MONSANTO COMPANY

Safety Data Sheet
Commercial Product

1. PRODUCT AND COMPANY IDENTIFICATION

Product name
Roundup QuikPRO™ Herbicide

EPA Reg. No.
524-535
Chemical name
Not applicable.
Synonyms
None.
Company
MONSANTO COMPANY, 800 N. Lindbergh Blvd., St. Louis, MO, 63167
Telephone: 800-332-3111, **Fax:** 314-694-5557
E-mail: safety.datasheet@monsanto.com
Emergency numbers
FOR CHEMICAL EMERGENCY, SPILL LEAK, FIRE, EXPOSURE, OR ACCIDENT Call CHEMTREC - Day or Night: 1-800-424-9300 toll free in the continental U.S., Puerto Rico, Canada, or Virgin Islands. For calls originating elsewhere: 703-527-3887 (collect calls accepted).
FOR MEDICAL EMERGENCY - Day or Night: +1 (314) 694-4000 (collect calls accepted).

2. HAZARDS IDENTIFICATION

Emergency overview
Appearance and odour (colour/form/odour): Pale yellow - Brown / Granules / Slight

CAUTION!
HARMFUL IF SWALLOWED
HARMFUL IF INHALED
CAUSES MODERATE EYE IRRITATION

Potential health effects
Likely routes of exposure
Skin contact, eye contact, inhalation
Eye contact, short term
May cause temporary eye irritation.
Skin contact, short term
Not expected to produce significant adverse effects when recommended use instructions are followed.
Inhalation, short term
Harmful by inhalation.
Single ingestion
Harmful if swallowed.

Refer to section 11 for toxicological and section 12 for environmental information.

OSHA Status
This product is hazardous according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Active ingredient

Ammonium salt of N-(phosphonomethyl)glycine; {Ammonium salt of glyphosate}
6,7-Dihydrodipyrido(1,2-a:2',1'c) pyrazinedium dibromide; {Diquat dibromide}

Composition

COMPONENT	CAS No.	% by weight (approximate)
Ammonium salt of glyphosate	40465-66-5	73.3
Diquat dibromide	85-00-7	2.9
Other ingredients		23.8

The specific chemical identity is being withheld because it is trade secret information of Monsanto Company.

4. FIRST AID MEASURES

Use personal protection recommended in section 8.

Eye contact

If in eyes, hold eye open and rinse slowly and gently for 15-20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing. Call a poison control center or doctor for treatment advice.

Skin contact

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.

Inhalation

If inhaled, move person to fresh air. If person is not breathing, call emergency number or ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call a poison control center or doctor for treatment advice.

Ingestion

Call poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison center or doctor. Do not give anything by mouth to an unconscious person.
QUICK TREATMENT IS ESSENTIAL TO COUNTERACT POISONING and should be initiated before signs and symptoms of injury appear.

Advice to doctors

This product is not an inhibitor of cholinesterase.

Antidote

Treatment with atropine and oximes is not indicated.

5. FIRE-FIGHTING MEASURES

Flash point

Does not flash.

Extinguishing media

Recommended: Water, dry chemical, foam, carbon dioxide (CO2)

Unusual fire and explosion hazards

None.
Environmental precautions: see section 6.

Hazardous products of combustion

Carbon monoxide (CO), nitrogen oxides (NOx), phosphorus oxides (PxOy), hydrogen bromide (HBr)

Fire fighting equipment
Self-contained breathing apparatus.
Equipment should be thoroughly decontaminated after use.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protection recommended in section 8.

Environmental precautions
SMALL QUANTITIES:
Low environmental hazard.
LARGE QUANTITIES:
Minimise spread.
Keep out of drains, sewers, ditches and water ways.

Methods for cleaning up
SMALL QUANTITIES:
Flush spill area with water.
LARGE QUANTITIES:
Absorb in earth, sand or absorbent material.
Dig up heavily contaminated soil.
Collect in containers for disposal.
Refer to section 7 for types of containers.
Flush residues with small quantities of water.
Minimise use of water to prevent environmental contamination.

Refer to section 13 for disposal of spilled material.
Use handling recommendations in Section 7 and personal protection recommendations in Section 8.

7. HANDLING AND STORAGE

Good industrial practice in housekeeping and personal hygiene should be followed.

Handling
Avoid breathing dust.
Avoid contact with eyes, skin and clothing.
Wash contaminated clothing before re-use.
Wash hands thoroughly after handling or contact.
Emptied containers retain vapour and product residue.
FOLLOW LABELLED WARNINGS EVEN AFTER CONTAINER IS EMPTIED.

Storage
Compatible materials for storage: stainless steel, fibreglass, plastic, glass lining
Incompatible materials for storage: galvanised steel, unlined mild steel, see section 10.
Keep out of reach of children.
Keep away from food, drink and animal feed.
Keep only in the original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne exposure limits

Components	Exposure Guidelines
Ammonium salt of glyphosate	No specific occupational exposure limit has been established.

Diquat dibromide	TLV (ACGIH): 0.5 mg/m3: inhalable fraction, skin, The exposure limit indicated is for the diquat cation. TLV (ACGIH): 0.1 mg/m3: respirable fraction, skin, The exposure limit indicated is for the diquat cation. PEL (OSHA): No specific occupational exposure limit has been established.
Other ingredients	No specific occupational exposure limit has been established.

Engineering controls
Provide local exhaust ventilation.

Eye protection
If there is significant potential for contact:
Wear dust goggles.

Skin protection
No special requirement when used as recommended.
If repeated or prolonged contact:
Wear chemical resistant gloves.

Respiratory protection
If airborne exposure is excessive:
Wear respirator.
Full facepiece/hood/helmet respirator replaces need for chemical goggles.

When recommended, consult manufacturer of personal protective equipment for the appropriate type of equipment for a given application.

9. PHYSICAL AND CHEMICAL PROPERTIES

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 specifications for the product.

Colour/colour range:	Pale yellow - Brown
Odour:	Slight
Form:	Granules
Physical form changes (melting, boiling, etc.):	
Melting point:	No data.
Flash point:	Does not flash.
Explosive properties:	No explosive properties
Auto ignition temperature:	No data.
Specific gravity:	No data.
Vapour pressure:	No significant volatility; aqueous solution.
Vapour density:	Not applicable.
Evaporation rate:	No data.
Dynamic viscosity:	Not applicable.
Kinematic viscosity:	Not applicable.
Density:	36 lb/ft3; (loose bulk density)
	42.6 lb/ft3; (tapped bulk density)
Solubility:	Water: Soluble
pH:	3.7 10 g/l
Partition coefficient:	log Pow: -3.2 @ 25 °C (glyphosate)

10. STABILITY AND REACTIVITY

Stability
Stable under normal conditions of handling and storage.

Oxidizing properties
none

Materials to avoid/Reactivity
Reacts with galvanised steel or unlined mild steel to produce hydrogen, a highly flammable gas that could explode.

Hazardous decomposition
Thermal decomposition: Hazardous products of combustion: see section 5.

Self-accelerating decomposition temperature (SADT)
No data.

11. TOXICOLOGICAL INFORMATION

This section is intended for use by toxicologists and other health professionals.

Data obtained on product and components are summarized below.

Acute oral toxicity
Rat, LD50: 4,443 mg/kg body weight
Slightly toxic.
FIFRA category III.

Acute dermal toxicity
Rat, LD50: > 5,000 mg/kg body weight
Slightly toxic.
FIFRA category IV.

Acute inhalation toxicity
Rat, LC50, 4 hours, aerosol:
Slightly toxic.
FIFRA category III.
No 4-hr LC50 at the maximum achievable concentration.

Skin irritation
Rabbit, 3 animals, OECD 404 test:
Days to heal: 2
Primary Irritation Index (PII): 0.5/8.0
Slight irritation.
FIFRA category IV.

Eye irritation
Rabbit, 3 animals, OECD 405 test:
Days to heal: 3
Moderate irritation.
FIFRA category III.

Skin sensitization
Guinea pig, 3-induction Buehler test:
Positive incidence: 0 %
Negative.

N-(phosphonomethyl)glycine; { glyphosate}

Mutagenicity
In vitro and in vivo mutagenicity test(s):

Not mutagenic.

Repeated dose toxicity

Rabbit, dermal, 21 days:
NOAEL toxicity: > 5,000 mg/kg body weight/day
Target organs/systems: none
Other effects: none

Rat, oral, 3 months:
NOAEL toxicity: > 20,000 mg/kg diet
Target organs/systems: none
Other effects: none

Chronic effects/carcinogenicity

Mouse, oral, 24 months:
NOAEL toxicity: ~ 5,000 mg/kg diet
Target organs/systems: liver
Other effects: decrease of body weight gain, histopathologic effects
NOEL tumour: > 30,000 mg/kg diet
Tumours: none

Rat, oral, 24 months:
NOAEL toxicity: ~ 8,000 mg/kg diet
Target organs/systems: eyes
Other effects: decrease of body weight gain, histopathologic effects
NOEL tumour: > 20,000 mg/kg diet
Tumours: none

Toxicity to reproduction/fertility

Rat, oral, 2 generations:
NOAEL toxicity: 10,000 mg/kg diet
NOAEL reproduction: > 30,000 mg/kg diet
Target organs/systems in parents: none
Other effects in parents: decrease of body weight gain
Target organs/systems in pups: none
Other effects in pups: decrease of body weight gain
Effects on offspring only observed with maternal toxicity.

Developmental toxicity/teratogenicity

Rat, oral, 6 - 19 days of gestation:
NOAEL toxicity: 1,000 mg/kg body weight
NOAEL development: 1,000 mg/kg body weight
Other effects in mother animal: decrease of body weight gain, decrease of survival
Developmental effects: weight loss, post-implantation loss, delayed ossification
Effects on offspring only observed with maternal toxicity.

Rabbit, oral, 6 - 27 days of gestation:
NOAEL toxicity: 175 mg/kg body weight
NOAEL development: 175 mg/kg body weight
Target organs/systems in mother animal: none
Other effects in mother animal: decrease of survival
Developmental effects: none

Diquat dibromide

Mutagenicity

In vitro and in vivo mutagenicity test(s):
Equivocal response.

Repeated dose toxicity

Rat, inhalation, 3 weeks:
NOEL toxicity: 0.1 mg/m3
Target organs/systems: lung
Other effects: organ weight change, histopathologic effects, local irritation

Chronic effects/carcinogenicity

Dog, oral, 52 weeks:
NOAEL toxicity: 0.5 mg/kg body weight/day
Target organs/systems: eyes, adrenals
Other effects: organ weight change

Rat, oral, 2 years:
NOAEL toxicity: 0.58 mg/kg body weight/day
Target organs/systems: eyes
NOEL tumour: 2.91 mg/kg body weight/day
Tumours: bone marrow, (sarcoma)
Tumours not related to treatment.

Mouse, oral, 2 years:
NOAEL toxicity: 3.56 mg/kg body weight/day
Target organs/systems: kidneys
Other effects: decrease of body weight gain, organ weight change
NOEL tumour: > 37.8 mg/kg body weight/day
Tumours: none

Toxicity to reproduction/fertility

Rat, oral, 2 generations:
NOEL toxicity: 0.8 mg/kg body weight/day
NOEL reproduction: 4 mg/kg body weight/day
Target organs/systems in parents: eyes
Other effects in parents: decrease of body weight gain, decrease of food consumption
Other effects in pups: decrease of body weight gain, decrease of litter survival
Effects on offspring only observed with maternal toxicity.

Developmental toxicity/teratogenicity

Rat, oral, 7 - 16 days of gestation:
NOEL toxicity: < 4 mg/kg body weight/day
NOEL development: 12 mg/kg body weight/day
Other effects in mother animal: decrease of body weight gain, decrease of food consumption
Developmental effects: weight loss, skeletal variations, visceral malformations, delayed ossification
Effects on offspring only observed with maternal toxicity.

Rabbit, oral, 7 - 19 days of gestation:
NOEL toxicity: 1 mg/kg body weight/day
NOEL development: 3 mg/kg body weight/day
Other effects in mother animal: decrease of body weight gain, decrease of food consumption
Developmental effects: visceral variations, delayed ossification
Effects on offspring only observed with maternal toxicity.

Mouse, oral, 6 - 15 days of gestation:
NOEL toxicity: 1 mg/kg body weight/day
NOEL development: 2 mg/kg body weight/day
Other effects in mother animal: decrease of body weight gain, breathing irregularities, neurotoxic signs, decrease of survival
Developmental effects: weight loss, skeletal variations
Effects on offspring only observed with maternal toxicity.

Acute neurotoxicity

Rat, oral, single dose, gavage:
NOEL: 25 mg/kg body weight
Other effects: neuromuscular effects
Not neurotoxic.

Repeated dose neurotoxicity

Rat, oral, 14 weeks, dietary:
NOAEL: 8 mg/kg body weight/day
Target organs/systems: eyes
Other effects: decrease of body weight gain
Not neurotoxic.

Surfactant

Mutagenicity
Micronucleus test(s):
Not mutagenic.
Repeated dose toxicity
Rat, oral, 14 days:
NOAEL toxicity: 250 mg/kg body weight/day
Target organs/systems: liver
Other effects: organ weight change

12. ECOLOGICAL INFORMATION

This section is intended for use by ecotoxicologists and other environmental specialists.

Data obtained on similar products and on components are summarized below.

Similar glyphosate formulation

Aquatic toxicity, fish
Rainbow trout (Oncorhynchus mykiss):
Acute toxicity, 96 hours, static, LC50: 5.4 mg/L
Moderately toxic.
Bluegill sunfish (Lepomis macrochirus):
Acute toxicity, 96 hours, static, LC50: 7.3 mg/L
Moderately toxic.
Aquatic toxicity, invertebrates
Water flea (Daphnia magna):
Acute toxicity, 48 hours, static, EC50: 11 mg/L
Slightly toxic.
Avian toxicity
Mallard duck (Anas platyrhynchos):
Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet
Practically non-toxic.
Bobwhite quail (Colinus virginianus):
Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet
Practically non-toxic.
Arthropod toxicity
Honey bee (Apis mellifera):
Oral/contact, 48 hours, LD50: > 100 µg/bee
Practically non-toxic.
Soil organism toxicity, invertebrates
Earthworm (Eisenia foetida):
Acute toxicity, 14 days, LC50: > 1,250 mg/kg soil
Practically non-toxic.

Isopropylamine salt of glyphosate (62%)

Aquatic toxicity, algae/aquatic plants
Green algae (Scenedesmus subspicatus):
Acute toxicity, 72 hours, static, EbC50 (biomass): 72.9 mg/L
Slightly toxic.

Diquat dibromide

Aquatic toxicity, fish
Bluegill sunfish (Lepomis macrochirus):

Acute toxicity, 72 hours, static, LC50: 12.1 - 21.5 mg/L

Rainbow trout (Oncorhynchus mykiss):

Acute toxicity, 96 hours, static, LC50: 14.8 mg/L

Slightly toxic.

Aquatic toxicity, invertebrates

Water flea (Daphnia magna):

Acute toxicity, 48 hours, static, EC50: 0.77 - 1.19 mg/L

Highly toxic.

Aquatic toxicity, algae/aquatic plants

Green algae (Selenastrum capricornutum):

Acute toxicity, 96 hours, static, EC50: 0.0094 mg/L

Very highly toxic.

Avian toxicity

Bobwhite quail (Colinus virginianus):

Dietary toxicity, 5 days, LC50: 575 mg/kg diet

Moderately toxic.

Mallard duck (Anas platyrhynchos):

Dietary toxicity, 5 days, LC50: > 980 mg/kg diet

Mallard duck (Anas platyrhynchos):

Acute oral toxicity, single dose, LD50: 60.6 - 89.6 mg/kg body weight

Moderately toxic.

Bioaccumulation

Bluegill sunfish (Lepomis macrochirus):

Edible portion: BCF: < 1

No significant bioaccumulation. Rapid depuration after end of exposure.

Dissipation

Water/sediment, field:

Half life: 1 - 2 days

Rapid removal by adsorption to sediments.

N-(phosphonomethyl)glycine { glyphosate}

Bioaccumulation

Bluegill sunfish (Lepomis macrochirus):

Whole fish: BCF: < 1

No significant bioaccumulation is expected.

Dissipation

Soil, field:

Half life: 2 - 174 days

Koc: 884 - 60,000 L/kg

Adsorbs strongly to soil.

Water, aerobic:

Half life: < 7 days

13. DISPOSAL CONSIDERATIONS

Product

Keep out of drains, sewers, ditches and water ways.

Recycle if appropriate facilities/equipment available.

Burn in proper incinerator.

Follow all local/regional/national/international regulations.

Container

See the individual container label for disposal information.

Emptied packages retain product residue and dust.

Observe all labelled safeguards until container is cleaned, reconditioned or destroyed.

Empty packaging completely.

Store for collection by approved waste disposal service.
Ensure packaging cannot be reused.
Do NOT re-use containers.
Recycle if appropriate facilities/equipment available.
Bury in approved landfill.
Follow all local/regional/national/international regulations.

Use handling recommendations in Section 7 and personal protection recommendations in Section 8.

14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

US DOT basic description and technical name
UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (diquat dibromide), 9, III

Note
Applies ONLY to packages which contain an RQ.

US DOT Reportable quantity

RQ Component	RQ	Minimum package size containing RQ
diquat	1,000 lb	34,483 lb

IMDG Code
Use description for ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., LIMITED QUANTITY

IATA/ICAO
See US DOT

15. REGULATORY INFORMATION

TSCA Inventory
Exempt

OSHA Hazardous Components
Diquat dibromide
Surfactant

SARA Title III Rules
Section 311/312 Hazard Categories
Immediate
Section 302 Extremely Hazardous Substances
Not applicable.
Section 313 Toxic Chemical(s)
Not applicable.

CERCLA Reportable quantity

RQ Component	RQ	Minimum package size containing RQ
diquat	1,000 lb	34,483 lb

Release of more than any reportable quantity to the environment in a 24 hour period requires notification to the National Response Center (800-424-8802 or 202-426-2675).

16. OTHER INFORMATION

The information given here is not necessarily exhaustive but is representative of relevant, reliable data.
Follow all local/regional/national/international regulations.
Please consult supplier if further information is needed.
In this document the British spelling was applied.

	Health	Flammability	Instability	Additional Markings
NFPA	2	1	2	

0 = Minimal hazard, 1 = Slight hazard, 2 = Moderate hazard, 3 = Severe hazard, 4 = Extreme hazard

Full denomination of most frequently used acronyms. BCF (Bioconcentration Factor), BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), EC50 (50% effect concentration), ED50 (50% effect dose), I.M. (intramuscular), I.P. (intraperitoneal), I.V. (intravenous), Koc (Soil adsorption coefficient), LC50 (50% lethality concentration), LD50 (50% lethality dose), LDLo (Lower limit of lethal dosage), LEL (Lower Explosion Limit), LOAEC (Lowest Observed Adverse Effect Concentration), LOAEL (Lowest Observed Adverse Effect Level), LOEC (Lowest Observed Effect Concentration), LOEL (Lowest Observed Effect Level), MEL (Maximum Exposure limit), MTD (Maximum Tolerated Dose), NOAEC (No Observed Adverse Effect Concentration), NOAEL (No Observed Adverse Effect Level), NOEC (No Observed Effect Concentration), NOEL (No Observed Effect Level), OEL (Occupational Exposure Limit), PEL (Permissible Exposure Limit), PII (Primary Irritation Index), Pow (Partition coefficient n-octanol/water), S.C. (subcutaneous), STEL (Short-Term Exposure Limit), TLV-C (Threshold Limit Value-Ceiling), TLV-TWA (Threshold Limit Value - Time Weighted Average), UEL (Upper Explosion Limit)

This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-APPROVED PRODUCT LABELING (attached to and accompanying the product container). This MSDS provides important health, safety, and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course. Use, storage and disposal of pesticide products 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 is set forth on that labeling. It is a violation of federal law to use a pesticide product in any manner not prescribed on the EPA-approved label.