

MONSANTO

MATERIAL SAFETY DATA

ROUNDUP® herbicide

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MONSANTO PRODUCT NAME

ROUNDUP® Herbicide

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**Product Name:** ROUNDUP® herbicide**Synonyms:** None**EPA Reg. No.:** 524-445**Company ID:** Monsanto Company
800 North Lindbergh
St. Louis, MO 63167, U.S.A.**Phone #s:** Emergency Phone Number (call collect): (314) 694-4000
Non-Emergency Information: 1-800-332-3111**Revisions:** Sections containing a revision or new information are marked with a ♣**MSDS Number:** S00012114**Date:** January, 1994**Supersedes:** November, 1992**2. COMPOSITION INFORMATION ON INGREDIENTS**

Chemical Ingredients:	Active Ingredient:	Glyphosate, N-(phosphonomethyl) glycine, in the form of its isopropylamine salt	41.0 %
	Inert Ingredients:		59.0 % 100.0%
<u>Component†</u>		<u>CAS Reg No</u>	
Ethoxylated Tallowamines*		61791-26-2	
Glyphosate		1071-83-6	

* Hazardous chemicals under the criteria of the OSHA Hazard Communication Standard (29 CFR §1910.1200)

† There are no chemicals listed as toxic under SARA §313 in this product.

☒ See Section 8 for exposure limits.**3. HAZARDS IDENTIFICATION ♣****Emergency Overview:****Appearance & Odor:** clear, viscous amber-colored solution**Warning Statements:** 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.)

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY**HARMFUL IF SWALLOWED OR INHALED****REFORMULATION IS PROHIBITED****SEE INDIVIDUAL CONTAINER LABEL FOR REPACKAGING LIMITATIONS****Potential Adverse Health Effects:****Likely Routes of Exposure:** Skin contact and inhalation**Eye Contact:** ROUNDUP® herbicide may cause pain, redness and tearing based on toxicity studies.

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Skin Contact: ROUNDUP® herbicide is no more than slightly toxic and no more than slightly irritating based on toxicity studies.

Ingestion: ROUNDUP® herbicide is no more than slightly toxic based on toxicity studies. No significant adverse health effects are expected to develop if only small amounts (less than a mouthful) are swallowed. Ingestion of similar formulations has been reported to produce gastrointestinal discomfort with irritation of the mouth, nausea, vomiting and diarrhea. Oral ingestion of large quantities of one similar product has been reported to result in hypotension and lung edema.

Inhalation: ROUNDUP® herbicide is no more than slightly toxic if inhaled based on toxicity studies.

4. FIRST AID MEASURES ☛

If In Eyes: Immediately hold eyelids open and flush with plenty of water. Get medical attention.

If Swallowed: This product will cause gastrointestinal tract irritation. Immediately dilute by swallowing water or milk. Get medical attention.

If Inhaled: Remove individual to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

NOTE: For additional human emergency first aid or treatment guidance, call collect, anytime, day or night (314) 694-4000.

5. FIRE FIGHTING MEASURES

Flash Point: >200°F **Method:** Pensky-Martens

Auto Ignition Temperature: Not determined

Extinguishing Media: Water spray, foam, dry chemical, CO₂, or any class B extinguishing agent.

Special Fire Fighting Procedures: Firefighters and others that may be exposed to vapors, mists, or products of combustion should wear full protective clothing and self-contained breathing apparatus. Equipment should be thoroughly cleaned after use.

Unusual Fire or Explosion Hazards: None

6. ACCIDENTAL RELEASE MEASURES

Observe all protection and safety precautions when cleaning up spills - See Exposure Controls/Personal Protection, Section 8.

Small Spills: For a spill less than one gallon on floor or other impervious surface, soak up with towels or other absorbent material and discard in the trash. Clean the spill area with soap and water and rinse the area thoroughly.

Large Liquid Spills on the floor or other impervious surface should be contained or diked and then absorbed with attapulgite, bentonite or other absorbent clays. Collect the contaminated absorbent, place in a metal drum and dispose of in accordance with the instructions provided under Disposal, Section 13 of this MSDS. Thoroughly scrub floor or other impervious surface with a strong industrial detergent and rinse with water.

Large spills that soak into the ground should be dug up, placed in metal drums and disposed of in accordance with instructions provided under DISPOSAL, Section 13 of this MSDS. Contact appropriate state agency when considering a land spreading disposal option.

Leaking containers should be separated from non-leakers and either the container or its contents transferred to a drum or other non-leaking container and disposed of in accordance with instructions provided under DISPOSAL, Section 13 of this MSDS. Any recovered spilled liquid should be similarly collected and disposed of.

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7. HANDLING AND STORAGE**Handling:**

- Do not get in eyes or on clothing.
- Avoid breathing vapor or spray mist.
- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- 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 washwaters.

Storage:

- Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**Personal Protective Equipment**

Eye Protection: Wear chemical splash goggles during mixing/pouring operations or other activities in which eye contact with undiluted ROUNDUP® herbicide is likely to occur.

Skin Protection: Wear appropriate protective clothing to prevent skin contact. Applicators and other handlers must wear long-sleeved shirt, long pants, shoes plus socks and protective eyewear. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Respiratory Protection:

For Handling of the Undiluted Product: Undiluted ROUNDUP® herbicide is not likely to present an airborne exposure concern during normal handling. In the event of an accidental discharge of the material during manufacture or handling which produces a heavy vapor or mist, workers should use NIOSH/MSHA approved equipment. In work situations where an air purifying respirator is appropriate to be used, use of a full face respirator equipped with purifying elements for protection against organic vapor and dust/mist approved for pesticides is recommended. Use cartridges with MSHA/NIOSH approval number TC-23C or canister with MSHA/NIOSH approval number TC-14G. Full facemask replaces the need for chemical goggles. Observe respirator use limitations specified by the manufacturers. Respiratory protection programs must comply with 29 CFR §1910.134.

For Application of Product Diluted in accordance with label instructions: Respirators are not required for applications of use - dilutions of ROUNDUP® herbicide.

Ventilation:

No special precautions are recommended.

Exposure Guidelines:

Material
ROUNDUP® herbicide
Ethoxylated Tallowamine

OSHA PEL
None established
None established

ACGIH TLV
None established
None established

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: clear, viscous amber-colored solution
Odor: practically odorless to slight amine-like odor
pH: 4.7 (1% solution)
Specific Gravity: 1.17 (Water = 1)

Note: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

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10. STABILITY AND REACTIVITY

Chemical Stability:	Stable for at least 5 years under normal conditions of warehouse storage.
Conditions to Avoid:	None
Incompatibility with Other Materials:	Spray solutions of this product should be mixed, stored or applied using only stainless steel, aluminum, fiberglass, plastic or plastic-lined containers. DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.
Hazardous Decomposition Products:	None
Hazardous Polymerization:	Does not occur. This product can react with caustic (basic) materials to liberate heat. This is not a polymerization but rather a chemical neutralization in an acid base reaction.

11. TOXICOLOGICAL INFORMATION**TOXICOLOGICAL DATA**

Data from laboratory studies conducted by Monsanto with ROUNDUP® herbicide are summarized below:

Single exposure (acute) studies indicate:

Oral -	Practically Non-toxic (Rat LD ₅₀ , >5,000 mg/Kg); FIFRA Category IV
Dermal -	Practically Non-toxic (Rabbit LD ₅₀ , >5000 mg/Kg); FIFRA Category IV
Inhalation -	Slightly toxic (Rat 4-hr LC ₅₀ , - 2.6 mg/L); FIFRA Category III
Eye Irritation -	Rabbits (6); 24-hr exp.; Slight to Moderate Irritation, Eye Irritation was evident at day 14 but cleared by day 21 after exposure in 1 animal; FIFRA Category II; EC: Corneal Opacity - 0.0, Iris - 0.0, Erythema - 1.7, Chemosis - 0.8
Skin Irritation -	Rabbits (6); 4-hr exp.; Essentially Non-Irritating; Slight erythema (redness) clearing in all animals within 24 hours; FIFRA Category IV; EC: Erythema - 0.0, Edema - 0.0

No skin allergy was observed in guinea pigs following repeated skin exposure.

COMPONENTS

Data from laboratory studies conducted by Monsanto and from the scientific literature on components of ROUNDUP® herbicide:

Isopropylamine Salt of Glyphosate

Data from studies with a formulation comprised of 62% isopropylamine salt of glyphosate (MON 0139) indicate the following:

In repeat dosing studies (6-month), dogs fed MON 0139 exhibited slight body weight changes. Following repeated skin exposure (3-week) to MON 0139, skin irritation was the primary effect in rabbits.

Additional toxicity information is available on glyphosate, the active herbicidal ingredient of MON 0139. Following repeated exposures (90-days) to glyphosate in their feed, decreased weight gains were noted at the highest test level in mice, while no treatment-related effects occurred in rats. Following repeated skin exposure (3 weeks) to glyphosate, slight skin irritation was the primary effect observed in rabbits. No skin allergy was observed in guinea pigs following repeated skin exposure. There was no evidence of effects on the nervous system, including delayed effects in chickens (repeat oral doses) or cholinesterase inhibition in rats (single oral doses). Reduced body weight gain and effects on liver

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tissues were observed with long-term (2-year) feeding of glyphosate to mice at high-dose levels. Reduced body weight gain and eye changes were observed at the high-dose level in one long-term (2 year) feeding study with rats, while no treatment-related effects occurred in a second study. No adverse effects were observed in feeding studies with dogs. Glyphosate did not produce tumors in any of these studies. Based on the results from the chronic studies, EPA has classified glyphosate in category E (evidence of non-carcinogenicity for humans). No birth defects were noted in rats and rabbits given glyphosate orally during pregnancy, even at amounts which produced adverse effects on the mothers. Glyphosate was fed continuously to rats at very high dose levels for 2 successive generations. Toxicity was reported in offspring from the high dose, a level which also produced adverse effects on the mothers. In a 3 generation study conducted at lower dose levels, no effects were seen on the ability of male or female rats to reproduce. Glyphosate has produced no genetic changes in a variety of standard tests using animals and animal or bacterial cells.

Ethoxylated Tallowamine

The surfactant component of ROUNDUP® herbicide is reported to cause irritation to the eyes and skin and may contribute to the irritation potential reported for this herbicide. Ingestion may produce gastrointestinal irritation, nausea, vomiting and diarrhea.

12. ECOLOGICAL INFORMATION ♣

ROUNDUP® herbicide has been shown to be slightly to moderately toxic in aquatic studies. ROUNDUP® herbicide has been shown to be practically non-toxic to avian species following subacute dietary exposure.

Rainbow Trout 96-hr LC ₅₀	22 mg/L (static)	Fathead minnow 96-hr LC ₅₀	9.4 mg/L
Rainbow Trout 96-hr LC ₅₀	8.2 mg/L (dynamic)	Channel catfish 96-hr LC ₅₀	16 mg/L
Daphnia Magna 48-hr LC ₅₀	37 mg/L (aeration)	Chinook Salmon 96-hr LC ₅₀	20 mg/L
Daphnia Magna 48-hr LC ₅₀	24 mg/L (without aeration)	Coho Salmon 96-hr LC ₅₀	22 mg/L
Bluegill Sunfish 96-hr LC ₅₀	5.8 mg/L (dynamic)	Algae S. Capricornutum 72-hr EC ₅₀	2.1 mg/L
Bluegill Sunfish 96-hr LC ₅₀	14 mg/L (static)	Bobwhite Quail 8-day LC ₅₀	> 6300 ppm
Gammarus pseudolimnaeus 48-hr EC ₅₀	42 mg/L	Mallard Duck 8-day LC ₅₀	> 6300 ppm

13. DISPOSAL CONSIDERATIONS

Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. DO NOT CUT OR WELD ON OR NEAR THIS CONTAINER.

Metal Drums: Triple rinse container. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Metal Bulk: Triple rinse emptied bulk containers. Then offer for recycling or reconditioning or disposal in a manner approved by state and local authorities.

Plastic Drums and mini bulk: Do not reuse container. Return container per the Monsanto container return program. If not returned, triple rinse container, then puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed, by state and local authorities, by burning. If burned, stay out of smoke.

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14. TRANSPORT INFORMATION

Follow the precautions indicated in the Handling and Storage Section, Section 7 of this MSDS.

DOT Proper Shipping Name: Not Applicable
 DOT Hazard Class/I.D. No.: Not Applicable
 DOT Label: Not Applicable
 U.S. Surface Freight Classification: Weed killing compound, N.O.I.B.N.

15. REGULATORY INFORMATION

SARA Hazard Notification:
 Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370): Immediate

Section 313 Toxic Chemical(s): Not Applicable

Reportable Quantity (RQ) under U.S. CERCLA: Not Applicable

TSCA Inventory: All components are on the US EPA's TSCA Inventory List

16. OTHER

Reasons for revision: New CMA Format; Add WPS language; Add aquatic & avian tox data

This Material Safety Data Sheet (MSDS) is for informational purposes only and does not constitute a contract. The EPA APPROVED PRODUCT LABELING is required for the safe handling of the product. The MSDS provides important health, safety, and environmental information for employers, employees, consumers, and others handling large quantities of the product. It is intended to supplement other product labels, which the labeling provides the information specifically for purposes of the primary label.

The storage and disposal of pesticides are regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling and all necessary and appropriate precautionary use, storage, and disposal information found on the product. The violation of Federal law to use a pesticide product in any manner not prescribed on the EPA approved label.

All other information and recommendations are for informational purposes only. Information is provided in good faith and believed to be correct as of the date hereof. Monsanto Company makes no representation as to the completeness or accuracy of the information supplied upon the condition that the person receiving same will know their own determination of responsibility. Pesticide products sold in the United States by Monsanto Company are registered with the U.S. Environmental Protection Agency and are subject to its regulations. NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, ARE MADE BY MONSANTO COMPANY FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION ON THE PRODUCT TO WHICH INFORMATION REFERS.

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