

# Pharmaceuticals and Personal Care Products (PPCP) in South OF THE African Water Resources

#### What are PPCP?

Pharmaceuticals and Personal Care Products (PPCPs) consist of a wide range of mainly synthetic organic compounds. Pharmaceuticals are used globally in health care including analgesics and anti-inflammatories, antibiotics, antiretroviral agents, lipid regulators, tranquilizers, antidepressants etc. Personal Care Products are beauty products used by humans for promoting personal hygiene and for grooming. These including body lotions, skin lightening agents, hair products, facial makeup, nail care products, perfumes, deodorants and colognes. Some PPCPs contain traces of inorganic compounds including heavy metals.

### Sources of PPCP?

PPCPs are introduced into the environment mainly due to anthropogenic activities from domestic sources excreted through urine and faeces from human beings and agricultural sources through animal husbandry. These are channelled through the wastewater treatment plants (WWTPs) and released into surface water sources. Other sources include hospital wastewater, industrial effluents, and poor disposal of unused and expired PPCPs which are sometimes flushed down the toilets. Poor disposal of PPCPs in municipal landfills can result in their leaching into soil, groundwater, and surface water from stormwater runoff.

# What are the dangers associated with PPCP in Water Sources?

Pharmaceuticals by their chemical composition and design alter the physiology of organisms hence are detrimental to humans and animal species. They are easily dispersed through the food chain due to their high solubilities and capacity to bioaccumulate and biomagnify. Uncontrolled intake as well as extended exposure can lead to physiological changes, risk of cancer cells formation, antibiotic resistance, hormonal imbalance, masculinisation/feminisation by hormones and disruption of endocrine functions. Heavy metals from PPCPs can also lead to health complications from heavy metal poisoning.

### How to prevent contamination of water resources with PPCP?

Improvement in wastewater treatment technologies and upgrading facilities at WWTPs would improve removal of PPCPs from waste streams reducing their release into surface water sources. Responsible use of antibiotics in animal rearing would significantly reduce their prevalence. Also, imposition of stricter regulations to limit release and disposal from production industries would significantly reduce their introduction into the environment. Additionally, proper awareness campaigns to sensitize the public on the proper use and disposal of PPCPs would reduce their introduction into the environment.

#### How to remove PPCP from water?

A variety of methods have been applied with different levels of success for the removal of PPCPs from water. These include adsorption using various media, photocatalytic degradation of organic constituents, biodegradation, light assisted electro degradation, electrochemical oxidation, reverse osmosis membrane filtration, nanofiltration and chemical treatment.

