

Pesticide Formulations & Compatibility

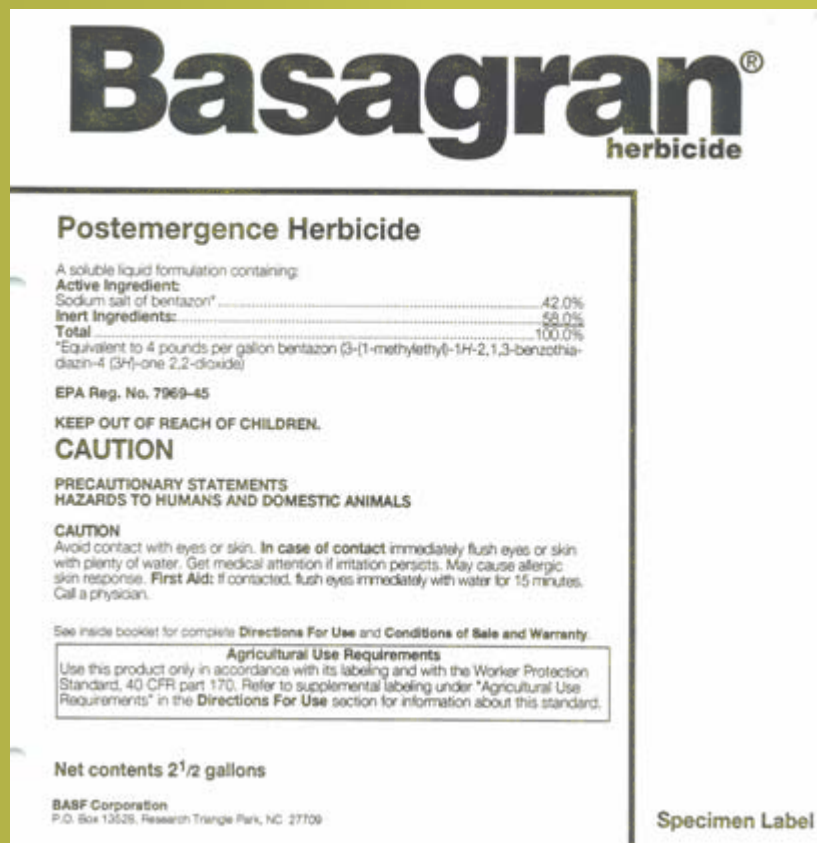
Avoiding gunk, glop and goop!

What is a Formulation



- How a pesticide is packaged.
- Contains:
 - **Active Ingredient**
 - **Inert Ingredient**

Active Ingredients – a.i.



Basagran[®]
herbicide

Postemergence Herbicide

A soluble liquid formulation containing:

Active Ingredient:	
Sodium salt of bentazon*	42.0%
Inert Ingredients:	58.0%
Total	100.0%

*Equivalent to 4 pounds per gallon bentazon (3-(1-methylethyl)-1H-2,1,3-benzothiazidin-4 (3H)-one, 2,2-dioxide)

EPA Reg. No. 7969-45

KEEP OUT OF REACH OF CHILDREN.

CAUTION

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION
Avoid contact with eyes or skin. In case of contact immediately flush eyes or skin with plenty of water. Get medical attention if irritation persists. May cause allergic skin response. **First Aid:** If contacted, flush eyes immediately with water for 15 minutes. Call a physician.

See inside booklet for complete **Directions For Use** and **Conditions of Sale and Warranty**.

Agricultural Use Requirements
Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. Refer to supplemental labeling under "Agricultural Use Requirements" in the **Directions For Use** section for information about this standard.

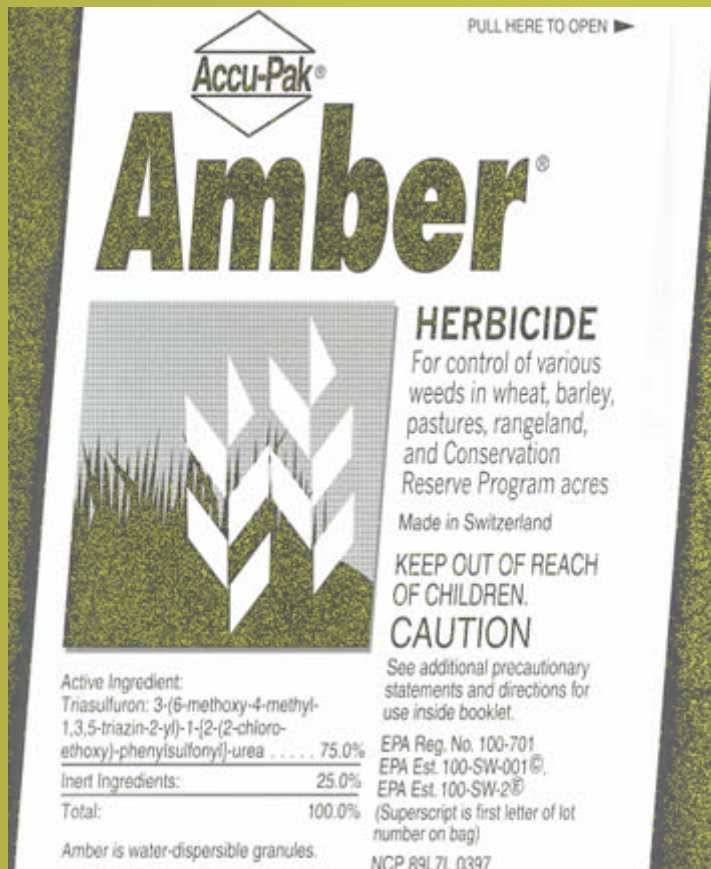
Net contents 2 1/2 gallons

BASF Corporation
P.O. Box 13525, Research Triangle Park, NC 27709

Specimen Label

- Has the pesticidal effect
- Its on the label
- Properties of the a.i. Influences the type of formulation

Inert Ingredients



- “Inactive” ingredients mixed with a.i. To make formulation easier to handle or store.
- Toxic or non-toxic

Two types of formulations

- **Wet**
- **Dry**

Types of formulations

- **Wet**
 - **More easily absorbed**
- **Dry**
 - **More easily inhaled**

Liquid Formulations

- EC –emulsifiable concentrate
- S - soluble
- ULV – ultra low volume
- F or FL - flowables
- ME – micro-encapsulated

Dry Formulations

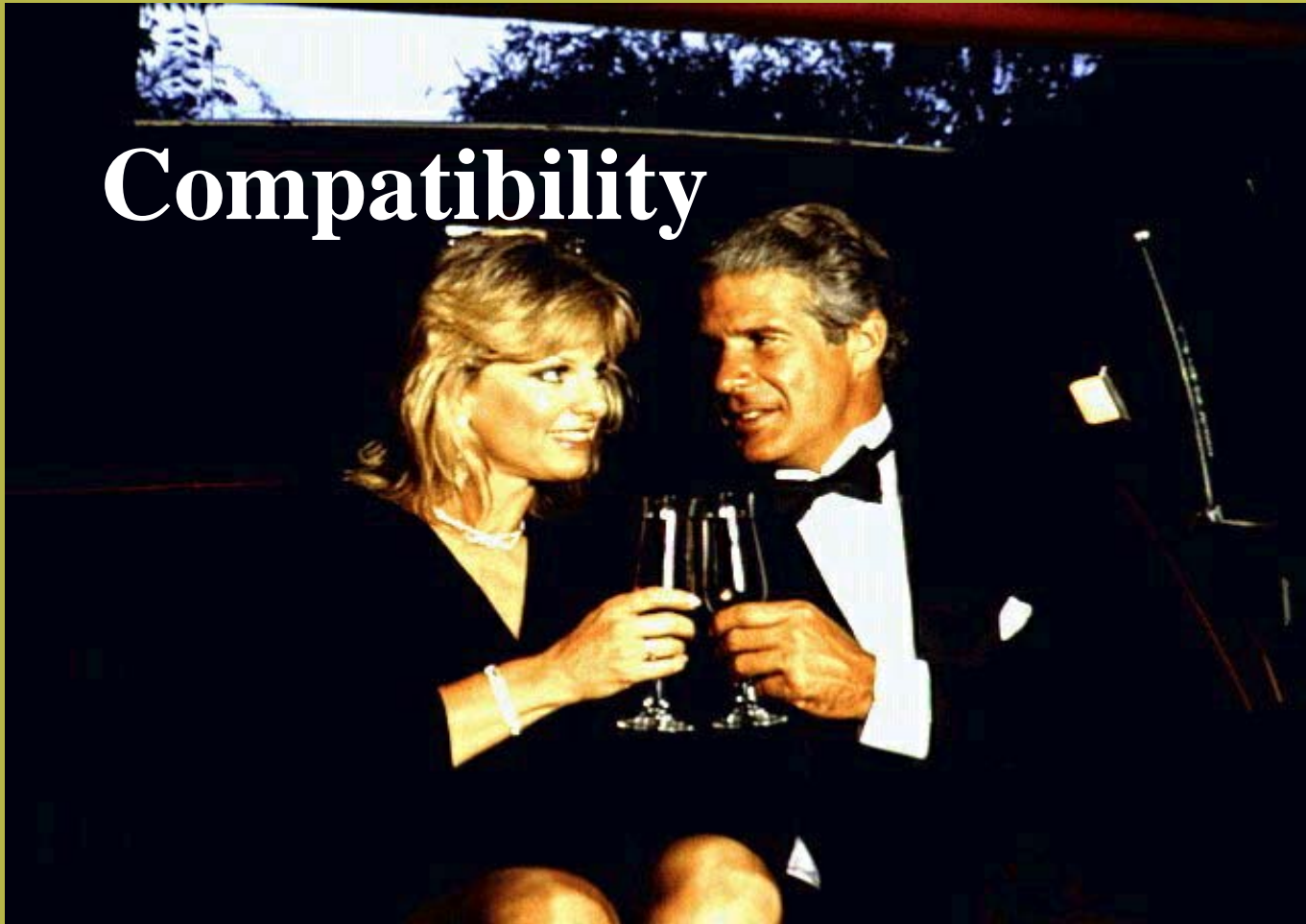
- WP – Wettable powder
- DF – Dry Flowable
- WDG – Water Dispersible Granule
- D - Dust
- P or G – Pellets or Granules
- M or ME – Micro-Encapsulated

Effects of Different Formulations

Formulation	Hazards	Phytox	Equipment	Agitate	Compatible
WP	Inhale	Safe	abrasive	Yes	High
DF/WDG	Safe	Safe	abrasive	Yes	Good
SP	Dusts	Safe	Non-abrasive	Some	Fair
EC	Dermal	Maybe	Seals, gaskets	No	Fair
F or FL	Dermal	Maybe	abrasive	Yes	Fair
S	Dermal	Safe	Non-abrasive	No	Fair
D	Inhale	Safe	NA	NA	NA
G or P	Inhale	Safe	NA	NA	NA
M or ME	Dermal	Safe	Generally ok	Yes	Fair

Pesticide Interactions

Compatibility



Four Types of Interactions

- Additive effects
- Synergistic responses
- Antagonism
- Enhancement

1. Additive Effects

- Mixing of 2 or more pesticides
- Same response when used alone
- Ease of mixing
- Reduces # of field passes
- Example: root absorbed herbicide with a foliar absorbed or Tordon with Escort

2. Synergistic Response

- Confused with Additive effects
- Greater response when mixed.
- True interaction between chemicals
- Reduced rates often the result
- Example:
Piperonyl butoxide and pyrethrums

3. Antagonism

- Less control when 2 or more chemicals are mixed
- May also increase phytotoxicity
- Example: mixing of some grass and broadleaf herbicides (Diclofop and 2,4-D)

4. Enhancement

- When a pesticide is mixed with an additive to provide greater response.
- Example: adjuvants

Two Types of Incompatibility

1. Physical

2. Chemical

- Physical - usually involve the inert ingredients. Flaking, crystals form sludge, clogs equipment. EC with WP, oil based surfactant and WP
- Chemical - deactivation of active ingredient due to pH, temperature, pesticide chemistries

Timing of application

Timing (or lack of) is another form of
incompatibility

Compatibility Test

A small scale test using a 1 quart jar

- **Wear your PPE!**
- **Add to jar in same proportions as you use in the field (1 teaspoon = 1 quart of pesticide added to 50 gallons of water).**
- **Add half of diluent to jar then add pesticide according to W-A-L-E plan.**
- **Add Wettable & other powders & Water-dispersible granules**
- **Agitate and add remaining diluent**
- **Add the Liquid products, such as solutions, surfactants and flowables.**
- **Add Emulsifiable concentrates last.**
- **Shake jar vigorously and feel sides of jar for heat. Check for lumps, scum and clumps**

Compatibility Test-Continued

- **Let the jar sit for 5 minutes.**
- **Check for any flakes, sludge, gels or other precipitants.**
- **Also see if there is any separation or layering, or small oil particles in solution.**
- **If separate layers are formed after sitting up to 30 minutes but can be resuspended by shaking, application may be possible but make sure you have agitation in the sprayer.**
- **If there is layering, an emulsifiable concentrate will normally go to the top. Wettable powders will either settle to the bottom or float on top.**
- **Add a compatibility agent.**

Be Safe

