DRINKING WATER IN FERMENTATIVE FOOD INDUSTRY. DIFFERENT POSSIBILITIES TO IMPROVE THE MAIN QUALITY PARAMETERS

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Abstract

In food industry the water has multiple uses in the technological process like: primary or auxiliary substance, washing water, sorting water, cooling water and transport of different materials. The water used in technological processes of food industry must correspond to same features which must ensure the right quality of food products and proper exploitation of production of machinery. It must be drinkable and must have appropriate organoleptic characteristics.
Keywords*: turbidity, hardness, qualitative parameters, drinkable water*

Introduction

Water represents au indispensable element of life, being au important factor in almost all processes in food industry. In food industry the water has multiple uses in the technological process like: primary or auxiliary substance, washing water, sorting water, cooling water and transport of different materials.

Drinkable water is defined as being the water which presents the proper characteristics for consuming and which through its consuming does not endanger the consumer's health (Guidelines for Drinking, 2004).

The water used in technological processes of food industry must to correspond to the same features which must ensure the right quality of food products and proper exploitation of production machinery.

It must be drinkable and must have appropiate organoleptic characteristics. The abnormal taste and odor appeared in the drinkable water and used in food industry may influence the organoleptic characteristics of the food products. The taste and odour of the water depend upon the chemical composition temperature and the presence of same volatile substances (Stoica, 2006; European Standards, 1971).

The technological water for food industry must have normal microbiological characteristics. Beside the conditions of being drinkable established by STAS it is recommended that from water to miss the actinomycetes, ferruginous and manganese bacteria which form mucilaginous precipitates in water modifying its organoleptic properties (Nistoreanu, 2000).

Experimental

At Simnic station the samples are taken from Jiu River each day. For the eloquence of the paper we selected the samples of water from 3 successive days (15, 16 and 17) August 2005 characterized from a totally different climatic point of view. The fresh water from Jiu River was decanted and filtered. It is moved in tanks where different chemical treatments are applied. A succession of physical and chemical determinations is done, for the samples taken from Jiu, before and, after decantation and filtration from each tank separately.

The analyses done are: the determination of temperature, turbidity and suspensions, the exact residue, the hardness and pH. As well the content in alkalinity, oxygen, chemical and biochemical consumption of oxygen, chlorides and residual chlorine are determined. The analysis was accomplished after official methods recommend by European and International Standards for Drinking Water adopted by Romanian Standards.

Results and Discussions

The value of the main physical quality parameters of the water are presented in the table 1. The water from Jiu is treated with aluminum sulfate. The quality used is different depending on the water turbidity. That it goes to decantation where the gravimetrical suspensions are left out. After decantation the water goes to fast filtration.

The water turbidity is due to the presence of some suspensions, fine divided (organically substances, argyles, plankton, different micro-organisms). Also, form the table we can see that all analyzed values done at raw water, after physical qualitative parameters. In this way, the turbidity is reduced in each of the 3 days, getting admissibility values. After decantation, the suspensions are totality removed, and, before fast filtration, the dry residue is reduced, getting normal values, accepted by the STAS in

use. The pH of water is a bite alkaline, having values between 6.4 and 6.9.

Table 1. The main physical constituents of brute and treated water

Day	Place	Turbidity (degrees)	Suspensions mg/l	Hardness (degrees)	Exact residue mg/l	pH
15.08	Jiu	80	226	8.0	40	7.5
	Decantation	11	-	7.8	12	7.0
	Filtration	6	-	7.8	7	7.0
	Reservoir	5	-	7.8	6	6.9
16.08	Jiu	720	250	8.0	180	7.5
	Decantation	11	-	7.8	12	7.0
	Filtration	6	-	7.8	7	7.0
	Reservoir	5	-	7.5	6	6.9
17.08	Jiu	4000	265	9.6	3780	7.2
	Decantation	11	-	9.4	17	6.3
	Filtration	6	-	9.4	10	6.3
	Reservoir	5	-	9.2	7	6.2

In the table 2 the main chemical components of water are shown as well as their evolution after the applied treatments. The water alkalinity is due to the presence of bicarbonates, carbonates and hydroxides and not very often of borates, silicates, phosphates and the values is given in ml HCl 0.1 n at 100 ml water. After the physical treatments applied to the raw water, the alkalinity decreases till to the normal values of admissibility.

Depending upon the ratio between permanent and total alkalinity, the water alkalinity may be given by the carbonates, by the and by the hydroxides from the water. The chemical consume of oxygen decreases also, ranging between the limits of standards. After the quick filtration, the second physical methods of improving the quality parameters of water must to be applied (chloride disinfection), the chloride being found in the values of residual chloride.

As can be observed in the second table the values of residual chloride do not appear, but it appears in the water from the distribution tank (reservoirs) used to the consumers from food industry.

On the other hand, the chlorides are presents in primary water but after the applying of treatments to, there value remaining unchanged no matter the physical or chemical treatment applied.

Table 2. The main chemical constituents of brute and treated water

Day	Place	Alkalinity	O_2 mg/l	CBO_5 mg/l	CCO mg/l	Chlorides mg/l	Cl mg/l
15.08	Jiu	2.6	9.2	1.0	12.3	24.8	-
	Decantation	2.4	-	-	6.8	24.8	-
	Filtration	2.1	-	-	6.2	24.8	-
	Reservoir	1.9	-	-	5.1	24.8	0.94
16.08	Jiu	2.2	8.8	0.9	101.2	31.9	-
	Decantation	2.1	-	-	10.5	31.9	-
	Filtration	1.8	-	-	8.2	31.9	-
	Reservoir	1.6	-	-	6.3	31.9	0.88
17.08	Jiu	2.5	8.8	1.2	31.6	28.4	-
	Decantation	2.4	-	-	7.8	28.4	-
	Filtration	2.3	-	-	7.1	28.4	-
	Reservoir	2.1	-	-	6.0	28.4	0.95

Conclusions

According to climatic conditions – temperature, and rainfalls – the primary water has certain characteristics whose values do not match by far the acceptable standards in use. By applying different physical treatments as decantation and quick filtration it can be observed a considerable amelioration of the main quality parameters of primary water, its values reaching the acceptable limits for drinkable water and hence that used in fermentative food industry. By applying corrective chemical treatments all the qualitative parameters considered here are between the necessary values.

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