Understanding Herbicide Labels, Formulations, and Adjuvants

Parts of a Pesticide Label
1. Product name
2. Type of pesticide
3. Ingredient statement
4. Keep out of reach of children
5. Signal word
6. Stmt. of practical treatment
7. Note to physician
8. Precautionary statements
9. Directions for use

Signal Word
Product is highly toxic and potentially deadly at low doses. Note: the words "Danger Poison" will always contain red text. N/A for T & O HERBICIDES
Products are corrosive and can cause irreversible eye damage or severe skin injury.
Products are moderately toxic or can cause moderate eye or skin irritation.
Products are slightly toxic or may cause slight eye or skin irritation.

Precautionary Statements

Gramoxone (Paraquat) – Most Toxic of All Herbicides
Are Herbicides Safe?

<table>
<thead>
<tr>
<th>Product</th>
<th>Oral LD50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerosene</td>
<td>5</td>
</tr>
<tr>
<td>Gasoline</td>
<td>50</td>
</tr>
<tr>
<td>Nicotine</td>
<td>53</td>
</tr>
<tr>
<td>Paraquat</td>
<td>125</td>
</tr>
<tr>
<td>Caffeine</td>
<td>250</td>
</tr>
<tr>
<td>Diquat</td>
<td>230</td>
</tr>
<tr>
<td>Acetamiprid</td>
<td>338</td>
</tr>
<tr>
<td>Household ammonia</td>
<td>350</td>
</tr>
<tr>
<td>2,4-D</td>
<td>764</td>
</tr>
<tr>
<td>Aspirin</td>
<td>1240</td>
</tr>
<tr>
<td>MSMA</td>
<td>2833</td>
</tr>
<tr>
<td>Dicamba</td>
<td>2900</td>
</tr>
<tr>
<td>Fenoxaprop</td>
<td>3510</td>
</tr>
<tr>
<td>Table salt</td>
<td>3320</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>4320</td>
</tr>
<tr>
<td>Trifluralinmehtrofop</td>
<td>&gt;5000</td>
</tr>
</tbody>
</table>

Current Debate about Mode of Action Groups

Some herbicides might mention the mode of action to help you in resistance management planning.

Others have voluntarily embraced a Group system that is already in use outside the US.

Directions for Use

USE OF A NONIONIC SURFACTANT OR CROP OIL CONCENTRATE

Always add one of the following (future to use one of the following at recommended rates will result in reduced performance of Gramosate Intens).

Nonionic Surfactant: Add a nonionic surfactant containing 15% or more surface-active agent at a minimum of 0.175% v/v (1 oz./100 gal.) or a nonionic surfactant containing 0.1% surfactant at a minimum of 0.25% v/v (2 pt./100 gal.) of the finished spray volume for ground applications. For aerial applications, add a nonionic surfactant at 0.25% v/v (2 pt./100 gal.) of the finished spray volume.

Crop Oil Concentrate: Add a nonpolarizable crop oil concentrate or methylated seed oil containing 15–20% approved material at 1.5% v/v (1 gal./100 gal.) of the finished spray volume for ground applications. For aerial applications, add 1 pint of crop oil concentrate per acre. Do not use crop oil concentrate when using Gramosate Intens for cotton harvest.

TANK MIXING FOR IMPROVED BURNDOWN OF DIFFICULT WEEDS AND RESIDUAL WEED CONTROL

Order of Tank Mixing

In general, Gramosate Intens tank mixes should be used as follows:
1. Fill spray tank 1/3 full with clean water or other approved carrier such as clear liquid fertilizer.
2. Begin tank agitation and continue throughout mixing and spraying.
3. Add dry formulations (MVP, DR, etc.) to tank.
4. Add liquid formulations (SC, EC, L, etc.) to tank.
5. Add Gramosate Intens to tank.
6. Add nonionic surfactant to tank.
7. Fill remainder of spray tank.
Where Can You Use This Herbicide?

Some herbicides place site uses just under the name, some place it early in the use directions under General Information, and some require you to check each separate section that describes use directions for each specific site.

Quick Tip! Use the search function [ctrl + F] in Adobe Acrobat to search for sites.

What is the Recommended Rate?

Rates are most often coupled with tables found inside specific site use instructions. Search the terms "rate" or "dosage" in Acrobat or look for weed control tables as you thumb through the pages.

Spot treatments often allow for higher mixed concentrations as it is assumed the entire area is not treated.

In this case, 2,4-D has a broad rate range and the maximum rate is also listed below the table.

What Does this Herbicide Control?

Look for tables that list weeds controlled. These may be up front in the "Directions for Use" section or separate tables may be found within each site use. These tables may or may not contain use rates. Rates may sometimes be found in the table header or footnotes.

Why are there different formulations?

- Some herbicides cannot be stored in liquid form
- Some herbicides do not mix in water
- Storage, handling, herbicide application needs

Formulations

- Liquid water solubles (S, SL)
- Water-dispersible liquids (L, WDL)
- Soluble powders or granules (SP, WSP, WSG)
- Emulsifiable concentrates (E, EC)
- Wettable powders (W, WP)
- Water-dispersible granules (DG, WDG)
- Granules (G, P, PS)
- Encapsulation
**Liquid Formulations**

- Liquid water solubles
- Water-dispersible liquids (dry flowables)
- Emulsifiable concentrates
  - Emulsifiers wrap around oil-soluble chemicals and suspend them in water. Require agitation.
- Issues
  - Must be protected from freezing
  - Shorter shelf life

**Dry Formulations**

- Granules
- Water-dispersible granules (Dry Flowables)
  - Herbicides contained within aggregates that dissolve in water
- Soluble powders and Wettable Powders either uncommon or not in use
  - WP were too fine & easily inhaled
- Issues
  - Must be protected from moisture
  - More expensive to apply b/c they contain less AI
  - Difficulty in uniform applications