Agricultural Contaminants of Emerging Concern (CECs) in South African Water Resources

THE KNOWLEDGE HUB

What are agricultural CECs?

Agricultural contaminants of emerging concern in environmental water bodies range from pesticides, herbicides and fungicides, to hormones and fertilizers. Emerging agricultural contaminants are gaining rapid attention due to their ability to be runoff or airborne into surrounding water distribution systems and their detrimental effects on the lives and health of communities utilising the water. Agricultural CECs have been associated with antimicrobial resistance in microorganisms, irregular reproductive behaviors in fish as well as liver and kidney disease in humans.

Where do agricultural CECs originate from?

Agricultural CECs are introduced into waterways from several sources relating to agriculture; this can include veterinary medications (given to livestock to prevent disease), pesticides (in order to control pests to ensure food security), nutrients (in the form of fertilizers) as well as activated sludge (used as nutrients but could contain various CECs). To improve pesticide stability, solubility, capacity for absorption and toxicity to pest active ingredients are being produced in nanoparticulate form. By developing nano-based "smart" pesticides, precision use can be achieved thereby potentially reducing the overall amount used. Agricultural wastes and residues remain in soil or animal secretions and are thus found in the environment as pollution. Accumulation of the residues increases their concentrations in the environment that later has negative impacts on environmental health instead of ecology.

What are the dangers associated with agricultural CECs?

Once present, agricultural CECs are persistent and have the potential for exposure to humans and animals either via food or water ingestion. Short-term illnesses such as headaches, vomiting, rashes and diarrhoea have been linked to agricultural CECs and may sometimes be fatal. The ability of agricultural CECs to cause both short-term and long-term health risks through dermal contact and consumption warrants their thorough monitoring and control.

How to prevent contamination of water resources with agricultural CECs

- Avoid irresponsible administration and handling of veterinary products.
- Avoid illegal dumping of animal and agricultural waste.
- Report any illegal dumping or suspected agricultural contamination to local authorities.
- Avoid use of inorganic agricultural inputs, e.g. inorganic fertilizers and harsh chemicals.

How to remove agricultural CECs from water

- Removal of chemical agricultural CECs is a difficult and complicated process, therefore prevention is recommended.
- Filtration and advanced water treatments such as ozonation can be used.

NB: Agricultural CECs cannot always be seen, smelled or tasted, thus laboratory tests may be required if you have concerns about agricultural CEC contamination of your water.

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Graphic Design by Christa Lombard ARC-NRE