



## FEATURED PRODUCT

# Diazinon

Diazinon, a pesticide, belongs to a class of chemicals known as organophosphates which were presented originally in World War Two as nerve gases.<sup>2</sup>

The purpose of diazinon is to ensure the survival of various agricultural crops including – but not limited to – rice, tobacco, sugarcane and corn by killing the insects which may affect the crops' yield.<sup>1</sup> The insecticide targets the nervous system and causes it to function ineffectively resulting in the eventual death of the insect.<sup>3</sup> Diazinon is, first and foremost, a colourless liquid,<sup>4</sup> although it is also possible to obtain as granules, seed dressings and wettable powder.<sup>1</sup>

### Diazinon

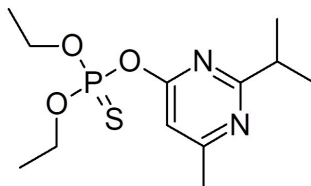
**Chiron part:** 2779.12

**Synonym:** NSC 8938

**CAS:** 333-41-5

**Molecular Weight:** 304.35

**Molecular Formula:** C<sub>13</sub>H<sub>21</sub>N<sub>2</sub>O<sub>3</sub>PS



# What are the concerns?

Diazinon may be useful at controlling pest attacks, but it is also highly toxic to fish, bees and birds.<sup>1</sup> Furthermore, exposure to the substance also affects the human nervous system – a particular concern given that Diazinon has been found in drinking water wells at levels exceeding the United States Environmental Protection Agency's (EPA's) predetermined 'safe' level.<sup>2</sup>

Contact with the pesticide can result in anything between eye irritation and dizziness to convulsions, vomiting and dyspnea (breathing difficulty).<sup>5</sup> As a matter of fact, Diazinon has been referenced in over 200 lawsuits involving acute poisonings, chronic conditions and a minimum of one death.<sup>2</sup>

## Diazinon-d10 (diethyl-d10)

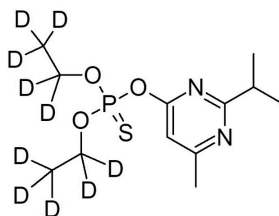
**Chiron part:** 2927.12

**Synonym:** NSC 8938-d10

**CAS:** 100155-47-3

**Molecular Weight:** 314.40

**Molecular Formula:** C<sub>12</sub>H<sub>11</sub>D<sub>10</sub>N<sub>2</sub>O<sub>3</sub>PS

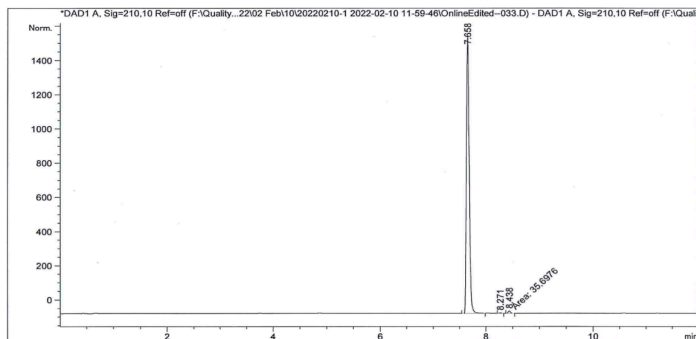


# How is it monitored?

There are numerous published methods available for the determination of organophosphorus pesticides in various matrices. Examples of such include ONORM EN ISO 14182:2000 Animal Feeding Stuffs - Determination of Residues of Organophosphorus Pesticides - Gas Chromatographic Method (ISO 14182:1999).<sup>11</sup>

Additionally, Diazinon is one of eight substances covered by the United States' EPA Method 614: The Determination of Organophosphorus Pesticides in Municipal and Industrial Wastewater<sup>8</sup> (See Chiron part no. S-4637-K-MX) The main application is monitoring the compounds in industrial and municipal discharges by gas chromatography.<sup>8</sup>

The EPA are currently in the process of validating the analytical methods for measuring pesticide residues, which are hosted on their website. Historical methods for monitoring Diazinon in soil and water, registered by Ciba-Geigy, can also be located there.<sup>12</sup>



**Instrument:** UHPLC/DAD

**Column:** Raptor Biphenyl, 90Å, 2.7 µm 100 x 2.1 mm, Restek part 9309A12

**Mobile Phase A:** 2 mM ammonium formate in water, 0.1 v/v% formic acid

**Mobile Phase B:** 2 mM ammonium formate in MeOH, 0.1 v/v% formic acid

**Injection volume:** 0.1-20 µL

**Flow rate:** 0.55 mL/min

**Temperature:** 40°C

**Wavelength:** 210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	7.658	BB	0.0588	5398.92920	1470.67419	99.2362
2	8.271	BB	0.0449	5.85922	2.07510	0.1077
3	8.438	MM	0.0490	35.69760	12.13799	0.6561

**Figure 1.** Chromatogram of Diazinon (2779.12) by UHPLC/DAD (Purity: 99,2% ± 0,1%).

# How is it regulated?

In recent years, the notable human health risks Diazinon presents have caused enough concern for the EPA to bring forward their scheduled pesticide registration review.<sup>7</sup> The agency is anticipated to reveal provisional regulation decisions in 2026.<sup>7</sup>

Several mitigation methods being contemplated involve spray drift requirements, increased personal protective equipment for insecticide handlers and the cancellation of some formulation types.<sup>6</sup>

The issues brought about had previously caused the Commission of European

Communities to review, in 2007, the maximum residue limits (MRL) of Diazinon.<sup>10</sup>

Moreover, in 2016, the Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO) Core Assessment Group on Pesticide Residues (JMPR) concluded an acceptable daily intake (ADI) of 0-0.003 mg/Kg body weight and acute reference dose (ARfD) of 0.03 mg/Kg body weight. Codex Alimentarius Commission – responsible for internationally adopted food standards – have also published MRLs for Diazinon in a variety of food stuffs on-line.<sup>13</sup>

## References

1. EXTONET PIP - DIAZINON (orst.edu)
2. The Facts About Diazinon | Environmental Working Group (ewg.org)
3. Diazinon General Fact Sheet (orst.edu)
4. Spectrum Laboratories : Chemical Fact Sheet - Cas # 333415 (archive.org)
5. CDC - NIOSH Pocket Guide to Chemical Hazards - Diazinon®
6. EPA announces accelerated action on 4 pesticides | Morning Ag Clips
7. EPA taking early action on organophosphate pesticide risks | TheFencePost.com
8. Method 614: The Determination of Organophosphorus Pesticides in Municipal and Industrial Wastewater (epa.gov)
9. WHO | Inventory of evaluations performed by the Joint Meeting on Pesticide Residues (JMPR).
10. Commission Directive 2007/39/EC of 26 June 2007 amending Annex II to Council Directive 90/642/EEC as regards maximum residue levels for diazinon (Text with EEA relevance) (legislation.gov.uk)
11. ONORM EN ISO 14182:2000 - Animal feeding stuffs - Determination of residues of organophosphorus pesticides - Gas chromatographic method (ISO 14182:1999) (Austrian Standard) (ansi.org)
12. Analytical Methods for Measuring Pesticide Residues | US EPA
13. Pesticide Detail | CODEXALIMENTARIUS FAO-WHO



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