

Pharmaceutical Pollution: Its Effect on Life and It's Remedies

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Abstract— Pharmaceutical pollution is a wide-reaching problem and it is likely to influence the health of human populations is great. Therefore it has become an environment concern for the world now days. This paper provides the insight view about the affects of pharmaceutical pollution on human by diseases and problems, animals and trees/ plants. Study finds that this kind of pollution is not only seriously affecting the human by diseases and problems but also the animals and trees/ plants. According to authors, still time left in the hands of global institutions, governments and local bodies to use the advance resources to balance the environment for living and initiates the breathed intellectuals to live friendly with environment. As effective reply to contamination is largely base on human appraisal of the problem from every age group and contamination control program evolves as a nationwide fixed cost-sharing effort relying upon voluntary participation.

Index Terms—Pollution, Pharmaceuticals, Human Disease, Human Health, Adverse Effects.

I. INTRODUCTION

Recently, there has been an increasing concern, particularly in highly developed countries about penetration of pharmaceuticals into the environment and related risks. Pharmaceutical pollutants are a type of organic pollutants. The enormity of pollution due to pharmaceuticals in India has caught the attention of researchers all over the world. The occurrence of pharmaceuticals in the aquatic environment has been carried out in many industrialized countries. More than 80 pharmaceutical compounds belonging to different therapeutic families have been detected up to the ppm level in sewage, surface and groundwater. The global market for pharmaceuticals has been estimated at between 100,000–200,000 tonne/year. The word "Pharmaceutical" derived from a Greek word pharmakeutikos (from pharmakeutēs 'druggist', from pharmak on 'drug') [1]. Pharmaceutical drug is also called as medicine or medicinal product which can be any chemical substance formulated or synthesized as single active ingredient or in combination of other pharmacologically active substances that are used in the medical diagnosis, cure, treatment, or prevention of disease [2]. In India around 400000 registered drug manufactures or pharmaceutical companies are present and are increasing rapidly. In pharmaceuticals industries different types of medicines or particular drugs are manufactured those are

required for different diseases like excretory, cardiovascular, diuretics, diabetics etc [3]. Pharmaceuticals or drug products used by human being or animals enter in to different water bodies like surface water, municipal waste water, ground water and drinking water without any treatment. This leads to produce adverse effects on human beings and organism present in aquatic system. Presence of pharmaceuticals on water (includes both Waste and drinking), soil or surface are not except according to some studies these studies are published in a lot of books and literature [4]. Pharmaceuticals products or drugs include organic and inorganic substance they may hamper the marine animals and plants along with this they effect cycle in environment. So most of the studies focus on the separation of pharmaceuticals from wastewater and also based on decrease their levels. Studies show that the concentration of pharmaceuticals are occurs in waste water, biologically treated water and also present in drinking water in few concentrations. Along with these studies many of the studies focused on effect of pharmaceuticals drugs (uses by Human being and Animals–veterinary) on environment and find out the risk on health of humans and others. Effects of pharmaceutical products on environments are not calculated easily because there is no statistical study or data present to favor this [5].

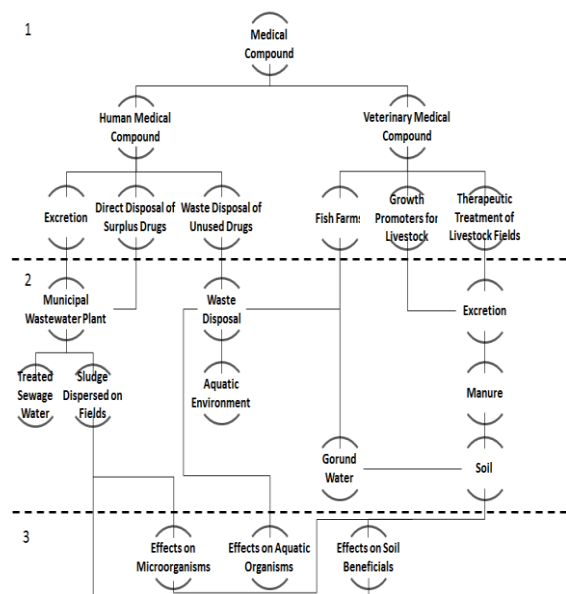


Figure 1: Different Routes of Pharmaceuticals administration in Environment.

With modernization and decrease mortality rate consumption or dependency on drugs is increased. These medicines are form to produce a specific action on target system or organ of human body. Similarly, the scope of veterinary drugs and products are also increased like fertilization, milk formation etc. this indicate dependency on drugs induced action in animals. After intake of medicine or drug by human being or animals they work on target organ through metabolism action and after that they excrete by excretory system of body in the form of urine. Now after that via sewage line or other mode it enters in to waste water, surface or soli similar in veterinary drugs are also enter in surface water, waste water and soil but it's a complex procedure [6]. Main source of pharmaceutical pollution or contamination are the human being and animals treated by various drugs this enter in to water sources and affect environment along with indirect way veterinary drugs are also enter in to environment by indirect route for example in case of fish farming. In this case pharmaceutical products or pollutants disturb aquatic system.

II. WATER RESOURCES AND PHARMACEUTICAL PRODUCTS

Water resources are sources of usually fresh water that are potentially useful to society, humans it is important because it is needed for life exist many uses of water include agricultural, industrial or recreational and household, recreational and environmental activities. All of these human uses require fresh water. For examples include groundwater, rivers, lakes and reservoirs. Looking at the sources of water in the world, there will be a desire to reuse water somewhere else [7]. This can happen municipal waste water not use to treat in way Due to lack of technology and too much caution investment will be needed. Pharmaceutical is a Matter of concern in aquatic environment. The more of studies attest of the presence of PPs (practical salinity unit) in expanse of water however essential drinking water in human health. The fate of PPs, their concentrations obviously decreases from wastewater. Consider the fate of PPs, its absorption evidently lose from wastewater to the atmosphere for example Levofloxacin, Norfloxacin and Fluoroquinolone antibiotic. The presence of water hazards in the main source of PPs, example plants effluents, and animal farming First of all, the dilution in surface water is spread to the site of detection ($\mu\text{g}/\text{L}$ to ng/L). The different, authorization devaluate ingredient of PPs of receiving water it's the adsorption on suspended solids, colloids and organic matter [8]. PPs can also undergo biological, chemical, physical changes in water. However, the PPs are designed to resist microbial degradation and to be chemically stable [9-10]. All the nonliving organism is the high point potential response develop in outside water with mostly directly and indirectly photodegradation [11-12]. From water source to drinking water hook on, the evacuation effectiveness of PPs in drinking water. Plant treatment is rather known anyhow even if some processes are accurately e.g photo degradation, ozonation and nanofiltration, disgrace may also be potential poisonous and some PPs not be complete removing in drinking water treatment [13-15] the presence and behavior of pharmaceuticals and especially of veterinary drugs in the aquatic environment is very limited.

III. POTENTIAL HAZARDS OF PHARMACEUTICAL IN WATER RESOURCES

Potential risks exposure to low concentrations of pharmaceuticals in the following negative effects are ecotoxicological effects (acute and chronic toxicity, genotoxicity and carcinogenicity); pharmacological effects (interference of the hormone and immune system) and resistance development of micro-organisms. A significant problem in assessing ecotoxicological impacts of PPs at the ecosystem level occurs because of the orientation of usual toxicological trying; individual chemicals are experienced on a single species. Hormones (particularly estrogen compounds) are some of the earliest medicines reported in sewage, and they have been found in significant concentrations [16-19]. Due to the vast use of antibiotics in aquaculture, veterinarian medicine, animals, and human medicine, extensive literature exists on their environmental effects, the studies show that up to 95% of antibiotic compounds can be released unaltered into the sewage system. This phenomenon may be a cause of the accelerated resistance of bacterial pathogens to antibiotics. High concentrations of antibiotics can lead to alterations in microbial community structure and affect food chains. Antibiotics such as Sulfamethoxazole, Trimethoprim, Erythromycin and Keflex can get into the water and create antibiotic resistance. Antibiotics are turning up in surface and ground waters, and are of concern due to the fact that antibiotics in the environment selects for drug-resistant strains of bacteria. When bacteria are exposed to low doses of antibiotics, they develop a tolerance for those same drugs. When humans are subsequently infected with these drug-resistant bacteria, certain antibiotics are ineffective at treatment. This is of concern to people because there are 14,000 deaths annually due to antibiotic resistance.

IV. PHARMACEUTICAL POLLUTION PREVENTION

Prevention of pollution by pharmaceutical products in environment includes water, waste water and soil is very essential for this we can alter the choice of raw material, chemicals and also shift technology or procedures use to form medicines by raw materials. For this various steps are taken to decrease the side effects of pharmaceutical products on environment for this pharmaceutical industry select best and modern technology, specific methods, high quality raw materials but due to day by day increase industrialization competition is also increase between pharmaceutical industries so they not share their methods or technology to decompose his waste and formation processed [20]. They share only simple things in general. So, major steps are taken towards the knowledge sharing in between the industries to recurrent their medicine synthesis process and decomposition of pharmaceutical products. This is the Wright steps to decrease pharmaceutical pollution.

Most of the bigger industries awake about pharmaceutical pollution and go ached towards improvement in manufacturing technique, efficiency and finally decrease the risk of pharmaceutical pollution in environment with the help of some alternatives industries try to decrease the threshold of pharmaceutical pollution [21].

We can reduce pharmaceutical pollution by reduction of source of pharmaceutical waste its work and implemented easily as compare to process modification or material alternative, now that pharmaceutical industries taken steps and also form rules to decrease pharmaceutical waste from manufacture and research unit [22-23]. We also know the sentence that “prevention is better than cure” according to this most of the pharmaceutical industries believe on this and work .its efficient, easy to implement coat effective and prevent environment. Pharmaceutical industries stabilized program oriented to pollution prevention and it work on “RRR” it mean to say -

R- Reduction of waste

R- Reuse waste

R- Recycle waste



Figure 2: Reduction, Reuse & Recycle

On the other end some of the industries also work on their manufacturing process, selection of raw materials for example they use alternative substance for coating capsule or tablets, uses non toxic dyes and coloring agent by this they decrees toxic effects of pharmaceutical production on environment.

V. MOVEMENT OF PHARMACEUTICAL PRODUCTS

It is impossible to predict how far the PPs discharged from wastewater treatment plants will travel. Obviously, factors that affect the distance these substances travel include soil type, groundwater and surface water flow, geology of the landscape, and pumping characteristics of nearby wells. However, Zimmerman (2005) showed that acetaminophen, carbamazepine, and sulfamethoxazole detected in a wastewater plume one mile away from the source [23].

VI. CONCLUSION

India The most important conclusion from the literature points to the ubiquity of PPs in aquatic environments. Existing sewage treatment systems are not designed to remove them. Therefore, now is the time to prevent further harm to living organisms. However, the concentrations are usually low; this is especially true of those which produce serious chronic effects at low concentrations such as endocrine disrupting compounds. Knowledge is rapidly growing, but nevertheless the problem is not yet fully clear, and information on risk assessment and management is far from adequate. Further investigation into the effects of exposure to mixtures of drugs would also be valuable especially if combined with monitoring programmers. To conclude, data human health risk assessment and ecotoxicological risk assessment related to PPs must also be developed.

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