Sedaxane

CAS 874967-67-6; EPA PC CODE 129223

New Active Ingredient Review
June 2012

PESTICIDE TYPE	**FUNGICIDE**
CHEMICAL CLASS	Succinate-dehydrogenase inhibitor (SDHI) Frac Group: 7
COMMON TRADE NAMES	Vibrance Vibrance Extreme (difenoconazole + mefenoxam) CruiserMaxx Vibrance (difenoconazole + mefenoxam + thiamethoxam)
APPLICATION RATE (lbs a.i./A)	Single: 0.001 -0.005 lb ai/100 lb seed
REGISTRATION STATUS	EPA: Registered: May 2012
TOXICITY PROFILE FOR APPLICATORS	Signal word: Caution Toxicity: III, IV
BASIC MANUFACTURER	Syngenta
MDA LABORATORY CAPABILITIES	In discussion

HUMAN HEALTH	
NON-CANCER	Acute PAD = 0.30 mg/kg/day Chronic PAD = 0.11 mg/kg/day
CANCER	Likely to be Carcinogenic to Humans Unit Risk Factor: 4.64 x 10^{-3} mg/kg/day^{-1} Lifetime Dietary Risk (U.S. Population): 7 x 10^{-7}

Acute PAD and Chronic PAD are the PODs with all relevant uncertainty and safety factors included

ENVIRONMENTAL AQUATIC TOXICITY	
FISH	Acute: 310 ppb Chronic: 110 ppb
INVERTEBRATE	Acute: 2,980 ppb Chronic: 750 ppb
AQUATIC PLANTS	Vascular: 1,200 ppb Non-vascular: 9,900 ppb

OPP LOCs have been applied to all values

Introduction

Sedaxane is a pyrazole carboxamide fungicide for use as a seed treatment in canola, cereal grains, and soybean. It is applied as a water based slurry to seeds which are then planted according to protect against certain seed-born and soil-born diseases, including *Rhizoctonia* sp. in plants. Sedaxane is particularly effective against certain smut diseases in cereal crops. The mode of action is the inhibition of succinate dehydrogenase, which is a functional part of the tricarboxylic acid cycle, the mitochondrial electron transport chain and oxidative phosphorylation. Minnesota Department of Agriculture (MDA) extensive review of the U.S. Environmental Protection Agency (EPA) sedaxane labels and risk assessments for issues relevant to Minnesota is summarized below.

Projected Use in Minnesota

Sedaxane is labeled for use on the following major crops in Minnesota: soybean, wheat, hay, oats, along with other grains and canola.

All 3 sedaxane seed treatment products have 'Vibrance' incorporated into the name. There are no products proposed for homeowner use or application to residential areas.

- **Vibrance** *(EPA Reg. No. 100-1374; registered in MN)* – Seed treatment
- **Vibrance Extreme** *(EPA Reg. No. 100-1382; registered in MN)* – Seed treatment co-formulated with difenoconazole and mefenoxam for protection against certain diseases of barley, oats, rye, triticale, and wheat.
- **CruiserMaxx Vibrance** *(EPA Reg. No. 100-1383; registered in MN)* – Seed treatment co-formulated with difenoconazole, mefenoxam, and thiamethoxam for protection against damage from certain insects and diseases of cereal.

Label Environmental Hazards

Water quality:

- The label carries enforceable language related to direct application to surface waters and equipment cleaning.

Other:

- No other specific environmental hazards are noted on the label.

MINNESOTA DEPARTMENT OF AGRICULTURE

Toxicology and Exposure

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 "Likely to be Carcinogenic to Humans." EPA has determined the chronic population adjusted dose (PAD) is protective of all long-term effects, including potential carcinogenicity. As a result, a separate dietary exposure assessment for the purpose of assessing cancer risk was not necessary.
- Drinking Water Guidance- High-end, screening exposure estimates for drinking water suggest that applications of sedaxane may result in surface water and groundwater detections; however, EPA concludes that conservative exposure estimates are below levels of concern for the general population and all population subgroups.
- Occupational Exposure – Low acute toxicity. Exposure and risk estimates indicate occupational risks are not of concern for the proposed uses.

Environment- Non-target Species

- Freshwater Aquatic Life Exposure – High-end screening exposure estimates for risks to fish and invertebrates generated some concern and sedaxane is classified as highly toxic to fish and moderately toxic to invertebrates; however, EPA concludes risks are mitigated by labeling requirements. Estimated surface water concentrations do not exceed 1% of the available aquatic toxicity benchmarks.

Environmental Fate

Soil

- Half-life- Aerobic = 296-422 days; Anaerobic = 375 days
- Adsorption- K_{foc}: 257-662 mL/ g
- Persistence- Sedaxane is persistent in the environment. It is only susceptible to degradation via aerobic soil metabolism and photolysis, but photolysis is unlikely because sedaxane is used as a seed treatment only. Aerobic soil metabolism is expected to be the primary mechanism of degradation in the environment. Sedaxane is not expected to bioaccumulate in aquatic and terrestrial organisms.

Water

- Half-life via hydrolysis- stable, no evidence of degradation
- Surface water- Moderately mobile. Sedaxane may move to surface water via runoff of dissolved or soil sorbed residues (*i.e.,* through erosion).
- Groundwater- Sedaxane may move to groundwater slowly via leaching.

Air

- Volatilization- Not expected to volatilize due to a low vapor pressure (20°C 6.5 x 10^{-8} Pa)

Degradates

Under conditions conducive to degradation, sedaxane has been shown to form five major transformation products, including carbon dioxide. None of the degradates are considered to be of potentially greater toxicological concern than that of the parent and they were not included in the exposure calculations. The assumption made in the risk assessment was that the four major transformation products will not influence the overall risk of sedaxane, there will be some uncertainty in this assumption as toxicity data were not available for all transformation products and taxa.