Product Safety Assessment

*Methoxyfenozide*


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**Names**

- CAS No. 161050-58-4
- Methoxyfenozide
- Intrepid® 2F Insecticide
- Prodigy® 240SC Insecticide
- IUPAC Name: N-tert-butyl-N'-(3-methoxy-o-toluoyl)-3,5-xylohydrazide
- CAS Name: 3-methoxy-2-methylbenzoic acid 2-(3,5-dimethylbenzoyl)-2-(1,1-dimethylethyl) hydrazide

Much of the information in this document relates to the registration and sale of methoxyfenozide in the United States of America. For details applicable to other geographies, consult the relevant [Product Label](#), [Safety Data Sheet](#) or [Contact Us](#).

**Product Overview**

- Methoxyfenozide is an off-white solid with a mild musty odor and is the active ingredient in a series of commercial-use insecticide products formulated by Dow AgroSciences, a subsidiary of The Dow Chemical Company. The formulated products are liquid soluble concentrates (SC) sold under the trade names Falcon®, Intrepid®, Integro®, Pacer®, and Prodigy® insecticides. Methoxyfenozide was accepted for review and registration under the Reduced Risk Pesticide Initiative by the U.S. Environmental Protection Agency (EPA). For further details, see [Product Description](#).
- Methoxyfenozide is a diacylhydrazine and acts as a molt accelerating compound commonly referred to as a MAC. It is specifically effective against a broad range of lepidopterous (caterpillar) pests. Products containing methoxyfenozide are globally registered for use on a wide range of crops including cotton, soybeans, apples, grapes, almonds, cherries, leafy vegetables, broccoli, tomatoes, and numerous other fruit, nut, and vegetable crops. It has not been found to have adverse effects on most beneficial insects. Methoxyfenozide may be applied either aerially or by ground spray. For further details, see the relevant [Product Label](#) and [Product Uses](#).
- Methoxyfenozide is essentially non-irritating to the eyes. Skin contact with methoxyfenozide is essentially non-irritating and not likely to result in absorption of harmful amounts. At room
temperature, exposure to vapor is minimal due to its low volatility. However, inhaling methoxyfenozide mist may result in irritation of the nose and throat. For further details, see Health Information or the Safety Data Sheet.

- Occupational exposure to methoxyfenozide could occur in manufacturing or formulating operations during maintenance, sampling, testing, or other procedures. Agricultural workers using methoxyfenozide could be exposed during field application. Workers using methoxyfenozide must wear proper protective equipment and follow label instructions carefully. Methoxyfenozide is not available for home use. See Exposure Potential.
- Methoxyfenozide is stable under normal storage and use conditions. Avoid contact with strong oxidizing agents. Consult the Product Label for specific use and storage information.

Manufacture of Product

- Manufacture – Dow AgroSciences LLC produces methoxyfenozide. The chemical structure of methoxyfenozide is shown below.

![Chemical Structure of Methoxyfenozide]

Product Description

Methoxyfenozide is the active ingredient in a series of insecticide products formulated by Dow AgroSciences LLC. It is an off-white solid with a mild odor. When formulated, methoxyfenozide is dispersed in a propylene glycol (CAS #37-55-6) carrier solution. Dow AgroSciences sells methoxyfenozide under the trade names Falcon®, Intrepid®, Integro®, Pacer®, Prodigy®, and Runner® insecticides.

Methoxyfenozide is a diacylhydrazine and acts as a molt accelerating compound commonly referred to as a MAC. When insects are exposed to methoxyfenozide it is rapidly absorbed into the insect’s circulatory system and binds with the ecdysone receptor. Feeding stops within hours of exposure and a premature, lethal molt is initiated in immature stages by mimicking the action of 20-OH ecdysone. This disruption of the normal molt cycle prevents the larvae from completely shedding its old cuticle resulting in starvation, dehydration, and death within a few days. Larvae exposed to a sub-lethal dose often die during the pupal stage or may emerge as sterile adults. Exposure of eggs through direct contact with methoxyfenozide spray or contact with treated surface may also disrupt egg hatching in some species. Exposure of adults to direct spray or residue deposits may cause adult infertility in some insect species. The mode of action for methoxyfenozide is uniquely different from chitin biosynthesis inhibitors and juvenile hormone mimics.

Methoxyfenozide selectively targets insect pests in the Lepidoptera group (for example, caterpillars). It is primarily active via ingestion but does have some contact action on some pest species. The high specificity of methoxyfenozide to lepidopterous insects means that it does not disrupt members of other insect orders and mites. Thus there is low impact on most beneficial...
insects including bees, predators, and parasitoids. The specificity to target *Lepidoptera* together with low adverse effect to beneficial arthropods make methoxyfenozide products ideal for Integrated Pest Management programs. Methoxyfenozide was accepted for review and registration by the U.S. Environmental Protection Agency (EPA) under its Reduced Risk Pesticide Initiative by demonstrating a lower risk to the environment and humans than many current marketplace standards.

**Product Uses**

Insecticide products containing methoxyfenozide are registered in more than 50 countries around the globe and new registrations are continuously being obtained. Global registrations include approved uses in *Row crops* (e.g. cotton, soybeans, rice and corn); *Tree fruits* (e.g. pome fruit, stone fruit); *Tree nuts* (e.g. walnuts, pecans, almonds, pistachios); *Small fruits* (e.g. grapes); *Leafy/brassica vegetables* (e.g. lettuce, cole crops, spinach); *Fruiting vegetables* (e.g. peppers, tomatoes, egg plant); *Bulb, root, & tuber vegetables* (e.g. potatoes); *Forages* (e.g. alfalfa); and *Other* (e.g. tea, and coffee).

Methoxyfenozide is applied either aerially or by ground spray. Since methoxyfenozide is primarily active on most *Lepidoptera* species by ingestion, applications should be made when the target pest is actively feeding. For internal feeding insects such as *Lepidopteran* leafminers or fruit worms, applications should be made prior to the insect moving into the plant or fruit (in other words, just prior to egg hatch). Methoxyfenozide is active against all stages of larval instars; however, timing an application for early instars will limit feeding damage.

Good coverage is essential for maximum effect. Residual control can vary depending on crop, use rate, pest pressure, and crop development stage. Applications at labeled rates should provide 14-21 days of residual control. Repeat applications may be required if the crop is rapidly growing. Methoxyfenozide formulations have been optimized to resist wash-off, but significant rainfall within a short interval after application can reduce residual.

**Exposure Potential**

Based on the uses for methoxyfenozide, the public could potentially be exposed through:

- **Workplace exposure** – Exposure could occur in a methoxyfenozide manufacturing or formulating facility. Workers could be exposed during maintenance, sampling, testing, or other procedures. Each manufacturing and formulating facility within Dow AgroSciences has a thorough training program for employees and appropriate work processes and safety equipment in place to limit unnecessary exposure. Agricultural workers could be exposed to methoxyfenozide during mixing/loading procedures or field application. Wearing recommended protective equipment and following label instructions will reduce risk of exposure. See Health Information and Product Label.

- **Consumer exposure to products containing methoxyfenozide** – Methoxyfenozide is not available for home use. Consumers could possibly be exposed to methoxyfenozide residues through consumption of trace residues in food and/or drinking water. The U.S. Environmental Protection Agency (EPA) has established legal tolerance levels for methoxyfenozide residues in food based on data from animal studies and mathematical modeling. The EPA risk estimates are conservative, designed to protect human health. The EPA concludes that “there is a reasonable certainty that no harm will result to the general population and to infants and children from aggregate [combined food and water] exposure to methoxyfenozide residues.” See Health Information.

- **Environmental releases** – In the event of a methoxyfenozide spill, the focus should be on containing the spill to prevent the material and any cleaning run-off from reaching irrigation ditches, municipal sewers, and open bodies of water. For small spills, contain and absorb the
material with inert materials such as sand or soil. Transfer material to suitable containers for
disposal. Wash all exposed skin areas thoroughly with soap and water immediately after
handling. Consult the relevant Product Label or Safety Data Sheet for more information about
protective equipment and procedures. See Environmental, Health and Physical Hazard
Information.

- **Large release** – In the event of a large spill, contain or dike the material immediately with an
inert material such as sand or soil. Avoid breathing vapor. Transfer liquids and solid diking
material into separate suitable containers for recovery or disposal. Personnel engaged in
clean up of spills must wear appropriate protective equipment. Consult the relevant Product
Label or Safety Data Sheet for more detailed information about protective equipment and
procedures.

- **In case of fire** – A self-contained breathing apparatus and full protective clothing must be
worn. Fight fire with carbon-dioxide, dry-chemical, or foam extinguishers or gentle water
spray. Use of an uncontrolled water stream can spread possible contamination. Follow
emergency procedures carefully. See Environmental, Health, and Physical Hazard
Information.

- **Emergency Response Information** – In the case of an emergency such as poisoning,
product spillage or fire associated with a Dow AgroSciences product please use the phone
number listed on the Safety Data Sheet for the appropriate country. In some countries, the
Emergency Response number is also provided on the package label.

For more information, consult the relevant Product Label or Safety Data Sheet.

**Health Information**

**Eye and Skin Contact** – Methoxyfenozide is essentially non-irritating to the eyes. Brief skin
contact is essentially non-irritating, and prolonged contact is unlikely to result in the absorption of
harmful amounts.

**Ingestion** – Methoxyfenozide has very low toxicity if swallowed, but it is not intended for direct
ingestion.

**Systemic** – Excessive exposure may result in methemoglobinemia, impairing the blood’s ability
to transport oxygen. In animal studies, effects have been reported on the blood, liver, kidney, and
thyroid.

**Inhalation** – At room temperature, exposure to vapor is minimal due to low volatility. However,
inhalation of methoxyfenozide mist may result in irritation of the nose and throat.

**Cancer and Birth Defect Information** – In animal studies, methoxyfenozide did not cause
cancer, birth defects, or interfere with reproduction. Genetic toxicity studies have been negative.

For more information, see the relevant Product Label or Safety Data Sheet.

**Environmental Information**

Registered methoxyfenozide insecticides have not been found to cause any threat to aquatic
environments, birds, fish, or bees when used according to label instructions.

For more information, see the relevant Product Label or Safety Data Sheet.
Physical Hazard Information
Methoxyfenozide is stable under normal storage and use conditions. Avoid contact with strong oxidizing agents. Consult the Product Label for specific use and storage information.

For more information, see the relevant Product Label or Safety Data Sheet.

Regulatory Information
Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of methoxyfenozide. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Product Label, Safety Data Sheet, or Contact Us.

Additional Information

For more business information about methoxyfenozide, visit the Dow AgroSciences website at: [www.dowagro.com/](http://www.dowagro.com/).

Reference
1. Intrepid® 2F Insecticide Material Safety Data Sheet, Dow AgroSciences LLC, MSDS: 007711
2. Prodigy® 240SC Insecticide Brochure, Dow AgroSciences Australia Ltd.
3. Intrepid® 2F Insecticide Specimen Label, Dow Agrosciences LLC, Label Code: D02-846-004
4. PAN Pesticide Database Website: California Methoxyfenozide Use 2005 ([http://www.pesticideinfo.org/Detail_ChemUse.jsp?Rec_Id=PC37414](http://www.pesticideinfo.org/Detail_ChemUse.jsp?Rec_Id=PC37414)).
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