# Chemical Factsheet

## Trifluralin

Updated February 2019

### General Information

- Product Names:
  **Treflan HFP** (Dow)
  **Treflan TR-10** (Dow)
  **Snapshot 2.5TG** (Dow), formulated with Isoxaben
  **Miracle Gro Garden Weed Preventer** (Scotts Company)
  **Tri-Scept** (BASF), formulated with Imazaquin
  **Freedom** (Monsanto), formulated with Alachlor
- Chemical Class: Dinitroaniline compound herbicide
- Uses: Annual grasses and broadleaf weeds on a variety of food crops and non-food uses, including residential use site
- Alternatives: Organic agriculture, Least toxic-weed managment
- Beyond Pesticides rating: Toxic

### Health and Environmental Effects

*See citations at end of document.*

- Cancer: Yes (**1**, **2**, **3**, **4**)
- Endocrine Disruption: Probable (**5**, **6**)
- Reproductive Effects: Yes (**7**)
- Neurotoxicity: Not documented
- Kidney/Liver Damage: Yes (**8**)
- Sensitizer/ Irritant: Yes (**7**)
- Birth/Developmental: Not documented
- Detected in Groundwater: Yes (**9**)
- Potential Leacher: Not documented
- Toxic to Birds: Not documented
- Toxic to Fish/Aquatic Organisms: Yes (**7**)
- Toxic to Bees: Not documented

### Residential Uses as Found in the ManageSafe™ Database

- Dandelions
- Annual Bluegrass
- Knotweed

### Additional Information

- Supporting information:
  - Extoxnet Trifluralin Factsheet (Extension Toxicology Network)
  - PAN Pesticides Database:Trifluralin (Pesticide Action Network)

    - Scorecard Trifluralin Factsheet (The Pollution Information Site)
    - FAN Trifluralin Factsheet (Fluoride Action Network)
- Studies [compiled from the Pesticide-Induced Diseases Database]
    - Agricultural exposures and gastric cancer risk in Hispanic farm workers in California. Mills, P.K., and Yang, R.C. 2007. Environ Res 104(2):282-289.
    - Assessment of genetic effects and pesticide exposure of farmers in NW Greece. Moshou, H., Karakitsou, A., Yfanti, F., Hela, D., Vlastos, D., Paschalidou, A.K., Kassomenos, P. and Petrou, I., 2020. Environmental Research, p.109558.
    - Cancer incidence among pesticide applicators exposed to trifluralin in the Agricultural Health Study. . Kang, D. et al., 2008. Environmental research, 107(2), pp.271-276.
    - Human exposure and risk assessment to airborne pesticides in a rural French community.. Coscollà C, López A, Yahyaoui A, Colin P, et al. 2017. Sci Total Environ. 584-585:856-868
    - In vitro genotoxicity assessment of dinitroaniline herbicides pendimethalin and trifluralin.. Kılıç, Z.S., Aydın, S., Bucurgat, Ü.Ü. and Başaran, N., 2018. Food and chemical toxicology, 113, pp.90-98.
    - A pesticide and iPSC dopaminergic neuron screen identifies and classifies Parkinson-relevant pesticides. Paul, K.C., Krolewski, R.C., Lucumi Moreno, E., Blank, J., Holton, K.M., Ahfeldt, T., Furlong, M., Yu, Y., Cockburn, M., Thompson, L.K. and Kreymerman, A., 2023. Nature Communications, 14(1), p.2803.
    - Pesticide use and incident Parkinson's disease in a cohort of farmers and their spouses. Shrestha, S. et al. (2020) Pesticide use and incident parkinson's disease in a cohort of farmers and their spouses, Environmental research. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7822498/.
    - Pesticides and prostate cancer incidence and mortality: An environment-wide association study. Soerensen, S. et al. (2024) Pesticides and prostate cancer incidence and mortality: An environment-wide association study, Cancer. Available at: https://acsjournals.onlinelibrary.wiley.com/doi/10.1002/cncr.35572.
    - Pesticide exposure and risk of cardiovascular disease: A systematic review. Zago, A. M., Faria, N. M. X., Fávero, J. L., Meucci, R. D., Woskie, S., & Fassa, A. G. (2022). Pesticide exposure and risk of cardiovascular disease: A systematic review. Global public health, 17(12), 3944–3966. https://doi.org/10.1080/17441692.2020.1808693
    - Association between pesticide exposure and colorectal cancer risk and incidence: A systematic review. Matich, E. K., Laryea, J. A., Seely, K. A., Stahr, S., Su, L. J., & Hsu, P. C. (2021). Association between pesticide exposure and colorectal cancer risk and incidence: A systematic review. Ecotoxicology and environmental safety, 219, 112327. https://doi.org/10.1016/j.ecoenv.2021.112327

## Gateway Health and Environmental Effects Citations

1. Kang, D. et al., 2008. Cancer incidence among pesticide applicators exposed to trifluralin in the Agricultural Health Study. Environmental Research, 107(2), 271-276. *Regression analysis of pesticide exposures and cancer incidence across a cohort of 50,127 private and commercial pesticide applicators show that above-average levels of trifularlin exposure significantly predict incidence of colon cancer, controlling for lifestyle factors and other agricultural exposures.*

2. Kılıç, Z.S., Aydın, S., Bucurgat, Ü.Ü. and Başaran, N., 2018. In vitro genotoxicity assessment of dinitroaniline herbicides pendimethalin and trifluralin. *Food and Chemical Toxicology, 113,* 90-98. *Trifluralin exposure at concentrations as low as 1.7 ppb causes significant damage to DNA and chromosomes in human peripheral lymphocytes, demonstrating genotoxicity as a mechanism of carcinogenicity.*

3. Saghir, S.A., Charles, G.D., Bartels, M.J., Kan, L.H., Dryzga, M.D., Brzak, K.A. and Clark, A.J., 2008. Mechanism of trifluralin-induced thyroid tumors in rats. *Toxicology Letters, 180(1)* 38-45. *Trifluralin treatment increased the conjugation and excretion of thyroid hormones (TH), thereby increasing pituitary production of thyroid stimulating hormone (TSH) and causing thyroid tumor development. The mode of action for tumor promotion by trifluralin has relevance to human health, as increased bile excretion coupled with decreased functioning of a shared class of thyroid hormone binding agents would be expected to cause similar effects in humans.*

4. Emmerson, J.L., Pierce, E.C., McGrath, J.P., 1980. The chronic toxicity of compound 36352 (trifluralin) given as a compound of the diet to the Fischer 344 rats for two years. StudiesR-87 andR-97 (Elanco Products Co., Division of Eli Lilly and Co., Indianapolis, IN). Cited in Reregistration Eligibility Decision (RED) on trifluralin, USEPA, Office of Prevention, Pesticides and Toxic Substances. EPA 738-R-95-040, April 1996. *Chronic exposure to trifluralin causes thyroid tumor development in rats.*

5. Illinois EPA, Endocrine Disruptors Strategy, February 1997. https://nepis.epa.gov/Exe/ZyNET.exe/910140ZK.txt

6. European Commission. Endocrine Disruptors: Study on Gathering Information on 435 Substances with Insufficient Data. Final Report. EU DG Environment: B4-3040/2001/325850/MAR/C2. BKH Consulting Engineers: M0355037. November 2002. http://ec.europa.eu/environment/chemicals/endocrine/pdf/bkh_report.pdf#page=76.

7. US EPA, Office of Prevention, Pesticides and Toxic Substances, Reregistration Eligibility Decisions (REDs), Interim REDS (iREDs) and RED Factsheets. https://archive.epa.gov/pesticides/reregistration/web/html/status.html.

8. Extension Toxicology Network (EXTOXNET) Pesticide Information Profiles. http://extoxnet.orst.edu/pips/ghindex.html

9. U.S. Geological Survey, Pesticides in the Nation's Streams and Ground Water, 1992-2001. http://water.usgs.gov/nawqa/pnsp/pubs/circ1291/appendix7.

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