DYNAMICS OF WATER USAGE IN FOOD INDUSTRY ACCORDING TO TECHNOLOGICAL PROCESS

Oneţ Cristian*, Oneţ Aurelia

**University of Oradea-Faculty of Environmental Protection, cristyonet@yahoo.com*

Abstract

Compared to other industrials sectors, the food industry uses a much greater amount of water for each ton of product. Drinking water consumption depends by the production size, the number of employees and also by the type of technological process and order activity. This paper presents the dynamics of drinking water usage in 4 units of food industry: 2 milk factories and 2 meat processing factories. Depending on need and use of potable water in this research is presented the potable water consumption (m^3/day) of the monitored units.

Keywords: potable water, consumption, food industry.

INTRODUCTION

The food industry requires a huge amount of water. The water is used as an ingredient, a cleaning agent, for boiling and cooling purposes, for transportation and conditioning of raw materials. However, concepts of total quality management and quantative risk assessment are increasingly being used to assure safe drinking water. Drinking water is often collected at springs, extracted from artificial borings (wells) in the ground, or pumped from lakes and rivers. Building more wells in adequate places is thus a possible way to produce more water, assuming the aquifers can supply an adequate flow. Other water sources include rainwater collection. Water may require purification for human consumption. This may involve removal of undissolved substances, dissolved substances and harmful microbes. Popular methods are filtering with sand which only removes undissolved material, while chlorination and boiling kill harmful microbes. Distillation does all three functions. More advanced techniques exist, such as reverse osmosis. Desalination of abundant seawater is a more expensive solution used in coastal arid climates.

The monitored food units were 2 milk factories: “Milk factory A” and “Milk factory B” and 2 meat processing factories: “Meat processing factory C” and “Meat processing factory D”. The “Milk factory B” has a central source of water supply while other factories present underground source of water supply represented by drilled wells.

MATERIALS AND METHODS

The research was conducted in 2010, in 4 units of food industry: Food Unit A, Food Unit B which are milk factories and Food Unit C, Food Unit D (meat factories).

Food Units A, B and C are placed in Bihor County while Food Unit D is placed in Satu Mare County.

RESULTS AND DISCUSSION

Depending on need and use of potable water in this research is presented the potable water consumption (m^3/day) of the monitored units.

Table 1

Average water consumption (m^3/day) in food industry

Monitored food units	Water consumption for health and hygiene purposes (m^3/day)	Water consumption for technological purpose (m^3/day)	Total consumption of water from underground sources (m^3/day)
Milk factory A	1,7	15,0	16,7
Milk factory B	0,9	30,5	31,5
Meat processing factory C	7,7	56	63,7
Meat processing factory D	1,0	5,5	6,58

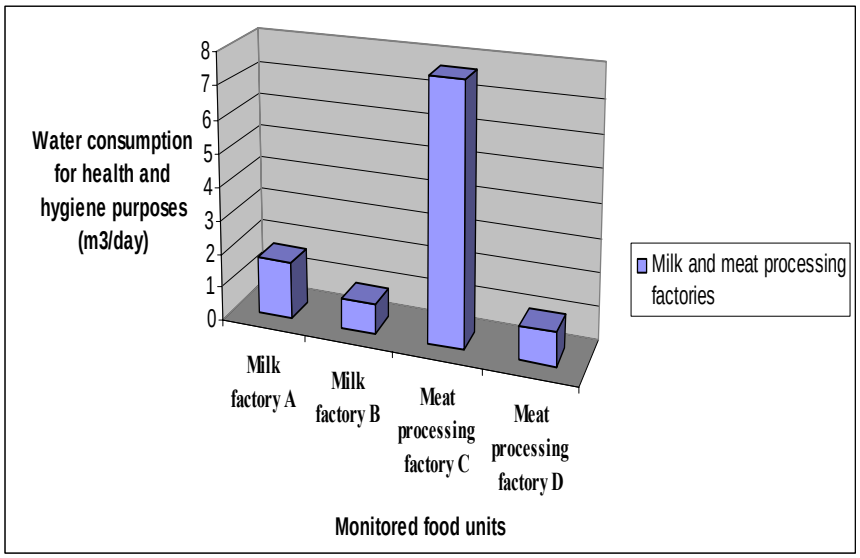

Fig. 1 Water consumption for health and hygiene purposes (m^3/day)

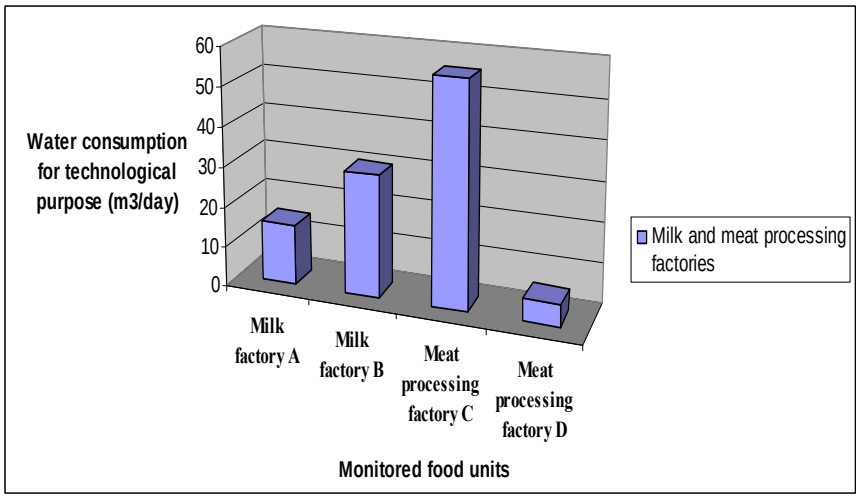

Fig. 2 Water consumption for technological purpose (m^3/day)

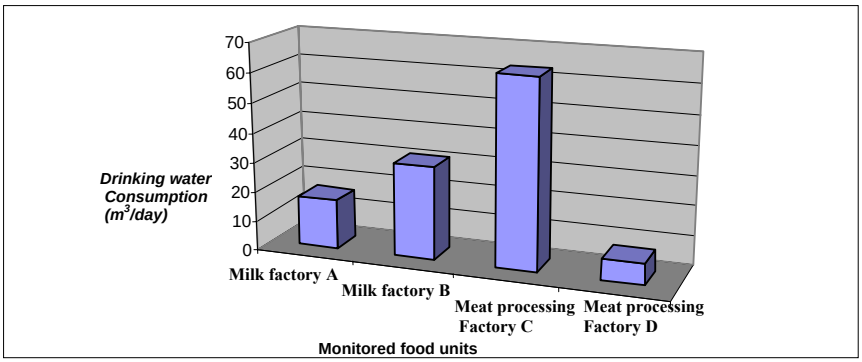

Fig. 3. Assessment of total drinking water consumption (m^3/day) on monitored food units

The highest consumption of drinking water was recorded at "Meat processing factory C" while the lowest consumption was registered at "Meat processing factory D".

The "Meat processing factory C" is a large factory which produces daily 20 tonnes until the "Meat processing factory D" produces only 2 tonnes per day.

Drinking water consumption depends by the production size, type of product being processed, the production program, operating methods, the number of employees, the degree of water management being applied, and subsequently the amount of water being conserved.

CONCLUSIONS

The provision of safe drinking water is one of the most important steps that can be taken to improve the health of a community by preventing the spread of water-borne disease.

The maintenance of a sufficient supply of wholesome drinking water is a complex undertaking in which individuals from many disciplines have a role.

Information gained over time through monitoring will provide a comprehensive picture of the range of quality of any particular source of water, any deterioration from which should at once arouse suspicion.

REFERENCES

1. Bara V. Oneț C., 2008, Hygiene Guide in Food Units, University of Oradea Publishing House;
2. Bara L. Oneț C., 2009, Food Hygiene, University of Oradea Publishing House;
3. Diersing, Nancy., 2009, "Water Quality: Frequently Asked Questions". PDA. NOAA. http://floridakeys.noaa.gov/pdfs/wqfaq.pdf. Retrieved 2009-08-24;
4. WHO, 1993, Guidelines for Drinking Water Quality, Volume 1 Recommendations, Second edition. Geneva, World Health Organisation;
5. McKnight, S., 2002, Issues on Water Quality and Safety, Dairy, Food and Environmental Sanitation, p. 512-513;
6. ECETOC 1988, Nitrate and drinking water. Brussels, European Chemical Industry Ecology and Toxicology Centre (Technical Report No. 27);
7. The Water Industry Act, 1991, Stationery Office Ltd.;
8. The Water Supply (Water Quality) Regulations, 2000, Statutory Instrument 2000 No. 3184, Stationery Office Ltd.;
9. The Water Supply (Water Quality) Regulations, 1989, Statutory Instrument 1989 No. 1147, Stationery Office Ltd.;
10. United States Environmental Protection Agency (EPA), 2006, Washington, DC. "Water Quality Standards Review and Revision.".