Amicarbazone

CAS 129909-90-6; EPA PC CODE 114004

New Use Review
April 2012

PESTICIDE TYPE	**HERBICIDE**
CHEMICAL CLASS	PS II inhibitor Site of Action Group 5
COMMON TRADE NAMES	Amicarbazone DF, Xonerate, Dinamic 70WDG
APPLICATION RATE (lbs a.i./A)	Single: 0.44 Max Annual: 0.44
REGISTRATION STATUS	EPA: Registered 10/4/2005; first residential use 2012 Minnesota: First registered in 2012 for both field corn and residential use
TOXICITY PROFILE FOR APPLICATORS	Signal word- Caution Toxicity III or IV
BASIC MANUFACTURER	Arysta Lifescience North America, LLC
MDA LABORATORY CAPABILITIES	Through spike recovery: feasibility analysis

HUMAN HEALTH	
NON-CANCER	Acute PAD = 0.10 mg/kg/day Chronic PAD = 0.023 mg/kg/day
CANCER	Not Likely to be Carcinogenic

Acute and chronic PADs are doses that include all relevant uncertainty and safety factors

ENVIRONMENTAL AQUATIC TOXICITY	
FISH	Acute: 60,200 ppb Chronic: 7,300 ppb
INVERTEBRATE	Acute: 20,400 ppb Chronic: 252 ppb
AQUATIC PLANTS	Vascular: 210 ppb Non-vascular: 84 ppb

Level of Concern (LOCs) have been applied to all values

Introduction

Amicarbazone is a selective herbicide for control of both broadleaf and grass weeds. It was first registered by EPA for use on field corn in 2005. New uses registered in 2012 include turf (golf courses, sod farms, residential and commercial turf sites, and other turf areas) and conifers in nurseries and field plantings (including Christmas trees). Amicarbazone is formulated as a 70% dry flowable powder. It is intended for pre- and post-emergence applications. Broadcast applications are to be made with ground equipment only; spot treatments are to be made using backpacks and hand held equipment. Amicarbazone belongs to the triazolinone class of compounds and is a photosystem II inhibitor with burn-down activity.

Projected New Use in Minnesota

With this new federally-approved use, amicarbazone is expected to primarily be used on turf grass (creeping bentgrass, Kentucky bluegrass, fine fescues, tall fescue and perennial ryegrass) for control of *Poa annua* (annual bluegrass). According to the primary registrant, *Poa annua* is one of the most troublesome winter-annual grassy weeds on golf courses. Golf course superintendents are likely to welcome the addition of amicarbazone for control of this critical weed. Extension specialists believe that this product will be used in a niche market on greens, tees, and less frequently on fairways. Furthermore, this product will probably only be used on golf courses that are fastidiously maintained. Alternate brand names include Xonerate and Dinamic 70 WDG.

Label Environmental Hazards

Water Quality:

- Labels carry advisories for surface water and groundwater impacts, runoff reduction potential from vegetative buffers, and avoiding applications before rainfall.

Other:

- Do not mix, load or clean spray equipment within 50 feet of any wells or aquatic systems, including marshes, ponds, ditches, streams, lakes, etc.
- Do not apply within 50 feet of well-heads or the above-mentioned aquatic systems
- Do not apply this product if the soil pH is > 7.4
- Applications must take all precautions necessary to keep spray drift from reaching sensitive areas like ponds, lakes, rivers, streams and wetlands.
- Apply only with ground equipment; do not apply using aerial application.
- Do not apply this product through any type of irrigation system
- Do not use a mechanically pressurized handgun for application to Christmas trees.

MINNESOTA DEPARTMENT OF AGRICULTURE

Toxicological Effects

EPA's screening models generate high-end, conservative exposure estimates for active ingredients and toxicologically significant degradates. Model inputs include annual usage at maximum use rates, maximum treated acres, maximum food residues, peak runoff and drift scenarios, etc. Some proposed products, application rates and use scenarios are not relevant to Minnesota. EPA's estimates, therefore, may not reflect future use and impacts in Minnesota.

Human Health

- Carcinogenic Effects- Classified as "Not Likely to be Carcinogenic to Humans"
- Drinking Water Guidance- High-end, screening exposure estimates for drinking water suggest that applications of amicarbazone may result in surface water and groundwater detections requiring a Minnesota-specific risk assessment by the Minnesota Department of Health; however, EPA concludes that conservative exposure estimates are below levels of concern for the general population and all population subgroups. The MDA will further explore laboratory and monitoring capabilities to assess potential impacts and related risks.
- Occupational Exposure- Low acute toxicity. EPA identified a risk of concern to occupational handlers using mechanically pressurized handgun for application to Christmas trees. Therefore, EPA is requiring this method of application be prohibited on the product label. All other handler exposures are not of concern.

Environment- Non-target Species

- Terrestrial Life Exposure – High end, screening exposure estimates for risks to birds, mammals and terrestrial plants generated some concern. Risks are mitigated by labeling requirements, including downwind spray drift buffers.
- Aquatic Like Exposure – High end, screening exposure for risks to non-vascular aquatic plants generated some concern; however, EPA concludes the likelihood of actual chronic risk is expected to be low or is further mitigated by labeling requirements. Nevertheless, estimates suggest that surface water concentrations are not likely to exceed 10% of the estimated non-vascular plant toxicity benchmark.

Environmental Fate

Soil

- Half-life- Aerobic = 87 days
- Adsorption- K_{oc}: 16.7 – 37.0 L kg^{-1}
- Persistence- Moderately persistent; slowly degrades into three major degradation products under different environmental conditions. Bioaccumulation is not expected to be of concern.

Water

- Half-life via hydrolysis- Stable within an acidic and neutral environment, but transforms slowly under alkaline conditions.
- Surface water- Very highly mobile
- Groundwater- Due to its moderate to long persistence and high mobility in the soil, leaching of this compound to lower soil horizons and groundwater is possible.

Air

- Volatilization- Amicarbazone has a low vapor pressure (9.75×10^{-9} mm Hg at 30°C); therefore, volatilization from water and soil surfaces is not expected to be a significant route of dissipation.

Degradates

Amicarbazone slowly degrades into three major products, Des-amino, N-methyl Des-amino and decarboxamide, under different environmental conditions. These degradates are very highly mobile and may reach both surface and groundwater under some conditions Des-amino and N-methyl Des-amino both were considered in the drinking water assessment, but neither were considered in the exposure modeling for aquatic systems in the ecological risk assessment.. Des-amino and N-methyl Des-amino are the only two degradates expected to be present in natural/acidic or neutral environments where the parent is proposed to be applied. Only in cases where amicarbazone is transported into alkaline (pH values > 7.4) groundwater, surface water and/or soils, the third degradate (decarboxamide) is expected to become important. However, since the amicarbazone is not to be applied on soils with pH higher than 7.4, only studies submitted for Des-amino, N-methyl Des-amino were evaluated by EPA during registration.