III International Scientific Conference "**Sustainable and efficient use of energy, water and natural resources – SEWAN-2021**"

Title: Biotesting method for assessing changes in the quality of goat milk during pasteurization

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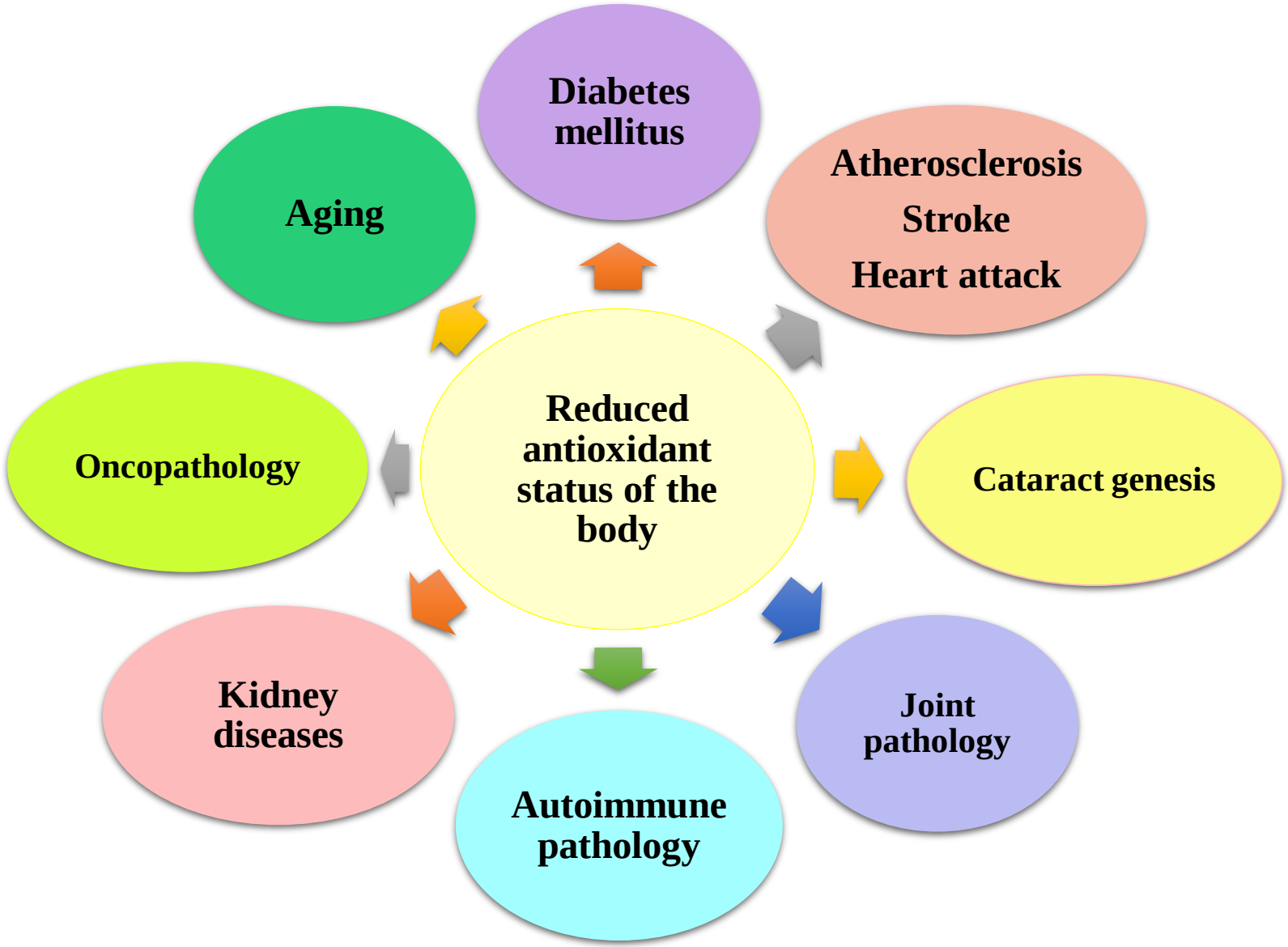
Biotesting method for assessing changes in the quality of goat milk during pasteurization

Sirotina Karina

Kazan National Research Technological University

Keywords:

goat milk, pasteurization, biotesting



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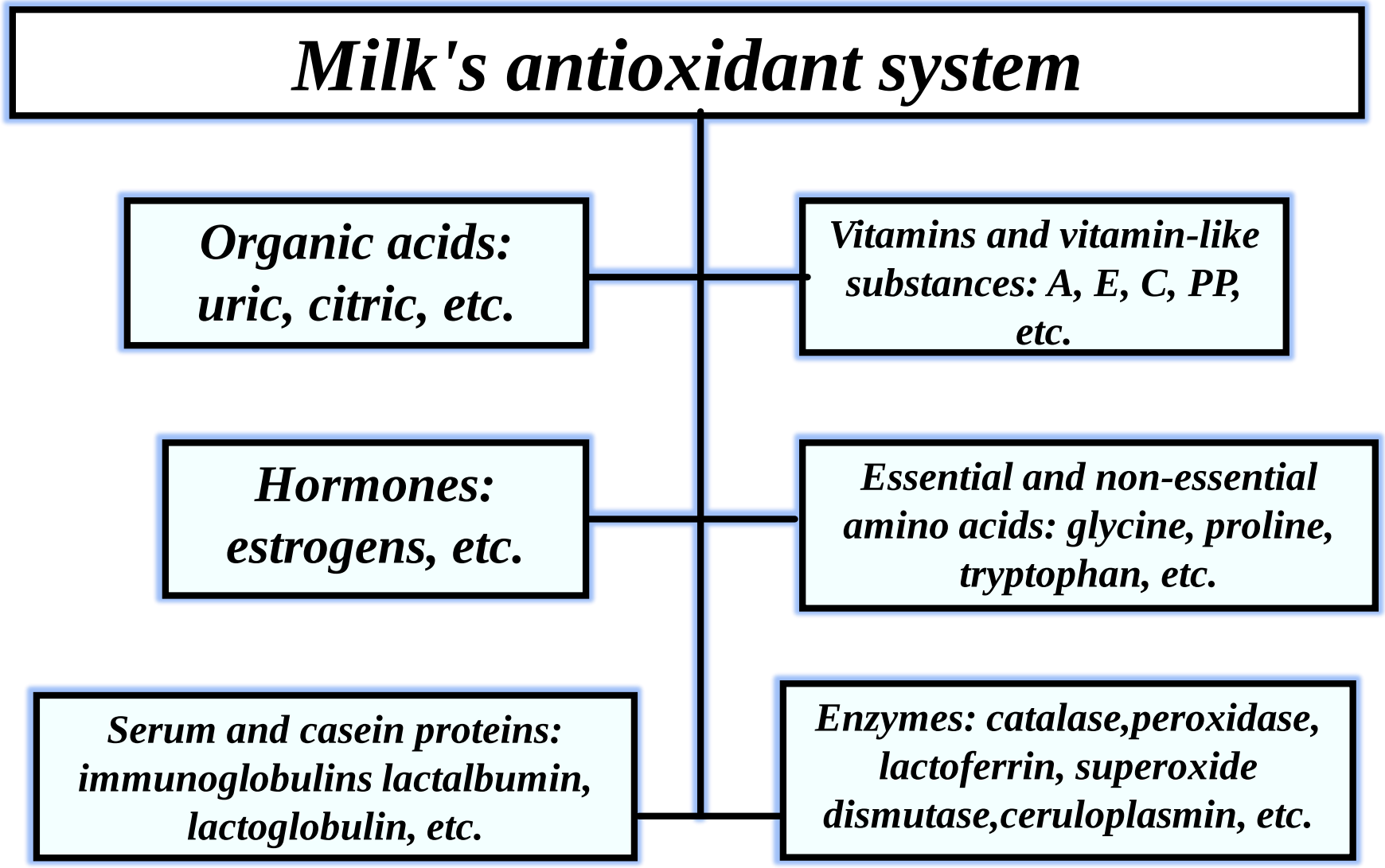

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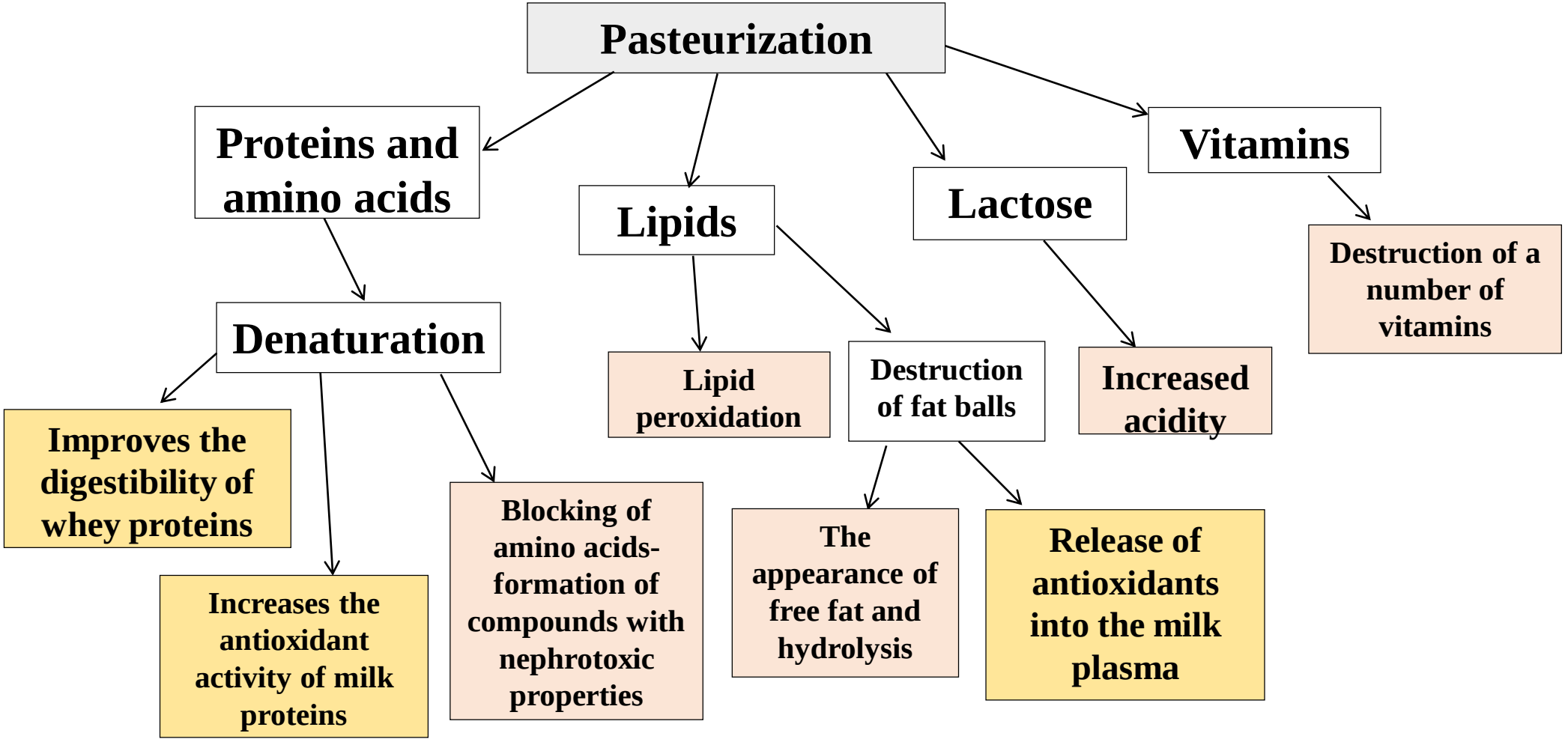
Effect of pasteurization on milk quality



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Advantages of biotesting

High accuracy: the experiment is performed on the most sensitive test organisms

Low cost of work

Integral assessment of the object under study: takes into account the impact of all toxic substances on a living organism

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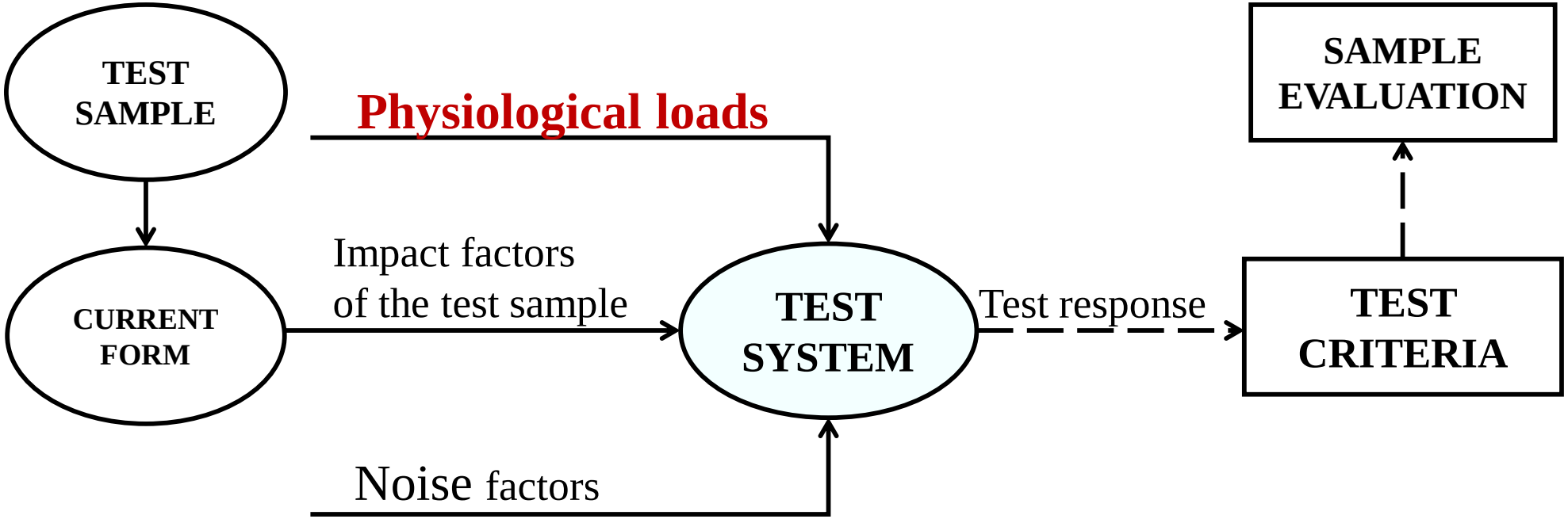
Schematic diagram of biotesting



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Research Objective:

Evaluation of the influence of a number of industrial modes of milk pasteurization on the stress resistance of *Paramecium caudatum* infusoria.

Object of research:

The object of the study was samples of cow's milk from private farms.

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Advantages of infusoria as a test of organisms

- As eukaryotic organisms infusorians have the properties of an individual organism and a cell;
- High sensitivity;
- Easily visualized under a microscope;
- Low cost of laboratory maintenance.

***Paramecium caudatum* at magnification ×600**

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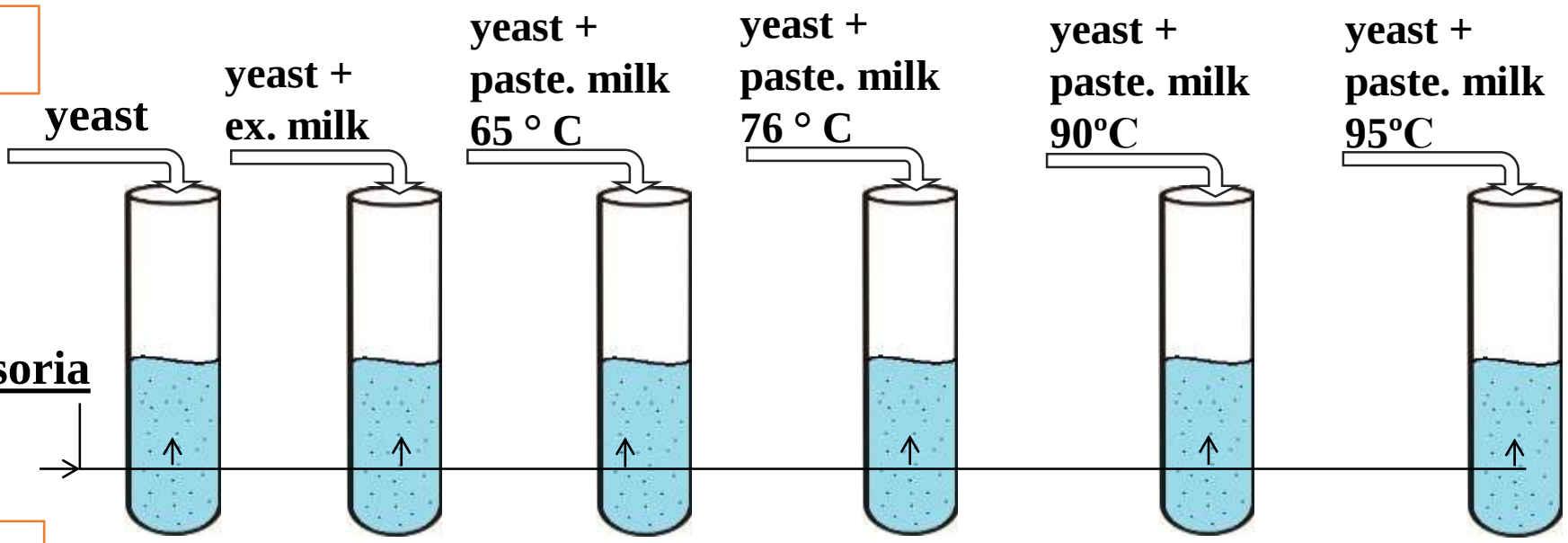
Conducting a biotesting

STAGE I

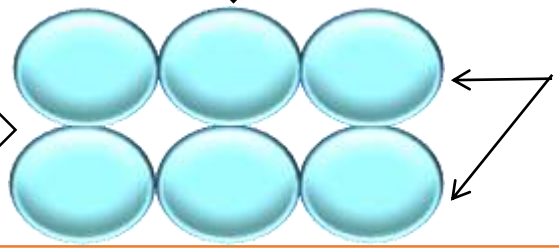


STAGE II

Infusoria were cultivated for 3 and 5 days

4-5 individuals were selected from each test tub

+ 300 µl 1.5% hydrogen peroxide solution



microaquarium wells

The time of immobilization of the infusoria was determined

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Screening of optimal biotesting conditions

Effect of stressor concentration on survival time
Paramecium caudatum

Hydrogen peroxide	
concentration	**immobilization time, min.**
3%	instantly
2%	0,20
1,5%	1
1%	>3

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Paramecium Caudatum cell lysis

Paramecium caudatum before exposure to hydrogen peroxide

Paramecium caudatum after exposure to hydrogen peroxide

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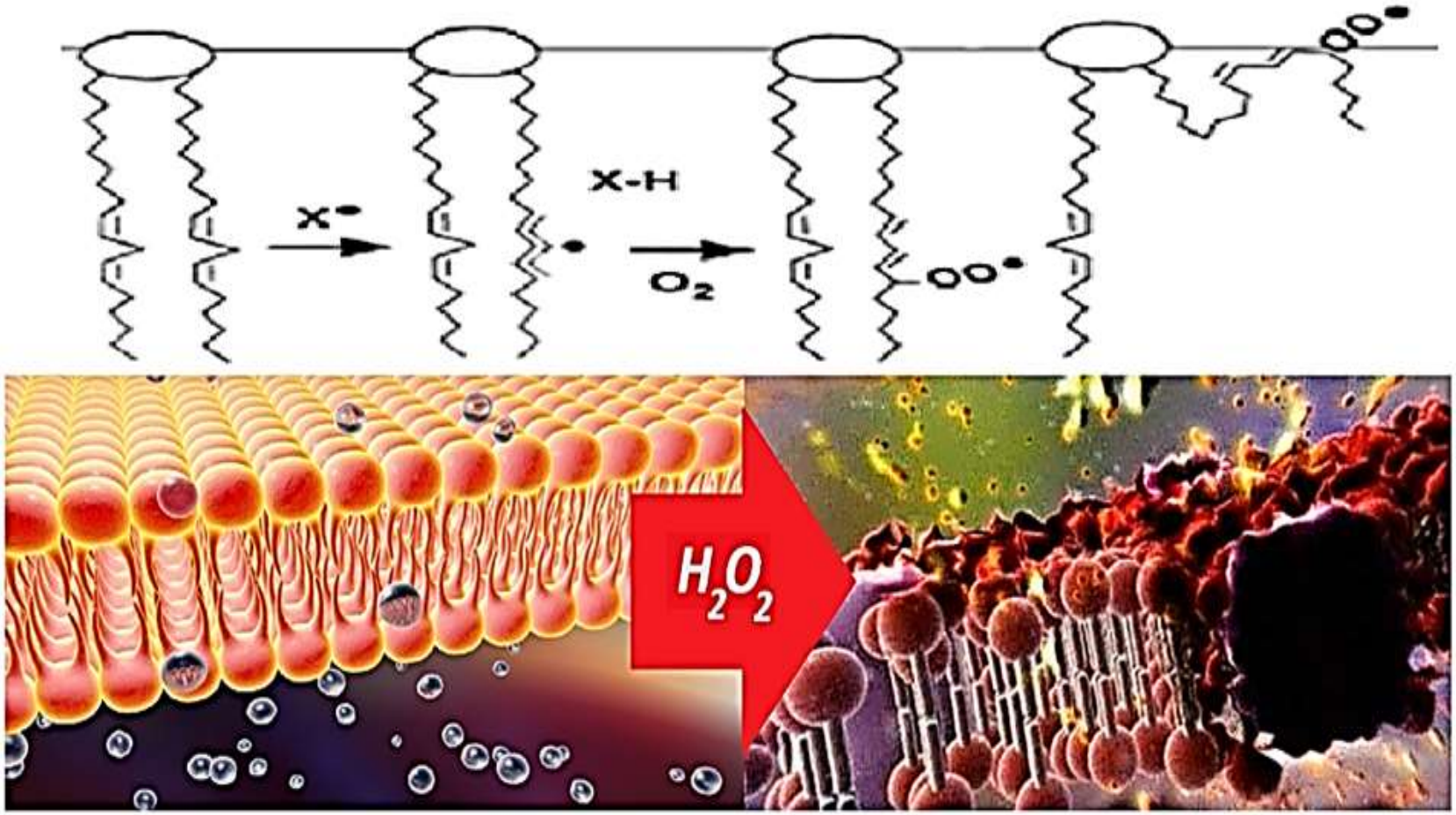
The effect of hydrogen peroxide on the lipid part of the cell membranes



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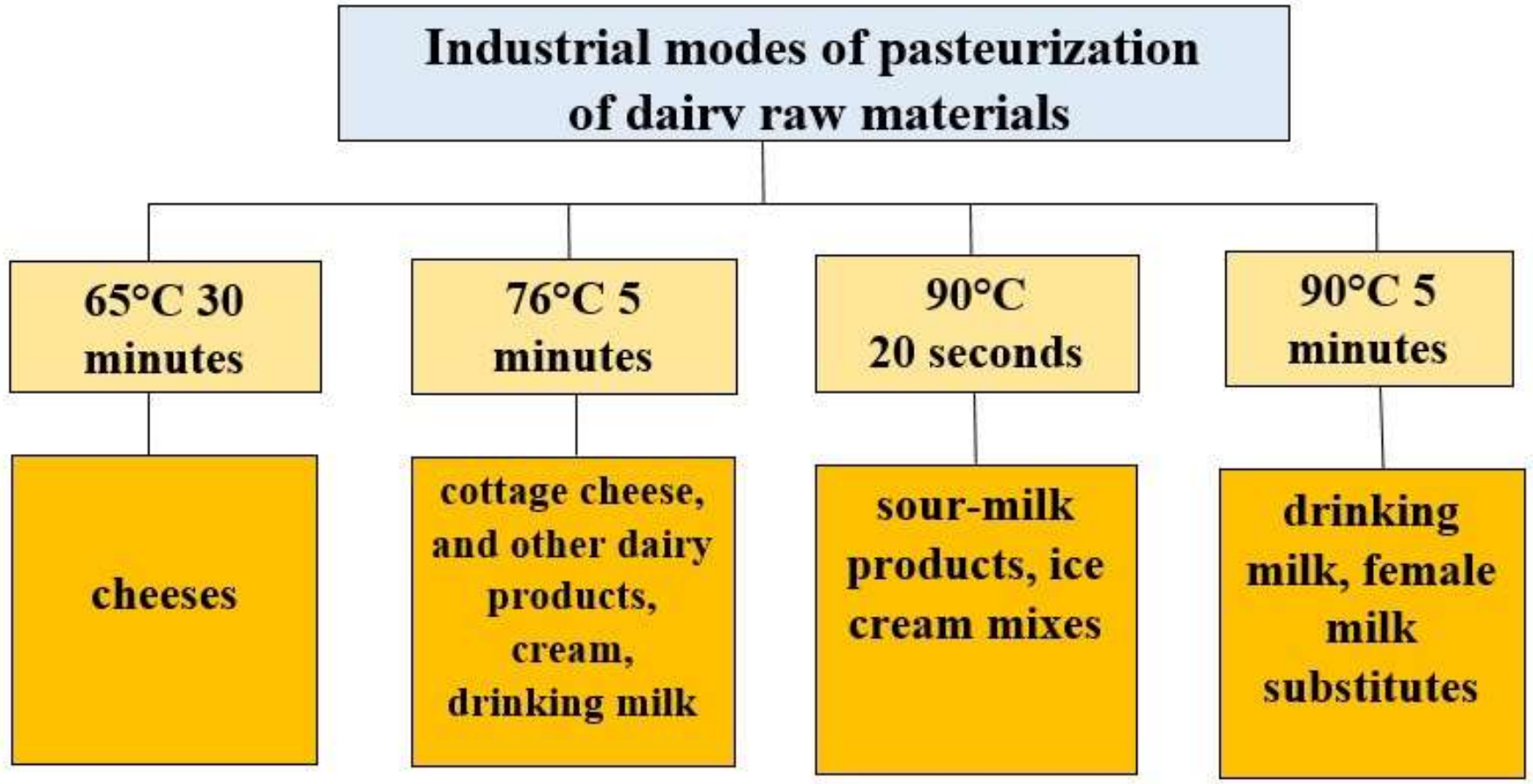

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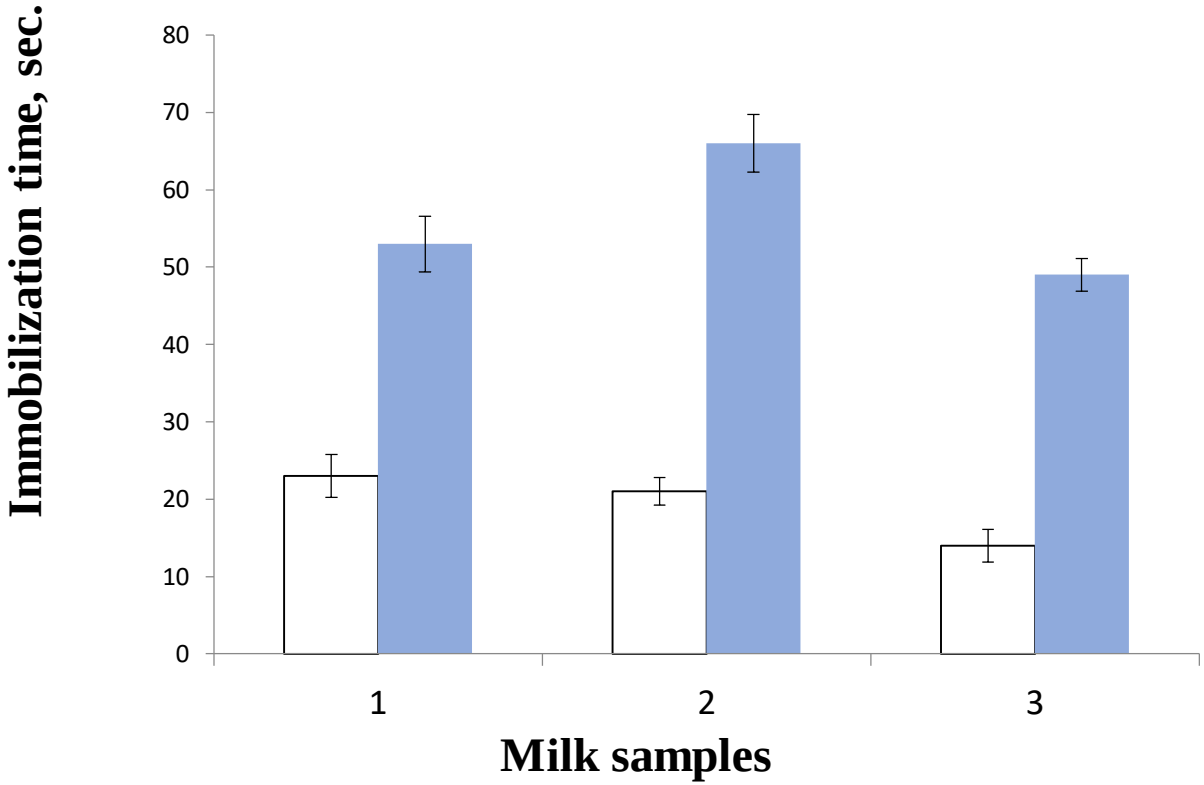
The effect of adding native goat's milk to the culture medium on the stress resistance of *Paramecium caudatum*



1, 2, 3 – different milk samples

– control, – with the addition of native milk

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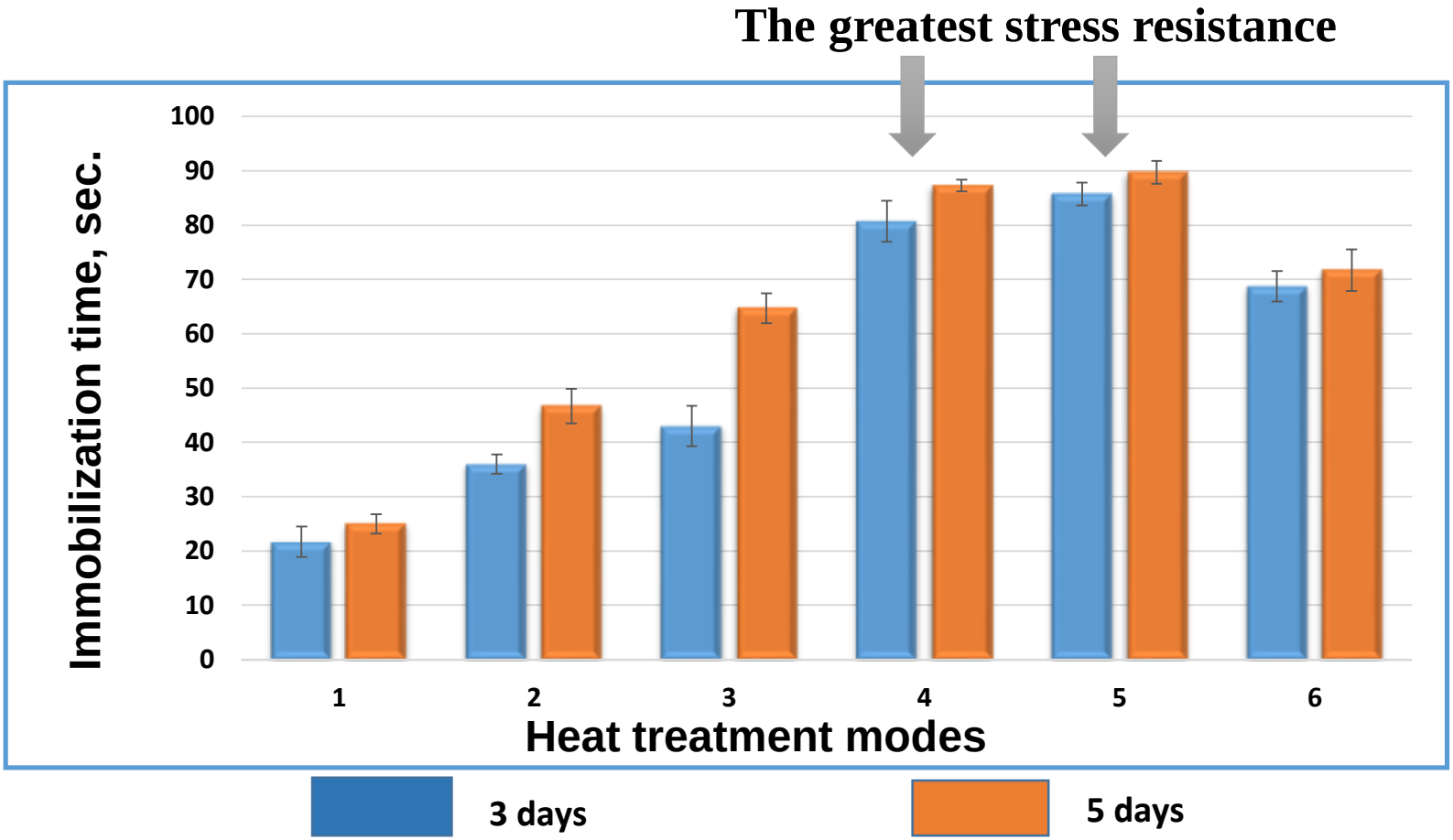
The effect of adding native goat milk to the culture medium on the stress resistance of *Paramecium caudatum* infusoria



1 - control; **2 - source milk;** **3 - 65 ° C 30 min.;**

4 - 76ºC 5 min.; **5 - 90ºC 20s.;** **6 - 95ºC 5min.**

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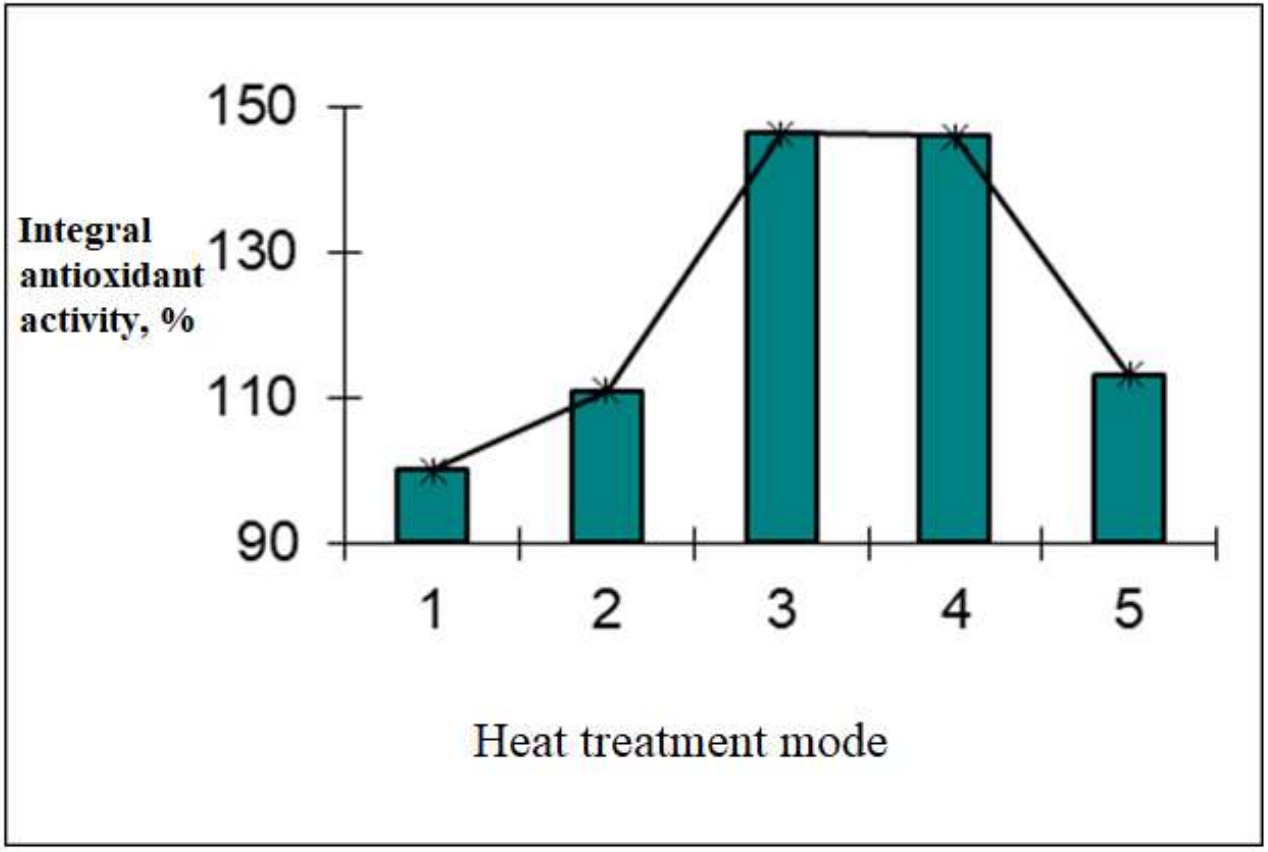
Influence of industrial pasteurization regimes on the antioxidant activity of milk

Integral antioxidant activity of natural goat milk: 32 mg/100 ml – 87 mg/100 ml



1 - source milk; 2 – 65 °C 30 min; 3 -76 °C 5 min;
4 – 90 °C 20s.; 5 – 95 °C 5min.

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Conclusions

1. The technique for determining the stress resistance of *Paramecium caudatum* infusoria by bioassay was mastered and the optimal conditions for the experiment were selected: the concentration of hydrogen peroxide-1.5%.

2. An increase in the stress resistance of *Paramecium caudatum* infusoria was shown when native goat's milk was added to the nutrient mixture compared to the control.

3. The high sensitivity of the selected test object to changes in the antioxidant properties of milk processed under different pasteurization modes was established.

4. The heat treatment modes that ensure the greatest preservation of the antioxidant activity of goat's milk and, accordingly, higher stress resistance of *Paramecium caudatum* infusoria were identified: 76 ° C for 5 minutes and 90 ° C for 20 seconds

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Thank you for your attention!

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