# WATER SUPPLY QUALITY FOR USE IN FOOD AND FOR CLEANING

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**Keywords:** water quality, chlorinated drinking water, CFU 22°C, CFU 37°C.
**Abstract:** Drinking water from the supply network of the city of Focşani, Vrancea county is used in food preparation and also for cleaning the production areas, equipments and working tools. Data obtained from the analysis of microbiological parameters of reference of water supply quality are presented in this paper.

## INTRODUCTION

Drinking water is water that is of sufficiently high quality that can be consumed or used without risk of immediate or long term harm. Such water is commonly called potable water. In most developed countries, all the water supplied to households, commerce and industry is drinking water, even though only a very small proportion is actually consumed or used in food preparation (often 5% or even less).

Over large parts of the world, humans drink water that contains disease vectors or pathogens or contain unacceptable levels of dissolved contaminants or solids in suspension. Such waters are not potable water and drinking such water or using it in cooking leads to widespread acute and chronic illness and is a major cause of death in many countries. (Jalan, 2004)

Throughout most of the world the most common contamination of raw water sources is from human sewage and in particular human faecal pathogens and parasites. In 2006, waterborne diseases were estimated to cause 1.8 million deaths, each year while about 1.1 billion people lacked proper drinking water. It is clear that people in the developing world need to have access to good quality water in sufficient quantity, water purification technology and availability and distribution systems for water. (Roy, 2007) In many parts of the world the only sources of water are from small streams often directly contaminated by sewage. Not even wells do not eliminate the risk of contamination.

## MATERIALS AND METHODS

The relationship between water quality and food safety is currently regulated by different legislative acts on the environment and food.

| Legal requirement | Guide to compliance | Advice on good practice |
|---|---|---|
| **1.** There must be an adequate supply of potable water.<br>This potable water must be used whenever necessary to ensure foodstuffs are not contaminated. | Potable water must be used:<br>• for the cleaning of food;<br>• for inclusion in food recipes;<br>• for cleaning of food equipment;<br>• for cleaning surfaces that come into contact with food or the hands of food handlers;<br>• for hand washing.<br>Generally, it can be assumed that water will be potable if it comes direct from the water undertaker mains supply or from a storage system that meets the relevant requirements of any local water bye-laws. If the operation has a private water supply, that supply must be of potable quality.<br>Non potable water may be used where this will not affect the safety and wholesomeness of the food. | Water softeners and water filter, should be maintained in good condition so that they do not contaminate water.<br>Filter cartridges should be changed regularly in accordance with maker instructions.<br>Softened water may not be suitable for infant foods or adults with certain medical conditions. |
| **2.** Where appropriate, ice must be made from potable water. This ice must be used whenever necessary to ensure foodstuffs are not contaminated. It must be made, handled and stored under conditions which protect it from all contamination. | All ice to be used in food and drink must be made from potable water.<br>Ice used to cool open food in buffet displays must also be made from potable water.<br>Ice machines must sited away from sources of contamination and be regularly cleaned as should containers and utensils used to store and dispense ice. Parts of the machine and utensils that come into direct contact with ice must be disinfected periodically. | Ice for drinks should not be handled with bar e hands.<br>Glassware should not be used to ‘shovel’ ice. |

| Legal requirement | Guide to compliance | Advice on good practice |
|---|---|---|
| | Utensils must be made of durable materials that will not present a foreign body hazard from brittle fracture. | |
| **3.** Steam used directly in contact with food must not contain any substance which presents a hazard to health, or is likely to contaminate the product. | Potable water must be used if the steam may come into contact with, or become included in the food. | |
| **4.** Water unfit for drinking used for the generation of steam, refrigeration, fire control and other similar purposes not relating to food, must be conducted in separate systems, readily identifiable and having no connection with, nor any possibility of reflux into, the potable water systems. | Supplies of non-potable water to food preparation areas are not recommended.<br>In some circumstances, hoses for fire fighting may be linked to a supply of water that is not potable. In those cases, the supply should be clearly marked for firefighting and hoses should not be used for cleaning. | |

Parameters for drinking water quality typically fall under two categories: chemical/physical and microbiological. Chemical/physical parameters include heavy metals, trace organic compounds, total suspended solids (TSS), and turbidity. Microbiological parameters include Coliform bacteria, *E. coli*, and specific pathogenic species of bacteria (such as cholera-causing Vibrio cholerae), viruses, and protozoan parasites.

Chemical parameters tend to pose more of a chronic health risk through buildup of heavy metals although some components like nitrates/nitrites and arsenic may have a more immediate impact. Physical parameters affect the aesthetics and taste of the drinking water and may complicate the removal of microbial pathogens.

Originally, fecal contamination was determined by the presence of coliform bacteria, a convenient marker for a class of harmful fecal pathogens. The presence of fecal coliforms (like *E. coli*) serves as an indication of contamination by sewage. Microbial pathogenic parameters are typically of greatest concern because of their immediate health risk.

Drinking water from the supply network of Focşani is used by units for the food preparation and also for cleaning the production areas, equipments and working tools. About 12 month, samples of 500 ml chlorinated drinking water were collected from the urban supplying distribution network of the city of Focşani, and microbiological analyzed.

## RESULTS AND DISCUSSIONS

The results of the exams are shows in the table 1.

The figures 1 and 2 reproduces the correlations between microbiological parameters of drinking water and time, CFU 22$^{o}$C and CFU 37$^{o}$C, in the studied samples.

Table 1. Microbiological analysis of drinking water

| Month | **BACTERIOLOGICAL EXAM** | | | | |
|---|---|---|---|---|---|
| | **Microbiological parameters** | | | | |
| | **CFU 22ºC** | **CFU 37ºC** | **Bacterii coliforme** | **Escherichia coli** | **Enterococi** |
| | **Reference** | | | | |
| | SR EN ISO 6222 | SR EN ISO 6222 | ISO 9308/1/ 2000 | ISO 9308/1/ 2000 | ISO 7899/2/ 2000 |
| | **CONDITIONS OF ADMISSIBILITY** | | | | |
| | **100/ml** | **20/ml** | **abs/100ml** | **abs/100ml** | **abs/100ml** |
| April 2008 | 28 | 5 | abs | abs | abs |
| May 2008 | 8 | 7 | abs | abs | abs |

| Month | BACTERIOLOGICAL EXAM | | | | |
|---|---|---|---|---|---|
| | Microbiological parameters | | | | |
| | CFU 22ºC | CFU 37ºC | Bacterii coliforme | Escherichia coli | Enterococi |
| | Reference | | | | |
| | SR EN ISO 6222 | SR EN ISO 6222 | ISO 9308/1/ 2000 | ISO 9308/1/ 2000 | ISO 7899/2/ 2000 |
| | CONDITIONS OF ADMISSIBILITY | | | | |
| | 100/ml | 20/ml | abs/100ml | abs/100ml | abs/100ml |
| June 2008 | 26 | 8 | abs | abs | abs |
| July 2008 | 32 | 7 | abs | abs | abs |
| August 2008 | 26 | 10 | abs | abs | abs |
| September 2008 | 17 | 6 | abs | abs | abs |
| October 2008 | 10 | 7 | abs | abs | abs |
| November 2008 | 8 | 5 | abs | abs | abs |
| December 2008 | 13 | 6 | abs | abs | abs |
| January 2009 | 7 | 4 | abs | abs | abs |
| February 2009 | 8 | 3 | abs | abs | abs |
| March 2009 | 15 | 7 | abs | abs | abs |

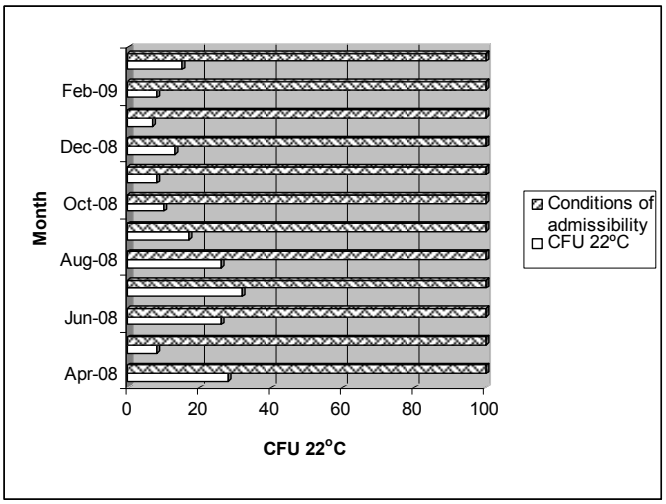


**Fig. 1** CFU 22°C of drinking water

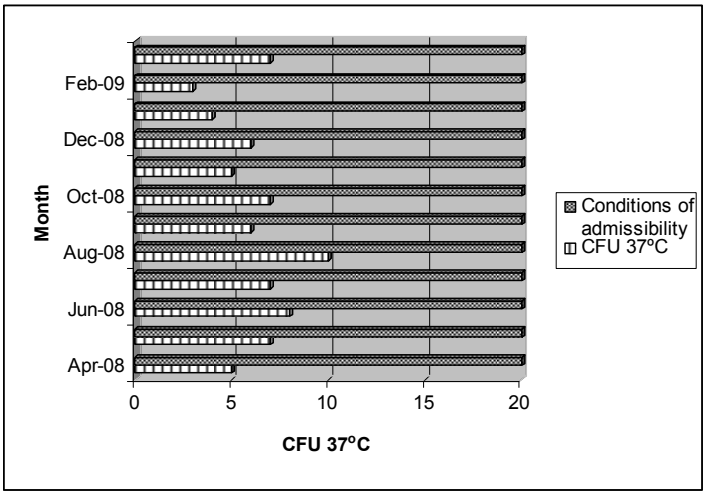


**Fig. 2** CFU 37°C of drinking water

The graphic analysis obtained by processing statistical data established that a slight increases of CFU 22°C in some months has been detected: April 2008 and June-August 2008, but not exceeding the admissibility conditions.

Increased values of CFU 37°C were recorded in August 2008, but without exceeding the maximum admissible levels.

All samples that were analyzed have recorded the parameters' values lower than the maximum permissible levels, in consequence, the water is accordingly in terms of quality, and can be used in technological processes in the manufacture of food and for hygiene.

## CONCLUSIONS

The food-processing industry is a large water user. Water is used as an ingredient, an initial and intermediate cleaning source, an efficient transportation conveyor of raw materials, and the principal agent used in sanitizing plant machinery and areas. Although water use will always be a part of the food-processing industry, it has become the principal target for pollution prevention, source reduction practices.

## REFERENCES

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Legea nr. 458/2002 privind calitatea apei potabile.

Legea nr. 311/2004 pentru modificarea şi completarea Legii nr. 458/2002 privind calitatea apei potabile.

Hotărâre de Guvern nr. 974/2004 pentru aprobarea Normelor de supraveghere, inspecţie sanitară şi monitorizare a calităţii apei potabile şi a Procedurii de autorizare sanitară a producţiei şi distribuţiei apei potabile.

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