New York State Integrated Pest Management Program | Cornell Cooperative Extension

Putrescent Whole Egg Solids Profile

Active Ingredient Eligible for Minimum Risk Pesticide Use

Brian P. Baker and Jennifer A. Grant
New York State Integrated Pest Management, Cornell University, Geneva NY

Label Display Name: Putrescent whole egg solids

Active Components: Partially decomposed proteins

CAS Registry #: 51609-52-0

U.S. EPA PC Code: 105101

CA DPR Chem Code: 1935

Other Names: Egg solids; Fermented egg solids; Inedible egg powder; Rotten eggs; Whole egg solids

Other Codes: None found

Summary: Putrescent whole egg solids are made from cracked eggs declared unfit for human consumption. Its pesticidal uses are as effective deer repellents for the protections of tree seedlings, shrubs and gardens.

Pesticidal Uses: Deer repellent; rodenticide; insect attractant.

Formulations and Combinations: Dried blood, white pepper, garlic oil, sucrose. When used as an attractant for traps of fly pests, putrescent egg solids may be combined with dichlorvos, naled, or other insecticides.

Basic Manufacturers: MGK; Not Tonight Deer; Woodstream.

Safety Overview: Fresh and whole eggs are commonly consumed foods, but putrescent whole egg solids are not considered fit for human consumption. Precautions need to be taken to prevent exposure to individuals allergic to eggs. The EPA has declared that putrescent whole egg solids do not pose any unreasonable adverse effects on the environment when used according to the label.

Background

Putrescent whole egg solids are used as an active ingredient to protect various plants, particularly shrubs and trees, from damage by deer, elk and beaver. EPA first registered putrescent egg solids as an animal repellent for use in almond orchards in 1975 (US EPA 1992).

Cracked eggs declared inedible by USDA inspectors are fermented or 'rotted' by biological activity. These may include eggs with blood spots or other imperfections (Matthews 2011). The decomposition of proteins and sulfur-containing amino acids, such as methionine, leads to the formation of compounds that repel deer and other mammals, and attract flies and other insects.

Chemical and Physical Properties

The physical and chemical properties of putrescent whole egg solids appear in Table 1.

Table 1

Physical and Chemical Properties of Putrescent Whole Egg Solids

Property	Characteristic/Value	Source
Molecular Formula:	N/A	
Molecular Weight:	N/A	
Percent Composition:	Not found	
Physical state at 25°C/1 Atm.	Powder	(McDavit 2010)
Color	Faint orange to beige	(McDavit 2010)
Odor	Slight malty odor	(McDavit 2010)
Density/Specific Gravity	0.514 g/ml	(McDavit 2010)
Melting point	Decomposes before melting	(McDavit 2010)
Boiling point	Not found	
Solubility	Almost insoluble	(McDavit 2010)
Vapor pressure	Not found	
pH	6.4 (10% solution)	(McDavit 2010)
Octonol/Water (K_{ow}) coefficient	N/A	
Viscosity	Not found	
Miscibility	Not found	
Flammability	Not found	
Storage stability	Stable in a closed container; will rapidly decompose when exposed to air and moisture.	(McDavit 2010)
Corrosion characteristics	Not found	
Air half life	Not found	
Soil half life	Not found	
Water half life	Not found	
Persistence	Not found	

Human Health Information

Acute Toxicity

The acute toxicity of putrescent whole egg solids appears in Table 2.

Table 2

Acute Toxicity of Putrescent Whole Egg solids

Study	Results	Source
Acute oral toxicity	>5,000 mg/kg	(Matthews 2011)
Acute dermal toxicity	>5,000 mg/kg	(Matthews 2011)
Acute inhalation	>2.10 mg/L	(Matthews 2011)
Acute eye irritation	Corneal irritation clearing within 7 days or less	(Matthews 2011)
Acute dermal irritation	Slight to moderate irritation	(Matthews 2011)
Skin sensitization	0.4 mL is a skin sensitizer	(Matthews 2011)

Putrescent whole egg solids were not toxic at 5,000 mg/kg, the highest doses administered (Matthews 2011).

Sub-chronic Toxicity

No data was found on the sub-chronic or chronic toxicity of putrescent whole egg solids.

Chronic Toxicity

Putrescent whole egg solids are not identified as carcinogens by the International Agency for Research on Cancer (IARC 2014). Putrescent whole egg solids are not on the California Proposition 65 list of known carcinogens (Cal-EPA 1997) and do not appear on the Toxics Release Inventory (TRI) Basis of OSHA Carcinogens (US EPA 2015a).

Human Health Incidents

Between September 30, 2008 and May 31, 2009, one confirmed human health related incident involving accidental inhalation of putrescent whole egg solids was reported to EPA (McDavit 2010). Between April 1, 1996 and March 30, 2016, the National Pesticide Information Center (NPIC) received 32 reports of human health related incidents involving accidental ingestion resulting in nausea, inhalation, or eye irritation related to putrescent whole egg solids (NPIC 2016). Eight of these involved EPA registered products. The remainder were either exempt or the registration number was unavailable.

Environmental Effects Information

Effects on Non-target Organisms

EPA considers putrescent whole egg solids to be non-toxic in their mode of action and has declared all non-target toxicity data requirements to have been met (Matthews 2011). Between September 30, 2008 and May 31, 2009, 10 incidents involving putrescent whole egg solids were reported to EPA (McDavit 2010). Of these, four involved dogs contracting diarrhea from ingesting small amounts of the product. Another four were reported plant damage. One involved an unspecified misuse of the product. NPIC

received 29 reports of animal related incidents between April 1, 1996 and March 30, 2016 (NPIC 2016). Seven of these involved EPA registered products. The prevalent exposure was through accidental ingestion, with reports of exposed animals vomiting—but many reported no symptoms.

Environmental Fate, Ecological Exposure, and Environmental Expression

Because the substance biodegrades quickly in the environment, the EPA made a "no effects" declaration on the active ingredient's effect in registered pesticides on endangered or threated species, as well as on any critical designated habitat (Matthews 2011).

Environmental Incidents

NPIC received 429 reports that were not related to animals or human health. For this reason, putrescent whole egg solids were involved in a total of 490 incidents reported to NPIC, the highest of any active ingredient eligible for use in minimum risk pesticides. Of the total number of incidents, 25 were in New York. Fifty four incidents were complaints about odor. One hundred and seven of the calls sought product information about Bonide Shotgun Repels-All, a formulation that also has garlic oil and dried blood as active ingredients. Miscellaneous inquiries generally involved questions about the product's use and safety. There were 39 reported incidents related to clean-up after misapplication or accidental spillage.

Efficacy

Vertebrate Repellent Activity

Putrescent whole egg solids are used primarily to repel white-tailed deer (*Odocoileus virginianis*) from tree seedlings, shrubs and gardens. The mode of action is believed to be based on fear, but other behavioral cues may result from exposure to the odor (Wagner and Nolte 2001). Deer Away Big Game Repellent (IntAgra), containing putrescent whole egg solids, was the only product of eight screened that resulted in a significant reduction of deer damage to flowering dogwood (*Cornus florida*), a preferred food of white tailed deer (Palmer et al. 1983). The no-treatment control and all other treatments resulted in about 80% damage. Damage in four trials was consistently less than 50% and resulted in zero damage in only one of four trials. The product is EPA registered and the inert ingredients are confidential.

The same product was also found to be the only effective treatment in a trial comparing soap and a repellent that contained a bitter-tasting ammonium compound and thymol in reducing deer feeding damage to 12.7% of Japanese yew (*Taxus cuspidata*), another favored food of white-tailed deer (Swihart and Conover 1990). By contrast, trees in the no-treatment control and those treated with soap or the ammonium compound and thymol repellents were all over 50% damaged. Both the 1983 and 1990 studies took place prior to EPA granting putrescent whole egg solids eligibility for use as an active ingredient in minimum risk pesticides. Putrescent whole egg solids were also the most effective repellent to black-tailed deer (*Odocoileus hemionis*) foraging on western red cedar (*Thuja plicata*) in a comparison of 20 products advertised to repel deer (Wagner and Nolte 2001). The publication did not identify which products were registered or exempt from registration.

Putrescent whole egg solids were completely ineffective in repelling European starlings when applied in plastic vials to their nest boxes in Ohio (*Sturmus vulgaris*) (White and Blackwell 2003). The product used in the study was Deer Away Big Game Repellent, which, as mentioned above, is registered with EPA with

other ingredients that are unknown. The product is labeled for use on non-food crops to repel deer and elk, but not birds.

Insect Attractant Activity

The decomposition of proteins and amino acids lead to the slow release of volatile ammonia. Flies and other dipteran pests are attracted to ammonia, and traps can be made with biocides to control flies, or mechanical means or other pesticide classes may be used. However, no data was found on the efficacy of putrescent whole egg solids as the only active ingredient against insects. Fly traps are considered pesticide devices under FIFRA section 2(h) and are subject to regulation (US EPA 2015b). Most studies involved the use of another pesticide with a biocidal mode of action and are not 25(b) exempt. For example, one study showed that putrescent whole egg solids increased the effectiveness of dichlorvos in control of a *Hippelates* eye gnat (*Hippelates collusor*) (Mulla et al. 1973).

Standards and Regulations

EPA Requirements

Putrescent whole egg solids are exempt from the requirement of a tolerance when used in accordance with 14 application methods specified in the regulations [40 CFR 180.1071]. The 14 different application methods prevent contact with food, limiting post application exposure to several known food allergens, including eggs.

FDA Requirement

As an animal product, eggs fall under USDA's and not FDA's jurisdiction.

Other Regulatory Requirements

Putrescent whole egg solids are not synthetic and are allowed by the USDA's National Organic Program (NOP) [7 CFR 205].

Putrid eggs are considered adulterated by the USDA Food Safety Inspection Service [9 CFR 590.5]. Such eggs cannot be sold for human consumption [9 CFR 590.45(b)].

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