
106 since no single method is 100 percent effective on its own. In organic crop production, farmers'
107 weed control options are even more limited, but many are most effective when utilized in
108 combination. The National Organic Standards require weed control under 7 C.F.R §205.206(a)
109 "*The producer must use management practices to prevent crop pests, weeds, and diseases including but not*
110 *limited to:*" and then lists several potential methods. It is important to note that the document
111 specifically does not limit growers to only those listed methods.

112
113 A proactive, targeted approach to weed control is necessary for productive cropping and for weed
114 control on organic farms. Therefore, limiting management practices to only what is specifically
115 listed in the Standards could potentially limit truly effective weed control. It could also result in
116 crop production loss due to ineffective weed control and a stifling of innovation. Adding

117 ammonium nonanoate to the other already allowed practices would be a valuable asset for organic
118 growers.

119
120 In accordance with the Procedure National List Petition Guidelines, NOP 3011 (Effective Date:
121 March 11, 2016), we will address in detail, and with supporting literature and citations, the criteria
122 the NOSB uses to evaluate petitioned substances. In particular, we will address the growing
123 demand from organic farmers for more effective alternatives to currently approved organic weed
124 control methods as well as the effects of the substance on biological and chemical interactions in
125 the agroecosystem in greater detail than offered in previous submissions. We will also specifically
126 address the benefits of using ammonium nonanoate as an environmentally-responsible alternative
127 to the increased tillage necessary for adequate weed control in organic cropping systems.

128
129 Respectfully submitted,
130



131
132
133 Darlene Florence, Ph.D. (Soil Science with a focus in Agronomy), CCA
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135 Agro Green Business
136 4900 Este Avenue
137 Cincinnati, Ohio 45232 USA

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Identification of Petitioned Substance

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I. Substance Name

Chemical Name:

Nonane-1-carboxylic acid, ammonium salt

Other Names:

Ammonium nonanoate

Ammonium pelargonate

Pelargonic acid, ammonium salt

Nonanoic acid, ammonium salt

Fatty acids (C₈-C₁₈ and C₁₈ unsaturated), ammonium salts

Ammonium soap salts of fatty acids (C₈-C₁₈ saturated)

Ammonium soap salts of higher fatty acids (C₈-C₁₈ saturated; C₈-C₁₂ unsaturated)

Trade Names:

Emery Agro 7000

EMERION™ 7000

EMERION™ W 40 SL

FL-AN140F (formerly Racer Concentrate)

FL-AN405F (formerly Racer Ready to Use)

FL-AN640OG

CAS Number:

63718-65-0 (ammonium nonanoate)

Other Codes:

031802 (EPA PC code for ammonium nonanoate; EPA, 2008)

031801 (EPA PC code for ammonium salts of C₈-C₁₈ and C₁₈ unsaturated fatty acids)

II. Petitioner and Manufacturer Information

Emery Oleochemicals LLC

Agro Green Business

4900 Este Avenue

Cincinnati, Ohio 45232 USA

Phone: 513-762-2500

III. Intended or Current Use

Ammonium nonanoate is currently approved for and used as a non-selective herbicide for the contact spray control or burndown of weeds and grasses for food crops, field crops, pastures, ornamentals, turf, landscapes, interiorscapes, greenhouses, nursery crops, farmsteads, and around buildings and industrial sites including homes and gardens.

214 We are petitioning that the use be expanded through amendment of the National List to
215 include ammonium nonanoate as a non-selective herbicide for use in organic agricultural
216 practices for production of food and fiber. Specifically, we propose that ammonium nonanoate
217 be added to § 205.601 (Synthetic substances allowed for use in organic crop production) of the
218 National Organic Standards National List as follows:

219
220 7 C.F.R. § 205.601(b)(3) Ammonium nonanoate, a soap-based, non-selective weed control
221 agent for use in food and ornamental crops for control of weeds and crop desiccation as a
222 harvest aid.

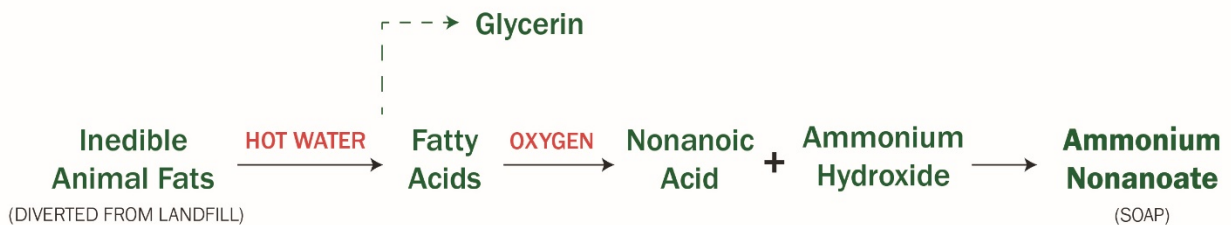
223
224 **IV. Intended Activities and Application Rate**
225 Ammonium nonanoate is intended for contact spray application on undesirable plant growth.
226 This includes, but is not limited to: annual and perennial broadleaf and grass species, mosses,
227 liverworts, sucker control and pre-harvest desiccation.

228
229 Approved crop groups include: root, tuber, bulb, leafy, legume, and fruiting vegetables; cole,
230 brassica, cucurbit, and melon crops; pome, stone, and berry fruits; citrus and nut trees; row
231 crops, including cereal grains; forages and pastures.

232
233 Ammonium nonanoate is approved for application as broadcast with field spray boom
234 equipment, directed spray equipment, or spot treatment with hand-held equipment. Thorough
235 saturation of the undesirable green leaf and stem surfaces is required for adequate control.
236 Application rates are 6 percent to 8 percent for plants less than 1 inch and up to 13 percent for
237 plants greater than 4 inches and those difficult to control.

238
239 The full, approved EPA Label is attached to this petition in **Appendix B**.

240
241 **V. Manufacturing Process**
242 Outlined below is a simplified version of the Agro Green Business' production process for
243 manufacturing ammonium nonanoate, which shows the flow from original feedstock to final
244 product. Due to the public nature of this petition and in order to protect the company's
245 intellectual property, confidential and proprietary process information has been excluded.
246



247
248
249 **VI. Ancillary Substances**
250 This petition does not request use in organic handling or processing.
251

252 **VII. Previous Reviews**

253 This substance was previously petitioned in December 2009 and reviewed by the NOSB in the
 254 fall of 2011. Ammonium nonanoate was classified as “Soap – Pesticide” and allowed with
 255 restrictions. Specifically as an herbicide, the substance is allowed if the requirements of
 256 §205.206(e) are met, and “for use in farmstead maintenance (roadways, ditches, right of ways,
 257 building perimeters) and ornamental crops,” but not for organic food or non-food crops.
 258

259 At that time, the primary objections of the Crops Committee were that there were sufficient
 260 organic weed control strategies available, the potential toxicity impact to aquatic invertebrates,
 261 and that a broad spectrum synthetic herbicide is not compatible or consistent with organic
 262 agriculture.
 263

264 Throughout this petition, we will present new data outlining the need expressed by organic
 265 growers for more effective organic weed control options, the environmental benefits of
 266 ammonium nonanoate (including reduced reliance on tillage), user safety issues with existing
 267 organic weed control methods such as acetic acid, and that the use of ammonium nonanoate
 268 in organic agriculture is indeed consistent with the traditions of organic agriculture.
 269

270 **VIII. Regulatory Authority**

271 Ammonium nonanoate is classified as a biochemical pesticide. The EPA Registration numbers
 272 are listed by product below in Table 1. Falcon Labs is the primary registrant, and the Emery
 273 products are a re-pack label of these products.
 274

275 *Table 1: EPA Registration numbers and products associated with Emery Oleochemicals.*

Primary Registrant Falcon Labs Product Names	Active Concentration	Falcon Lab / Emery Transferred Registration Number	Emery Registered Product Name	Emery Repack Registration Number
FLAN140F	40%	79766-1 / 87663-11	Emery Agro 7000 Concentrate Emerion™ 7000 Concentrate Emerion™ W 40 SL	87663-1
FLAN140F	40%	79766-1 / 87663-11	Emery Agro 7001 Concentrate (MUP)	87663-6
FLAN405F	5%	79766-4 / 87663-12	Emery Agro 7010 RTU	87663-2
FLAN640OG	40%	79766-6 / 87663-14	Emery Agro 7030 Concentrate	87663-4
FLAN640OG	40%	79766-6 / 87663-14	Emery Agro 7031 Concentrate (MUP)	87663-7

276
 277 The EPA established an Exemption from the Requirement of Tolerance for Ammonium Soap
 278 Salts of Higher Fatty Acids (C₈-C₁₈ Saturated; C₈-C₁₂ unsaturated) in the Federal Register on
 279 July 9, 2008 (73 Federal Register 39264) for “all food commodities when applied for the
 280 suppression and control of a wide variety of grasses and weeds.”
 281

282 Additionally, the EPA established an Exemption from the Requirement of Tolerance for
 283 Ammonium Soap Salts of Fatty Acids (C₈-C₁₈ Saturated) in the Federal Register on March 24,
 284 2010 (75 Federal Register 14082) for “pre- and post-harvest on all raw agricultural when
 285 applied / used as a surfactant.”

286
 287 An Exemption from Tolerance is only issued when the EPA has determined that the substance
 288 is considered safe enough that a maximum level of substance permitted in food does not need
 289 to be established (EPA, 2015, “Minimum Risk Pesticides”).

290

291 **IX. Chemical Abstracts Service (CAS) Number and Product Labels**

292 The CAS number for ammonium nonanoate is 63718-65-0.

293 The CAS number for fatty acids (C₈-C₁₈ and C₁₈ unsaturated), ammonium salts is 84776-33-0.

294

295 **X. Physical and Chemical Properties**

296 Ammonium nonanoate is a nine-carbon, saturated fatty acid soap with the chemical formula
 297 NH₄(C₉H₁₇O₂). It is also considered a mineral salt of fatty acids that occurs naturally in the
 298 environment (75 Federal Register 14082). At 20°C (68°F), ammonium nonanoate is a clear,
 299 pale yellow liquid with a slight fatty acid odor. It is completely miscible in water and non-
 300 flammable. Table 2 describes additional physical and chemical properties of ammonium
 301 nonanoate.

302

303 *Table 2: Properties of ammonium nonanoate (EPA, 2008).*

Guideline Number	Study	Result
63-2 (OPPTS 830.6302)	Color	Clear, colorless to pale yellow @ 20°C (68°F)
63-3 (OPPTS 830.6303)	Physical State	Liquid @ 20°C (68°F)
63-4 (OPPTS 830.6304)	Odor	Slightly fatty acid odor
63-5 (OPPTS 830.7200)	Melting point	20.7°C (68°F)
63-6 (OPPTS 830.7220)	Boiling point	260°C (500°F)
63-7 (OPPTS 830.7300)	Density	1.00 ± 0.00 @ 20°C (68°F)
63-9 (OPPTS 830.7950)	Vapor Pressure	17.5 mm Hg at 20 °C (68°F) 23.8 mm Hg at 25 °C (77°F)
63-13 (OPPTS 830.6313)	Stability	Long history of stability of fatty acid soap salts in plastic containers in the form of detergents.
63-15 (OPPTS 830.6315)	Flammability	Product is non-flammable
63-18 (OPPTS 830.7100)	Viscosity	61.02 ± 0.01 cP
63-19 (OPPTS 830.6319)	Miscibility	Completely miscible in water
63-20 (OPPTS 830.6320)	Corrosion characteristics	Not corrosive; product consists of a soap salt of a fatty acid that has been routinely packaged in plastic containers for several decades without exhibiting corrosive properties.
Biodegradation Half-Life		4.99 days
Bio-concentration Factor		0.474

304 Ammonium nonanoate is non-systemic, contact herbicide that has no soil activity (EPA, 2008).
305
306

307 **A. Chemical interactions with other substances, especially substances used in organic**
308 **production.**

309
310 The 2015 Registration Review of Soap Salts by the EPA updated environmental and
311 toxicology information to ensure that “all registered pesticides continue to meet the statutory
312 standard of no unreasonable adverse effects to human health and the environment.” In
313 particular, the 2015 Report added publically available literature, and models of risk quotients
314 and exposure concentrations to the EPA’s 1992 Reregistration Eligibility Document (RED)
315 for Soap Salts. Additionally, the 2015 Report differentiated these data for the various carbon
316 chain lengths (C₈-C₁₈) and three cations (sodium, potassium, and ammonium).

317
318 The precipitation with metal ions (zinc (Zn), copper (Cu), manganese (Mn), iron (Fe),
319 molybdenum (Mo), selenium (Se), cobalt (Co), etc.) is specifically addressed in the 2015
320 Report. It stated that long-chain fatty acids do form a precipitate with metal ions; however,
321 short-chain fatty acids, including nonanoic acid, are too soluble to form these precipitates
322 (EPA, 2015).

323
324 Ammonium nonanoate does not have any known incompatible materials.

325
326 **B. Toxicity and environmental persistence.**

327
328 According to the 2008 Biopesticide Registration Action Document (emphasis added):

329
330 Ammonium nonanoate is closely related to other salts of fatty acids known as soap salts.
331 Toxicology and environmental data requirements for this biochemical herbicide product
332 were waived, primarily via the Agency’s Reregistration Eligibility Document (RED) for
333 Soap Salts. The RED (EPA-738-F-92-013, September, 1992) concludes that **no risks to**
334 **human health** are expected from the use of ammonium salts of higher fatty acids (C₈-C₁₈
335 saturated and C₁₈ unsaturated) based on their **low toxicity** and the fact that residues from
336 pesticide uses are not likely to exceed the levels of naturally-occurring or intentionally-
337 added fatty acids in commonly-eaten foods. Ammonium salts of fatty acids are **rapidly**
338 **biodegraded in the environment**, and are expected to be only minimally toxic to non-
339 target organisms, with the exception of aquatic invertebrates. Appropriate precautionary
340 labeling of end use products containing ammonium salt will further minimize potential
341 exposure and mitigate risk to humans and non-target organisms.

342
343 The Agency has considered ammonium nonanoate in light of relevant safety factors in the
344 Food Quality Protection Act (FQPA) of 1996 and under the Federal Insecticide, Fungicide,
345 and Rodenticide Act (FIFRA) and determined there will be **no unreasonable adverse**
346 **effects from the use of this product**. The Agency has considered available data and other
347 factors, including the natural occurrence of soap salts and the lack of reported adverse
348 effects, and believes that end-use products containing ammonium nonanoate, **can be used**
349 **without causing unreasonable adverse effects to humans or the environment.**

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While potential toxic impact on aquatic organisms was a concern noted in the past decision, the 2015 Registration Review of Soap Salts by the EPA quantified this risk based on the toxicity and solubility of the individual carbon chain lengths compared to the 1992 RED, which treated the range of carbon chains as a single length. The 2015 Report concluded that ammonium salts were less toxic than potassium salts, and that the short-chain fatty acids, including nonanoic acid, are too low in toxicity to cause negative effects to aquatic organisms (EPA, 2015). Classification for the toxicity of ammonium nonanoate for specific aquatic organisms is listed in Table 3.

Table 3: Toxicity classification for acute exposure of aquatic organisms to ammonium nonanoate.

Species Class (Species Evaluated)	Toxicity Classification
Freshwater Fish (Rainbow Trout)	Slightly Toxic
Estuarine / Marine Fish (Sheepshead Minnow)	Practically Non-Toxic
Freshwater Invertebrates (Water Flea / Daphnia)	Slightly Toxic
Estuarine / Marine Fish (Mysid Shrimp)	Slightly Toxic

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Any potential toxic effects to aquatic organisms is further mitigated by the rapid degradation of ammonium nonanoate in the environment. With a half-life in soil of 24 hours, the active elements of the product biodegrade microbially before any potential negative interactions occur within the water column. Furthermore, the biodegradation products are carbon dioxide, water and energy for the microorganism – all naturally occurring elements in nature.

For terrestrial birds, mammals, reptiles and amphibians, the toxicity is negligible and exposure to ammonium nonanoate soap is expected to be minimal (EPA, 2015). Exposure to non-target terrestrial invertebrates (including honey bees) is also expected to be minimal due to the low drift of the substance. Mortality effects are not expected outside of the application site due to the thorough wetting and high concentration required for toxic effects (EPA, 2015). Details on the lack of any negative impact on honey bees are noted in Section XIII, Part 5, as well as outlined in a full study done by the Agro Green Business (see **Appendix C**).

C. Environmental impacts from its use and/or manufacture.

Environmental contamination from the manufacture of ammonium nonanoate at Emery Oleochemicals' Cincinnati, Ohio, site is minimal. Multiple levels of engineering and administrative safety controls are in place throughout our facility. Details are noted in Section XIII, Part 3.

D. Effects on human health.

385 The EPA has concluded that “there is a reasonable certainty that no harm to the U.S.
386 population, including infants and children, will result from aggregate exposure to residues of
387 ammonium salts of fatty acids (C₈-C₁₈ saturated, C₈-C₁₂ unsaturated) due to their use as a
388 pesticide” (73 Federal Register 39264). Additional details are outlined in Section XIII, Part 4.
389

390 E. Effects on soil organisms, crops, or livestock.

391
392 Ammonium nonanoate is a post-emergent, contact herbicide that is intended for spray
393 application on undesirable plant growth. As such, any crop foliage that is not thoroughly
394 wetted will display minimal necrosis, and only a minimal amount will contact the soil.
395 However, both components of ammonium nonanoate act as food for the microorganisms
396 present in the soil, which they convert to energy, and release carbon dioxide and water back
397 into the environment through respiration (EPA, 2008). Ammonium nonanoate is basically
398 non-toxic to birds, mammals, reptiles and terrestrial amphibians, including any livestock that
399 may come in contact with sprayed areas. In general, the taste of soaps is unpleasant, and
400 therefore, it further reduces the likelihood of livestock consuming freshly sprayed
401 undesirable plants. Additional details are outlined in Section XIII, Part 5.
402

403 XI. Safety Information

404 While ammonium nonanoate is classified as an acute health hazard due to the potential for eye
405 irritation when used at high concentration levels, as with any agricultural substance, the use of
406 safety glasses is recommended to avoid exposure to liquid splashes or mists. Personal hygiene
407 measures, including proper hand washing, refraining from eating during application, and
408 wearing appropriate clothing, are also recommended for the safe handling of most agricultural
409 substances and are sufficient for the safe use of ammonium nonanoate.
410

411 The full Safety Data Sheet (SDS) is attached to this petition in **Appendix D**.
412

413 XII. Research Information

414 The primary purpose of the use of ammonium nonanoate is weed-control efficacy.
415 Independent, third-party field and greenhouse trials have evaluated the efficacy of ammonium
416 nonanoate against a variety of plant species and under numerous environmental conditions.
417 Studies have also considered the interaction between product rates and spray volumes to
418 establish the balance between the product cost and water usage.
419

420 In 2006, a field trial at Oklahoma State University determined that control of tumble pigweed
421 (*Amaranthus albus* L.) and spiny pigweed (*Amaranthus spinosus*) tended to peak with a spray
422 volume of 70 gallons per acre (GPA) at 4.1 percent volume by volume (v/v) rate. This
423 combination resulted in greater than 93 percent control. For sensitive weed species, such as
424 carpetweeds (*Mollugo verticillata* L.), lower spray volumes of 17.5 GPA and 35 GPA also
425 resulted in greater than 93 percent control at 6 days after treatment (DAT).
426

427 The field study was repeated at two locations in 2007 with the 35 and 70 GPA spray volumes.
428 At 7 DAT, there was greater than 90 percent control for both carpetweeds (*Mollugo verticillata*

429 L.) and crabgrass (*Digitaria* species) regardless of spray volume, as long as the application rate
430 was more than 5 percent v/v. Here, as in 2006, the control of tumble pigweed (*Amaranthus*
431 *albus* L.) was greatest with a spray volume of 70 GPA, but a 6.1 percent v/v rate was required.
432

433 Also in 2007, a field trial at the University of California, Davis evaluated ammonium
434 nonanoate at a 40 GPA application volume against shepard's purse (*Capsella bursa-*
435 *pastoris*), burning nettle (*Urtica urens*), purslane (*Portulaca oleracea*), and hairy nightshade
436 (*Solanum physalifolium*). A 6 percent v/v rate controlled each weed species at greater than 85
437 percent with shepherd's purse and hairy nightshade, particularly sensitive species.
438

439 Ammonium nonanoate was also tested in a greenhouse setting at Penn State University in
440 2008 (Table 3). The weed species evaluated were: brown mustard (*Brassica juncea*), yellow
441 mustard (*Brassica alba*), giant foxtail (*Setaria faberi*), velvetleaf (*Abutilon theophrasti*), common
442 lambsquarter (*Chenopodium album*) and smooth pigweed (*Amaranthus hybridus*). As part of the
443 trial, four rates of vinegar and four rates of clove oil were tested against two rates of
444 ammonium nonanoate.
445

446 For each of the weed species tested, the 13 percent v/v rate of ammonium nonanoate worked
447 as effectively as or better than any of the other treatments. This is particularly true for the giant
448 foxtail and velvetleaf species. The 13 percent v/v rate of ammonium nonanoate resulted in 85
449 percent control of giant foxtail; the 6.5 percent rate controlled 65 percent, which was
450 significantly less than the 13 percent rate, but still significantly greater control than any of the
451 other products. In fact, only the 20 percent vinegar and 20 percent clove oil provided control
452 that was significantly greater than the untreated check plots for giant foxtail and velvetleaf.
453

454 For the other four weed species, both rates of ammonium nonanoate (6.5 percent and 13
455 percent v/v) had numerically better control than the 20 percent vinegar and 20 percent clove
456 oil rates, though the values were not statistically different.
457

458 Please see Table 4 on the following page for more information.
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472 Table 4: Percent control of brown mustard (*Brassica juncea*), yellow mustard (*Brassica alba*), giant foxtail
 473 (*Setaria faberi*), velvetleaf (*Abutilon theophrasti*), common lambsquarter (*Chenopodium album*) and smooth
 474 pigweed (*Amaranthus hybridus*) 14 days after treatment with vinegar, clove oil, or ammonium nonanoate as
 475 listed.

			Percent Control					
Treatment	Rate ¹	GPA ²	Brown Mustard	Yellow Mustard	Giant Foxtail	Velvetleaf	Common Lambsquarter	Smooth Pigweed
Untreated	---	---	0.0 c ³	0.0 f	0.0 e	0.0 d	0.0 e	0.0 d
Vinegar	5%	70	10.0 c	13.8 ef	0.0 e	0.0 d	0.0 e	0.0 d
Vinegar	10%	70	27.5 b	30.0 de	0.0 e	1.3 d	13.8 e	20.0 c
Vinegar	15%	70	61.3 a	61.3 bc	2.5 e	8.8 cd	50.0 cd	45.0 b
Vinegar	20%	70	70.0 a	82.5 ab	25.0 d	28.8 b	80.0 ab	77.5 a
Clove oil	5%	35	35.0 b	37.5 d	5.0 e	0.0 d	35.0 d	43.8 b
Clove oil	10%	35	35.0 b	47.5 cd	10.0 de	13.8 bcd	46.3 cd	43.8 b
Clove oil	15%	35	38.8 b	50.0 cd	15.0 de	15.0 bcd	52.5 cd	42.5 b
Clove oil	20%	35	65.0 a	68.8 abc	21.3 d	23.8 bc	88.8 a	60.0 ab
Ammonium nonanoate	6.5%	70	75.0 a	91.3 a	65.0 b	55.0 a	88.8 a	73.8 a
Ammonium nonanoate	13%	35	73.8 a	92.5 a	85.0 a	55.0 a	92.5 a	72.5 a

476 ¹ The rate for vinegar and clove oil is expressed as percent active product applied. The vinegar concentrated product
 477 was 46.9% acetic acid; the clove oil product was 50% concentrate. The ammonium nonanoate is a 40%
 478 concentrate and the amount of product applied is expressed as percent volume by volume (% v/v).

479 ² GPA is gallons per acre spray volume.

480 ³ Within a column, treatments with different letters are significantly different at p< 0.05.

481

482 XIII. Petition Justification Statement

483

484 1. The potential of the substance for detrimental chemical interactions with other materials 485 used in organic farming systems.

486

487 The 2015 Registration Review of Soap Salts by the EPA updated environmental and
 488 toxicology information to ensure that “all registered pesticides continue to meet the statutory
 489 standard of no unreasonable adverse effects to human health and the environment.” In
 490 particular, the 2015 Report added publically available literature, and models of risk quotients
 491 and exposure concentrations to the EPA’s 1992 Reregistration Eligibility Document (RED)
 492 for Soap Salts. Additionally, the 2015 Report differentiated these data for the various carbon
 493 chain lengths (C₈-C₁₈) and three cations (sodium, potassium, and ammonium).

494

495 The precipitation with metal ions (zinc (Zn), copper (Cu), manganese (Mn), iron (Fe),
 496 molybdenum (Mo), selenium (Se), cobalt (Co), etc.) is specifically addressed in the 2015
 497 Report. It stated that long-chain fatty acids do form a precipitate with metal ions; however,
 498 short-chain fatty acids, including nonanoic acid, are too soluble to form these precipitates.

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In the updated Safety Data Sheet (**Appendix D**), ammonium nonanoate does not have incompatible materials or the possibility of hazardous reactions.

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.

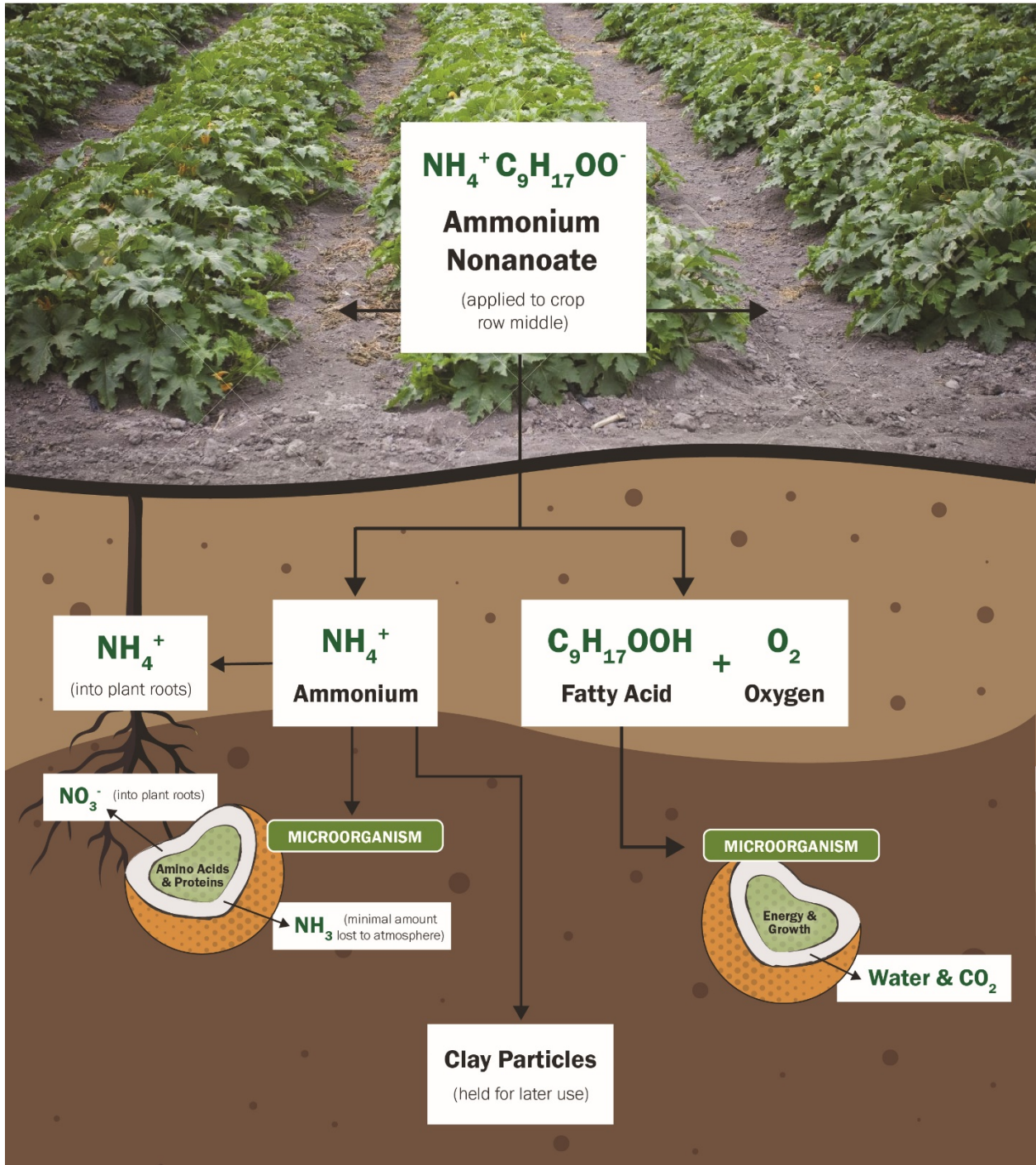
Ammonium nonanoate has a physical, not systemic, mode of action. It is a non-selective, broad-spectrum, contact herbicide that has no soil activity (EPA, 2008). It acts by penetrating the waxy coating (cuticle) on plant leaves and disrupts the structure of the cell walls. As a result, the leaves are unable to hold water. This evaporation results in the drying out and death of the plant leaves. Without sufficient leaf surface area, the plant is unable to conduct photosynthesis and eventually dies.

While ammonium nonanoate is intended to be applied to weeds in crop row middles, we understand that it will make some contact with soil during application. The following and Figure 1 will explain ammonium nonanoate's breakdown products and its benefits to microorganisms as a food source:

The fatty acid component of ammonium nonanoate is an excellent energy source for microorganisms. In nature, fatty acids are an essential part of all animal diets as they are present in the fats and oils of all living tissues, including seeds (EPA, 2015). As such, soil microorganisms are the primary consumers of fatty acids, where they combine it with atmospheric oxygen to produce energy and growth for the microorganism's cells, and release carbon dioxide (CO₂) and water (H₂O) into the environment (EPA, 2015).

During microbial biodegradation, the ammonium ion (NH₄⁺) is primarily consumed by the microorganisms as a food source and is converted to either amino acids or proteins that cells use for biological functions and growth. Alternatively, though less frequently, ammonium can be absorbed by the plant roots, converted to nitrate (NO₃⁻) by microorganisms and then absorbed by the plant roots, incorporated into the structure of soil clay particles for later use, or converted by microorganisms into ammonia gas. All of these are naturally occurring biological functions and processes that occur in all soils.

541 Figure 1: The diagram below shows how ammonium nonanoate should be applied to weeds in the crop row
 542 middles as well as the resulting breakdown in the soil if contact is made during application.
 543



544
 545
 546 Based on a study submitted and approved by the EPA, fatty acid soaps, including ammonium
 547 nonanoate, break down within 24 hours (EPA, 1992). A further study concluded that in soil
 548 treated with fatty acid soaps, the fatty acid levels had declined to natural levels within 10 days
 549 and that microbial processes were responsible for the degradation (EPA, 2015). Therefore,

550 ammonium nonanoate does not bioaccumulate in the environment, and exposure to this
551 substance by soil microorganism is not a concern, since these organisms rapidly biodegrade
552 all fatty acids soaps.

553
554 In contrast, while acetic acid (vinegar) is also a fatty acid, albeit a very short-chained one, and
555 due to its very acidic pH of 2.4, acetic acid results in the immediate death of any soil
556 microorganisms that it contacts. Acetic acid also poses hazardous risks for worker safety due
557 to the higher concentrations needed for acetic acid to be effective for weed control versus the
558 low hazard and lower concentrations required for efficacy of ammonium nonanoate.
559 Further, the restricted-entry interval (REI) for acetic acid is typically 48 hours versus 4 hours
560 for ammonium nonanoate.

561
562 **3. The probability of environmental contamination during manufacture, use, misuse or**
563 **disposal of the substance.**

564 Environmental contamination from the manufacture of ammonium nonanoate at Emery
565 Oleochemicals' Cincinnati, Ohio, site is minimal. Multiple levels of engineering and
566 administrative controls are in place to safeguard the environment during our operations as
567 follows:

568
569 Management Systems for Environmental Sustainability:
570 Emery Oleochemicals is an ISO 14001 registered facility. Benchmarking and goal setting are
571 conducted annually as our company continually works to reduce the site's environmental
572 footprint. Areas addressed have included energy conservation projects, solid waste recycling
573 and reduced water use.

574 Emery Oleochemicals has sponsored a Community Advisory Panel for more than 25 years.
575 The facility staff meets with representatives of the surrounding local communities on a bi-
576 monthly basis to discuss topics of common interest such as site emissions, emergency
577 preparedness and response, transportation safety, student education in math and sciences,
578 and job availability.

579 Emery Oleochemicals has issued an annual Sustainability Report for the last four years
580 demonstrating the company's environmental, social, governance and economic performance
581 which acts as a benchmark to reinforce our ongoing commitment to achieve a long-term
582 positive impact on society and the economy through sustainable business practices.

583
584 Process safety management systems at our site, including multiple safety, health and
585 environmental procedures, pre-startup safety reviews for all manufacturing processes and
586 mechanical integrity inspections, have been adopted site-wide as part of our company's
587 sustainability goals, not just in OSHA or EPA-regulated manufacturing processes.

588 Protection of Air:
589 In 2011, Emery Oleochemicals made the decision to switch from coal to natural gas for
590 steam generation. Criteria pollutant emissions were reduced by more than 90 percent.
591 Multiple recognition awards were received including the 2011 Eagle Award for Excellence

592 for an exemplary accomplishment in reducing emissions that defines sustained commitment,
593 program excellence and innovative environmental stewardship, Ohio Chemistry Technology
594 Council (OCTC) and 2012 Biggest Breakthrough, Greater Cincinnati Manny Award.
595

596 In addition, the following processes and protocols are in place to ensure regulatory
597 compliance and worker safety:

- 598 • Scrubbers and regenerative thermal oxidizers are used for volatile organic compounds
599 (VOC) and ammonia point emissions control;
- 600 • Thermal incinerators and a bio-reactor are used for odor abatement; and
- 601 • Leak detection and repair (LDAR) programs are in place for control of any potential
602 fugitive VOC emissions.

603
604 Protection of Water:

605 Mill Creek flows through the center of our Cincinnati-based site. An 18-inch-high concrete
606 dike protects the creek from any potential contaminants from our manufacturing processes
607 and site vehicle traffic.
608

609 Installations of bio-swales (rain gardens) alongside our
610 main site roadway capture oil and grease from
611 roadways and eliminate contaminated flow into
612 groundwater or the Mill Creek. *The image to the right*
613 *shows a Monarch Waystation sign in one of the bio-swales*
614 *at Emery Oleochemicals Cincinnati, Ohio site.*

615
616 Our bio-swales are nationally certified Wildlife
617 Habitats and Monarch Waystations. Numerous
618 awards have been received for the installation of these
619 bio-swales at our Cincinnati site, including the 2012
620 Eagle Award for Excellence for Collaboration for the
621 Environment, Ohio Chemistry Technology Council
622 (OCTC); and the 2013 Biggest Breakthrough,
623 Greater Cincinnati Manny Award.



624
625 Bio-digesters are used to convert high organic concentration waste water streams into bio-gas
626 for energy recovery. In addition, dikes have been installed around tank farms for any spill
627 containment. Finally, the site has a process for the skimming of floating oil and grease from
628 waste water prior to discharge to the public water treatment facility. This reclaimed material
629 is reworked into additional fatty acids.

630
631 Protection of Land:

632 Recycling programs are in place at our site for collection of scrap metal, paper and
633 cardboard, gloves, aluminum cans and more. In addition, all vehicles leaving the site to
634 transport product are inspected, with photograph documentation, to ensure the containers
635 are properly sealed before release onto public roadways.

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Use:

The probability of environmental contamination during use of the product is mitigated by the EPA approved product label (**APPENDIX B, EMERY AGRO 7000 CONCENTRATE:** Page 6):

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements of agricultural workers on farms, forests, nurseries and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated such as plants, soil, or water is:

- Coveralls worn over short-sleeve shirt and short pants
- Socks and chemical resistant footwear
- Chemical resistant gloves
- Protective eyewear

The product is a contact herbicide effective only when targeted weeds are contacted directly. Any material that reaches the soil will be broken down in a 24-hour period (as noted in Section II). Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Use care when applying adjacent to any body of water. Should the product come in contact with water, it is only slightly toxic to freshwater invertebrates (EPA, 2015), and will be quickly biodegraded by water microorganisms, thus largely mitigating ammonium nonanoate's impact on water.

Clear label instructions mitigate potential misuses. However, the impact from any potential misuses with regard to non-target species, waterways, soil, human or livestock interaction are already largely mitigated and detailed by the safety profile and non-toxic nature of the product as noted in Sections IV and V.

Disposal:

Proper disposal of the product is outlined in the product label (**Appendix B, EMERY AGRO 7000 CONCENTRATE:** Page 17):

STORAGE AND DISPOSAL

DO NOT contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store container in cool place until used. Store at temperatures above 32° F.

Pesticide Disposal: Wastes resulting from use of this product must be disposed of on-site or at an approved waste disposal facility.

Container Handling:

Non-refillable Containers: Do not reuse or refill this container. Offer for recycling if available.

Clean container promptly after emptying (liquid formulations).

Non-refillable container equal to or less than 5 gals: Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container ¼ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Non-refillable container between 5-55 gals: Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container ¼ full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

Refillable container 5 gals to bulk: Refill this container with this pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. Dispose of in a sanitary landfill or by other procedures approved by state and local authorities.

4. The effect of substance on human health.

As with any agricultural input, general safety precautions are suggested when handling, mixing, applying or disposing ammonium nonanoate – for example, eye protection, gloves and appropriate clothing – as outlined by the product label and required by law.

Were the product to be misused, oral exposure is generally self-limiting, since the taste of soap is easily recognized and unpleasant. In addition, ammonium soaps have an ammonia odor that limits oral exposure. Ammonium nonanoate is of acute or low toxicity and has been placed in Toxicity Category IV, the lowest toxicity classification (EPA, 2008).

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Fatty acids are a significant part of the human diet and the residues of fatty acids from pesticidal use of ammonium nonanoate are not likely to add significantly to the levels of fatty acids. In addition, exposure to low levels of soap salt residues on treated foods poses no known health risks (EPA, 1992). In fact, the FDA even lists salts of fatty acids as additives that may be used in food (69 Federal Register 23122).

The EPA has concluded that “there is a reasonable certainty that no harm to the U.S. population, including infants and children, will result from aggregate exposure to residues of ammonium salts of fatty acids (C₈-C₁₈ saturated, C₈-C₁₂ unsaturated) due to their use as a pesticide” (73 Federal Register 39264).

While prolonged dermal or inhalation exposure (24 hours) to ammonium nonanoate has the potential to cause skin or respiratory irritation (EPA, 2008), as noted on the product label, the use of gloves, hand-washing after product use and use in a properly ventilated area can easily mitigate these potential unfavorable consequences.

Regarding worker safety, the Restricted Entry Interval (REI) for ammonium nonanoate is four hours (minimum REI period required by EPA). However, were this not the minimum, workers could re-enter the area as soon as the product dries post-application due to the product’s fast-acting process.

Salts of fatty acids are exempt from the requirement of a tolerance for residues in or on all raw agricultural commodities when used in accordance with good agricultural practices (73 Federal Register 39264). Substances are only exempt from tolerance when the EPA determines that the substance is considered to be safe enough that a maximum level of substance permitted in food does not need to be established (EPA, 2015, “Minimum Risk Pesticides”).

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.

Ammonium nonanoate acts as food for microorganisms present in the soil to provide energy. As a non-selective, broad-spectrum, contact herbicide (EPA, 2008), ammonium nonanoate’s mode of action is physical, not systemic, and it has no pesticidal soil activity. It disrupts the structure of the waxy cuticle of the leaf, causing desiccation. It does not add to the salinity of the soil because neither the product nor its biodegradation products contain any sodium. The ammonium ion is also used by soil microorganisms in the synthesis of proteins and amino acids. Refer to Section XIII, Part 2 for a detailed diagram of this process.

Since ammonium nonanoate has a half-life of 24 hours in soil, the substance is microbially biodegraded before potential unfavorable interactions in the soil are possible. Furthermore, the biodegradation products are carbon dioxide and water as well as energy and growth for microorganisms (EPA, 2008).

774
775 Based on low toxicity and limited potential for non-target exposure (due to the thorough
776 wetting required for efficacy), soaps, as a group, are not expected to cause adverse effects to
777 organisms that are not directly exposed. Ammonium nonanoate is practically non-toxic to
778 birds, mammals, reptiles and terrestrial amphibians. Due to the ubiquitous nature of fatty
779 acids in the environment and limited potential for oral exposure via established uses, the
780 EPA has waived all generic mammalian toxicity data requirements for fatty acid soaps (EPA,
781 2015).

782
783 Regarding toxicity for non-target organisms, Emery Oleochemicals conducted a study in May
784 2014 to test the potential impact of ammonium nonanoate on the mortality rate of honey
785 bees (as outlined in **Appendix C**). The study exposed each honey bee in the study to a single
786 dose of 100 micrograms of ammonium nonanoate. The bees were observed for 48 hours and
787 none of the exposed bees showed any abnormal behavior. Since the mortality rate in the test
788 substance group (6.7 percent ammonium nonanoate) and control group (3.3 percent) was
789 different by less than 10 percent LD₅₀ (Median Lethal Dose), the product can be classified as
790 non-toxic to honey bees. Based on application rate and low drift potential of ammonium
791 nonanoate, offsite mortality effects are also not expected. At the use rate, honey bees and
792 other non-target insects, are likely to be repelled due to the unpleasant odor of soaps, which
793 further limits their exposure.

794
795 Results of the acute toxicity studies with soap products indicated that ammonium soaps are
796 less toxic than potassium soaps to estuarine, marine and freshwater fish and invertebrates
797 (EPA, 2015), whereas the EPA 1992 RED only used potassium soap data to determine
798 aquatic toxicity for all soaps, including ammonium soaps. Since the product is not intended
799 for direct application to aquatic sites, exposure to aquatic organisms is further mitigated
800 (EPA, 2008). Additionally, both the ammonium ion and fatty acid components are quickly
801 biodegraded by microorganisms in the soil and therefore, are not likely to leach out of the
802 soil profile and into any bodies of water.

803
804 As outlined on the product label, ammonium nonanoate is intended for use in crop row
805 middles and not in areas where livestock may be active. However, even if livestock were
806 introduced to an area treated with ammonium nonanoate, toxicity is negligible. Adverse
807 effects are unlikely due to the low mammalian toxicity and unpleasant taste of soaps which
808 would deter livestock from ingesting any treated weeds.

809
810 When compared to other weed control alternatives, the contrasts are significant. As one
811 example, tillage, an organically approved method of weed control, can have the following
812 negative effects:

- 813 • Reduced earthworm activity;
- 814 • Reduced soil organic matter, which is tied to nutrient availability;
- 815 • Reduced water infiltration;
- 816 • Reduced soil-stored carbon, which increases climate change;
- 817 • Increased burning of fossil fuels (tillage tools);

- 818 • Compacted soil, which lowers yields and reduces root mass; and
- 819 • Reduced soil particle size, which leads to increased erosion (wind and water).

820

821 **6. The alternatives to using the substance in terms of practices or other available materials.**

822

823 While traditional and alternative organic weed control methods listed under 7 C.F.R.
824 §205.206(c) may be effective in optimal organic system planning and weather years, they may
825 not always be practical or safe for the environment or workers:

- 826 • Tillage lends itself to increased soil damage, including the loss of organic matter
827 through soil inversion and exposure to air.
- 828 • Flaming creates negative environmental effects through carbon emissions and fossil
829 fuel introduction to soil.
- 830 • Vinegar, clove oil, thyme oil, lemon grass oil and limonene are generally not effective;
831 high concentration levels needed for effectiveness lead to potential user safety risks.
- 832 • Hand-rouging/hand-weeding can be effective, but is not always profitable or easily
833 scalable to additional organic acres.
- 834 • Cover crops add additional complexity and are hard to maintain for optimal
835 effectiveness (hard to grow, hard to kill).
- 836 • Mulching is often impractical and only effective on high-value farming crops (needs
837 high-volume to be effective); sufficient material is not always available. The utilization
838 of plastic mulches is wasteful of natural resources, requires additional effort and fuel
839 for removal and contributes to the contamination of the environment through both its
840 manufacture and disposal in landfills.

841 Effective weed control consistently ranks among organic growers' top concerns. When asked
842 about production conditions of greatest concern, losses from weed pressure ranked fourth
843 behind weather, input costs, and labor costs (Walz, 2004). In the USDA Organic Census of
844 Agriculture, nearly 21 percent of farms listed production problems as their primary challenge
845 in 2014, compared with 20 percent in 2008 (USDA, 2014; USDA, 2008). In a follow-up
846 survey, the Sustainable Food Laboratory determined that yield losses from weed pressure
847 were of greatest concern to current organic farmers (Reaves and Rosenblum, 2014). For
848 potential organic growers, and those looking to expand their acreage, the high risk associated
849 with the transition to a highly complex management system that is specific to both the region
850 and cropping system was of greatest concern (Reaves and Rosenblum, 2014).

851

852 The National Organic Standards focus on the prevention of weeds under 7 C.F.R.
853 §205.206(a). As noted, growers are to use these methods, but are not limited to them.
854 Provided that the requirements of 7 C.F.R. §205.206(e) are met, when 7 C.F.R. §205.206(c)
855 methods are insufficient, ammonium nonanoate is a viable alternative.

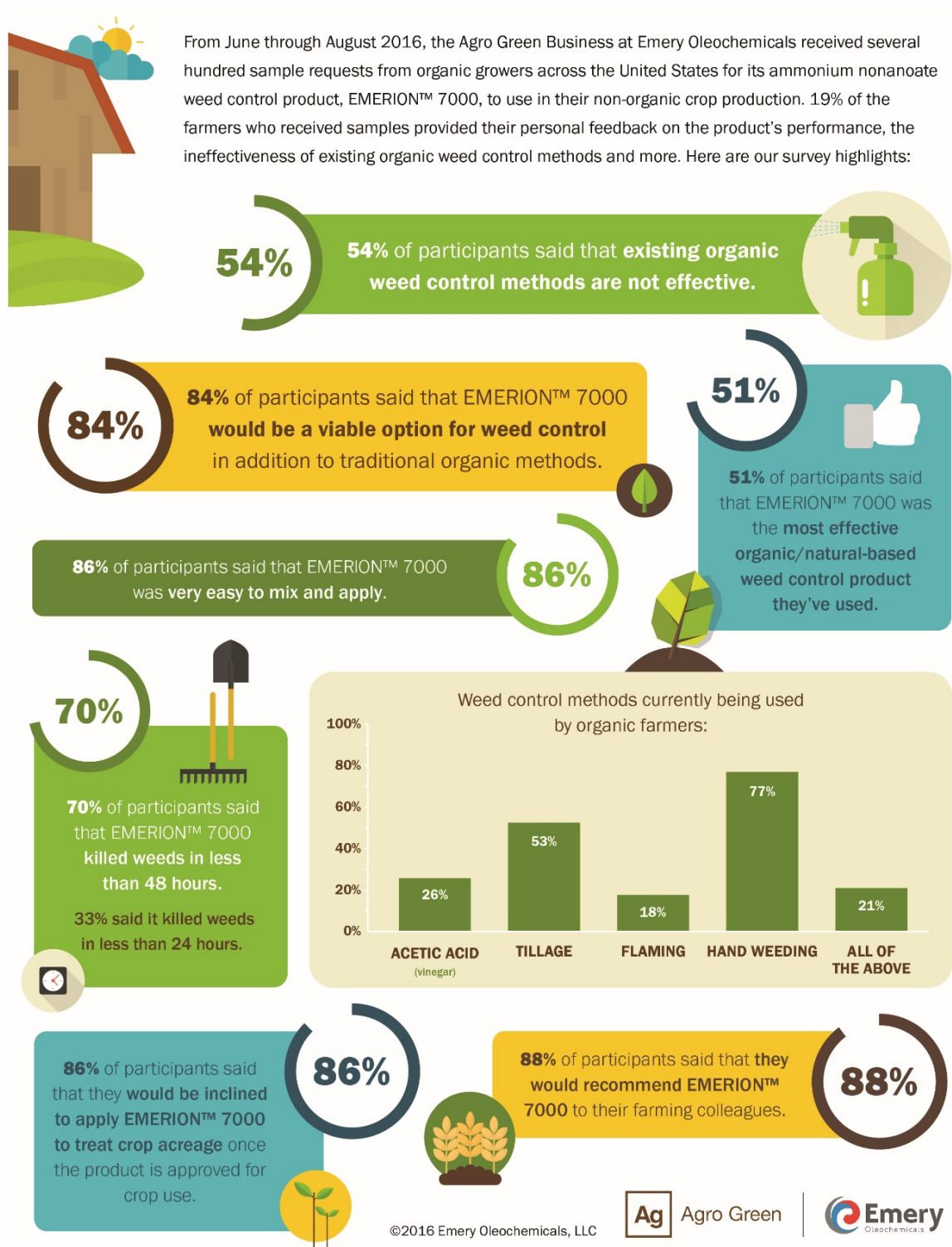
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857 Our Agro Green Business conducted a survey as part of its 2016 ammonium nonanoate
858 sampling program. The survey requested feedback from organic growers across the United
859 States who had sampled the product for use in their non-organic farming production to
860 determine organic grower demand for alternative methods to organic weed control. As
861 referenced in the past NOSB decision, it was noted that the Committee felt grower demand

862 was not present and existing methods were satisfactory (NOSB, 2011). However, based on
863 hundreds of requested ammonium nonanoate samples sent to and used by organic growers
864 in non-organic crop production during the two month sample program, our survey findings
865 support that there is indeed significant grower interest for alternative organic methods and
866 those current organic methods are not effective for all growers.
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Refer to **Appendix A** for the Agro Green Business' organic grower survey results and see key findings in the graphic below:



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911 7. Its compatibility with a system of sustainable agriculture.
912

913 Organic agriculture is a production system that sustains the health of soils, ecosystems and
914 people. It relies on ecological processes, biodiversity and cycles adapted to local conditions,
915 rather than the use of inputs with adverse effects. Organic agriculture combines tradition,
916 innovation and science to benefit the shared environment, and promote fair relationships
917 and a good quality of life for all involved.

918
919 Ammonium nonanoate lends itself to organic agriculture as a sustainable product that can
920 also promote the health of soils, ecosystems and people due to the ability to predict its
921 effectiveness, estimate its impact and solve a problem - weed control. Sustainable agriculture
922 focuses on how to preserve land for continued crop harvests from generation to generation.
923 In the approach of ammonium nonanoate's natural-based sourcing, there is a positive effect
924 on the environment, including reducing material sent to the landfill.

925
926 Ineffective weed control methods in organic agriculture will continue to negatively affect the
927 consumer ratio of supply and demand. By increasing our ability to control weeds in organic
928 systems through the use of ammonium nonanoate, we increase potential yields to provide
929 quality, sustainable food sources for our growing world population. The introduction of
930 ammonium nonanoate will help produce healthy foods without compromising the next
931 generation's health.

932
933 Allowing ammonium nonanoate to be added to the National List will also help supplement
934 the export vs. import ratio in the organic farming industry. As governing agencies continue
935 to regulate safe, sustainable solutions for growers within the U.S., we also must continue to
936 review how our global partners are regulating themselves to harvest their "organic" products
937 and export them to our country for consumption in the U.S.. Are their products held to the
938 same standards? We cannot be sure that other countries, from which we already import
939 products, are abiding by the same rules. Therefore, allowing ammonium nonanoate as a
940 method to control weeds in the organic market within the U.S. will help supply our own
941 nation's ever-growing demand for local organic products; doing so in a way that customers
942 and consumers can rest assured that the products are truly organically produced by local
943 growers.

944
945 Maintaining biodiversity through effective, responsible and sustainable methods is critically
946 important as populations continue to grow and require healthy, natural food sources.
947 Allowing ammonium nonanoate as an approved method of organic weed control will help
948 ensure continued biodiversity for generations of agricultural need.
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950 8. In Closing.

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New information provided by the EPA in 2015, “Revised Environmental Fate and Ecological Risk Assessment, Soap Salts,” additional organic industry studies, and feedback received directly from organic growers across the United States provides compelling support for why ammonium nonanoate should be added to the National List of allowed substances, including:

- Data published by the EPA in 2015 further clarified the safety of ammonium nonanoate to the soil, non-target organisms (including honey bees and aquatic invertebrates), workers and the environment through a thorough assessment of the environmental fate and potential ecological risks;
- Organic growers across the United States have expressed the need for weed control alternatives to approved traditional organic methods (as outlined in **Appendix A**);
- Fatty acids, the foundation of ammonium nonanoate, are ubiquitous in nature. They are excellent and efficient sources of energy for living cells;
- Any potential unfavorable effects on the environment from manufacture, use, misuse, or disposal are mitigated by careful environmental protection practices during manufacture, comprehensive label instructions and a 24-hour half-life in the environment;
- There is no level of concern (LOC) by the EPA regarding non-target aquatic and terrestrial animals and plants when ammonium salts are applied to terrestrial crop sites and this substance is non-toxic to birds and mammals; and
- Carbon dioxide emissions, fossil fuel burning and the breakdown of soil from methods such as tillage and flaming operations all negatively affect soil microorganisms, structure, fertility and soil biological systems despite both of these being approved organic weed control methods.

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Appendix A

EMERION™ 7000 Ammonium Nonanoate Sample Program and Survey Results

Program Details:

In June 2016, the Agro Green Business at Emery Oleochemicals implemented a product sample program for organic growers across the United States. These farmers were invited to sample the company's ammonium nonanoate weed control product, EMERION™ 7000, for use in their non-organic crop operations.

During the two-month duration of the program, several hundred sample requests were received and fulfilled.

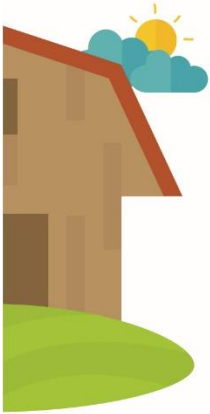
Survey Results:

After the organic farmers received their ammonium nonanoate sample, they were encouraged to share their experience using the product by participating in an online survey. The Agro Green Business received a 19% response rate from the hundreds of sample recipients indicating the organic farmers' overwhelming support of this product and uncovering a key unmet need for more effective weed control products that could be used in organic production.

The following statistics highlight key survey results:

- 54 percent of respondents indicated that existing organic weed control methods are not effective for them; they noted that existing organic methods included tillage, acetic acid, flaming and hand weeding
- 51 percent of respondents indicated that EMERION™ 7000 was the most effective product they had ever used compared to other organic or natural-based weed control products
- 84 percent of respondents indicated that they felt EMERION™ 7000 would be a viable option for weed control in addition to traditional organic methods (tillage, acetic acid, flaming, hand weeding, etc.) once the product is approved for organic crop production
- 86 percent of respondents indicated they would be inclined to use EMERION™ 7000 to treat crop acreage once the product is approved for organic crop production
- 88 percent of respondents said they would recommend EMERION™ 7000 to their farming colleagues

Refer to the infographic below on Page 2 of this attachment for additional information.



From June through August 2016, the Agro Green Business at Emery Oleochemicals received several hundred sample requests from organic growers across the United States for its ammonium nonanoate weed control product, EMERION™ 7000, to use in their non-organic crop production. 19% of the farmers who received samples provided their personal feedback on the product's performance, the ineffectiveness of existing organic weed control methods and more. Here are our survey highlights:

54%

54% of participants said that **existing organic weed control methods are not effective.**



84%

84% of participants said that EMERION™ 7000 **would be a viable option for weed control** in addition to traditional organic methods.

51%



51% of participants said that EMERION™ 7000 was the **most effective organic/natural-based weed control product** they've used.

86% of participants said that EMERION™ 7000 was **very easy to mix and apply.**

86%

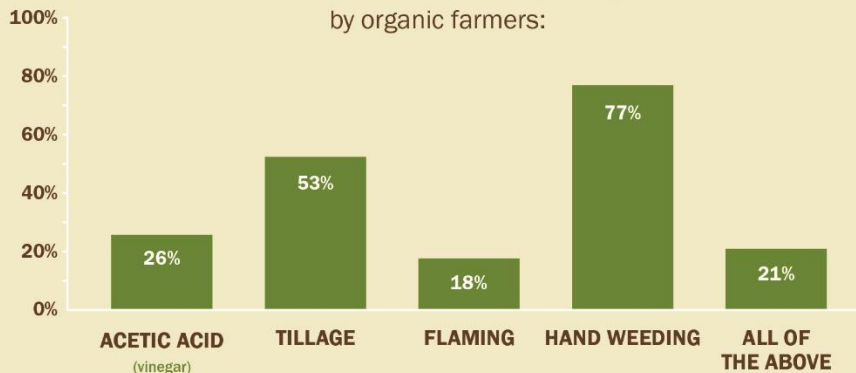
70%

70% of participants said that EMERION™ 7000 **killed weeds in less than 48 hours.**

33% said it killed weeds in less than 24 hours.



Weed control methods currently being used by organic farmers:



86% of participants said that they **would be inclined to apply EMERION™ 7000 to treat crop acreage** once the product is approved for crop use.

86%

88% of participants said that **they would recommend EMERION™ 7000 to their farming colleagues.**

88%





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

July 25, 2016

Sam Ghantous
Emery Oleochemicals LLC
4900 Este Avenue
Cincinnati, OH 45232

Subject: Non-PRIA (Pesticide Registration Improvement Act) Labeling and Formulation
Amendment – Adding Additional Use Directions and Additional Producers
Product Name: Emery Agro 7000 Concentrate
EPA Registration Number: 87663-1
Application Date: March 17, 2016
OPP Decision Number: 515756

Dear Mr. Ghantous:

The amended labeling and Confidential Statement of Formula (CSF) referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, are acceptable.

This approval does not affect any terms or conditions that were previously imposed on this registration. You continue to be subject to existing terms or conditions on your registration and any deadlines connected with them.

Please note that the record for this product currently contains the following acceptable CSF:

- Basic CSF dated 03/15/2016

Any CSFs other than those listed above are superseded/no longer valid.

A stamped copy of your labeling is enclosed for your records. This labeling supersedes all previously accepted labeling. You must submit one (1) copy of the final printed labeling before you release this product for shipment with the new labeling. In accordance with 40 CFR § 152.130(c), you may distribute or sell this product under the previously approved labeling for 18 months from the date of this letter. After 18 months, you may only distribute or sell this product if it bears this new revised labeling or subsequently approved labeling. "To distribute or sell" is defined under FIFRA section 2(gg) and its implementing regulation at 40 CFR § 152.3.

Should you wish to add/retain a reference to your company's website on your label, then please be aware that the website becomes labeling under FIFRA and is subject to review by the U.S. Environmental Protection Agency (EPA). If the website is false or misleading, the product will be considered to be misbranded and sale or distribution of the product is unlawful under FIFRA section 12(a)(1)(E). 40 CFR § 156.10(a)(5) lists examples of statements the EPA may consider false or misleading. In addition, regardless of whether a website is referenced on your product's label, claims made on the website may not substantially differ from those claims approved through the registration process. Therefore, should the EPA find or if it is brought to our attention that a website contains false or misleading statements or claims substantially differing from the EPA-approved registration, the website will be referred to the EPA's Office of Enforcement and Compliance Assurance.

Your release for shipment of this product constitutes acceptance of these terms. If these terms are not complied with, this registration will be subject to cancellation in accordance with FIFRA section 6.

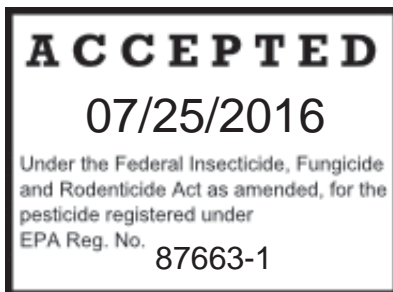
If you have any questions, please contact Gina Burnett of my team by phone at (703) 605-0513 or via email at burnett.gina@epa.gov.

Sincerely,

A handwritten signature in blue ink that reads "Andrew C. Bryceland". The signature is fluid and cursive, with the first name "Andrew" and last name "Bryceland" clearly legible.

Andrew Bryceland, Team Leader
Biochemical Pesticides Branch
Biopesticides and Pollution
Prevention Division (7511P)
Office of Pesticide Programs

Enclosure



EMERY AGRO 7000 CONCENTRATE
(Alternate Brand Name EMERION™ 7000 CONCENTRATE)
(Alternate Brand Name Emerion™ w40 SL)

Non-selective Herbicide

MASTER LABEL

SUBLABEL A: FOR AGRICULTURAL AND COMMERCIAL USE

FOR CONTACT SPRAY CONTROL OR BURNDOWN OF WEEDS AND GRASSES
FOR FOOD CROPS, FIELD CROPS, PASTURES, ORNAMENTALS, TURF, LANDSCAPES,
INTERIORSCAPES, GREENHOUSES, NURSERY CROPS, FARMSTEADS AND AROUND BUILDINGS
AND INDUSTRIAL SITES

FOR CONTROL OF ADELGIDS, APHIDS, EARWIGS, GRASSHOPPERS, LACEBUGS, MEALYBUGS,
MITES, PLANTBUGS, PSYLLIDS, SAWFLY LARVAE, SCALES, TENT CATERPILLARS, WHITEFLIES
AND WOOLY APHIDS *(Not Approved For Use In California)*

FOR THRIPS CONTROL

SUBLABEL B: FOR RESIDENTIAL USE

FOR CONTACT SPRAY CONTROL OR BURNDOWN OF WEEDS AND GRASSES
FOR HOMES AND GARDENS

Active ingredient:

Ammonium Nonanoate	40.0 wt. %
Other ingredients	60.0 wt. %
Total	100.00 wt. %

Optional Label Claims:

- Fast Acting
- Acts on Contact
- Acts on Contact to Kill Green Leafy Tissues
- Results in 15 Minutes
- Effective Weed Control in Cooler Climates
- Quicker Action in Warm / Hot Weather Conditions
- Rain Fast in 2 Hours
- For Control or Burndown of Weeds and Grasses.
- Grass and Weed Knockdown
- Controls Annual and Perennial weeds
- Ideal For Spot Weed Control Around Ornamental Trees, Bushes, Flowers and Landscaping Beds
- Ideal for Weed Control Along Walkways and Driveways
- For Weed Control in and Around the Home and Gardens
- For Agricultural Use
- For Sucker Control Use on Established Nut Trees, Fruit Trees and Vines (Grapes)
- Sucker Control Formula
- Tobacco Sucker Control
- Sucker Control Agent on Flue-Cured Tobacco
- Nut Trees Sucker Control
- Hazelnut Tree Sucker Control
- Fruit Trees Sucker Control
- Cotton Harvesting Aid
- Potato Harvesting Aid
- Row Middles Weed and Grass Control
- Based on Naturally Derived Fatty Acids
- Quickly Kills Green Plant Tissue on Contact
- Readily Biodegradable
- Moss and Algae Control Formula
- For Use as a Harvest Aid and Crop Desiccant on a Variety of Crops
- Will Not Leach Through the Soil to Harm Desirable Plants
- Leaves No Harmful Residues
- Exempt from Tolerance
- For Insect Control

SUBLABEL A: FOR AGRICULTURAL AND COMMERCIAL USE

FOR CONTACT SPRAY CONTROL OR BURNDOWN OF WEEDS AND GRASSES
FOR FOOD CROPS, FIELD CROPS, PASTURES, ORNAMENTALS, TURF, LANDSCAPES, INTERIORSAPES,
GREENHOUSES, NURSERY CROPS, FARMSTEADS AND AROUND BUILDINGS AND INDUSTRIAL SITES

FOR CONTROL OF ADELGIDS, APHIDS, EARWIGS, GRASSHOPPERS, LACEBUGS, MEALYBUGS, MITES,
PLANTBUGS, PSYLLIDS, SAWFLY LARVAE, SCALES, TENT CATERPILLARS, WHITEFLIES AND WOOLY
APHIDS (Not Approved For Use In California)

FOR THRIPS CONTROL

EMERY AGRO 7000 CONCENTRATE
(Alternate Brand Name EMERION™ 7000 CONCENTRATE)
(Alternate Brand Name Emerion™ w40 SL)
Non-selective Herbicide

Active ingredient:

Ammonium Nonanoate 40.0 wt.%
Other ingredients 60.0 wt.%
Total 100.00 wt.%

EMERY AGRO 7000 CONCENTRATE contains 3.3 lbs. of ammonium nonanoate per US gallon

KEEP OUT OF REACH OF CHILDREN

WARNING "AVISO"

"Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)"

FIRST AID	
If in eyes	<ul style="list-style-type: none">• Hold eye open and rinse slowly and gently with water for 15-20 minutes.• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.• Call a poison control center or doctor for treatment advice.
If inhaled	<ul style="list-style-type: none">• Move person to fresh air.• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.• Call a poison control center or doctor for further treatment advice.
If on skin or clothing	<ul style="list-style-type: none">• Take off contaminated clothing• Rinse skin immediately with plenty of water for 15-20 minutes.• Call a poison control center or doctor for treatment advice.
EMERGENCY NUMBER	
FOR 24-HOUR EMERGENCY MEDICAL ASSISTANCE, CALL THE NATIONAL POISON CONTROL CENTER 1-800-222-1222.	
Have the product container or label with you when calling a poison control center or doctor.	

This product is protected by U. S. Patent No. 6,323,156

EPA Reg. No. 87663-1

EPA Establishment No. 87663-OH-001, 72038-DE-001, 06574-KY-001, 064784-OK-001, 75822-TN-001,
70299-CT-001, 082521-GA-001

Lot No. xxxxxxxx

Net Contents: 3,4,16 & 32 fl oz, 1, 2.5,5, 55, 270 & 6000 gals

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Warning. Causes substantial, but temporary eye irritation. Do not get in eyes or on clothing. Wear goggles. Harmful if inhaled. Avoid breathing spray mist. Causes moderate skin irritation. Avoid contact with skin or on clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using toilet. Remove and wash contaminated clothing before reuse.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers must wear:

- Coveralls worn over short-sleeve shirt and short pants
- Socks and chemical resistant footwear
- Chemical resistant gloves
- Protective eyewear
- When mixing and loading wear a chemical resistant apron

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow the manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergents and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

Users should:

- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

For terrestrial uses: This pesticide is toxic to fish and aquatic invertebrates. Use care when applying in areas adjacent to any body of water. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash water or rinsate. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas.

Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the State/Tribal agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated such as plants, soil, or water is:

- Coveralls worn over short-sleeve shirt and short pants
- Socks and chemical resistant footwear
- Chemical resistant gloves
- Protective eyewear

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Keep unprotected persons out of treated areas until sprays have dried.

METHODS OF USE AND GENERAL APPLICATION INSTRUCTIONS

General Instructions:

EMERY AGRO 7000 CONCENTRATE is a contact non-selective herbicide for spray application only to undesirable plant growth. For sucker control (e.g., tobacco, hazelnut, etc.) refer to specific use instructions. Do not allow spray to contact any green plant parts of desirable plants. **EMERY AGRO 7000 CONCENTRATE** provides control and burndown suppression of annual and perennial broadleaf and grass weeds. Spore producing plants such as mosses and liverworts are also controlled. The amount of burndown and the duration of weed suppression may be reduced when weed growth conditions are unfavorable or when plants are mature.

EMERY AGRO 7000 CONCENTRATE when applied directly to the soil surface controls listed insects in row middles of staked crops and row crops, between rows covered in plastic mulch, and areas around the base of trees and vine crops in orchards.

EMERY AGRO 7000 CONCENTRATE is non-volatile and water soluble for foliar application in tractor powered field-type sprayers or manual pump sprayers. Complete and uniform coverage of weeds by the spray solution is required for the best weed control. Plant foliage will change from a green color to brown/black necrotic tissue within one to two hours after spray application of **EMERY AGRO 7000 CONCENTRATE** diluted with water. **EMERY AGRO 7000 CONCENTRATE** effect on plant tissue may be more rapid in warm weather than in cold conditions. However, weed control is normally unaffected by temperature.

EMERY AGRO 7000 CONCENTRATE herbicide is a fatty acid soap product which penetrates the cell walls of plants to disrupt the cellular organization of physiological functions which are compartmentalized by membranes within the cell walls. Plant growth ceases when cellular contents are mixed which causes brown necrotic plant tissue.

EMERY AGRO 7000 CONCENTRATE does not migrate through the soil and is not translocated in plants. **To ensure satisfactory control, plant leaves must be thoroughly and uniformly covered with the spray solution.** **EMERY AGRO 7000 CONCENTRATE** does not provide any residual weed control in soil to affect germinating weed seeds.

Mixing and Application Instructions:

For use, **EMERY AGRO 7000 CONCENTRATE** is diluted with water to the specified concentration for effective control of the undesirable vegetation. Apply using standard methods of liquid herbicide application. Dilution must be in accordance with label instructions. Do not apply this product through any type of irrigation system. A 6 - 8% v/v dilution is recommended for most weed control situations. Based on the results, applicators may increase spray concentrations as discussed in the following text and tables to obtain better control.

The degree of dilution for application is based on the concentration of active ingredient needed for the size of vegetation to be suppressed or the rate of herbicidal effect desired. The larger the vegetation, the higher the concentration (lower dilution) required for rapid action. See required concentration for variously sized weeds and grasses in Dosage and Application Rates Section. Hard to suppress weeds (deep-rooted perennials and some grasses) may require one or more later applications for complete control.

Spray equipment options include hand-held, boom sprayers, pressure sprayers and hose-end sprayers. Spray nozzles that produce a uniform spray will give maximum coverage of the leaves, and thus highest activity. **EMERY AGRO 7000 CONCENTRATE** is completely soluble in water and requires only nominal mixing. Once mixed, no additional mixing or agitation is required.

Application Precautions:

- Do not apply to weeds when wet from dew, rain or irrigation.
- Do not irrigate within 2 hours after application
- Do not apply if rainfall is expected within 2 hours.

During application, some foaming may occur; however, weed control is unaffected if the foam is deposited on the plant surface and is not blown away as drift. Foaming can be reduced by using the minimum spray pressure required for a uniform application to the target weeds. Use low spray pressure to reduce foaming and avoid contact with desirable plants. Most spray nozzles are designed to operate at 10 to 15 psi and provide uniform spray coverage of weeds.

Mixing:

Fill sprayer tank with half the required amount of water, add the full amount of **EMERY AGRO 7000 CONCENTRATE** to be used (see Dilution Factors below), then fill the sprayer tank with the remainder of the water required for the desired final concentration. Since **EMERY AGRO 7000 CONCENTRATE** is completely soluble in water and when uniformly dispersed in water, continuous mixing or agitation is not required.

Always pre-determine the compatibility of labeled tank mixes of EMERY AGRO 7000 CONCENTRATE with other products in advance of application. When tank mixing, add formulation in the following sequence: compatibility agent (if needed), wetting agent and soluble powders, flowable liquids, emulsifiable concentrates and EMERY AGRO 7000 CONCENTRATE. Mix only with other labeled products.

Broadcast Application with Field Sprayer Boom Equipment

The amount of weed vegetation will determine the spray volume required for complete coverage of undesired plants (weeds). Weed vegetation conditions that affect spray coverage are number of weeds present, leaf shape, weed size and weed species. For weeds of over 1 inch height, do not use less than 30 gal/acre of final spray volume. Large weeds of 12 to 18 inch in height may require 80 to 125 gal/acre of final spray volume or more for control.

Hand-Held Equipment

Thorough saturation of the foliage and stems is required for control, but stop sprays prior to run-off from weed leaves. Creating run-off from the leaves may result in the reduction of active material contact with the leaves. Good contact is required for control. Use low spray pressure to reduce foaming and avoid contact with desirable plants. Most spray nozzles are designed to operate at 10 to 15 psi and provide uniform spray coverage of weeds.

Directed Spray Equipment

Use a shielded sprayer to prevent spray contact on desirable plants. Avoid spray contact of green plant stems or green bark of young trees and shrubs.

NOTE: In areas of hard water, the final mixture may appear milky. This condition does not change the effectiveness of the treatment. A clearly visible foam will appear on the leaves as the plants are sprayed. Drift onto desirable plants should be avoided; however, this is usually not a serious problem because of the need for thorough leaf coverage for control of weeds. Repeat application as often as necessary to obtain desired control.

Dosage and Application Rates:

For general weed and grass control, rates are based on the size of the plants and/or the desired speed of kill. The larger the plants, the higher the dosage rates needed to ensure maximum herbicidal activity. Also, the higher the concentration, the quicker the plants wilt and turn brown. Apply **EMERY AGRO 7000 CONCENTRATE** spray solutions only when weed surfaces are dry.

- The rate table presents the suggested percent volume/volume solutions of **EMERY AGRO 7000 CONCENTRATE** to use for application as follows:
- Use a 6 to 8 % V/V (Volume/Volume) **EMERY AGRO 7000 CONCENTRATE** spray solution for control of annual weeds of 1 inch height or less and for control of liverworts and mosses.
- Use an 8 to 10% V/V **EMERY AGRO 7000 CONCENTRATE** spray solution for control of annual weeds over 1 inch height and up to 4 inch height.
- Use a 10 to 13% V/V **EMERY AGRO 7000 CONCENTRATE** spray solution for weeds over 4 inch height, perennial and hard to control weeds.
- Repeat spray applications as necessary to obtain the desired control or suppression of weeds from newly germinated weed seeds and regrowth from roots or stems.

RATE TABLE # 1

Final Spray Volume (gallons)	Amount of EMERY AGRO 7000 CONCENTRATE for Percent V/V (Volume/Volume) Solution								
	3.5%	4%	6%	8%	10%	13%	15%	20%	32.5%
1	4.5 fl oz	5 fl oz	8 fl oz	10 fl oz	13 fl oz	1 pt	1.2 pt	1.6 pt	2.6 pt
2	9 fl oz	10 fl oz	1 pt	1.3 pt	1.6 pt	2 pt	2.4 pt	3.2 pt	5.2 pt
5	1.4 pt	1.6 pt	2.5 pt	3.3 pt	4 pt	5 pt	6 pt	1 gal	1.6 gal
10	2.8 pt	3.2 pt	5 pt	6.5 pt	1 gal	1.3 gal	1.5 gal	2 gal	3.25 gal
15	4.2 pt	4.8 pt	7.2 pt	1.2 gal	1.5 gal	2 gal	2.25 gal	3 gal	4.9 gal
20	5.6 pt	6.4 pt	1.3 gal	1.6 gal	2 gal	2.6 gal	3.0 gal	4 gal	6.5 gal
30	1.05 gal	1.2 gal	1.8 gal	2.4 gal	3 gal	4 gal	4.5 gal	6 gal	9.75 gal
50	1.75 gal	2 gal	3 gal	4 gal	5 gal	6.5gal	7.5 gal	10 gal	16.25 gal

Height of Plants
to be Controlled

1 inch or less

1 to 4 inches

Above 4 inches

Spray
Solution (% V/V)

6 to 8%

8 to 10%

10 to 13%

Use Methods

Determine the weed control situation and select the use method required as follows:

- A. **Vegetative Burndown:** Broadcast spray for weed control for no-till planting or seedbed preparation to control weeds prior to seeding or transplanting. Spot sprays may be used in crops, ornamentals, pastures and turf.
- B. **Directed and shielded sprays:** Spray nozzle type or configuration for directed spray or a shield placed around the nozzle to prevent spray contact on the foliage or green stems or bark. Directed/shielded spray applications to area between plastic mulch strips and staked crops for weed control.
- C. **Pre-emergence Spray Before Seeds Germinate and Emerge, and Before Perennial Plants, Tubers, Bulbs or Seed Pieces Sprout and Emerge:** Make application before new growth emerges.
- D. **Dormant or Post Harvest Spray:** Apply after crops are harvested to kill weeds and residual green growth of the crop plants. Apply to dormant crops such as alfalfa or turf.
- E. **Sucker Control, Pruning and Trimming:** Direct sprays to kill small tender basal suckers in fruit trees, nut trees, field crops and on vines (grapes).
- F. **Desiccation and Harvest Aid:** Apply only when crop is ready to harvest and green crop leaves or weeds interfere with harvest. Spray as broadcast application over the crop and weeds for rapid desiccation of green plant growth to facilitate harvest. Apply as a harvest aid for cotton, potatoes and other root, tuber and bulb vegetables.
- G. **Industrial and Building Uses:** Apply to weeds in walkways, driveways, parking areas and around buildings or structures. Broadcast or spot sprays may be applied to open field areas and rights-of-ways.

PESTS

I. Weeds controlled or suppressed by EMERY AGRO 7000 CONCENTRATE:

COMMON NAMES

TAXONOMIC NAMES

Broadleaf Weeds:

Algae	Gloeocapsa magma
Bittercress, hairy	Cardamine hirsuta
Chickweed, common	Stellaria media
Chickweed, mouse-ear	Cerastium vulgatum
Cocklebur, common	Xanthium strumarium
Corn spurry	Spergula arvensis
Cudweed, purple	Gnaphalium purpureum
Groundsel	Senecio spp.
Lambsquarters, common	Chenopodium album
Liverwort	Machantia spp.
Marestail or Horseweed rosettes	Conyza canadensis
Morningglory, annual	Ipomoea spp.
Moss	Bryophyta
Mustards	Brassica spp.
Oxalis or Woodsorrel	Oxalis stricta
Pansy, wild	Viola tricolor
Plantain	Plantago spp.
Pigweed, smooth and redroot	Amaranthus spp.
Mallow, roundleaved	Malva spp.
Moneywort	Lysimachia nummularia
Shepherdspurse	Capsella bursa-pastoris
Sorrel, sheep	Rumex acetosella
Spurge, spotted	Euphorbia maculata
Field pennycress	Thiaspi arvense
Velvetleaf	Abutilon theophrasti

Grass and Other Weeds:

Bentgrass, colonial	Agrostis tenuis
Bluegrass, annual	Poa annua
Crabgrass, large	Digitaria sanguinalis
Fescue, creeping red	Festuca rubra
Fescue, hard	Festuca ovina
Nimblewill	Muhlenbergia scheberi
Onion, wild	Allium canadense
Ryegrass, perennial	Lolium perenne
Star-of-Bethlehem	Ornithogalum nutans

II. Weeds Moderately Difficult to Control¹

Bermudagrass (Wireweed)	Cynodon dactylon
Bindweed, field	Convolvulus arvensis
Dandelion	Taraxacum officinale
Nutsedge, yellow	Cyperus esculentus
Ragweed, common	Ambrosia artemisiifolia

¹Use 13 to 15% V/V EMERY AGRO 7000 CONCENTRATE for control or suppression

Crop Uses and Methods of Application*

Crop Group	Crops	Use Methods
Root Tuber and Perennial Vegetables	Asparagus, artichoke, beet, carrot, ginger, horseradish, parsnip, potato, radish, rutabaga, sweet potato, turnip and yam ¹ Harvest Aid and Desiccation approved for root and tuber crops in this crop group	A, B, C, D, F ¹
Bulb vegetables	Garlic, leek, onion and shallot	A, B, C, F
Leafy Vegetables	Celery, cilantro, cress, endive, fennel, lettuce, parsley, rhubarb, spinach, Swiss chard	A, B
Cole or Brassica Crops	Broccoli, brussel sprouts, cabbage, cauliflower, collards, kale, kohlrabi, mustard and turnip greens	A, B, C
Legume Vegetables	Beans (Phaseolus spp.: black, green, kidney, lima, mung, navy, pinto, snap and wax), (Vigna spp.: black-eyed, Chinese longbean, cowpea and southern pea), peas (Pisum spp.: garden, green, sugar and snow peas), soybeans	A, B, C
Fruiting Vegetables	Eggplant, okra, pepper, (bell, chili, sweet), pimento, and tomato	A, B, C
Cucurbits and Melons	Cucumber, gourd, muskmelon, cantaloupe, pumpkin, squash, and watermelon	A, B, C
Citrus	Grapefruit, kumquat, lemon, lime, orange, tangerine and tangelo	A, B
Pome Fruit	Apple, crabapple, pear and quince	A, B, E
Stone fruit	Apricot, cherry, nectarine, peach, plum and prune	A, B, E
Small Fruit and Grapes	Blackberry, blueberry, boysenberry, cranberry, currant, dewberry, elderberry, grape (all types), loganberry, olallieberry, raspberry and strawberry	A, B, C, E
Nuts	Almond, brazil nut, chestnut, filbert, macadamia, pecan, pistachio and walnut	A, B, E
Tropical and Other Fruit	Avocado, banana, coconut, date, fig, guava, kiwi, mango, olive, persimmon, papaya and banana	A, B, E
Agronomic Crops and Cereal Grains	Barley, buckwheat, canola, corn (field, popcorn and sweet), cotton, cowpea, flax, millet, oat, peanut, rice, rye, safflower, sorghum, soybean, sugarcane, sunflower and wheat ¹ Harvest Aid and Desiccation approved for cotton, soybean and wheat	A, B, C, F ¹
Forages and Pastures (Forage or Seeds)	Alfalfa, clovers, trefoil, vetch, bromegrass, fescue, bluegrass, lespedeza, ryegrass, sudangrass, timothy, range grasses and crops grown for livestock feed	A, C, D
Herbs and Spices	Anise, basil, Caraway, chive, cumin, curry, dill, fennel, oregano, mints, rosemary, sage, savory, sweet bay, tarragon, thyme and wintergreen	A, B, C, D
Beverage and Specialty Crops	Cocoa, coffee, hops, tea, tobacco and jojoba	A, B, E

* Refer to the General Instructions section for Use Methods description

Farmstead, Buildings and Industrial Sites Uses and Methods of Application*		
Group	Crops	Use Methods
Turf, Flowers, Container, Bedding and Landscape Plants	Turfgrass (maintenance, sod or seed production), bedding plants, flowers and ornamental plants	A, B, C, D, E, F
Trees and Shrubs	Christmas trees, forest and commercial trees, landscape trees, nursery production of trees and shrubs	A, B, E
Greenhouse and Indoor Use	All crops, plants and structures	A, B, C, G
Industrial, Parks and Public Areas	Farmstead, homestead, fallow land, storage areas, schools, paved areas, rights-of-ways (road, railroad, utilities, etc.), parking lots, recreational areas (athletic fields, campgrounds, golf courses, playgrounds, etc.), walks, industrial sites (tank farms, lumberyard, warehouses and other structures, etc.)	A, B, G
Buildings, Driveways, Walkways and Other Structures	Benches, decks, equipment, floors, roofs, wall, walks and evaporative cooling pads	G
Dry Aquatic Sites, Dry Drainage Systems, and Around Aquatic Sites	Applications must be made 72 hours prior to reflooding of dry aquatic sites. Dry ditches, dry canals, ditch banks, and for use above the water line or after drawdown of agricultural irrigation water and ditch systems, industrial ponds and disposal systems, and impounded water areas.	A, G
* Refer to the General Instructions section for Use Methods description		

USE INFORMATION

Harvesting Aid

- **Cotton Harvest Aid**

Usage: **EMERY AGRO 7000 CONCENTRATE** is recommended for use to desiccate the cotton plant green foliage prior to harvesting. Only apply if bolls to be harvested have matured. Make application when 70 to 80 percent of the bolls are open, or according to the State Agricultural Extension Service guidelines in the use area.

Mixing: A final spray volume of 15 gallons per acre is recommended to ensure complete coverage of cotton foliage. The minimum recommended dilution is 1.7 gallons of **EMERY AGRO 7000 CONCENTRATE** in the final spray volume of 15 gal (11.3% V/V). Use 3.4 gallons of **EMERY AGRO 7000 CONCENTRATE** in 15 gal (22.7% V/V) for high fertilizer or extreme weather conditions. Use 6.7 gallons of **EMERY AGRO 7000 CONCENTRATE** in 15 gal (44.7% V/V) for dense foliage.

Application: Avoiding spray drift at the application site is the responsibility of the applicator and the grower. Use nozzles that produce a medium droplet size at a spray pressure of less than 30 psi. Make applications in the early morning if windy conditions are expected later in the day. An evening application may be appropriate to maximize spray coverage in the lower canopy, but only if temperature inversion conditions are not present. Rank growth cotton may require two applications.

- **Potato Harvest Aid**

Usage: **EMERY AGRO 7000 CONCENTRATE** is recommended for use to desiccate the potato plant green foliage prior to harvesting. Apply when the potato plant begin natural senescence.

Mixing: A final spray volume of 20 gallons per acre is recommended to ensure complete coverage of the foliage. The minimum recommended dilution is 4.0 gallons of **EMERY AGRO 7000 CONCENTRATE** in the final spray volume of 20 gal (20% V/V). Use 6.5 gallons of **EMERY AGRO 7000 CONCENTRATE** in 20 gal (32.5% V/V) for dense foliage use.

Application: Apply using a broadcast sprayer.

Sucker Control

- **Tobacco sucker control agent for use on flue-cured tobacco.**

Usage: **EMERY AGRO 7000 CONCENTRATE** is recommended for control of the tobacco plant suckers. The first application should occur prior to topping, when 50% – 60% of the plants have a visible button. Use during topping to remove any suckers that are greater than 1 inch in size. Repeat treatment in three to five days after the initial application and in five to seven days thereafter as needed.

Equipment: Use a three nozzle (TG3-TG5-TG3) per row or equivalence sprayer operating at a low pressure (20 to 25 psi). Nozzle selection, pressure, and delivery volume are critical for proper droplet size, which leads to good stalk rundown and coverage.

Mixing: A final spray volume of 50 gallons per acre is recommended to ensure complete coverage. Dilute 1.75 – 2.0 gallons of **EMERY AGRO 7000 CONCENTRATE** to a final spray volume of 50 gallons (3.5% - 4% V/V).

Application: Coverage of leaf axils and stalk rundown are essential for proper contact. To reduce the risk of leaf burn, apply product when humidity is low and leaf axils are fully exposed (10 a.m. - 6 p.m. on sunny days). Do not apply if the plants are wilted and temperature exceeds 90°F, wet with rain or heavy dew, severely stressed by drought, or during windy conditions causing turnover the tobacco leaf.

- **Trees and Vines Sucker Control**

Usage: **EMERY AGRO 7000 CONCENTRATE** is recommended to control tender basal growth on woody trees, foliage growth on vines and excessive cane growth in brambles. Apply to unwanted vegetative parts before suckers become hardened and woody. For use on nut trees such as Almond, Beech Nut, Brazil Nut, Butternut, Cashew, Chestnut, Chinquapin, Filbert (Hazelnut), Hickory Nut, Macadamia Nut (bush nut), Pecan, Pistachio, Walnut (black and English)

Mixing: Dilute 1 pint of **EMERY AGRO 7000 CONCENTRATE** to a final spray volume of 1 gallon (13% V/V).

Application: Spray to completely wet and run off undesired foliage. Do not spray on desired plant parts. **EMERY AGRO 7000 CONCENTRATE** is a non-select herbicide and will kill green leafy tissue in both weeds and crops. Best results are achieved in warm/hot weather with sunshine with temperatures above 60°F.

Weed Control

- **Row Middles**

Usage: **EMERY AGRO 7000 CONCENTRATE** is a non-selective herbicide, use only on undesired weeds and grasses. Do not spray on desired plants. Weeds should be growing vigorously and must not be covered with soil or heavy dew.

Equipment: Hand-held ultra-low volume controlled droplet applicators (CDA units), directed and Shielded Sprayers and spray nozzle type or configuration to prevent spray contact on the foliage or green stems or bark. Do not use boomless jets or misting-machines.

Mixing: A final spray volume of 50 gallons per acre is recommended to ensure complete coverage. Dilution rates are based on the size of the plants and / or the desired speed of kill. The larger the plants, the higher the dosage rates needed to ensure maximum herbicidal activity. Also, the higher the concentration, the quicker the plants wilt and turn brown. Add 3 – 6.5 gals of **EMERY AGRO 7000 CONCENTRATE** per 50 gal of final spray volume (6% - 13% V/V) in the spray tank and mix to get even mixing. Use only clean water free from clay, silt and algae as these will tend to clog the spray nozzles. Water collected from roofs, bore water, dam water and water from creeks may be used provided it does not contain any sediment. Refer to the rate table #1 for the proper dilution needed.

Application: Direct shielded spray applications to area between plastic mulch strips and staked crops. Full coverage of the weeds leafy tissue is critical for control. Spray solutions only when weed surfaces are dry. Repeat treatment as necessary to obtain the desired control or suppression of weeds from newly germinated weed seeds and regrowth from roots or stems.

- **Ornamental & Nursery and Orchard Crops**

Usage: **EMERY AGRO 7000 CONCENTRATE** is a non-selective herbicide recommended for weed control in seedbeds or for site preparation in non-crop sites. Apply prior to emergence of plants from seed, Perennial Rootstocks, Corms and Bulbs. Ideal for nursery and orchards, where weed control between rows is desired. For spot treatments in crop and pasture situations. Do not apply if desired new growth or after crop emerges from soil or damage will occur.

Equipment: Use directed and Shielded Sprayers. Select nozzle/pressure combination that deliver large coarse droplets (solid cones or flat fans) and avoid combinations that generate fine particles or mist.

Mixing: Dilute 1 pint of **EMERY AGRO 7000 CONCENTRATE** to a final spray volume of 1 gallon (13% V/V).

Application: Apply to control weeds in seedbeds and growth sites prior to emergence of desirable plants. Apply around trees, shrubs, turfgrasses or desirable vegetation making sure avoid material contact with foliage and green bark. Repeat applications may be necessary. Reseeding or transplanting can occur in treated areas as soon as desirable levels of weed control are obtained.

Insect Control

- **Usage:** **EMERY AGRO 7000 CONCENTRATE** is Used For Control of Adelgids, Aphids, Earwigs, Grasshoppers, Lacebugs, Mites, Plantbugs, Psyllids, Sawfly Larvae, Scales, Tent Caterpillars, Whiteflies and Woolly Aphids (*Not Approved For Use In California*).
- For Thrips Control. For soil surface application only. Do not allow spray to contact the foliage or green stems or bark of desirable plants, vines, and trees, as crop injury may occur.

- **Equipment:** Hand-held ultra-low volume controlled droplet applicators (CDA units), directed and shielded sprayers and spray nozzle type or configuration to prevent spray contact on the foliage or green stems or bark. Select nozzle / pressure combination that deliver large coarse droplets (solid cones or flat fans) and avoid combinations that generate fine particles or mist.
- **Mixing:** Dilute **EMERY AGRO 7000 CONCENTRATE** using Rate Table # 2 below to determine the appropriate use rate for your pest situation.
- **Application:** Apply spray directly to the soil surface to the area between plastic mulch strips and row middles of staked crops, row crops, and areas around the base of trees and vine crops in orchards, to control listed pests. Make applications when insects first appear and are in their early larval stages. Repeat spray applications every 7 days or as needed.

RATE TABLE # 2

Final Spray Volume (gallons)	Amount of EMERY AGRO 7000 CONCENTRATE for Percent V/V (Volume/Volume) Solution				
	6%	8%	10%	13%	15%
1	8 fl oz	10 fl oz	13 fl oz	1 pt	1.2 pt
2	1 pt	1.3 pt	1.6 pt	2 pt	2.4 pt
5	2.5 pt	3.3 pt	4 pt	5 pt	6 pt
10	5 pt	6.5 pt	1 gal	1.3 gal	1.5 gal
20	1.3 gal	1.6 gal	2 gal	2.6 gal	3.0 gal

<u>Insect Pressure</u>	<u>Spray Solution (% V/V)</u>
Low	6 to 8%
Medium	8 to 10%
High	10 to 13%

STORAGE AND DISPOSAL

DO NOT contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store container in cool place until used. Store at temperatures above 32° F.

Pesticide Disposal: Wastes resulting from use of this product must be disposed of on-site or at an approved waste disposal facility.

Container Handling:

Non-refillable Containers: Do not reuse or refill this container. Offer for recycling if available.

Clean container promptly after emptying (liquid formulations).

Non-refillable container equal to or less than 5 gals: Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container ¼ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Non-refillable container between 5- 55 gals: Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container ¼ full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

Refillable container 5 gals to bulk: Refill this container with this pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. . Repeat this rinsing procedure two more times. Dispose of in a sanitary landfill or by other procedures approved by state and local authorities.

For non-medical emergencies or spills, see **EMERY AGRO 7000 CONCENTRATE** SDS or call CHEMTREC at 800-424-9300.

Terms and Conditions of Use:

If terms of the following Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. Otherwise, use by the buyer or any other user constitutes acceptance of the terms under Warranty Disclaimer, Inherent Risks of Use and Limitations of Remedies.

Warranty and Disclaimer Notice:

To the extent consistent with applicable law, Emery Oleochemicals, LLC, makes no warranty or guarantee of any kind, expressed or implied concerning the effects of use of this product, other than those specified on this label. Buyers or users accept all responsibility for results due to misuse or improper handling of this product.

Inherent Risks of Use:

It is impossible to eliminate all risks associated with use of this product. Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to the label instructions (including adverse conditions noted on the label, such as unfavorable temperatures, wind, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Emery Oleochemicals, LLC or the seller. All such risks shall be assumed by the buyer.

Limitation of Remedies:

The exclusive remedy for losses or damages resulting from the use of this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Emery Oleochemicals, LLC's election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought,
or
2. Replacement of amount of product used.

To the extent allowable by state law, Emery Oleochemicals, LLC shall not be liable for losses or damages resulting from handling or use of this product unless Emery Oleochemicals, LLC is promptly notified of such loss or damage in writing. In no case shall Emery Oleochemicals, LLC be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer above and this Limitation of Remedies cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Emery Oleochemicals, LLC or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or this Limitation of Remedies in any manner.

Produced for:

Emery Oleochemicals LLC
4900 Este Avenue
Cincinnati, OH 45232
513-762-2500

SUBLABEL B: FOR RESIDENTIAL USE
 FOR CONTACT SPRAY CONTROL OR BURNDOWN OF WEEDS AND GRASSES
 FOR HOMES AND GARDENS

EMERY AGRO 7000 CONCENTRATE
 (Alternate Brand Name EMERION™ 7000 CONCENTRATE)
 (Alternate Brand Name Emerion™ w40 SL)

Non-selective Herbicide

Active ingredient:

Ammonium Nonanoate40.0 wt.%
 Other ingredients 60.0 wt.%
 Total 100.00 wt.%

EMERY AGRO 7000 CONCENTRATE contains 3.3 lbs. of ammonium nonanoate per US gallon

KEEP OUT OF REACH OF CHILDREN

WARNING “AVISO”

"Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)"

FIRST AID	
If in eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If inhaled	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. • Call a poison control center or doctor for further treatment advice.
If on skin or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
EMERGENCY NUMBER	
FOR 24-HOUR EMERGENCY MEDICAL ASSISTANCE, CALL THE NATIONAL POISON CONTROL CENTER 1-800-222-1222.	
Have the product container or label with you when calling a poison control center or doctor.	

This product is protected by U. S. Patent No. 6,323,156
 EPA Reg. No. 87663-1
 EPA Establishment No. 87663-OH-001, 72038-DE-001, 06574-KY-001, 064784-OK-001, 75822-TN-001,
 70299-CT-001, 082521-GA-001

Lot No. xxxxxxxx

Net Contents: 3,4,16 & 32 fl oz, 1, 2.5 & 5 gals

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Warning: Causes substantial, but temporary eye irritation. Do not get in eyes or on clothing. Wear goggles. Harmful if inhaled. Avoid breathing spray mist. Causes moderate skin irritation. Avoid contact with skin or on clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using toilet. Remove and wash contaminated clothing before reuse.

ENVIRONMENTAL HAZARDS

For terrestrial uses: This pesticide is toxic to fish and aquatic invertebrates. To protect the environment, do not allow pesticide to enter or run off into storm drains, drainage ditches, or gutters or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours will help ensure that wind or rain does not blow or wash pesticide off the treatment area. Rinsing application equipment over the treated area will help avoid run off to water bodies or drainage systems.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the State/Tribal agency responsible for pesticide regulation.

METHODS OF USE AND GENERAL APPLICATION INSTRUCTIONS

General Instructions:

EMERY AGRO 7000 CONCENTRATE is a contact non-selective herbicide for spray application only to undesirable plant growth. Do not allow spray to contact any green plant parts of desirable plants. **EMERY AGRO 7000 CONCENTRATE** provides control and burndown suppression of annual and perennial broadleaf and grass weeds. Spore producing plants such as mosses and liverworts are also controlled. The amount of burndown and the duration of weed suppression may be reduced when weed growth conditions are unfavorable or when plants are mature.

EMERY AGRO 7000 CONCENTRATE is non-volatile and water soluble pesticide for foliar application with manual pump sprayers. Complete and uniform coverage of weeds by the spray solution is required for the best weed control. Plant foliage will change from a green color to brown/black necrotic tissue within one to two hours after spray application of **EMERY AGRO 7000 CONCENTRATE** diluted with water. **EMERY AGRO 7000 CONCENTRATE** effect on plant tissue may be more rapid in warm weather than in cold conditions. However, weed control is normally unaffected by temperature.

EMERY AGRO 7000 CONCENTRATE herbicide is a fatty acid soap product which penetrates the cell walls of plants to disrupt the cellular organization of physiological functions which are compartmentalized by membranes within the cell walls. Plant growth ceases when cellular contents are mixed which causes brown necrotic plant tissue.

EMERY AGRO 7000 CONCENTRATE does not migrate through the soil and is not translocated in plants. **To ensure satisfactory control, plant leaves must be thoroughly and uniformly covered with the spray solution.** **EMERY AGRO 7000 CONCENTRATE** does not provide any residual weed control in soil to affect germinating weed seeds.

Mixing and Application Instructions:

Mixing:

Fill hand held sprayer tank with half the required amount of water, add the full amount of **EMERY AGRO 7000 CONCENTRATE** to be used (see Dosage and Dilution Rate Table below), then fill the sprayer tank with the remainder of the water required for the desired final concentration and mix well. Since **EMERY AGRO 7000 CONCENTRATE** is completely soluble in water and when uniformly dispersed in water, continuous mixing or agitation is not required. A 13% v/v dilution is recommended for most weed control situations and based on the results, applicators may increase or decrease spray concentrations as discussed in the rate tables to obtain better control or to reduce herbicide use.

The degree of dilution for application is based on the concentration of active ingredient needed for the size of vegetation to be suppressed or the rate of herbicidal effect desired. The larger the vegetation, the higher the concentration (lower dilution) required for rapid action. See required concentration for variously sized weeds and grasses in Dosage and Application Rates Section. Hard to suppress weeds (deep-rooted perennials and some grasses) may require one or more later applications for complete control.

Application Precautions:

- Do not apply to weeds when wet from dew, rain or irrigation.
- Do not irrigate within 2 hours after application
- Do not apply if rainfall is expected within 2 hours.

During application, some foaming may occur; however, weed control is unaffected if the foam is deposited on the plant surface and is not blown away as drift. Foaming can be reduced by using the minimum spray pressure required for a uniform application to the target weeds. Use low spray pressure to reduce foaming and avoid contact with desirable plants. Most spray nozzles are designed to operate at 10 to 15 psi and provide uniform spray coverage of weeds.

Application with Hand-Held Equipment

Thorough saturation of the foliage and stems is required for control, but stop sprays when run-off from weed leaves occurs. Use low spray pressure to reduce foaming and avoid contact with desirable plants. Most spray nozzles are designed to operate at 10 to 15 psi and provide uniform spray coverage of weeds.

NOTE: In areas of hard water, the final mixture may appear milky. This condition does not change the effectiveness of the treatment. A clearly visible foam will appear on the leaves as the plants are sprayed. Drift onto desirable plants

should be avoided; however, this is usually not a serious problem due to the need for thorough leaf coverage for control of weeds. Repeat application as often as necessary to obtain desired control.

Dosage and Application Rates:

For general weed and grass control, rates are based on the size of the plants and/or the desired speed of kill. The larger the plants, the higher the dosage rates needed to ensure maximum herbicidal activity. Also, the higher the concentration, the quicker the plants wilt and turn brown. Apply **EMERY AGRO 7000 CONCENTRATE** spray solutions only when weed surfaces are dry.

The rate table presents the suggested percent volume/volume solutions of **EMERY AGRO 7000 CONCENTRATE** to use for application as follows:

- Use a 6 to 8 % V/V (Volume/Volume) **EMERY AGRO 7000 CONCENTRATE** spray solution for control of annual weeds of 1 inch height or less and for control of liverworts and mosses.
- Use an 8 to 10% V/V **EMERY AGRO 7000 CONCENTRATE** spray solution for control of annual weeds over 1 inch height and up to 4 inch height.
- Use a 10 to 13% V/V **EMERY AGRO 7000 CONCENTRATE** spray solution for weeds over 4 inch height and for hard to control weeds.
- A 15% V/V **EMERY AGRO 7000 CONCENTRATE** spray solution is the maximum labeled rate. Use this rate for hard to control perennial weeds or extremely dense weed growth.

Repeat spray applications as necessary to obtain the desired control or suppression of weeds from newly germinated weed seeds and regrowth from roots or stems.

RATE TABLE

Final Spray Volume (gallons)	Amount of EMERY AGRO 7000 CONCENTRATE for Percent V/V (Volume/Volume) Solution				
	6%	8%	10%	13%	15%
1	8 fl oz	10 fl oz	13 fl oz	1 pt	1.2 pt
2	1 pt	1.3 pt	1.6 pt	2 pt	2.4 pt
5	2.5 pt	3.3 pt	4 pt	5 pt	6 pt
10	5 pt	6.5 pt	1 gal	1.3 gal	1.5 gal
20	1.3 gal	1.6 gal	2 gal	2.6 gal	3.0 gal

<u>Height of Plants to be Controlled</u>	<u>Spray Solution (% V/V)</u>
1 inch or less	6 to 8%
1 to 4 inches	8 to 10%
Above 4 inches	10 to 13%

Use Methods

Determine the weed control situation and select the use method required as follows:

- A. **Vegetative Burndown:** Broadcast spray for weed control for seedbed preparation to control weeds prior to seeding or transplanting. Spot sprays may be used in crops, ornamentals, pastures and turf.
- B. **Directed Sprays:** Spray nozzle type or configuration for directed spray to prevent spray contact on the foliage or green stems or bark. Directed spray applications to area between plastic mulch strips and staked crops for weed control.
- C. **Preemergence Spray Before Seeds Germinate and Emerge, and Before Perennial Plants, Tubers, Bulbs or Seed Pieces Sprout and Emerge:** Make application to weeds before desired new growth emerges.
- D. **Dormant or Post Harvest Spray:** Apply after desirable annual plants are removed to kill weeds and residual green growth of the plants. Apply to dormant crops such as turf.
- E. **Sucker Control, Pruning and Trimming:** Direct sprays to kill small tender basal suckers in fruit trees, nut trees and on vines (grapes).
- F. **Desiccation and Harvest Aid:** Apply only when root, tuber or bulb vegetable is ready to harvest and green leaves or weeds interfere with harvest. Spray over the plants and weeds for rapid desiccation of green plant growth to facilitate harvest.
- G. **Building and Premise Uses:** Apply to weeds in walkways, driveways, parking areas and around buildings or structures. Spot sprays may be applied to open areas and rights-of-ways.

PESTS

I. Weeds controlled or suppressed by **EMERY AGRO 7000 CONCENTRATE**:

COMMON NAMES

TAXONOMIC NAMES

Broadleaf Weeds:

Algae	<i>Gloeocapsa magma</i>
Bittercress, hairy	<i>Cardamine hirsuta</i>
Chickweed, common	<i>Stellaria media</i>
Chickweed, mouse-ear	<i>Cerastium vulgatum</i>
Cocklebur, common	<i>Xanthium strumarium</i>
Corn spurry	<i>Spergula arvensis</i>
Cudweed, purple	<i>Gnaphalium purpureum</i>
Groundsel	<i>Senecio</i> spp.
Lambsquarters, common	<i>Chenopodium album</i>
Liverwort	<i>Machantia</i> spp.
Marestail or Horseweed rosettes	<i>Conyza canadensis</i>
Morningglory, annual	<i>Ipomoea</i> spp.
Moss	Bryophyta
Mustards	<i>Brassica</i> spp.
Oxalis or Woodsorrel	<i>Oxalis stricta</i>
Pansy, wild	<i>Viola tricolor</i>
Plantain	<i>Plantago</i> spp.
Pigweed, smooth and redroot	<i>Amaranthus</i> spp.
Mallow, roundleaved	<i>Malva</i> spp.
Moneywort	<i>Lysimachia nummularia</i>
Shepherdspurse	<i>Capsella bursa-pastoris</i>
Sorrel, sheep	<i>Rumex acetosella</i>
Spurge, spotted	<i>Euphorbia maculata</i>
Field pennycress	<i>Thlaspi arvense</i>
Velvetleaf	<i>Abutilon theophrasti</i>

Grass and Other Weeds:

Bentgrass, colonial	<i>Agrostis tenuis</i>
Bluegrass, annual	<i>Poa annua</i>
Crabgrass, large	<i>Digitaria sanguinalis</i>
Fescue, creeping red	<i>Festuca rubra</i>
Fescue, hard	<i>Festuca ovina</i>
Nimblewill	<i>Muhlenbergia scheberi</i>
Onion, wild	<i>Allium canadense</i>
Ryegrass, perennial	<i>Lolium perenne</i>
Star-of-Bethlehem	<i>Ornithogalum nutans</i>

II. Weeds Moderately Difficult to Control¹

Bermudagrass (Wireweed)	<i>Cynodon dactylon</i>
Bindweed, field	<i>Convolvulus arvensis</i>
Dandelion	<i>Taraxacum officinale</i>
Nutsedge, yellow	<i>Cyperus esculentus</i>
Ragweed, common	<i>Ambrosia artemisiifolia</i>

¹Use 13 to 15% V/V EMERY AGRO 7000 CONCENTRATE for control or suppression

Garden Uses and Methods of Application*

Crop Group	Crops	Use Methods
Root Tuber and Perennial Vegetables	Asparagus, artichoke, beet, carrot, ginger, horseradish, parsnip, potato, radish, rutabaga, sweet potato, turnip and yam ¹ Harvest Aid and Desiccation approved for root and tuber crops in this crop group	A, B, C, D, F ¹
Bulb vegetables	Garlic, leek, onion and shallot	A, B, C, F
Leafy Vegetables	Celery, cilantro, cress, endive, fennel, lettuce, parsley, rhubarb, spinach, Swiss chard	A, B
Cole or Brassica Crops	Broccoli, brussel sprouts, cabbage, cauliflower, collards, kale, kohlrabi, mustard and turnip greens	A, B, C
Legume Vegetables	Beans (Phaseolus spp.: black, green, kidney, lima, mung, navy, pinto, snap and wax), (Vigna spp.: black-eyed, Chinese longbean, cowpea and southern pea), peas (Pisum spp.: garden, green, sugar and snow peas), soybeans	A, B, C
Fruiting Vegetables	Eggplant, okra, pepper, (bell, chili, sweet), pimento, and tomato	A, B, C
Cucurbits and Melons	Cucumber, gourd, muskmelon, cantaloupe, pumpkin, squash, and watermelon	A, B, C
Citrus	Grapefruit, kumquat, lemon, lime, orange, tangerine and tangelo	A, B
Pome Fruit	Apple, crabapple, pear and quince	A, B, E
Stone fruit	Apricot, cherry, nectarine, peach, plum and prune	A, B, E
Small Fruit and Grapes	Blackberry, blueberry, boysenberry, cranberry, currant, dewberry, elderberry, grape (all types), loganberry, olallieberry, raspberry and strawberry	A, B, C, E
Nuts	Almond, brazil nut, chestnut, filbert, macadamia, pecan, pistachio and walnut	A, B, E
Tropical and Other Fruit	Avocado, banana, coconut, date, fig, guava, kiwi, mango, olive, persimmon, papaya and banana	A, B, E
Forages and Pastures (Forage or Seeds)	Alfalfa, clovers, trefoil, vetch, bromegrass, fescue, bluegrass, lespedeza, ryegrass, sudangrass, timothy, range grasses. and crops grown for livestock feed	A, C, D
Herbs and Spices	Anise, basil, Caraway, chive, cumin, curry, dill, fennel, oregano, mints, rosemary, sage, savory, sweet bay, tarragon, thyme and wintergreen	A, B, C, D

* Refer to the General Instructions section for Use Methods description

Buildings and Premise Uses and Methods of Application*

Group	Crops	Use Methods
Turf, Flowers, Container, Bedding and Landscape Plants	Turfgrass (maintenance, sod or seed production), bedding plants, flowers and ornamental plants	A, B, C, D, E, F
Trees and Shrubs	Landscape trees and evergreen shrubs,	A, B, E
Greenhouse and Indoor Use	All crops, plants and structures	A, B, C, G
		A, B, G
Buildings, Driveways, Walkways and Other Structures	Benches, decks, equipment, floors, roofs, wall, walks and evaporative cooling pads	G

* Refer to the General Instructions section for Use Methods description

Use Information

Usage: EMERY AGRO 7000 CONCENTRATE is a non-selective herbicide recommended for weed control in gardens, seedbeds, flower beds, for site preparation, and around the home. Do not apply if desired new growth or after crop emerges from soil or damage will occur. Do not spray on desired plants. Weeds should be growing vigorously and must not be covered with soil or heavy dew. Apply prior to emergence of plants from seed, Perennial Rootstocks, Corms and Bulbs.

Equipment: Hand-held ultra-low volume controlled droplet applicators (CDA units), directed and shielded sprayers and spray nozzle type or configuration to prevent spray contact on the foliage or green

stems or bark. Select nozzle / pressure combination that deliver large coarse droplets (solid cones or flat fans) and avoid combinations that generate fine particles or mist.

Mixing: Dilute 1 pint of **EMERY AGRO 7000 CONCENTRATE** to a final spray volume of 1 gallon (13% V/V).

Application: Apply to control weeds in seedbeds and growth sites prior to emergence of desirable plants. Apply around trees, shrubs, turfgrasses or desirable vegetation making sure avoid material contact with foliage and green bark. Repeat applications may be necessary. Reseeding or transplanting can occur in treated areas within two days.

STORAGE AND DISPOSAL

DO NOT contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store container in cool place until used. Store at temperatures above 32° F.

Pesticide Disposal: Wastes resulting from use of this product must be disposed of on-site or at an approved waste disposal facility.

Container Handling:

If empty: Non-refillable - Do not reuse or refill this container. Offer for recycling if available.

If partly filled: Call your local solid waste agency or 1-800-CLEANUP for disposal instructions. Never place unused product down any indoor or outdoor drain.

For non-medical emergencies or spills, see **EMERY AGRO 7000 CONCENTRATE** SDS or call CHEMTREC at 800-424-9300.

Terms and Conditions of Use:

If terms of the following Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. Otherwise, use by the buyer or any other user constitutes acceptance of the terms under Warranty Disclaimer, Inherent Risks of Use and Limitations of Remedies.

Warranty and Disclaimer Notice:

To the extent consistent with applicable law, Emery Oleochemicals, LLC, makes no warranty or guarantee of any kind, expressed or implied concerning the effects of use of this product, other than those specified on this label. Buyers or users accept all responsibility for results due to misuse or improper handling of this product.

Inherent Risks of Use:

It is impossible to eliminate all risks associated with use of this product. Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to the label instructions (including adverse conditions noted on the label, such as unfavorable temperatures, wind, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of

other materials, the manner of application, or other factors, all of which are beyond the control of Emery Oleochemicals, LLC or the seller. All such risks shall be assumed by the buyer.

Limitation of Remedies:

The exclusive remedy for losses or damages resulting from the use of this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Emery Oleochemicals, LLC's election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought,
or
2. Replacement of amount of product used.

To the extent allowable by state law, Emery Oleochemicals, LLC shall not be liable for losses or damages resulting from handling or use of this product unless Emery Oleochemicals, LLC is promptly notified of such loss or damage in writing. In no case shall Emery Oleochemicals, LLC be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer above and this Limitation of Remedies cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Emery Oleochemicals, LLC or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or this Limitation of Remedies in any manner.

Produced for:

Emery Oleochemicals LLC
4900 Este Avenue
Cincinnati, OH 45232
513-762-2500

STILLMEADOW

I N C O R P O R A T E D

TITLE

Ammonium nonanoate
Honey Bee, *Apis mellifera*, Acute Contact Toxicity Limit Test

TEST GUIDELINE

OCSPP 850.3020 and OECD 214

AUTHOR

Cole Younger, PhD

STUDY COMPLETION DATE

23 May 2014

PERFORMING LABORATORY

STILLMEADOW, Inc.
12852 Park One Drive
Sugar Land, TX 77478

LABORATORY STUDY ID

17956-14

PAGE 1 of 15

NO CLAIM OF CONFIDENTIALITY

No claim of confidentiality, on any basis whatsoever, is made for any information contained in this document. I acknowledge that information not designated as within the scope of FIFRA § 10 (d) (1) (A), (B) or (C), and which pertains to a registered or previously registered pesticide is not entitled to confidential treatment and may be released to the public, subject to the provisions regarding disclosure to multinational entities under FIFRA § 10 (g).

Submitter: _____

Date: _____

Name of Signer: _____


Sponsor: Emery Oleochemicals

GOOD LABORATORY PRACTICE COMPLIANCE STATEMENT

The following is a detailed description of all differences between the practices used in the study and those required by 40 CFR 160 and Organization for Economic Cooperation & Development Principles of GLP, ENV/MC/CHEM (98) 17:

Section 160.31 (d) and 160.105 (a)(b)(e) Characterization and stability information was not provided to the testing facility.

Section II, 1.1 (2)(p), 6.1 (1) and 6.2 (2)(4) Characterization and stability information was not provided to the testing facility.

Study Director: 
Cole Younger, PhD
STILLMEADOW, Inc.

Date: 23 MAY 14

Sponsor: _____
Name of Signer: _____
Sponsor: Emery Oleochemicals

Date: _____

Submitter: _____
Name of Signer: _____
Submitter: Emery Oleochemicals

Date: _____

QUALITY ASSURANCE STATEMENT


Study Title: Ammonium Nonanoate
Honey Bee, *Apis mellifera*, Acute Contact Toxicity Limit Test

The study report and data have been audited in accordance with Good Laboratory Practice Standards and STILLMEADOW, Inc. Standard Operating Procedures (SOPs). The final report accurately reflects the study data. The Quality Assurance Unit has not been involved in the actual conduct of this study.

The Quality Assurance Unit performed a recent facility inspection on 07 Feb 14. All findings were reported to Management, and the report and responses are kept in the Quality Assurance files.

The findings from any study inspections and audits were reported to the Study Director and Management as follows:

Critical Phase Inspected	Date Inspected	Reported to Study Director	Reported to Management
Protocol Review	24 Feb 14	24 Feb 14	24 Feb 14
Observations	11 Mar 14	11 Mar 14	11 Mar 14
Report/Data Audit	21 May 14	21 May 14	21 May 14


Richard L. Martin, MS
Auditor, Quality Assurance
STILLMEADOW, Inc.

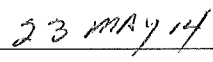

Date

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SUMMARY

In a 48-hour contact toxicity study, honey bees (*Apis mellifera*) were exposed to a single dose of 100 µg a.i./bee of Ammonium nonanoate by direct application to the thorax. Bees were observed for 48 hours. A control and positive control (3 levels) were run concurrently. Mortality was 6.7% in the test substance group 48 hours after dosing. There were no significant differences in mortality between the test substance group and the control. Since mortality in the test substance group and control group was less than 10%, the LD₅₀ for Ammonium nonanoate was considered to be greater than 100 µg a.i./bee and non-toxic to honey bees.

INTRODUCTION

The objective of this study was to assess the acute contact toxicity of the test substance, Ammonium nonanoate, when administered to honey bees in accordance with OECD Guideline 214 and OCSPP 850.3020, which is intended to meet testing requirements of FIFRA 7 U.S.C. 136, *et seq.* This study was conducted according to the approved protocol and STILLMEADOW, Inc. SOPs. There were no deviations from the protocol that affected the quality or outcome of the study. The protocol, raw data, this report and a sample of test substance are archived at STILLMEADOW, Inc. The study was initiated on 25 Feb 14, the pre-dose experimental portion began on 10 Mar 14 and the laboratory portion of the study was conducted from 10-12 Mar 14.

SPONSOR INFORMATION

Company Name: Emery Oleochemicals
Address: 4900 Este Avenue
Cincinnati, OH 45232

TEST SUBSTANCE

Synonyms: Ammonium pelargonate; Fatty acids C8-18 and C18 unsaturated, ammoniated salt; Ammoniated salts of fatty acids
Label Identification: Ammonium Nonanoate; Lot # 12-014DCF; Emery Oleochemicals LLC; February 3, 2014
Date & Quantity Received: 10 Feb 14; 172.5 g (GW)
Physical Description: Pale yellow liquid
Storage: Room temperature
Purity: 36% active ingredient per provided information
Characterization: Not provided to testing facility
Stability: Not provided to testing facility

Data generated for characterization and stability is the responsibility of the sponsor. Records pertaining to identity, synthesis methods and location of documentation are the responsibility of the sponsor. A copy of the Certificate of Analysis is included as report Appendix A.

POSITIVE CONTROL SUBSTANCE

<u>Name</u>	<u>Manufacturer</u>	<u>Lot</u>	<u>Expiration</u>
Dimethoate CAS 60-51-5	ChemService	182700	Feb 2015

VEHICLE

<u>Name</u>	<u>Manufacturer</u>	<u>Lot</u>	<u>Expiration</u>
Acetone	Fisher	10897	Apr 2016

TEST SYSTEM

Insect Species

Species / Strain / Source: Honey bee, *Apis mellifera*, worker; STILLMEADOW, Inc. bee colony disease and pest free with no previous pesticide exposure

Justification of Species: The honey bee is the species required in the regulatory guidelines for this study.

Quantity and Age: 300 bees (20 bees per replicate; 3 replicates per treatment group); Young adult worker bees collected from the hive brood chamber

Identification: Numbered cups with treatment identification

Insect Husbandry

Housing: 16 oz paper cup with screen lid

Environmental Controls

Set to Maintain: · Temperature 30±5° C · Relative Humidity 50-70%
· Lighting dark except when dosing or making observations

Actual Temp/Rel. Humidity: 30-31°C / 74-79%

Food: 50:50 w/v sucrose:dechlorinated (DC) water solution; available *ad libitum*

Watering System: Cotton balls saturated with DC water

No contaminants were expected to have been present that would have interfered with or affected the results of the study.

PROCEDURES

Preparation of Test Substance

The dose rate and the amount of test substance required for dosing were calculated according to the following equations and conversion.

$$\text{Test Substance amount (g)} = \frac{\text{Target dose}}{\text{Dose volume}} * \text{Unit Conversion} / \text{Active Concentration}$$

where:

$$\begin{aligned} \text{Target Dose} &= 100 \mu\text{g a.i. / bee} \\ \text{Dose volume} &= 2 \mu\text{L per bee} \\ \text{Concentration of Active Ingredient} &= 36\% = 0.36 \text{ g/mL} \\ \text{Unit Conversion} &= 1 \text{ g} / 1000\text{mg} = 0.001 \text{ g/mg} \\ \mu\text{g}/\mu\text{L} &= \text{mg/mL} \\ \text{Volume conversion} &= 1 \text{ mL} = 1 \text{ gram} \end{aligned}$$

$$\text{Test Substance amount (g)} = \frac{100 \mu\text{g a.i. / bee}}{2 \mu\text{L / bee}} * 0.001 \text{ g/mg} / 0.36 \text{ g/mL} = 0.1389 \text{ g / mL}$$

Amount of Test substance needed for 10 mL of solution = 1.4 g

Based on the above calculations, the amount of test substance required was 1.4 g and was brought to a 10 mL volume with acetone.

Preparation of Control Substances

The positive control stock solution of dimethoate was prepared by taking 5 mg of dimethoate and bringing it to a 10 mL volume with acetone to make a 0.5 $\mu\text{g}/\mu\text{L}$ stock solution. Ten-fold serial dilutions were made from the stock solution for the 0.05 and 0.005 $\mu\text{g}/\mu\text{L}$ solutions.

PROCEDURES (cont.)

Test and Control Substance Administration

Honey bees were separated into five groups with 60 bees in each group. On day 0, bees collected from the hive were immobilized using CO₂ gas, randomly separated into 3 cups of 20 bees each, and all bees were dosed on the dorsal side of their thorax with 2 µL of the appropriate test substance or control solutions. Group I was dosed with acetone alone. Group II was dosed with the test substance in acetone. Group III-V were dosed with 0.01, 0.1 and 1.0 µg/bee of dimethoate, respectively.

Observations

The insects were observed at 4, 24 and 48 hours after dosing for mortality and clinical signs of toxicity, particularly signs of intoxication (ataxia, lethargy, hypersensitivity, etc). The dead bees were not removed until the end of the study and bees that were still alive were frozen and discarded.

Evaluation of Results

Results were evaluated by comparing mortality between treated and control groups. If not more than 10% of control bees and the test substance bees die during the test, the LD₅₀ was considered to be greater than 100 µg a.i./bee.

RESULTS AND DISCUSSION

Protocol Deviations

- Humidity was outside the protocol range.

The deviation listed did not adversely affect the outcome of the study.

Observations and Evaluation

Percent mortality results are presented in Table 2 and observations are presented in Table 3. By 48 hours, the percent mortality in the control, test substance, and dimethoate 0.01, 0.1, and 1.0 µg/bee was 3.3%, 6.7%, 13.3%, 68.3% and 100%, respectively. Since mortality in the test substance group and the control group was less than 10%, the LD₅₀ for Ammonium nonanoate was considered to be greater than 100 µg a.i./bee and non-toxic to honey bees (Table 1). The only significant difference between groups was a higher mortality in the two-highest positive control groups, which was expected.

Table 1 - Cumulative Mean and Percent Mortality Summary

	Mean ^a No. Dead / % Mortality ^b					<i>p value</i> ¹
	Control	Ammonium nonanoate	Dimethoate 0.01 µg/bee	Dimethoate 0.1 µg/bee	Dimethoate 1.0 µg/bee	
4 Hours	0.3 a / 1.7	1.3 a / 6.7	2.0 ab / 10.0	4.7 b / 23.3	19.7 c / 98.3	<0.0001
24 Hours	0.3 a / 1.7	1.3 a / 6.7	2.3 a / 11.7	11.3 b / 56.7	20.0 c / 100.0	<0.0001
48 Hours	0.7 a / 3.3	1.3 a / 6.7	2.7 a / 13.3	13.7 b / 68.3	20.0 b / 100.0	<0.0001

^a Different letters within the same row indicate significance at $p < 0.05$.

^b Each group began with 60 honey bees on Day 0.
No., number

Toxic Standard

The toxic standard (positive control) was verified with three dose levels and the LD₅₀ was calculated using a computer program utilizing probit analysis. The estimated dimethoate LD₅₀ at 48 hours was determined to be 0.04 µg a.i./bee, with 95% confidence limits of 0.028-0.0988 µg a.i./bee.²

¹ One-way Analysis of Variance (ANOVA) with Tukey-Kramer post test was performed using GraphPad InStat version 3.06 for Windows 95, GraphPad Software, San Diego California USA, www.graphpad.com.

² Rosiello, Essignmann and Wogan: Rapid and Accurate Determination of the Median Lethal Dose and its Error with a Small Computer, Journal Toxic Environ Health, 797-809, 1977; Computed on Microsoft Office 97 Visual Basic copyright 1997.

CONCLUSION

This study was designed to assess the acute contact toxicity of the test substance, Ammonium nonanoate, when administered topically to the honey bee, *Apis mellifera*, at 100 µg a.i. /bee. Mortality was 6.7% in the test substance group 48 hours after dosing. There were no significant differences in mortality between the test substance group and the control group. Since mortality in the test substance group and the control group was less than 10%, the LD₅₀ for Ammonium nonanoate was considered to be greater than 100 µg a.i./bee and non-toxic to honey bees.



Cole Younger, PhD
Study Director
Entomologist, STILLMEADOW, Inc.



Date

STUDY PERSONNEL

Technical Staff
Stephen Balestrier, BS
Diane Fraga

Technical Writer
Courtney S. Francis, BS

Table 2 - Percent Mortality

Honey Bee, *Apis mellifera*, Acute Contact Toxicity Limit Test

Test Substance: Ammonium nonanoate

CONTROL			
Cup	Hours		
Number	4	24	48
1	0	0	1
2	0	0	0
3	1	1	1
Mean	0.3	0.3	0.7
S.D.	0.6	0.6	0.6
S.E.	0.3	0.3	0.3
Total Dead	1	1	2
% Mortality	1.7%	1.7%	3.3%

AMMONIUM NONANOATE			
Cup	Hours		
Number	4	24	48
1	1	1	1
2	2	2	2
3	1	1	1
Mean	1.3	1.3	1.3
S.D.	0.6	0.6	0.6
S.E.	0.3	0.3	0.3
Total Dead	4	4	4
% Mortality	6.7%	6.7%	6.7%

DIMETHOATE 0.01 µg a.i./bee			
Cup	Hours		
Number	4	24	48
1	2	3	3
2	1	1	2
3	3	3	3
Mean	2.0	2.3	2.7
S.D.	1.0	1.2	0.6
S.E.	0.6	0.7	0.3
Total Dead	6	7	8
% Mortality	10.0%	11.7%	13.3%

S.D., standard deviation; S.E., standard error

Note: Digits indicate number of dead bees per Cup unless otherwise noted. Beginning number of bees on Day 0: 20 per Cup; 60 per group. Mortality is cumulative.

Table 2 - Percent Mortality (cont.)

Honey Bee, *Apis mellifera*, Acute Contact Toxicity Limit Test

Test Substance: Ammonium nonanoate

DIMETHOATE 0.1 µg a.i./bee			
Cup	Hours		
Number	4	24	48
1	4	8	9
2	7	15	20
3	3	11	12
Mean	4.7	11.3	13.7
S.D.	2.1	3.5	5.7
S.E.	1.2	2.0	3.3
Total Dead	14	34	41
% Mortality	23.3%	56.7%	68.3%

DIMETHOATE 1.0 µg a.i./bee			
Cup	Hours		
Number	4	24	
1	20	20	
2	20	20	
3	19	20	
Mean	19.7	20.0	
S.D.	0.6	0.0	
S.E.	0.3	0.0	
Total Dead	59	60	
% Mortality	98.3%	100.0%	

S.D., standard deviation; S.E., standard error

Note: Digits indicate number of dead bees per Cup unless otherwise noted. Beginning number of bees on Day 0: 20 per Cup; 60 per group. Mortality is cumulative.

Table 3 - Observations

Honey Bee, *Apis mellifera* , Acute Contact Toxicity Limit Test

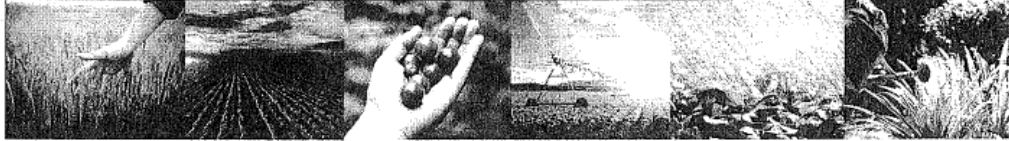
Test Substance: Ammonium nonanoate

CONTROL	Observations
<u>Time after dosing</u>	
4 Hours	Rest NOA
24 Hours	Rest NOA
48 Hours	Rest NOA
AMMONIUM NONANOATE	
<u>Time after dosing</u>	
4 Hours	Rest NOA
24 Hours	Rest NOA
48 Hours	Rest NOA
DIMETHOATE 0.01 µg a.i./bee	
<u>Time after dosing</u>	
4 Hours	Erratic behavior: Cup 1-2 bees, Cup 2-2 bees, Cup 3-1 bee, Rest NOA
24 Hours	Rest NOA
48 Hours	Rest NOA
DIMETHOATE 0.1 µg a.i./bee	
<u>Time after dosing</u>	
4 Hours	Erratic behavior: Cup 1-2 bees, Rest NOA
24 Hours	Erratic behavior: Cup 2-3 bees, Cup 3-2 bees, Rest NOA
48 Hours	Erratic behavior: rest Cup 1 and rest Cup 3, 0 NOA
DIMETHOATE 1.0 µg a.i./bee	
<u>Time after dosing</u>	
4 Hours	Cup 3-1 bee NOA
24 Hours	All bees dead

NOA, No observable abnormalities

APPENDIX A - Certificate of Analysis

Certificate of Analysis



Ammonium Nonanoate

Date 31 January 2014
Lot Number 12-014DCF
Date of Manufacture 20 January 2014

Quality Control Data		
Characteristic	Specification	Analysis Result
Actives, Wt.%	34 – 41	36
pH	8.5 – 9.0	8.8
Titer, °C	7 max	7
Appearance @ 25°C	Clear Liquid	Pass

Submitted by,

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Rev 01-2001201

Safety Data Sheet


**EMERION™ 7000 CONCENTRATE
NON-SELECTIVE HERBICIDE**

Date of printing : 02/01/2016
Date of revision : 02/01/2016
SDS No. : RS000000350180

Section 1. Identification

- Product name** : EMERION™ 7000 CONCENTRATE
NON-SELECTIVE HERBICIDE
For Food Crops Use
This chemical is a pesticide product registered by the United States Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace labels of non-pesticide chemicals. The container label reflects the approved EPA classification and includes other important information such as the directions for use.
- Supplier** : Emery Oleochemicals LLC
4900 Este Avenue
Cincinnati, OH 45232-1446
Phone: +1-800-543-7370
Fax-no.: +1-513-246-3332
Plant 24 Hr Phone: +1-513-762-2635
- Responsible name** : **Emery Oleochemicals Product Safety & Regulations**
- In case of emergency** : +1-800-424-9300 or +1-703-527-3887 (24 hour)
- Product type** : Liquid.

Section 2. Hazards identification

- OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- Classification of the substance or mixture** : SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
- GHS label elements**
- Hazard pictograms** : 
- Signal word** : Warning
- Hazard statements** : Causes serious eye irritation.
- Precautionary statements**
- General** : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.
- Prevention** : Wear eye or face protection. Wash hands thoroughly after handling.
- Response** : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention. If eye irritation persists, get medical advice/attention.
- Hazards not otherwise classified** : None known.

Section 3. Composition/information on ingredients

CAS number/other identifiers

Ingredient name	CAS number	%
Ammonium Nonanoate	63718-65-0	36 - 41
Other Ingredients		59 - 64

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes serious eye irritation.
- Inhalation** : No known significant effects or critical hazards.
- Skin contact** : No known significant effects or critical hazards.
- Ingestion** : No known significant effects or critical hazards.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Inhalation** : No specific data.
- Skin contact** : No specific data.
- Ingestion** : No specific data.

Section 4. First aid measures

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.

- Specific hazards arising from the chemical** : In a fire or if heated, a pressure increase will occur and the container may burst.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

- Conditions for safe storage, including any incompatibilities** : Do not store below the following temperature: 0°C (32°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment by a qualified industrial hygienist indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Section 8. Exposure controls/personal protection

- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment by a qualified industrial hygienist indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment by a qualified industrial hygienist indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Liquid.
- Color** : Clear. Pale color.
- Odor** : Ammoniacal. [Slight]
- pH** : 8 to 9 [Conc. (% w/w): 40%]
- Boiling point** : 104.4°C (219.9°F)
- Flash point** : Open cup: Not applicable. [Product does not sustain combustion.]
- Relative density** : 1
- Solubility** : Easily soluble in the following materials: cold water.
- Viscosity** : Kinematic (room temperature): 0.61 cm²/s (61 cSt)

Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Conditions to avoid** : No specific data.
- Incompatible materials** : No specific data.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
EMERY AGRO 7000 NON-SELECTIVE HERBICIDE	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-

Irritation/Corrosion

Section 11. Toxicological information

Product/ingredient name	Result	Species	Score	Exposure	Observation
EMERY AGRO 7000 NON-SELECTIVE HERBICIDE	Eyes - Severe irritant	Rabbit	-	-	-

Information on the likely routes of exposure : Routes of entry anticipated: Dermal.

General : No known significant effects or critical hazards.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Persistence and degradability

Not available.

Bioaccumulative potential

Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-	-
Transport hazard class(es)	-	-	-	-	-
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.
Additional information	-	-	-	-	-

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b):** All components are listed or exempted.

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Immediate (acute) health hazard

Composition/information on ingredients

No products were found.

State regulations

Massachusetts : None of the components are listed.

New York : None of the components are listed.

New Jersey : None of the components are listed.

Pennsylvania : None of the components are listed.

California Prop. 65

None of the components are listed.

Canadian regulations

Canada inventory DSL : Not determined.

WHMIS (Canada) : Class D-2B: Material causing other toxic effects (Toxic).

Section 15. Regulatory information

Canadian lists : **CEPA Toxic substances:** None of the components are listed.
Canadian ARET: None of the components are listed.
Canadian NPRI: None of the components are listed.
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

[International lists](#)

[National inventory](#)

Section 16. Other information

[Hazardous Material Information System \(U.S.A.\)](#)

Health	2
Flammability	0
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

[National Fire Protection Association \(U.S.A.\)](#)



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