Monsanto Company, Lawn & Garden Products

Material Safety Data Sheet
Commercial Product

1. PRODUCT AND COMPANY IDENTIFICATION

Product name

Roundup® Weed & Grass Killer Concentrate Plus

EPA Reg. No.
71995-29
Chemical name
Not applicable
Synonyms
None
Company
Monsanto Company, Lawn & Garden Products, P.0. Box 1750, Columbus, OH, 43216
Telephone: 1-888-ROUNDUP (888-768-6387)
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: 1-888-768-6387

2. COMPOSITION/INFORMATION ON INGREDIENTS

Active ingredient
Isopropylamine salt of N-(phosphonomethyl)glycine; {Isopropylamine salt of glyphosate}
1,1-Ethylene-2,2-bipyridinium dibromide; {Diquat dibromide}

Composition

COMPONENT	CAS No.	% by weight (approximate)
Isopropylamine salt of glyphosate	38641-94-0	18
Diquat dibromide	85-00-7	0.73
Other ingredients		81.27

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

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

3. HAZARDS IDENTIFICATION

Emergency overview
Appearance and odour (colour/form/odour): Amber / Liquid / Musky

CAUTION!
CAUSES MODERATE EYE IRRITATION

Potential health effects
Likely routes of exposure
Skin contact, eye contact, inhalation
Eye contact, short term
Causes temporary eye irritation.

Skin contact, short term
Not expected to produce significant adverse effects when recommended use instructions are followed.
Inhalation, short term
Not expected to produce significant adverse effects when recommended use instructions are followed.

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

4. FIRST AID MEASURES

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.

Skin contact
Wash affected skin with plenty of water.
Take off contaminated clothing, wristwatch, jewellery.
Wash clothes before re-use.

Inhalation
Remove to fresh air.

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.

7. HANDLING AND STORAGE

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

Handling

Avoid contact with eyes.
When using do not eat, drink or smoke.
Wash hands thoroughly after handling or contact.
Do not contaminate drains, sewers and water ways when disposing of equipment rinse water.
Emptied packages retain product residue and dust.
Observe all labelled safeguards until container is cleaned, reconditioned or destroyed.

Storage

Compatible materials for storage: stainless steel, aluminium, 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
Isopropylamine salt of glyphosate	No specific occupational exposure limit has been established.
Diquat dibromide	TLV (ACGIH): 0.5 mg/m3: inhalable fraction, skin, No specific occupational exposure limit has been established., The exposure limit indicated is for the diquat cation. TLV (ACGIH): 0.1 mg/m3: respirable fraction, skin, No specific occupational exposure limit has been established., 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 adequate ventilation to keep airborne concentration below exposure limits.

Eye protection

If there is significant potential for contact:

Wear chemical 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:	Amber
Form:	Liquid
Odour:	Musky
Flash point:	Does not flash.
Specific gravity:	1.074 20 °C / 15.6 °C
Solubility:	Water: Soluble

10. STABILITY AND REACTIVITY

Stability
Stable under normal conditions of handling and storage.

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

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

11. TOXICOLOGICAL INFORMATION

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

Monsanto has not conducted toxicity studies on this product. Data obtained on similar products and on components are summarized below.

Similar formulation

Acute oral toxicity
Rat, LD50: > 5,000 mg/kg body weight
Practically non-toxic.
FIFRA category IV.

Acute dermal toxicity
Rat, LD50: > 5,000 mg/kg body weight
Practically non-toxic.

FIFRA category IV.

Skin irritation

Rabbit, 3 animals, OECD 404 test:
Days to heal: 2
Primary Irritation Index (PII): 0.4/8.0
Essentially non irritating.
FIFRA category IV.

Eye irritation

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

Acute inhalation toxicity

Rat, LC50, 4 hours, aerosol:
Practically non-toxic.
FIFRA category IV.
No 4-hr LC50 at the maximum tested concentration.

Skin sensitization

Guinea pig, 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

Carcinogenicity

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

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

Toxicity to reproduction/fertility

Rat, oral, 3 generations:
NOAEL toxicity: > 30 mg/kg body weight
NOAEL reproduction: > 30 mg/kg body weight
Target organs/systems in parents: none
Other effects in parents: none
Target organs/systems in pups: none
Other effects in pups: none

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

Ames test(s):
Not mutagenic without metabolic activation.

Micronucleus test(s):
Not mutagenic.

Dominant lethal test(s):
Not mutagenic.

In vitro chromosomal aberration test(s):
Not mutagenic.

Mammalian cell mutagenicity test(s):
Mutagenic with and without metabolic activation.

In vitro chromosomal aberration test(s):
Mutagenic.

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

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

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

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.

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 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, ErC50 (growth rate): 166 mg/L

Practically non-toxic.

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.
Triple or pressure rinse empty containers.
Do NOT contaminate water when disposing of rinse waters.
Ensure packaging cannot be reused.
Do NOT re-use containers.
Store for collection by approved waste disposal service.
Recycle if appropriate facilities/equipment available.
Follow all local/regional/national/international regulations.

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.

Not hazardous under the applicable DOT, ICAO/IATA, IMO, TDG and Mexican regulations.

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
Not applicable.

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.

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)

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