Technical Bulletin For Roundup® Herbicide

PHYSICAL AND CHEMICAL PROPERTIES

Physical State:
Viscous, golden yellow liquid.

Specific gravity:
9.75 lbs/gal (1.17 gm/ml).

Solubility in water:
Completely miscible; mixes readily with water.

Flammability:
Nonflammable, formulation is a water based salt.

Freezing point:
Freezes at -20°F; returns to liquid state upon thawing. Although heated storage is not required, storage above 10°F is suggested.

Shelf life:
Formulation is very stable. Will last at least 4 years under normal warehouse conditions.

pH:
4.5.

Active Ingredient:
Isopropylamine salt of glyphosate.* Contains 41% active ingredient by weight. Contains 4 lb/U.S. gallon or 480 gm/liter.

Inert Ingredients:
59% by weight, includes a surfactant to aid adherence and absorption by plant foliage.

TOXICOLOGICAL PROPERTIES

Fish and Wildlife:
Investigations conducted on bobwhite quail, mallard ducks, honeybees, rainbow trout, bluegills and other species of fish showed these species have extremely high tolerance.

Acute Toxicity:
Oral LD_{50} — 4900 mg/kg (rats). Skin absorption MLD_{50} >7940 mg/kg (rabbits).

Subacute Toxicity:
Results of subacute toxicity testing have shown no toxicological properties which would limit labeled uses of Roundup herbicide.

Irritation:
Mild skin irritant; causes eye irritation.

Toxicity Category:
Category II pesticide. Label carries WARNING! statement based only on eye irritation as required by the Environmental Protection Agency.

Symptoms of Poisoning:
No unique symptoms.

First Aid and Antidotes:
Avoid contact with eyes, skin and clothing because of possible irritation. In case of eye contact, flush immediately for 15 minutes with plenty of water. If irritation persists, call a physician. Flush skin with water. There is no specific antidote for this formulation and in light of its low acute oral toxicity, none should be necessary.

HERBICIDAL PROPERTIES AND USE

General:
Roundup is a broad-spectrum, foliar applied herbicide that is considered relatively non-selective. Controls most species dependent on stage of growth and herbicide rate. Very effective on perennial, annual and biennial species of grasses, sedges, and broadleaved weeds.

Mode of Action:
Absorbed through foliage and translocated throughout the plant. Visible effects normally occur in 2 to 4 days on annual species, and 7 to 10 days on perennial species. Translocation to

*Glyphosate is the common name for N-(phosphonomethyl) glycine

underground propagules of perennial species prevents regrowth and results in their destruction.

Soil Activity:
Roundup has no residual soil activity and is herbicidally effective only when applied to leaf and green stem tissue. The active ingredient is adsorbed strongly by soil particles, thereby preventing root uptake, leaching, and herbicidal activity in the soil.

Volatility:
Does not volatilize or move as a vapor to harm adjacent vegetation.

Breakdown:
Microbiological degradation is the major cause of decomposition. In the soil, the active ingredient is not taken up by plants, is essentially immobile and relatively nonpersistent. Rate of breakdown depends on microfloral population and type; normally the half-life is less than 60 days and soil residues are near or below 10% of that applied within a growing season.

Application Method:
Applied in water as a postemergence spray to actively growing foliage of vegetation to be controlled. Selectivity can be achieved by directional application, by shielding desirable vegetation, or by different physiological stages of treated vegetation.

Application Timing:
Effective on annuals at all active growth stages. On perennials, best control is usually achieved at or beyond bud or boot stage, or when applied late in the growing season.

Application Sites:
Labeled for use in many cropping systems and noncropland sites.

Mixing:
Since Roundup herbicide is water soluble, it readily mixes with water. To minimize foaming from the surfactant included in the formulation, add Roundup near the end of the filling process and minimize agitation.

Acceptable Equipment:
Roundup may be mixed and applied in stainless steel, aluminum, fiberglass, plastic, and plastic lined containers. Roundup is compatible with nearly all plastics and elastomers used as sprayer components including nylon, polyethylene, polypropylene, acetal, polyester, polystyrene, polyurethane, polyvinyl chloride, silicone, Teflon,* Viton,* EPDM, Buna N and SBR. Do not use galvanized or unlined steel (except stainless) containers. Some types of nitrile hose may become stiff after prolonged use.

USE PRECAUTIONS

Avoid Drift:
If fine spray particles are allowed to drift onto desirable plants during application; they may be injured or killed. Avoid combinations of wind, spray pressure, and nozzle types which are more likely to produce fine particles and cause drift.

Use Clean Water:
Dirt or mud in water can adsorb Roundup and cause reduced performance.

Avoid Rainfall:
Rain occurring within six hours of application may wash some Roundup off treated plants and reduce effectiveness. If heavy rain occurs within two hours after application, repeat treatments may be required.

Treat Active Growth:
Reduced results may occur if treated vegetation is covered with dust, if it is under drought stress, or if it is damaged by diseases, insects, mechanical injury, or previous chemical treatments.

Use Proper Equipment:
Make sure equipment is clean and properly calibrated. Do not mix, store, or apply Roundup or spray solutions of Roundup in galvanized or unlined steel (except stainless) containers.

Avoid Contact:
Roundup herbicide is a mild skin irritant and causes eye irritation. Therefore, contact with eyes, skin, or clothing should be avoided.

Roundup
Herbicide by Monsanto

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