STUDY ON MICROFLORA OF VEGETABLE SALADS

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Salads are prepared with a special role in human ration due to beneficial advantages on the body. These are reliable sources of minerals (K, Na, Ca, P, Mg, Fe), vitamins (vitamin C, vitamin. B1, vit. B2, vit. B6, vit. PP), easily digestible and not the least prevent constipation, obesity and helps lower cholesterol in the body, and not least, reduce the risk of diabetes. Unlike other dishes, salads are kept at t = 6.4 ˚ C no longer than 1 h, and salads of raw-for 0.5 h [2].

Reduced during storage of salads is explained by the variety ingredients and different sources of contamination with unwanted microflora with during other operations: cutting components, their mixing and portioning transportation, marketing. Purpose of the thesis was to study the microflora of raw materials used in the preparation of 2 types of salads - "cabbage salad" and No.100 "meat salad" no. 89 [1], and their microflora during storage at t = 4-8 ˚C for 5 h. To identify the appropriate microflora samples were inoculated on culture media, Saboureaud, for detecting yeasts and molds and Agar meat peftonate - for bacteria.

Cultures were incubated in Petri plates under appropriate rules on culture media indicated pH of 2.5 to 5.5 which were subsequently kept in thermostat for 48-72 h at t = 32-37 ˚C. Paralel to this was used citric acid solution 5% as control and preservative on the same period of cultivation.

Findings microbiota of raw materials used for preparing salads are presented in Table 1.

Table 1. Microbiota identified in untreated and heat-treated materials

Raw material	Culture medium	Total number of colonies n/ g	Identified microflora
1	2	3	4
Raw material for "Cabbage salad"			
Cabbage	Agar Saboureaud Meat peptone agar	$1,1*10^2$ $1,84*10^2$	- Gen. Bac. mesentericus
Lettuce (leaves)	Agar Saboureaud Meat peptone agar	$0,73*10^2$ $0,6*10^2$	Lees, gen Torulopsis Micrococci
Green onion	Agar Saboureaud Meat peptone agar	$0,3*10^2$ $0,65*10^2$	- Gen Bacillus
Raw material for "Meat salad"			
Raw potatoes	Agar Saboureaud Meat peptone agar	$0,64*10^2$ $3,0*10^2$	 Micrococcus
Boiled potatoesT= 30'	Agar Saboureaud Meat peptone agar	$0,4*10^2$ $0,55*10^2$	 Gen Bacillus
Raw meat	Agar Saboureaud Meat peptone agar	$0,38*10^2$ $9,0*10^2$	- Micrococci, gen Baccilus, Streptococcus Lactis

1	2	3	4
Boilead meat T=60-90’	Agar Saboureaud Meat peptone agar	$0,2*10^2$ $1,5*10^2$	- Micrococci, Streptococcus Lactis
Raw egg	Agar Saboureaud Meat peptone agar	$0,7*10^2$ $0,8*10^2$	- Gen. Potcus
Boileg egg T=10’	Agar Saboureaud Meat peptone agar	$0,25*10^2$ $0,65*10^2$	- Sac. subtilis

From the data presented in Table 1 is observed that the number of colonies of microorganisms appeared on both culture media of heat untreated raw is higher than the boiling feedstock and is included within $(0,3\div9,0)* 10^2$. On the raw material heat treated microbes we can remark, that the overall number of colonies is reduced virtually for all types of environmental samples analyzed by 1.5 ÷ 6.0 times.

It is also noteworthy that the microflora identified for untreated and heat-treated material is representing, especially Peptone Agar culture medium meat by: Bac.gen Bacillus, Micrococci, Streptococcus lactis. Genus Torulopsis yeasts were found in lettuce (leaves) on agar culture medium Saboureaud in number of 0.73 * 102 colonies. Microbiota of "cabbage salad" and "meat salad" in dynamic storage for 4 h at temperature 5-10 ° C is shown in Figure 1 and 2.

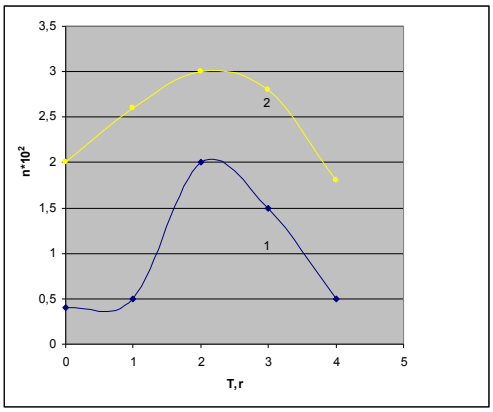

Fig. 1 Microbiota evolution in "cabbage salad": 1 - Agar Saboureaud culture medium; 2 - Meat peptone agar culture medium

The data fig.1 notice that the initial number of colonies salad "cabbage salad" appears in the culture medium, the microbiota exceeds the number of of colonies on Agar culture medium Saboureaud on average 1.5 to 6.0 times during 4 h of storage.

But comparing the microbiological standards for salads of crudités with laboratory results is confirmed the fact that the total number of bacteria (N TG) and standards for yeasts and molds respectively equal to 5 * 104 and 1.0 * 102 microorganisms / g, were not exceeded and Salmonella and Listeria in 25 g sample type - were not detected.

Thus, the data obtained for "cabbage salad" kept at low temperatures to 5 h, shows that it can be consumed without danger human health. Similar results were obtained for "meat salad" (Fig. 2).

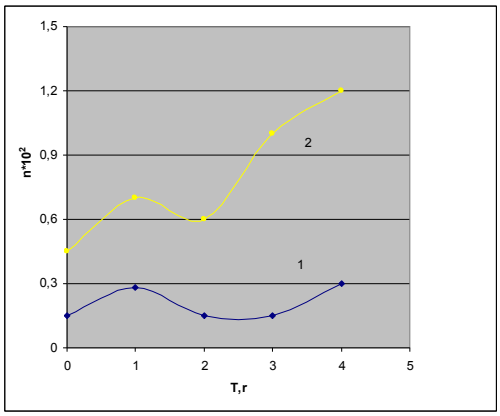

Fig. 2 Microbiota evolution in "Meat salad": 1 - Agar Saboureaud culture medium; 2 - Meat peptone agar culture medium

Insemination on both culture media of "meat salad" of heat treated components was carried over each hour of storage period at temperatures of 4-10 ˚ C. The results presented in Figure 2 show insignificant deviations in the number of colonies on Agar culture medium Saboureaud (curve 1) the salad immediately prepared and examined over 2 h of storage, maintained at t = 4.2 ˚ C.

NTG values 0.18 * 102 for every prepared salad and after 2 h of storage are practically identical, which confirms that temperature is the important factor, influencing storage time. At this temperature - 2-4 ˚ C the speed of metabolic processes of microorganisms is reduced. In these cases low storage temperatures of salads help reduce the number of microorganisms and possible increase of a limited duration of storage of foodstuffs. (17)

Microflora of studied salads was identified by examining the salad samples at microscopic size 16 * 100 by emersion.

In "cabbage salad" during storage were found and identified the following types of organisms presented in Table 2.

Table 2. Salad microorganisms

Time of storage,h	Tempe rature, ˚C	Cabbage salad		Meat salad	
		Agar Saboureaud	Meat peptone agar	Agar Saboureaud	Meat peptone agar
0,0	4-10˚C	Lactobaciul lus, Dj.Torulopsis	-	Bac. subtilis	
1,0	4-10˚C	-	Gen.Bacterii	-	Gen. Bacilus
2,0	4-10˚C	-		-	Gen. Bacilus
3,0	4-10˚C	Gen. Bacilus	-	-	-
4,0	4-10˚C	Gen. Bacilus	-	Gen. Bacilus	-
72	37˚	-	Streptococcus	-	Bacillus with spores

From Table 2 data it is observed that the "meat salad" inseminated on Peptone Agar contains Bacillus with spores, detected after maintaining the samples at 37 ˚ C for 72 h. These results confirm that the prepared salad including raw material heat treated and used for cooking presents the danger of food poisoning because contamination with microorganisms cooked meat occurs after cutting it. It should be noted that such Bacillaceal family includes over 36 types of species: Bac.anthracis, Bac.cereus, Bac.subtilis.

On "cabbage salad" were found streprococus, which group includes S.Aurens, S.Psendomonaie, S. faecalis and.

Remarkably, the salads prepared and inseminated on medium Eudo for detecting microorganisms such as E. coli has not confirmed their presence.

In order to protect salads of influence of pathogenic microorganisms and increase the retention period were used cloth impregnated with citric acid solution with a concentration of 5%, covered with culture media.

Analysis of samples inoculated with suspension of salads formed sterile areas of microorganisms around fabrics impregnated with citric acid solution, indicating inhibition of microorganisms by acid.

The study of process preparation of 2 types of salads - "cabbage salad" and "meat salad" allow for molding the following conclusions:

- Perishable salads are prepared with a shortened retention due to the large number of components and mechanical processes;
- Raw food salads are more likely for microorganisms invasion and their slightly contaminated during preparation (washing with water, and cut);
- Heat treatment of raw materials reduces initial microflora:

In potato - 5.5 times, meat - 6.0 times, eggs - 1.2 times.

- reducing the contamination of salad of raw is achieved by substituting mass vinegar with lemon salt solution
- Microflora of raw materials used to make "cabbage salad" is represented by conditioned pathogenic bacteria like: Bacielus and pathogens such as salmonella, E. coli - were not detected.

Using lemon salt solution (C6 H8 O7) in concentrations of 5% or lemon juice as a substitute of vinegar for salads of raw greatly reduce their contamination with microorganisms.

Literature

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