

An Analysis of Water Pollution in the American Continent

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Abstract

Presently, water contamination addresses a serious natural danger, causing an effect not exclusively to fauna and verdure yet in addition to human wellbeing. Among these poisons, inorganic and natural contaminations are prevalently significant addressing high poisonousness and perseverance and being challenging to treat utilizing current procedures. As a result, a number of research groups are looking for ways to find and fix contaminated water bodies and effluents. A current assessment of the situation's state has been carried out in light of the foregoing. The findings indicate that there is a wide variety of contaminants in the water bodies on the American continent, affecting a variety of aspects, with remediation options available in some instances. It is concluded that the real challenge lies in establishing local sanitation measures based on the particular requirements of the area of interest. As a result, water treatment facilities need to be tailored to the requirements of the population in question and designed in accordance with the contaminants found in the local water supply.

Keywords: Water contamination • New technologies • Clarivate Investigation • Mass spectrometry

Introduction

A current threat to human and environmental health is water contamination. In the poorest nations, the elimination of extreme poverty and diseases is hampered by the presence of contaminants in the water and a lack of basic sanitation. In a number of nations, for instance, poor water sanitation is one of the leading causes of death. There are a number of diseases among the population as a result of unclean water and poor sanitation. As a result, the United Nations sixth global goal, which is included in its sustainable development agent 2030, is to ensure that water resources are available and managed sustainably. In this way, a lot of research groups have tried to come up with different solutions that focus on three main things the examination of the risks to public and environmental health posed by contaminants in the water, the evaluation of the presence of contaminants in the water and c) the proposal of water treatment technologies.

Literature Review

The detection of organic and inorganic contaminants on the American continent has been the subject of research; the results of the research are alarming because they show how water pollution affects the ecosystem, how it affects human health and how it affects water quality. The fact that new-borns, children and adults have been reported to have consumed drinking water from a variety of sources (such as rivers, lakes, groundwater and wells) without being certain that it is free of contaminants, which is a health risk factor, makes this last point even more concerning. Some of the contaminants that were found have been linked to potential health risks, like the connection between some disinfectants and cancer and NO₃ and NO₂ as potential digestive system carcinogens. Since the presence of contaminants in water has demonstrated

that actual quality controls are unable to detect or treat pollutants that are present, the lack of safe drinking water has been reported in a number of nations [1].

In this way, a lot of research groups have tried to come up with different solutions that focus on three main things: a) a proposal for water treatment technologies, b) an assessment of the risks to public and environmental health posed by the presence of contaminants in the water and c) the detection of contaminants in water intended for human consumption. This communication demonstrates a critical analysis of the most recent research publications. The utilization of Web of Science from Clarivate Investigation was utilized for the bibliographic survey. In January 2023, the keywords "public health pollutants/contaminants water" and "name of the American country" were used in the bibliographic search. The following criteria were used to filter the retrieved articles: articles that demonstrate the presence and/or treatment of organic (excluding biological contaminants) and inorganic contaminants in water, as well as articles conducted based on effluents and bodies of water belonging to the American continent. The selection of these research articles was used to conduct a critical analysis of the situation at hand and suggest potential obstacles to overcome in order to develop water treatment procedures that are both effective and long-lasting [2].

In order to identify and quantify inorganic and organic contaminants in aqueous matrices, a variety of analytical methods are currently in use. The majority of these methods fall into three broad categories: spectroscopic, chromatographic and other methods like electrochemical and colorimetric titration. Supplementary Table S1 provides a comparison of the advantages and disadvantages of the most widely used analytical methods. The methods that have been utilized the most are listed below. In chromatographic procedures, the most revealed are gas chromatography-mass spectrometry (GC-MS), gas chromatography/mass spectrometry with chosed particle observing (GC-MS/SIM), fluid chromatography-mass spectrometry (LC-MS), fluid chromatography quadruple season of-flight-mass spectrometry (LC-QTOF-MS), superior execution fluid chromatography-electrospray ionization-mass spectrometry (HPLC-ESI-MS), ultra-execution fluid chromatography-electrospray ionization-mass spectrometry (UPLC-ESI-MS), elite execution fluid chromatography-charged spray locator (HPLC-computer aided design) and particle chromatography (IC). In terms of spectroscopic methods, these include inductively coupled plasma mass spectrometry (ICP-MS), atomic absorption spectrometry (AAS), inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS), thermal ionization mass spectrometry (TIMS), high resolution inductively coupled plasma mass spectrometry (HR-ICP-MS), particle-induced X-ray emission (PIXE), fluorescence spectrum [3].

These methods have made it possible to ascertain the concentrations of

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various pollutants that are relevant to both the environment and human health. The collection of data from the most recent scientific papers (pertaining to the detection of water-based inorganic contaminants). On the other hand, the detection limits for the limits of interest are compared using various analytical methods. The presence of As, Fe, U, Zn, Na, K, Ca, Mg, HCO₃ and Hg in relation to interactions between water, bedrock mineralogy and geochemical conditions of the region has been studied in some of these works, which can be classified as contamination due to a natural source. Other works have been carried out based on water bodies in various nations, including Canada, the United States, Mexico and Brazil. U, which can be found in water bodies in the southwest and west central United States, can be looked at in a particular case because high levels of acute exposure can kill people and low levels of chronic exposure are linked to health problems like kidney and heart risk. Although the surrounding communities exposure studies cannot be considered conclusive, they represent a significant advance in the field. Future research should be conducted to evaluate potential harm to human health and the ecosystem [4].

Discussion

In the American continent, the presence of contaminants in the water poses a serious threat to public health and the environment. Both anthropogenic and natural factors in the region are to blame for the presence of inorganic pollutants like As, Cd, Cr, Pb, Cu, Hg and U as well as organic pollutants like dyes, phenolic compounds, hormones, pesticides and pharmaceutical compounds in water bodies and effluents. Skin damage, carcinogenic effects, nervous system damage, circulatory system issues, kidney damage, gastrointestinal damage and impacts on the food chain are the primary health risks posed by these contaminants. The most significant difficulties are identified in this document's critical review of the reports. Improve detection limits, reduce operating expenses, shorten analysis times and enable mobility for in-situ determinations by utilizing advanced analytical detection methods, such as electrochemical tests.

In order to propose measures for containment and sanitation as a solution to the issue, precisely identify the source of contamination in each geographic location of interest. Optimize the treatment procedures by evaluating water treatment technologies on a large scale and under real-world conditions. Specific water treatment plant design and/or conditioning based on the region's desired pollutant. A water treatment plant's paradigm of universal design must be broken; the appropriate changes should be made by the requirements of the number of inhabitants in interest. Create treatment procedures that are both economical and kind to the environment. In order to produce biofuels or valuable products like precious metals and high-quality water, future water treatment processes will need to incorporate circular economy concepts. The development of environmentally and economically viable treatment procedures is the final obstacle. It is necessary to end the current model of treating metal-contaminated water; the importance lies not only in improving the sanitation of the water, but also in recovering the metal so that valuable products can be obtained and the pollutant phase can be altered [5,6].

Conclusion

Adsorption and chemical precipitation have emerged as the most common approaches among the above options. However, because the removal results that are obtained depend on the matrix that is used, it is necessary to propose the materials and experimental conditions based on the requirements and the kind of effluent that will be treated. The primary purpose of their detection has

been to evaluate the effects of these pollutants. The majority of them come primarily from various industrial applications like cement, coolants, and flame retardants and so on. Their presence contributes significantly to water eco toxicity in Ecuador, Argentina and Mexico, which compromises the ecosystem's biodiversity. Aquatic environments have been the scene of significant problems. Analyses of samples taken from water, fish and sediment from two local seasonal periods have shown that a number of organic compounds, such as polybrominated diphenyl ethers (PBDEs) and polychlorinated biphenyl compounds (PBCs), bio accumulate in significant water bodies like Lake Chapala (Mexico). *Cyprinus carpio*, *Oreochromis aureus* and *Chirostoma spp.* were the fish that were analyzed in this instance proving that these chemicals can enter the lake through the Lerma River in Mexico through industrial activities and strong winds.

Acknowledgement

None.

Conflict of Interest

None.

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