New York State Integrated Pest Management Program | Cornell Cooperative Extension

Dried Blood Profile

Active Ingredient Eligible for Minimum Risk Pesticide Use

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Label Display Name: Dried blood

Active Components: Blood

CAS Registry #: 68911-49-9

U.S. EPA PC Code: 000611

CA DPR Chem Code: 1315

Other Names: Animal blood, denatured; Blood glyoxal

Other Codes: EINECS: 272-771-3

Summary: Dried blood is a by-product of the slaughter or rendering of animals, typically cattle. As a pesticide, it is used to repel deer and other vertebrate pests. The EPA considers registered pesticides containing dried blood to have negligible risks to human health and the environment (Andersen 2007).

Pesticidal Uses: Repellent of deer and other vertebrate pests.

Formulations and Combinations: Putrescent egg solids, garlic oil, white pepper.

Basic Manufacturers: Dragon Chemical; Faesy & Besthoff.

Safety Overview: Blood is considered edible and is a source of protein (Hsieh and Ofori 2011). The EPA considers registered pesticides containing dried blood to have negligible risks to human health and the environment (Andersen 2007).

Background

Dried blood is the dehydrated powder obtained as a by-product of the slaughter or rendering of animals, typically cattle (US EPA 1991b). Animals are bled and impurities such as hair, regurgitants and urine are removed. The blood is collected, centrifuged and then flash-dried, drum-dried or spray-dried at temperatures ranging from 250° to 1,000°F (121° to 538°C), which is considered sufficient to denature the protein and deactivate any possible pathogens (US EPA 1991b).

Blood has a long history of use in certain foods, including sausages and pudding (Hsieh and Ofori 2011). Dried bovine plasma, a fraction of dried blood, can be used as an egg substitute (Raeker and Johnson 1995). Spray-dried blood plasma can also be incorporated into flour to make high-protein biscuits (Hsieh and Ofori 2011).

Chemical and Physical Properties

The physical and chemical properties of dried blood appear in Table 1.

Table 1

Physical and Chemical Properties of Dried Blood

Property	Characteristic/Value	Source
Molecular Formula:	N/A	
Molecular Weight:	N/A	
Percent Composition:	91% protein; remainder includes various trace elements	(US EPA 1991b)
Physical state at 25°C/1 Atm.	Solid (Dust)	(US EPA 1991b)
Color	Black and tan speckled	(Woodstream 2013)
Odor	Faint	(Woodstream 2013)
Density/Specific Gravity	Not found	
Melting point	N/A	
Boiling point	N/A	
Solubility	Insoluble	(US EPA 1991b)
Vapor pressure	Not found	
pH	Not found	
Octonol/Water (K_{ow}) coefficient	Not found	
Viscosity	N/A	
Miscibility	Not found	
Flammability	Not found	
Storage stability	Stable for one year without loss of nitrogen content	(US EPA 1991b)
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

The EPA declared that "the potential risks, if any, to humans from exposure to dried blood pesticide products during application are considered negligible" and concluded that, in registered pesticides, the use of dried blood alone poses no adverse human health effects (US EPA 1991a).

Acute Toxicity

No acute toxicity data for dried blood was found.

Sub-chronic Toxicity

No sub-chronic toxicity data was found for dried blood.

Chronic Toxicity

No chronic toxicity data was found for dried blood. Dried blood is not identified as a carcinogen by the International Agency for Research on Cancer (IARC 2014), is not on the California Proposition 65 list of known carcinogens (Cal-EPA 1997), and does not appear on the Toxics Release Inventory (TRI) Basis of OSHA Carcinogens (US EPA 2015).

Human Health Incidents

The National Pesticide Information Center (NPIC) received 21 reports of human health related incidents between April 1, 1996 and March 30, 2016 (NPIC 2016). Symptoms included headaches, sweating, gagging, nausea, vomiting and coughing.

Environmental Effects Information

Effects on Non-target Organisms

No data was found on dried blood's effects on non-target organisms. NPIC received 21 reports of animal related incidents involving dried blood between April 1, 1996 and March 30, 2016 (NPIC 2016). In many cases there were no symptoms, but in four cases dog vomiting was reported.

Environmental Fate, Ecological Exposure, and Environmental Expression

No data was found on dried blood's environmental fate. Dried blood is biodegradable.

Environmental Incidents

No other environmental impact studies were found. NPIC received 256 reports unrelated to animals or human health. The 298 total incidents reported to NPIC was the third highest total number of incidents of any active ingredient eligible for use in minimum risk pesticides, following putrescent whole egg solids and garlic oil. Of the total number of incidents, 14 were in New York. Fifteen incidents were complaints about odor. One hundred and seven incidents were from seekers of product information about Bonide Shotgun Repels-All, a minimum risk pesticide. The formulation also has putrescent whole egg solids and garlic oil as active ingredients. Miscellaneous inquiries generally involved questions about the product's use, safety, and clean-up after application.

Efficacy

Vertebrate Repellent Activity

Dried blood is believed to induce a fear response in deer (Wagner and Nolte 2001). Plantskydd, a dried blood deer repellent that is exempt from EPA registration, repelled white-tailed deer (*Odocoileus hemionus*) from red Western cedar (*Thuja pliconis*) for a period of 18 weeks in winter (Wagner and Nolte 2001). Plantskydd provided the longest lasting protection through winter and resulted in springtime measurements of damage levels comparable to putrescent whole egg solids in Deer Away Big Game Repellent Powder (Wagner and Nolte 2001).

Standards and Regulations

EPA Requirements

The EPA has had no registered pesticides containing dried blood as an active ingredient since March 5, 2008 (US EPA 2017). Dried blood does not have a tolerance or an exemption from the requirement of a tolerance [40 CFR 180] and cannot be used on food crops.

FDA Requirements

Dried blood was not found in the Generally Recognized As Safe (GRAS) sections of the Code of Federal Regulations [21 CFR 184] or on the Select Committee on GRAS Substances database. Blood and blood products are excluded from the prohibition of animal derived protein sources in livestock feed [21 CFR 589.2000].

Other Regulatory Requirements

Dried blood is allowed by the USDA's National Organic Program (NOP) [7 CFR 205].

Bovine blood and blood products that are imported are subject to quarantine requirements and hygienic conditions [9 CFR 95.12].

Literature Cited

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