

Mono- and di-potassium salts of phosphorous acid (076416) Fact sheet

Issued: 10/98

1. Description of the Chemical(s)

- **Generic Name(s) of the Active Ingredient(s):** Mono- and di-potassium salts of phosphorous acid
- **OPP Chemical Code:** 076416
- **Year of Initial Registration:** 1997
- **Trade name of end-use product:** Foli-R-Fos 400
- **Type of Pesticide:** Systemic fungicide
- **Basic Producers:**
 - U.I.M. Agrochemicals (Aust.) Pty. Ltd.
 - 30-42 Railway Terrace, Rocklea
 - Brisbane Market, Qld.
 - Australia, 4106
- **U.S. Agent:**
 - Compliance Services International
 - 2001 Jefferson Davis Highway, Suite 1010
 - Arlington, VA 22202

2. Use Sites, Target Pests, and Application Methods

- **Target Pests:** *Pythium* and *Phytophthora*.
- **Registered Uses:** Ornamentals and bedding plants grown in greenhouses, field nurseries, landscaping areas, conifers, turfgrasses on golf courses, sod farms and other turf areas.
- **Application Methods:** Various application methods, including foliar spray, soil drench, soil incorporation, and bare root dip.
- **Application Timing:** As needed. Repeat at 2-3 weeks interval.
- **Use Practice Limitation:** Do not apply to plants that are dormant, or heat or moisture stressed.

3. Food Clearances / Tolerances

A numeric tolerance or exemption from the requirement of a tolerance is not needed since there are no food uses associated with the registration. Safety factors from the Food Quality Protection Act of 1996 (FQPA) were considered.

4. Science Findings

A. Chemical Description

The active ingredient, mono- and di-potassium salts of phosphorous acid (also referred to as phosphonic acid), is a synthesized active ingredient. The end-use product, manufactured by an integrated process, is a liquid formulation containing 45.5% a.i. w/w, 5.14 lbs. a.i. per gallon (29.5% phosphorous acid equivalent). The CAS number for monopotassium phosphonate (KH_2PO_3) is 13977-65-6, and the CAS number for dipotassium phosphonate (K_2HPO_3 , also referred to as potassium phosphite) is 13492-26-7.

B. Biochemical Classification

Phosphorous acid is not a naturally occurring substance and has a mixed mode of action involving direct toxicity to the plant pathogen, aided by natural plant defenses. Therefore, phosphorous acid is not classified as a biochemical. However, these simple inorganic chemicals are amenable to structure-activity relationship analysis and for regulatory purposes these are subject to a reduced set of data requirements akin to those established for biochemical pesticides.

C. Toxicology

The following toxicity studies were submitted and reviews were found acceptable using a technical grade manufacturing product:

1. **Guideline No. 152-10 Acute Oral Toxicity in Rats:** Toxicity Category III.
2. **Guideline No. 152-11 Acute Dermal Toxicity in Rabbits:** Toxicity Category III.
3. **Guideline No. 152-12 Acute Inhalation Toxicity in Rats:** Toxicity category IV.
4. **Guideline No. 152-13 Primary Eye Irritation in Rabbits:** Toxicity Category III.
5. **Guideline No. 152-14 Primary Dermal Irritation in Rabbits:** Toxicity category IV.
6. **Guideline No. 152-17 Genotoxicity Studies in *Salmonella* / Mammalian Microsomal (Reverse Mutation Assay):** Negative.

The dermal sensitization and cellular immune response tests were waived based on low toxicity of the compound and a history of safe use in Australia and other countries. A 90-day feeding study was not required because the non-food uses do not require a tolerance or an exemption from the requirement of a tolerance; and proposed uses are not likely to result in repeated human exposure by the oral route.

D. Food Quality Protection Act Requirements

Safety factors from FQPA were evaluated. EPA has considered, among other factors, available information concerning the aggregate exposure levels of consumers (and major identifiable subgroups of consumers) to the pesticide chemical residue and to other related substances. Given the low toxicity of mono- and di- potassium salts of phosphorous acid as indicated by toxicity data, and a history of safe use in other parts of the world, a determination of reasonable certainty of no harm for the general population, as well as subgroups including infants and children, was made.

E. Human Health Effects

1. Acute and Chronic Dietary Risks for Sensitive Subpopulations, Particularly Infants and Children

There are no food uses associated with the registration of Foli-R-Fos 400 containing the active ingredient mono- and di-potassium salts of phosphorous acid. Therefore, acute and chronic dietary risks should be minimal based on lack of exposure. Furthermore, results from mammalian acute and subchronic toxicity studies indicate lack of toxicity, adding further weight to the lack of risk from exposure. Therefore, the Agency concludes that there is a reasonable certainty of no harm from dietary exposure to sensitive subpopulations including infants and children.

2. Common Mode of Action

Foli-R-Fos 400 may share common metabolic mechanism with other salts (such as calcium or sodium) of phosphorous acid; however, due to their limited use, these other salts are not expected to pose significant contributions to the cumulative effects from the fungicidal use of Foli-R-Fos 400.

3. Risks Posed by Potential Residential, School or Day Care Exposure

No indoor residential, school or day care uses currently appear on the label. The proposed use pattern is for ornamental and commercial turf sites only. There is a potential for dermal exposure at these sites where children are present but the health risk is expected to be minimal to nonexistent based on evaluations of the submitted toxicological studies and the relatively low application rate.

4. Drinking Water Exposure and Risk Characterization

No significant exposure is expected to result from mono- and di-potassium salts of phosphorous acid because it is likely to be biodegraded in the terrestrial and aquatic environments. Health risk to humans is considered negligible based on low toxicity and low application rate of the active ingredient.

5. Aggregate Exposure

The Agency has considered the various routes of exposure (dietary, drinking water, and exposure from non-occupational sources) and potential risks of the subject compound and determined that the proposed use of the active ingredient does not pose significant risk over a lifetime to populations including infants and children. This is demonstrated by low acute mammalian toxicity and a history of safe use of the compound in other countries

F. Occupational and Residential Exposure and Risk Characterization

Because of the lack of significant mammalian acute toxicity, low application rates, and a lack of reports of toxicity or allergic reactions from 12 years of use in other parts of the world, occupational exposure data are not required at this time. Risks from occupational exposure will be mitigated through appropriate precautionary labeling.

G. Environmental Assessment

The ecological database for Foli-R-Fos 400 is adequate and will support registration. All guideline requirements for mono- and di-potassium salts of phosphorous acid have been satisfied.

H. Ecological Effects

The following ecological effects studies were submitted and reviews were found acceptable:

1. **Guideline No. 154-6 Avian Acute Oral LD₅₀, Bobwhite Quail:** Practically non-toxic.
2. **Guideline No. 154-7 Avian Dietary LD₅₀, Bobwhite Quail:** Practically non-toxic.
3. **Guideline No. 154-8 Freshwater Fish, LC₅₀, Rainbow Trout:** Practically non-toxic.

4. **Guideline No. 154-9 Freshwater Invertebrate, LC₅₀, *Daphnia magna*:**
Slightly toxic.

5. **Guideline No. 154-11 Nontarget Organism Testing (honey bee):**
Practically non-toxic.

I. Environmental Fate and Ground Water Data

The environmental fate data requirements were not triggered because no human health or ecological effects issues were manifested in the acute toxicity (Tier I) studies.

J. ECOLOGICAL RISK ASSESSMENT

A potential for exposure exists to nontarget insects, fish, and other wildlife with foliar spray applications. However, test results indicate that the compound is practically nontoxic to birds and freshwater fish, and, at most, slightly toxic to aquatic invertebrates. Low toxicity, the proposed rate of application, and mitigating label language present minimal to nonexistent risk to wildlife.

Required Environmental Hazards Statement on the End-Use Product Label

"Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Drift and runoff may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of rinsate or equipment washwaters."

5. Summary of Required Data

All hypersensitivity incidents must be reported to the Agency when/if they occur.

6. Regulatory Actions

Unacceptable adverse effects from the use of Foli-R-Fos 400 are not expected. Unconditional registration was issued.

7. Additional Contact Information

[Ombudsman, Biopesticides and Pollution Prevention Division](#) (7511P)
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Environmental Protection Agency
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Washington, D.C. 20460