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Short Communication

Water: Source of Life and Pollution

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"Deny man his food and he will live for several days, but deny him the possibility of drinking water and he will succumb in a few hours" (WATER, our most precious asset – Dr SP Baggini – incunable).

It is not possible, therefore, to understand the phenomenon of life without understanding its fundamental component: WATER. The UN (UN) in accordance with the WHO (WHO), adopts on December 22, 1993 and by Resolution A/RES/47/193, that every year, every March 22, the call is commemorated: *World Day of the water*. Likewise, an invitation was sent to all member states to consecrate this day, as the promotion of public awareness and through the production and dissemination of documentaries, conferences, round tables, seminars and exhibitions related to the conservation and development of natural resources. hydric.

Water is essential for life and all people must have a satisfactory supply (sufficient, safe and accessible). Improving access to clean water can provide tangible health benefits. Every effort must be made to ensure that drinking water is as safe as possible. Safe drinking water (drinking water) does not cause any significant risk to health when consumed over a lifetime, taking into account the different vulnerabilities that people may present at different stages of their lives. People most at risk of contracting waterborne diseases are infants and young children, people who are debilitated or living in unhygienic conditions, and the elderly. Drinking water is suitable for all normal household uses, including personal hygiene.

Applying a comprehensive approach to risk assessment and management of drinking-water supplies increases confidence in the safety of water. This approach involves the systematic assessment of risks throughout a drinking-water supply system, from the source water and catchment to the consumer, and the identification of measures that can be applied to manage these risks, as well as of methods to ensure the effective operation of control measures. Water as a strategic natural resource will be the cause of the next armed conflicts, becoming the reason why a new world war may start.

Today, around 700 million people in 43 countries suffer the consequences of water scarcity. Water is essential for food security. Livestock and crops need water to grow. Agriculture requires large amounts of water for irrigation, in addition to quality water for the different production processes. The agricultural sector is positioned as the largest consumer of water on the planet given its productive function, not only for food, but also for other non-edible crops such as cotton, rubber or industrial oils, whose production continues to grow. Irrigation today demands about 70% of the fresh water extracted for human use. There are new motivations for an efficient and sustainable use of water in industry. Reuse is beginning to be perceived as a feasible option. Also the recovery of compounds from internal liquid currents. We are moving towards a zero discharge goal based on the development of new circular models aligned with the new challenges of the bioeconomy.

The relationship between innovation, water and food processing, together with a growing context of responsible management and increased environmental control by administrations, is marking a very interesting line of research, technological development and innovation. The map of technological solutions to current water management challenges is diverse. Each company must apply the one that best suits its reality and context. In 2025, due to global climate change and population growth across the planet, this figure will exceed 3 billion. The scarcity of drinking water may cause new armed conflicts in the near future that will be more intense than those

unleashed to control energy resources, experts believe.

Today, around 700 million people in 43 countries suffer the consequences of water scarcity. In 2025, due to global climate change and population growth across the planet, this figure will exceed 3 billion. According to experts, the main trigger for future conflicts will be the unequal distribution of water resources. The places with the greatest water scarcity in the world are the Middle East, China, India, Central Asia, and Central and Eastern Africa. Improvements in the water supply are opportunities to solve Public Health problems. Hence the importance of establishing comprehensive assessment and management models that guarantees their quality.

Currently there are multiple methodologies to detect microbial contamination of water. However, the high costs they represent, the analysis times and isolation in culture of microorganisms, have been an obstacle to establish the microbial quality of water for human consumption. The use of bioindicator microorganisms of water quality reduces costs and facilitates the implementation of efficient treatment measures, control of water and diseases associated with its transmission.

The main activities that favor water contamination are agricultural activities such as the movement of animals, crops, poorly processed organic fertilizers and inadequate disposal of wastewater that affect the microbiological quality of water sources. Although the presence of waterborne microorganisms is not limited to a specific region in the world, or to its level of development, the problems of displacement, the inefficient response of health services, the low investment of the States in guaranteeing purification of water for the entire population, the lack of control of outbreaks and the lack of intervention of public health systems, favor the spread, incidence, morbidity and mortality associated with diseases related to drinking water, mainly in countries in developmental.

The lack of guarantees in the security of the water resource makes the community exposed to the risk of outbreaks of diseases related to the Water. Avoiding them is particularly important given that water as a vehicle has great potential to simultaneously infect a large proportion of the population. Water, sanitation and hygiene services can prevent a wide range of diseases, including:

- Those due to the ingestion of water contaminated by microorganisms and chemical products, such as diarrhoea, arsenicosis and fluorosis;
- Diseases, such as schistosomiasis, that have a causative organism that is present in the water as part of its life cycle;
- Diseases such as soil-transmitted helminth infections that are due to poor sanitation and hygiene;
- Diseases that, like malaria and dengue, transmit vectors that reproduce in water;
- And other diseases, such as legionellosis, which are caused by aerosols containing certain microorganisms.

A vague understanding of the need to protect water sources from contamination with waste and sewage is documented in historical records such as the Bible. In medieval Europe, however, most of this pragmatic knowledge was forgotten, so organic waste and sewage in cities were disposed of in poor condition. Regular outbreaks of diarrheal diseases and cholera were thought to be related to local atmospheric conditions and not to contaminated water. Despite this theory, the father of modern epidemiology, John Snow, concluded that a water pump on Broad Street was the cause of the cholera outbreak in London. One of the first outbreaks to be concluded from evidence was the 1919 outbreak of typhoid fever in Pforzheim, Germany, which caused 4,000 cases and resulted in 400 deaths.

Waterborne diseases are global in distribution, causing epidemics in both developed and developing countries. They are one of the main reasons for the 4 billion cases of diarrhoea, which annually cause 1.6 million deaths worldwide. As an aggravating circumstance, it is responsible for 21% of deaths in children under five years of age. These diseases have high underreporting and their etiology is rare; They can be viral, bacterial, fungal or parasitic. Within these, as previously mentioned, we find infections by enteric viruses, bacteria such as *Campylobacter sp*., *enterohemorrhagic E. coli*, *Y. enterocolitica*, *H. pylori*, *L. pneumophila*, *P. aeruginosa*, *Aeromonas*, *Cryptosporidium spp*., *G. intestinalis*, *T. gondii*, *E. histolytica*, *Acantameba spp*., *C. cayetanensis*, *C. belli*, *B. hominis*, *Sarcocystis spp*. and *B. coli*.

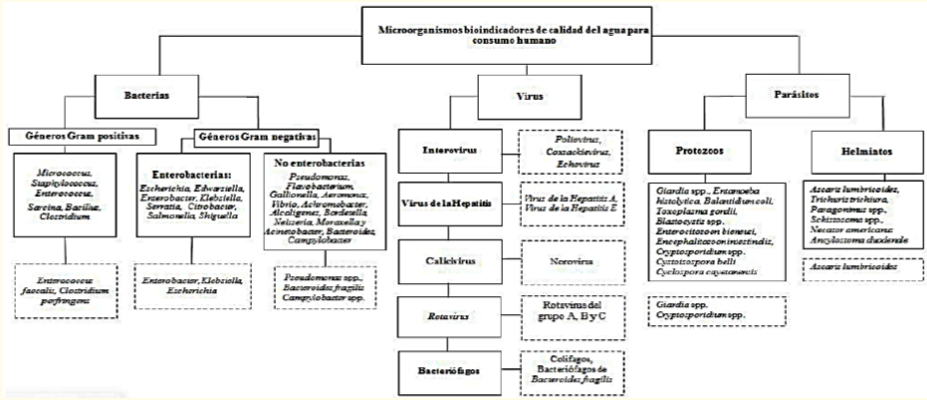
Today in most industrialized countries drinking water is classified as food, and there are numerous standards, established to guarantee its quality and safety. The strict microbiological requirements specify that the bacterial content must be very low and that

pathogens must be detected and eliminated. The discovery of new microorganisms and existing knowledge on the microbiology of water require a more elaborate design of these standards, which prevent the appearance of potentially pathogenic bacteria, viruses, fungi and parasites in drinking water. Recent WHO guidelines and legislation state that drinking water should contain pathogenic microorganisms only in such low numbers that the risk of contracting waterborne infections is below an acceptable limit.

Compliance with these requirements requires the protection of resources and the rigorous treatment of raw water, as well as exhaustive quality control of the process. However, the evaluation of the behavior of pathogens in drinking water is also essential as a basis for future improvements in the treatment process and the generation of new regulations.

The investigations associated with these diseases have given rise to the formulation of recommendations to the national authorities related to the management of the outbreak, the prevention of similar outbreaks in the future and the promotion of an intersectoral approach. Most of these microorganisms are transmitted orally and exposure to them occurs through water and soil contaminated with fecal matter. Efficient sanitation and a better water supply are the main safety measures against the risks posed by these pathogens. In the event of suspected contamination of drinking water, procedures must be in place in order to facilitate timely action and control the risk to public health. Therefore, and mainly in developed countries, a series of short- and long-term recommendations have been proposed, including increased surveillance of water sources and drinking water and the introduction of automatic and permanent measurement equipment, in addition to guarantee of residual chlorine up to the disposal site.

In view of the appearance of emerging pathogens associated with outbreaks, some of which are still capable of multiplying in the water supply system, the European Union created a new guideline for water management, which establishes water for human consumption as that free of any microorganism, parasite or substance, in an amount or concentration that may pose a potential danger to human health. Finally, every time we drink a glass of fresh water we must ask ourselves what efforts we make for it and how much we do in parallel for its contamination.



BIOINDICADORES PRESENTES EN EL AGUA (OMS – 2010).

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