Chemical Factsheet

Pyrethrins

General Information

- Fact Sheet: Synthetic.Pyrethroids.Factsheet.pdf
- Product Names:
  Raid House & Garden Bug Killer (SC Johnson), formulated with Piperonyl butoxide, Isobutane, Propane
  Hot Shot Kitchen Bug Killer 2 (Spectrum Brands), formulated with Piperonyl butoxide, Isobutane
  Raid Flea Killer Plus (SC Johnson), formulated with Piperonyl butoxide, Isobutane, N-Octyl bicycloheptene dicarboximide (MGK 264), Tetramethrin, Propane
  Pyrenone (Bayer Environmental Science), formulated with Piperonyl butoxide
  Hartz 2 in 1 Flea + Tick Killer (Hartz Mountain), formulated with Piperonyl butoxide, N-Octyl bicycloheptene dicarboximide
- Chemical Class: Pyrethrin insecticide
- Uses: Pre-harvest and postharvest uses on many agricultural crops; livestock animals and premises; commercial and industrial facilities and storage areas where raw and processed food/feed commodities are stored or processed; wide area mosquito abatement use in areas which include aquatic areas; and residential settings. Targets many different types of insects and arthropods including ants, worms, beetles, mites, flies, gnats, spiders, weevils, caterpillars, grubs, moths, ticks, lice, wasps, aphids, midges etc.
- Alternatives: Organic Agriculture, Least-toxic mosquito control
- Beyond Pesticides rating: Toxic

Health and Environmental Effects

See citations at end of document.

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

Residential Uses as Found in the ManageSafe™ Database

- Ants
- Bed Bugs
- Carpenter Ants

- Cockroaches
- Fleas
- Head Lice
- Spiders
- Carpenter Bees
- Chiggers
- Mosquitoes
- Wasps and Yellowjackets
- Bagworms
- Carpet Beetle
- Centipedes
- Ticks
- Aphids

Additional Information

- Regulatory Status:
  - EPA Reregistration Eligibility Decision (RED) signed (6/2006)
  - Beyond Pesticides' Pyrethrins RED comments.
- Supporting information:
  - Asthma, Children and Pesticides (Beyond Pesticides)
  - NCAP Pyrethrins Factsheet (Northwest Coalition for Alternatives to Pesticides)
  - Extoxnet Pyrethrins Factsheet (Extension Toxicology Network)
  - PAN Pesticides Database:Pyrethrins (Pesticide Action Network)
  - Scorecard Pyrethrins Factsheet (The Pollution Information Site)
- Studies [compiled from the Pesticide-Induced Diseases Database]
  - Acute Illnesses Associated With Pesticide Exposure at Schools, Alarcon, W. et. al. 2005. *Journal of the American Medical Association*. 294 (4):455-465
  - A Longitudinal Approach to Assessing Urban and Suburban Children's Exposure to Pyrethroid Pesticides. Lu C, Barr DB, Pearson M, Bartell S, Bravo R.. 2006. Environ Health Perspect. 114(9):1419-23.
  - A mode of action for induction of thyroid gland tumors by Pyrethrins in the rat.. Finch JM, Osimitz TG, Gabriel KL, et al. 2006. Toxicol Appl Pharmacol.214(3):253-62
  - Fatal asthma in a child after use of an animal shampoo containing pyrethrin. Wagner, SL. 2000. West J Med 173: 86-87
  - Oxidative stress of glyphosate, AMPA and metabolites of pyrethroids and chlorpyrifos pesticides among primary school children in Cyprus. Makris, K.C., Efthymiou, N., Konstantinou, C., Anastasi, E., Schoeters, G., Kolossa-Gehring, M. and Katsonouri, A., Environmental Research, 212, p.113316.
  - Effects of prenatal and infant daily exposure to pyrethroid pesticides on the language development of 2-year-old toddlers: A prospective cohort study in rural Yunnan, China. Chen, S., Xiao, X., Qi, Z., Chen, L., Chen, Y., Xu, L., Zhang, L., Song, X. and Li, Y. NeuroToxicology.
  - Gut microbiota dysbiosis involves in host non-alcoholic fatty liver disease upon pyrethroid pesticide exposure. Li, M., Liu, T., Yang, T., Zhu, J., Zhou, Y., Wang, M. and Wang, Q., 2022.Environmental Science and Ecotechnology, 11, p.100185.
  - Exploratory analysis of the association between pyrethroid exposure and rheumatoid arthritis among US adults: 2007-2014 data analysis from the National Health and Nutrition Examination Survey (NHANES). Guo, X., Li, N., Wang, H., Su, W., Song, Q., Liang, Q., Sun, C., Liang, M., Ding, X., Lowe, S. and Sun, Y., 2022. Environmental Science and Pollution Research, pp.1-11.

- Developmental pyrethroid exposure causes a neurodevelopmental disorder phenotype in mice. . Curtis, M.A., Dhamsania, R.K., Branco, R.C., Guo, J.D., Creeden, J., Neifer, K.L., Black, C.A., Winokur, E.J., Andari, E., Dias, B.G. and Liu, R.C., 2023.PNAS nexus, 2(4), p.pgad085.

Gateway Health and Environmental Effects Citations

1. EPA weight-of-evidence category, "Likely to be carcinogenic to humans." US EPA, 2005. Office of Pesticide Programs. List of Chemicals Evaluated for Carcinogenic Potential. May 10, 2005. http://www.fluoridealert.org/wp-content/pesticides/pesticides.cancer.potential.2006.pdf

2. Hu, Y., Zhang, Y., Vinturache, A., Wang, Y., Shi, R., Chen, L., Qin, K., Tian, Y. and Gao, Y., 2020. Effects of environmental pyrethroids exposure on semen quality in reproductive-age men in Shanghai, China. Chemosphere, 245, p.125580. https://doi.org/10.1016/j.chemosphere.2019.125580

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

4. 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.

5. Yueh, MF et al. 2014. The commonly used antimicrobial additive triclosan is a liver tumor promoter. *PNAS* doi: 10.1073/pnas.141911911. *Triclosan promotes liver cancer cell development and proliferation in mice through pathways common to humans.*

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