

# STUDY OF BACTERICIDAL PROPERTIES OF CHLORAMINE IN COMBINATION WITH WASHING MEANS

(FIRST COMMUNICATION)

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The production of combined disinfection preparations based on various substances (phenols, halogen-containing, oxidatives, aldehydes, etc) presents a perspective direction in the field of disinfection. The assortment of these means enlarges ceaselessly which is evident from numerous literature data (1, 2, 3, 4). The interest in them is due to their specific properties: high bactericidal action together with washing and cleaning properties. Combined disinfection preparations are widely used both in focal and hospital disinfection.

Chlorine preparations have powerful bactericidal properties. However, they possess certain disadvantages: storage instability, unpleasant smell, irritative action on skin and mucous membranes, and corrosive action. They are strongly inactivated in the presence of organic substances. K. Trayanova et al. (8) studied disinfection properties of chlorine-containing preparations. They established a good compatibility and an increase of bactericidal effect after combination with liquid synthetic soaps.

The objective of our work was to investigate the bactericidal properties of new combinations of chloramine with washing means available on the market at this moment with a view to their wide application in disinfection practice, especially in children's hospitals.

## Material and methods

We used the following synthetic washing means: "Perla-74", "Penol", "Moke tin", "Delta", "Puhi", and "Vero". All the preparations are liquid with pH of 0,5 per cent water solution between 7 and 9 (see table 1). The initial solution is chloramine B with an active chlorine concentration of 29,11 per cent. Then the following dilutions are prepared: 1 per cent, 0,50 per cent, 0,25 per cent, 0,10 per cent, and 0,05 per cent each of them combined with 0,50 per cent concentrations of the above mentioned washing means. These combinations are tested for stability. By using the chemical analysis (7) their active chlorine concentration in per cent is determined at the first hour as well as 24 hours after preparation of the solutions. The bactericidal properties of chloramine alone and in combination with different washing means are estimated according to the suspension method (5). As microbial tests standard bacterial strains received from the disinfection laboratory of the Institute of Infectious and Parasitic Diseases, Sofia, are used. The determinations are performed by using 2 mlrd/ml bacterial suspension obtained by mixing of bacterial culture aged 18 hours of 3 *Staphylococcus aureus* strains as follows: Sg 511, Sa 209, ATCC 4163, and *E. coli* 1,8 and 10.2 ml of the latter

Table 1

## Physico-chemical properties of washing means combined with chloramine

Name	"Perla 74"	"Penol"	"Moketin"	"Delta"	"Puhi"	"Vero"
Kind	fluid	fluid	fluid	fluid	fluid	fluid
pH of 0,5 % water solution of the soap	8,45	7,82	7,25	8,61	7,05	7,57

are added to 2 ml of corresponding disinfection solution, washing preparation and their combinations. After an exposition of 30 sec, 1 min, 5 min, 10 min, 1 hour, 2 hours, and 24 hours it is dropped directly on common agar and Endo medium. The growth is measured at 24 and 48 h after incubation in thermostat at 37 °C. Dry nutritious media — common agar and Endo medium — produced by the Institute of Infectious and Parasitic Diseases, Sofia, are used in our study.

### Results and discussion

The data from the laboratory analysis of the bactericidal properties of chloramine solutions combined with washing means are given on table 2. It can be seen that bactericidal properties are increased in all the combinations as compared with those of chloramine solutions alone. The combinations with "Moketin", "Puhi", and "Vero" with mean pH=7—7,57 are the most effective ones while the combination with "Delta" (pH=8,61) shows the slightest increase of bactericidal action. These results support the concept that chloramine solutions with neutral and slightly alkaline reaction possess the best bactericidal properties.

0,5 per cent water solutions of washing means used as controls do not demonstrate any bactericidal properties. Washing means addition to chloramine solutions reduced chlorine smell. In regard to the stability of the combinations it is evident that their suitability is preserved for 24 hours.

In this report some preliminary laboratory data are stated. Our further investigations will include more test-microorganisms and evaluate definitively the chloramine-detergent combinations on the basis of terrain experiments in children's institutions.

### Conclusions:

1. Chloramine combinations with 0,5 per cent liquid washing means "Moketin", "Puhi", and "Vero" with neutral and slightly alkaline pH are the best ones resulting in increase of its own bactericidal action.

2. Synthetic washing means addition to chloramine solutions reduces the smell of the latter and endues them with washing properties.

Table 2

## Bactericidal action of chloramine in combination with washing means

Test microorganisms		Staph. aureus								E coli							
Disinfection solution	% solution	Exposition in min															
		1/2	1	5	10	30	60	120	24 h	1/2	1	5	10	30	60	120	24 h
Chloramine	1	+	+	+	+	-	-	-	-	+	+	+	-	-	-	-	-
	0,50	+	+	+	+	+	-	-	-	+	+	+	+	-	-	-	-
	0,25	+	+	+	+	+	-	-	-	+	+	+	+	-	-	-	-
	0,10	+	+	+	+	+	+	-	-	+	+	+	+	+	-	-	-
	0,05	+	+	+	+	+	+	+	-	+	+	+	+	+	+	-	-
0,5 % "Perla 74 "	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0,50	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-
	0,25	+	+	+	-	-	-	-	-	+	+	-	-	-	-	-	-
	0,10	+	+	+	+	-	-	-	-	+	+	+	-	-	-	-	-
	0,05	+	+	+	+	+	-	-	-	+	+	+	+	-	-	-	-
0,00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
0,5 % "Penol"	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0,50	+	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
	0,25	+	+	+	-	-	-	-	-	+	+	-	-	-	-	-	-
	0,10	+	+	+	+	-	-	-	-	+	+	+	-	-	-	-	-
	0,05	+	+	+	+	+	-	-	-	+	+	+	+	-	-	-	-
0,00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
0,5 % "Moketin"	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0,25	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
	0,10	+	+	+	-	-	-	-	-	+	+	+	-	-	-	-	-
	0,05	+	+	+	+	-	-	-	-	+	+	+	+	-	-	-	-
0,00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
0,5 % "Delta"	1	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-
	0,50	+	+	+	-	-	-	-	-	+	+	-	-	-	-	-	-
	0,25	+	+	+	-	-	-	-	-	+	+	-	-	-	-	-	-
	0,10	+	+	+	+	-	-	-	-	+	+	+	-	-	-	-	-
	0,05	+	+	+	+	+	-	-	-	+	+	+	+	-	-	-	-
0,00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
0,5 % "Puhi"	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0,25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0,10	+	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
	0,05	+	+	+	+	-	-	-	-	+	+	+	-	-	-	-	-
0,00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	

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## **ИССЛЕДОВАНИЕ БАКТЕРИЦИДНЫХ СВОЙСТВ ХЛОРАМИНА В КОМБИНАЦИИ С МОЮЩИМИ ПРЕПАРАТАМИ**

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### **Р Е З Ю М Е**

Проведено лабораторное исследование дезинфицирующих свойств хлорамина в комбинации с болгарскими моющими препаратами: «Перла 74», «Мокетин», «Делта», «Веро» при рН в границах 7—9.

Установлена совместимость этих препаратов с 0.5-процентным водным раствором, именно: ослабление запаха хлора и повышение бактерицидных качеств во всех комбинациях. Особинно высокими качествами обладали комбинации с препаратами «Мокетин», «Пухи» и «Веро» с нейтральным и слабощелочным рН в середине. Наиболее слабое повышение бактерицидного эффекта было установлено при комбинации препарата «Делта» с рН 9.