International Journal of Advance and Applied Research
www.ijaar.co.in
ISSN – 2347-7075 Impact Factor – 8.141
Peer Reviewed Bi-Monthly
Vol. 6 No. 18 March - April - 2025

Environmental Impact Of Herbicides 2,4-Dichloro Phenoxyacetic Acid (2,4 D) On Water Of Painganga River Of Dhanoda Region Tq Mahagaon Dist. Yavatmal

Balaji Gangadhar Kolapwar[1] & Arvind Balasaheb Harkal[2]
[1]*Department of Chemistry*
[2]*Department of Zoology*
Shri Renukadevi Arts, Commerce and Science Mahavidyalaya Mahur 431721
Corresponding Author – Balaji Gangadhar Kolapwar
DOI - 10.5281/zenodo.15260147

Abstract:

Pesticides are the chemical products used for plant protection. They include Insecticides, Fungicides, and Herbicides. Over 98% of sprayed insecticides and 95% of herbicides reach a destination other than their target species, including non-target species, and water. Indiscriminate use of organic pesticides kills the natural enemies of pest. Organic pesticides can contaminate unattended land and water when they are sprayed aerially or allowed to run off fields soils from production site and storage tanks or are inappropriately discarded. The number of pesticides that migrate from the intended use area is influenced by the particular chemical properties. Soil binding, water vapor pressure and water solubility. Factors in the soil such, as its texture ability to retain water and amount of organic matter contained in it.

In present investigation we found that the herbicide used as 2,4-dichloro phenoxyacetic acid (2,4 d) the results of 24,48,72 and 96 hours the toxicity 6.63 ppm, 6.15 ppm, 6.58 ppm and 6.00 ppm respectively.

Keywords: Pesticide, Environmental impact, Dhanoda Region, Painganga River.

Introduction:

Herbicide can contribute to water pollution pesticides drift occurs when they suspended in the water as particle is carried by through both to other areas, potentially contaminating them. Pesticides that are applied to crops can volatile and may be drain by with water into near areas, potentially posing a threat to non-target animals and sometime wild animals. pesticides that are sprayed on to fields and used fumigate soil can give off chemicals called volatile organic compounds, which can react with other chemicals and form pollutant called tropospheric ozone. Pesticide use accounts for about 6 percent of total tropospheric ozone (UC.IPM-2006). Pesticides are substances or mixture of substances intended for preventing, destroying, repelling or mitigating any pest. They are a class of biocide. The most common use of pesticides is as plant protection products (also known as crop protection products), which in general protect plants from damaging influences such as weeds, diseases or insects. This use of pesticides is so common that the term pesticide is often treated as synonymous with plant protection product, although it is in fact a broader term, as pesticides are also used for non-agricultural purposes.

Pure uncontaminated water does not occur in nature. Poppe W and Hurst R. (1997). Water pollution is any undesirable change in the state of water, contaminated with harmful substances. Terry L.A. (1996).

It is the second most important environmental issue next to air pollution. UC-IPM Online (August 11, 2006). Any change in the physical, chemical and biological properties of water that has a harmful effect on living things is termed as 'water pollution. The main objectives of this study are to highlight the impact of various water pollutants which have rendered the water unsuitable for drinking and other domestic purposes and to enumerate new and affordable techniques which can be used to purify water for various purposes. Virtually all human activities produce some kind of environmental disturbance that contaminate surrounding waters. Maduka And Hugh C.C. (2006). Eating (body wastes), gardening (pesticide and sediment runoff) and many other activities create by products that can find their way into the water cycle. For convenience, we can assign the large majority of sources of water pollution through industry domestic waste and mainly affected agricultural waste residues. Since before 2000 BC, humans have utilized pesticides to protect their crops. dominant. Paul Müller discovered that DDT was a very effective insecticide. Organ chlorines such as DDT were dominant, but they were replaced in the U.S. by organophosphates and carbonates by 1975. Since then, pyrethrum compounds have become the dominant insecticide. Herbicides became common in the 1960s, led by & thiazine and other nitrogen-based compounds, carboxylic acids such as 2, 4-dichlorophenoxyacetic acid, and glyphosate. A pesticide is generally a chemical or biological agent (such as a virus, bacterium, antimicrobial or disinfectant) that through its effect deters, incapacitates, kills or otherwise discourages pests.

Target pests can include insects, plant pathogens, weeds, molluscs, birds, mammals, fish, nematodes (roundworms), and microbes that destroy property, cause nuisance, spread disease or are vectors for disease. Many insecticides and herbicides are toxic to fish, amphibians and other aquatic organisms and can reduce water quality. As the region's population grows, pesticide levels will likely increase unless safer and less toxic alternatives are more widely used.

1. Local people wash their domestic animals such as cow, sheep, goat etc.
2. Women washing cloth using detergent powder.
3. Farmers spraying pesticides (Endosulphan, Cypermethrin) Aquatic organisms come into contact with pesticides and fertilizers through runoff from yards and other landscapes into streams.
4. Monitoring studies in the Puget Sound region find common pesticides and fertilizer nutrients in local waterways.
5. Herbicides impact is evaluated by its intended use; if it travels to unintended places by water, soil or air it can have unintended – and unmeasured effects.

Pesticides are widely used to help ensure an adequate food supply as well as to protect our health and safety from unwanted pests. But despite their benefits, these chemicals are not without them problems: they pose known and potential risks to human and environmental health. Individually and collectively, we need to examine our use of all forms of pesticides and consider alternatives to the use of pesticides. More research is needed to find and test less-toxic alternatives as well as to develop pesticides that do a better job targeting particular species. Wang H.(2005).

Material and Method:

For details study of environmental impact were selected the aquatic water body are affected with one of them such as organic-inorganic material, hazards and pollutants. Biological response of organisms to organic (Materials run-off from agricultural field) pollutants in the aquatic environment is usually understood through

determining their rate of survival and changes in the level of various physiological phenomenon.

In present investigation, fishes were collected from painganga river, Dhanoda region and brought to laboratory. These fishes were observed for any pathological symptoms and then placed in a dilute bath of 0.1% potassium permanganate (Kmn04) for 2 minutes so as to avoid any dermal infection. The fish were then washed with water and acclimatized to laboratory conditions for few days in glass aquaria.

During acclimatization, the fish were provided with a diet consisting of live earthworms. Food supply was withdrawn 24 hours prior to the experimentation. Fishes of almost same size measuring 9+ 2cm and weighing about 7+2 gms were selected for experimentation.

Different concentrations were made from stock solution as per dilution method suggested by APHA (1998). Fresh stock solutions were used for each exposure and LC_{50} value observed after exposed to different hours such as 24,48,72, and 96 hours respectively.

Sr. No	Name of toxicant	Time of exposure	Grafical method	Probit analysis	Avarage LC_{50} Values
1	2,4-dichloro phenoxyacetic acid	24	7.0 ppm	6.89 ppm	6.63 ppm
		48	6.5 ppm	6.45 ppm	6.15 ppm
		72	5.9 ppm	5.8 ppm	6.58 ppm
		96	5.4 ppm	5.2 ppm	6.00 ppm

Effect of herbicides 2,4-dichloro phenoxyacetic acid (2,4 d) on water of painganga river:

Observed Some Impact Factor:

1) Polluted water drainage and mix into main stream or source of water that are used to drinking for people.
2) Agricultural (Pesticides, Herbicides, fungicides, insecticides) residue or materials directly or indirectly peculate and mix in Water.
3) Water gets polluted it kills aquatic life such as fishes, crabs and other non-target animals.
4) Water treatment plants wastage also affect the water body.
5) Women's washing cloths and used detergent powder, detergent sops, they directly mixed into the water.

Results and Discussion:

There no doubt that pollution of water has the direct effect on aquatic fauna and human activities. Indiscriminate discharge of different hazardous chemicals into the water bodies, without pre -treatment is a major reason for water pollution. According to the word aquatic pollution can be used for qualitative and quantitative study of adverse or toxic effects of chemicals and other anthropogenic materials on the water quality and dwelling animals. Water pollution due to run-off rain water from agricultural and forest areas where they adversely affect the water quality and are hazardous for aquatic life. Ganguly and Mukhopdhayay (2011).

Fish and other aquatic biota may be harmed by pesticide contaminate water (Helfrich.L.A.et.al1996). Pesticides surface runoff into rivers and streams can be highly lethal to aquatic life, sometimes killing all the fish in a particular stream. Application of pesticides (organ chlorine or organophosphate) to water bodies of can cause fish kills. Repeated exposure to sub lethal doses of some pesticides can cause physiological and behavioral changes in fish that reduce populations, such as abandonment of nests and broods, decreased immunity to disease, and increased failure to avoid predators (Helfrich.L.A.et.al-1996). Pure uncontaminated water does not occur in nature. Water pollution is any undesirable

change in the state of water, contaminated with harmful substances. It is the second most important environmental issue next to air pollution. Any change in the physical, chemical and biological properties of water that has a harmful effect on living things is termed as 'water pollution. The main objectives of this study is to highlight the impact of various water pollutants which have rendered the water unsuitable for drinking and other domestic purposes and to enumerate new and affordable techniques which can be used to purify water for various purposes.

Virtually all human activities produce some kind of environmental disturbance that contaminate surrounding waters. Eating (body wastes), gardening (pesticide and sediment runoff) and many other activities create byproducts that can find their way into the water cycle. For convenience, we can assign the large majority of sources of water pollution through industry domestic waste and mainly effected agricultural waste residues. The similar results were reported Pickering et al., (1966), Ivaprasad Rao et.al., (1980), Swarup et.al. (1981), Arora et.al., 1971), Arora et al. (1971), Pankaj et al. (2004), Joyti and Narayan 1996), Singh and Narain (1982), Anandswamp et al. (1981), Reddy omati (1977, Vasait et al. (2005) studied toxic evaluation of ganophosphate insecticide monocrotophos on the edible fish species amacheilus botai for a period of 7 and 14 days and showed that the LC_{50} values were 49.6 and 42.0 ppm respectively. The observed result dicates that the mortality of the test fish to monocrotophos was dose pendent. Sivaprasad Rao et al. (1980) studied toxicity of methyl parathion on freshwater teleost. Tilapia mossambica and reported tha the LC50 value was 0.266 ppm.

Prashanth (2006) studied impact of cypermethrin on protein metabolism of freshwater fish, *Cirrhinus mrigala* and showed that the LC value was 5 mg/1 for days. Abdul Naveed, et al. (2006) studied toxicily of libocin on the activities of glycolytic and gluconeogenic enzyme of fish, Channa punctata and showed that the LC50 values.

In present investigation we found that the herbicide used as 2,4-dichloro phenoxyacetic acid (2,4 d) the results of 24,48,72 and 96 hours the toxicity 6.63 ppm, 6.15 ppm, 6.58 ppm and 6.00 ppm respectively.

References:

1) UC-IPM Online (August 11, 2006): What's up Doc? Maybe less air pollution. Statewide IPM Programe, Augriculture and Natural Resources, University of California. Ipm.ucadavis.edu. Retrieved on 2007-10-15.
2) Helfrich, L.A., Weigmann, DL, Hipkins,P and Stinson, ER(1996):Pesticides and aqutic animals: A GUIDE TO REDUCING IMPACTS ON AQUTIC SYSTEM .Virginia Cooperative Extention. Retrieved on 2007-10-14.
3) Poppe, W. and R. Hurst (1997), ' Water pollution' Water Quality International, pp. 39-43.
4) Terry, L. A. (1996), ' Water pollution&#39, Environmental Law Practice 4(1): 19-39.
5) Wang, H. (2005), 'Probe on controlling of water pollution and its relative problems', Journal of Natural Science of Hanan Normal University 28(1): 84-87.
6) Cruickilton RL and Duchrow RM (1990). Impact of a massive crude oil spill on the invertebrate fauna of a Missouri Ozark stream. Environmental Pollution, 63(1) 13-31.
7) Svensson, B.G, Hallberg, T. Nilson, A., Schutz, A. and Hagmar, L (1994): Parameters of immunological competence subjects with high consumption of fish contaminated with persistant organochlorine compounds,

Ind. Avch Occup. Environ. Health, 65:351-358pp.

8) APHA (1998): Standared method for the examination of water and waste water 20th Ed. American Public Health Association Anand swarup, P., Mohan Rao, D., Murthy, A.S. (1981) Toxicity of endosulfan to freshwater fish, Cirrhinus merigala Bill. Environ Contam Toxicol., 27(6): 850-855pp.
9) Prashant, M.S., David, M. and Riveendra C. Kuri (2003): Effects of cypermethrin on toxicity and oxygen consumption in the freshwater fish. Cirrhinus mrigala, J. Ecotoxicol Environ Monir 13(4):271-277pp.
10) Pankaj Kumar, B. Sharma and A.P. Mishra, (2004): Efficiancy of malathion on mortality of a freshwater air breathing catfish, Hetengetes fiilis (Botech) during different developmental stages. Eent En And Cons 10(1): 47-52pp.
11) Teck, 5(2), 321-323pp. Paraskar PS., Destinach S.P. Kulkarni K.M. and Jadhav R.G (2005) : Effects on three selected freshwater fishes exposed to cypermethrin Aqua Biol. Vol 20(2): 187-192pp.
12) Prashanth, MS. (2006): Impact of cypermethrin on protein metabolism in freshwater fish, Cirrimus mrigala Nature Environ, and Poll
13) Prabhukar Rao K. and Radhakrishnaiah, K. (2006): Pesticidal impact on protein metabolism of freshwater fish. Ciperime curpin, Nature environment and pollution
    a. technology 5(3): 367-374pp
14) Abdal Naveed, P. Venkateshwarlu and C. Janailah (2006): Toxicity of lihocin on the activities of glycoytic and glycogenic enzymes of fish, Channa punctatus, Nature Environ. and Poll. Techn. Vol. 5. No. 1 pp 79-88.
15) Prashanth, MS. (2006): Impact of cypermethrin on protein metabolism in freshwater fish, Cirrimus mrigala Nature Environ, and Poll