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Studying the Effect of Organoleptic and Physical Properties on Milk Productivity in Cows

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Annotation: This article explores the factors affecting milk productivity in cows. Research results demonstrate that organoleptic and physical properties have a considerable impact. Information is provided regarding milk quality.

Keywords: Milk, physical properties, organoleptic method, color, smell, taste, fat content, protein, somatic cells, dry milk, density, temperature.

Introduction:

Ensuring food security and meeting the population's nutritional needs can be achieved by sustainably developing the livestock industry, improving the genetic quality of breeds, and fully utilizing their productivity potential. In the context of Uzbekistan, there is a growing need for methods to predict animal productivity (milk, meat, combined, skin, wool) and resistance to various infectious and non-infectious diseases.

Research Object and Methods: The research was conducted at the "PURE MILKY PRODUCTS" farm specialized in cattle breeding, located in Jomboy district, Samarkand region. The study is part of the dissertation titled "Forecasting Animal Productivity Based on Detection of DNA Markers and SNP Polymorphism in Cattle." We aimed to forecast productivity by examining milk composition, particularly beta-casein (a milk protein commonly found in cow

milk and a major indicator of milk quality, digestion, and immunity) and hormones like prolactin. Experimental groups included 12 Holstein cows from Danish and Estonian breeding lines.

The results of physical properties of milk observed in both groups (n=12 each) are presented in the following table.

Table 1. Organoleptic Assessment of Milk Samples.

Samples Taken for Milk testing GROUP 1	**Milk color**	**Milk consistency**	**Milk Smell**	**Milk taste**
1 sample	white	Consistent	distinctive	Sweet-tasting
2 Sample	white	Consistent	distinctive	Sweet-tasting
3 sample	white	Consistent	distinctive	Sweet-tasting
4 sample	yellowish	Consistent	distinctive	Sweet-tasting
5 sample	white	Consistent	distinctive	Sweet-tasting
6 sample	white	Consistent	distinctive	Sweet-tasting
7 sample	white	Consistent	distinctive	Sweet-tasting
8 sample	yellowish	Consistent	distinctive	Sweet-tasting
9 sample	white	Consistent	distinctive	Sweet-tasting
10 sample	white	Consistent	distinctive	Sweet-tasting
11 sample	white	Consistent	distinctive	Sweet-tasting
12 sample	yellowish	Consistent	distinctive	Sweet-tasting
GROUP 2				
1 sample	white	Consistent	distinctive	Sweet-tasting
2 Sample	white	Consistent	distinctive	Sweet-tasting
3 sample	white	Consistent	distinctive	Sweet-tasting
4 sample	white	Consistent	distinctive	Sweet-tasting
5 sample	white	Consistent	distinctive	Sweet-tasting
6 sample	white	Consistent	distinctive	Sweet-tasting
7 sample	white	Consistent	distinctive	Sweet-tasting
8 sample	yellowish	Consistent	distinctive	Sweet-tasting
9 sample	white	Consistent	distinctive	Sweet-tasting
10 sample	white	Consistent	distinctive	Sweet-tasting
11 sample	white	Consistent	distinctive	Sweet-tasting
12 sample	white	Consistent	distinctive	Sweet-tasting

Sample Color Consistency Smell Taste All I-group samples Mostly white, with some yellowish Uniform Specific Sweet All II-group samples Predominantly white Uniform SpecificSweet

Summary: Color, smell, taste, and consistency were evaluated. Among group I, 2 out of 12 (20%) samples had a yellowish hue but otherwise met quality standards. In group II, only 1 sample had a yellowish tone. Thus, the milk from group II generally had better physical quality, making it more suitable for dairy product processing such as butter, cream, industrial milk fat, yogurt, kefir, cheese (hard, soft, processed), dry milk, and whey.Table 2

Table 2. Quality indicators of milk yield in cows from the experimental group.

№	Groups	Milk yield without fat (kg)	Fat %	Protein	Acidity	Density	Freezing point	% of water is addet	Fat-free dry ingredients	TBC (total bacterial count)	Somatic cell count, %	Cleanliness group	Total number fertilized	Milk grade	Heat resistanse
	Group 1														
1		9837	3.71	3.25	17.54	1.029	5.7		8.76	2837.0	807	1	500000	2 grade	1.0
2		9837	3.73	3.21	17.0	1.029	5.7		8.66	2837.0	807	1	500000	No grade	1.0

3		9409	3.81	3.27	17.6	1.029	5.7		8.68	2837.0	807	1	500000	2 grade	1.0
4		9837	3.79	3.17	17.6	1.028	5.7	0.11	8.57	7016.0	455	1	500000	1 grade	1.0
5		9837	3.79	3.19	17.6	1.028	5.7		8.57	7016.0	455	1	500000	1 grade t	2.0
6		5981	3.66	3.17	17.4	1.028	5.7		8.66	3674.0	455	1	500000	No grade	2.0
7		2176	3.81	3.23	17.6	1.028	5.7		8.70	1760.0	455	1	500000	1 grade	2.0
8		9837	3.80	3.19	17.6	1.028	5.7		8.50	7016.0	455	1	500000	1 grade	2.0
9		9837	3.88	3.15	17.6	1.028	5.7		8.57	7016.0	455	1	500000	1 grade	2.0
10		9837	3.75	3.18	17.6	1.028	5.7		8.67	7016.0	458	1	500000	1 grade	2.0
11		9837	3.86	3.21	17.6	1.028	5.7		8.77	7016.0	460	1	500000	1 grade	2.0
12		11845	3.88	3.24	17.4	1.029	5.7		8.71	3348.0	550	1	500000	1 grade	2.0
	Group 2														
1		9837	3.88	3.19	17.6	1.028	5.7		8.57	7016.0	470	1	500000	1 grade	2.0
2		9837	3.85	3.19	17.6	1.028	5.7		8.57	7016.0	465	1	500000	1 grade	2.0
3		9409	3.71	3.27	17.6	1.029	5.7		8.68	2837.0	807	1	500000	2 grade	1.0
4		9837	3.80	3.17	17.6	1.028	5.7	0.76	8.57	7016.0	467	1	500000	1 grade	1.0
5		9837	3.79	3.19	17.6	1.028	5.7		8.57	7016.0	470	1	500000	1 grade	2.0
6		9837	3.80	3.19	17.6	1.028	5.7		8.57	7016.0	455	1	500000	1 grade	2.0
7		2176	3.81	3.23	17.6	1.028	5.7		8.70	1760.0	455	1	500000	1 grade	2.0
8		9837	3.83	3.19	17.6	1.028	5.7		8.50	7016.0	455	1	500000	1 grade	2.0
9		9837	3.88	3.15	17.6	1.028	5.7		8.57	7016.0	467	1	500000	1 grade	2.0
10		9837	3.79	3.18	17.6	1.028	5.7		8.67	7016.0	458	1	500000	1 grade	2.0
11		9837	3.86	3.21	17.6	1.028	5.7		8.77	7016.0	460	1	500000	1 grade	2.0
12		11845	3.88	3.24	17.4	1.029	5.7		8.71	3358.0	550	1	500000	1 grade	2.0

Comparison of Milk Physico-Chemical Properties Between Groups

GroupAverage Milk (kg)Fat %Protein %Acidity °TDensityTemp (°C)Dry Matter %Somatic Cells (×1000)CleanlinessSorting GradeHeat ResistanceGroup I~98373.763.2117.4–17.61.028–1.0295.7~8.642837–70161Mostly 1st grade, some 2nd & ungraded1.0–2.0Group II~98373.823.2017.4–17.61.028–1.0295.7~8.621760–70161Mostly 1st grade1.0–2.0

Analysis:

The volume of milk in both groups was similar (~9837 kg), except for a few samples. Group II had slightly higher fat content (3.82%) compared to Group I (3.76%), indicating higher nutritional value. Protein content was nearly the same in both groups. Acidity, density, and temperature remained within optimal and stable ranges. Somatic cell count was lower in Group II, indicating better udder health. Cleanliness and sorting showed that most samples in both groups were of 1st grade, but Group I had a few 2nd grade and ungraded samples, implying stricter hygiene is needed. Both groups showed good heat stability.

Conclusion

The milk samples from Group II had higher fat and lower somatic cell content, suggesting better milk quality and animal health. Both groups showed similar values in protein, density, and acidity, indicating consistent experimental conditions. Scientifically, the quality indicators of Group II milk were superior.

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