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# DETERMINATION OF THE QUALITY OF RAW MILK FROM BLACK AND WHITE COWS FROM BIGA (CANAKKALE, TURKEY)

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***ABSTRACT***

*In this research, the subject of inquiry is whether the raw milk in Havdan, Güleçköy and Gürçeşme villages of Biga region is produced according to food safety standards as well as their somatic cell count and chemical characteristics.*

*For this purpose, 32 samples from Havdan village, 68 from Güleçköy and 16 singular samples from Gürçeşme village. Fat, fatless dry material, protein, somatic cell count, freezing point, cryoscope water amount, lactose and density values of the raw samples have been inquired. Somatic cell count of the produced raw milk turned out to be higher than estimated values in "Turkish Food Codex Raw and Heat Treated Drinking Milk Communiqué Türk Gıda Kodeksi Çiğ ve Isıl İşlem Görmüş İçme Sütleri Tebliği". With precautions to be followed in companies, remarkable outcomes will be accomplished in order to decrease somatic cell count.*

***Keywords:*** *Raw milk, quality, somatic cell, chemical characteristics, Biga, Turkey.*

## 1. INTRODUCTION

One or more cows are breast secretions outside the untreated colostrum (mouth milk) which is obtained by milking a goat, sheep or mandarin, which is not heated above 40 ° C or has an equivalent effect. In milk technology, which will be described in another way, raw milk is milk which is milked at regular intervals and thoroughly from the milk animal's milk, then cooled, no components are taken in, no milk is added to the milk factories to be processed.

### *Raw milk*

Milk should be obtained in conditions of general health which do not show signs of infectious disease which can be passed on to humans, taste of smell, smell and appearance, no visible disease, no abnormal discharge from the back of the animal other than the period of fever, no diarrhea and fever, no intestinal disease or significant breast inflammation.

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Healthy raw milk should be derived from cows and cattle that have not been cured and that are likely to be dangerous or dangerous for human health, from cows that have not come to the end of the lactation period. It should be gathered from cows and cattle's that;

***Quality of raw milk***

It can be defined as milk that is gathered from a healthy animal under healthy and clean conditions, has distinctive color, taste, structure and composition and none of its components (milk fat) is taken away or no other material (water, soda) added inside (Berberoğlu, 2011).

We can define high quality milk as, milk that is milked from healthy animals under hygienically conditions, is quickly cooled after milking process and kept cool until it is delivered to the factory, has superior sensorial properties, standard chemical composition, untouched biological properties, low bacteria count, low enzyme activity and none of its components is taken away or no new materials added inside.

***Quality milk issues***

Firstly, there should be no nutrients or preservatives in the milk composition. Also, the total number of bacteria in the raw milk should be very low and should not contain pathogenic bacteria.

***Quality criteria of raw milk***

Quality criteria in raw milk can be listed as follows;

- ✓ Color and appearance: it must be porcelain white, matt, clean, mildly yellowish.
- ✓ Taste and smell: mildly sweet, fatty, distinctive taste and smell but not an unfamiliar taste or smell.
- ✓ Physical state: Opaque, liquid, a little heavier than water, in a distinctive state that can form cream.
- ✓ Acidity: Desired state is between 6.4 and 6.8 pH values and 6.5 and 7.5°SH titration acidity. Titration acidity going over 8°SH shows a rapid acid increase. If titration acidity goes over 10°SH, clotting occurs during heating. Milk that has titration acidity lower than 5°SH or pH value over 6.8 is considered abnormal.
- ✓ Dirt amount: Milk that contains up to 3 mg dirt per 100 ml milk is considered as `extra class`, up to 6 mg dirt / 100 ml as `first class` and up to 10 mg dirt/ 100 ml as `second class`.
- ✓ Inhibitor: Raw milk shouldn't contain any inhibitors or antibiotics.
- ✓ Composition: It must have the composition value of normal cow milk for the species it belongs to.

***Raw milk quality affect***

- ✓ Species and breed of the animal,
- ✓ Physiologic state (lactation period, pregnancy)
- ✓ Age of the animal
- ✓ Animal's health
- ✓ States of health of employees

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- ✓ Feeds and feed additives
- ✓ Feeding method
- ✓ Animal feeding
- ✓ Animal welfare
- ✓ Milking management and type
- ✓ Human and Season

## 2. MATERIAL AND METHOD

In this study, important physical and chemical analyzes were carried out in determining the quality of raw milk. From these analyzes, physical, sensory tests, color, odor, taste, consistency and appearance tests were performed. Milk samples were taken from milk collection centers from different villages of Biga. In dairy collecting areas, milk sampling cups and raw milk prefixes were taken to the laboratory. In addition, analysis of specific weight, freezing point, refractometer index, dry matter, ash content, titration acidity, antibiotic and similar inhibitor control, protein ratio, total bacteria number and somatic cell number were analyzed from chemical analyzes.

## 3. PHYSICAL ANALYSIS

### *Sensorial tests*

Sensorial tests help us to acquire knowledge about general properties of milk and its production and preservation.

### *Color*

Color of milk is generally white even though it shows some changes depending on species and breed of the animal, individuals and feeding conditions. Apart from its normal color, milk can be a different color depending on physiologic effects, activity of some organisms, bleeding of breasts or water and dyes added in milk.

### *Smell-taste*

Freshly squeezed milk has its own unique taste and odor. Normal taste and smell of milk changes with the effects of many factors. Most significant ones are; feeds and medicine that are given to the animal, diseases, microorganism and enzyme activities in milk, catalytic effects of metals such as copper, iron, etc. interacting with light and oxygen

### *Viscosity and appearance*

Normal milk has a certain viscosity and appearance. Thread-like elongation with high viscosity or pouring fast like water are seen in rigged and spoilt milk. A sandy, pebbly and earthy structure and abnormality can be seen on milk's appearance. These cases are seen in stale and defective milks.

### *Specific weight*

Specific weight of milk, which means weight of 1 ml milk at 15.55°C is averagely 1.032 gr dry matter of milk increases specific weight. Volume increase without change in weight decreases specific weight. Specific weight of newly milked milk is smaller than its specific weight a couple hours after being milked. Reason of this is; decrease in volume of fat globules with time and evaporation of gases.

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***Freezing point***

It is important because it helps detecting the rig of adding water to the milk and gives accurate information about the amount of water added. Milk freezes at -0.55°C. Boiling the milk decreases the amount of dissolved materials in the composition of milk and therefore increases freezing point. It means; the closer freezing point of milk gets to 0°C, the more the amount of water added in milk.

***Refractometer index***

Light refraction powers of solutions is constant under certain conditions. Refractometer index of milk changes in a very tight boundary between 1,3440 and 1, 3480.

**Chemical**

***Dry matter***

Dry matter is important not only for showing componential wealth of milk, but it is also important because it contains fatless dry matter that helps distinguishing the presence of water that can always be added, due to it being a less volatile substance (Önal et al., 2007).

***Ash***

Ash determination analysis in milk isn't done often. Studies show that mastitis disease decreases lactose amount and increase NaCl amount in milk, therefore increase the amount of milk ash. Also, milk ash is a low volatile substance and low amount of milk ash shows that water was added and high amount of milk ash shows that inhibitors were added inside the milk.

***Fat***

Fat rate analysis is one of the most important milk analyses. Fat being constantly variable in the composition of milk, not depending on milk serum much and its rate decreasing by adding water makes fat something to be considered. Therefore fat analysis is one of the analyses that is done in small milk dairies along with milk factories all the time.

***Acidity***

Newly-milked shows acidic reaction. This is called first acidity or natural acidity. First acidity is affected by age, species, breed and character of the animal, lactation period diseases and the composition of milk. Milk can't preserve its first acidity. Milk is contaminated by different types of microorganisms due to milking conditions. Milk is a great food source and breeding environment for transmitted bacteria. Especially, milk acid bacteria decompose lactose into energy and lactic acid by secreting enzymes. Lactic acid increases the acidity of milk. Acidity that is formed this way is called developing acidity.

**Enzyme activation tests**

***Catalase test***

Catalase enzyme is generally present in every milk and its amount is increased by some physiological and pathological factors. Especially colostrum and milk of animals with mastitis contain larger amount of catalase enzyme. Catalase test is done in order to analyze the state caused by these physiological and pathological factors and especially the properties of milk that is going to be used in cheese production (Kınık et al., 2011).

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***Peroxidase test***

Peroxidase is one of the enzymes that milk contains naturally. It goes into inactive state in 2,5 minutes at 70°C, in 1,5 seconds at 78°C and in 2,5 seconds at 80°C.

***Preservative substances check***

Some preservative substances are used to keep milk from spoiling and to increase its resistance. However, usage of these substances are prohibited by law. Most common substances used are some alkaline substances, formaldehyde, hydrogen peroxide, certain antibiotics.

***Mastitis check***

pH value of milk of animals with mastitis goes over 7 and it can even reach to 9,5 in acute mastitis cases (Ak, 2010). Decrease in susceptibility of milk of animals with mastitis to rennet, meaning clotting of milk taking longer composes a loose clot and makes extraction of whey harder. Excess amount of whey remains in clot and it decreases the amount of dry matter. This negatively effects quality. On the other hand, excess amount of whey proteins that remain in clot are reduced to undesired materials during maturation process and because cheese have a bitter taste.

**Analysis data of milk samples collected from certain villages of Biga (Canakkale) region**

The milk to be analyzed is taken from milk collection centers. Taking into consideration the size of the container in which the milk was stored, the samples were mixed for five minutes using a stirring bar and samples were taken from tank (Uslu, 2009). The samples are approximately 200 ml, placed in clean and sterile sample containers, sealed well, and labeled. On the label, information such as sample type, place of receipt of the bulb, date of receipt of the sample, temperature grade, what purpose it was received (Demirbaş, 2012) is written. Milk samples were sent to the laboratory between 0°C and 9°C temperatures and protected from sunlight.

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**Table 1.** Analysis data of Danişment village

| Row Number | Fat(%) | Protein (%) | Lactose (%) | YKM (%) | Cryoscopic water amount (%) | FP (°C) | SCC |
|---|---|---|---|---|---|---|---|
| 1 | 3,95 | 3,95 | 4,31 | 12,01 | 0 | 0,546 | 3466,000 |
| 2 | 3,29 | 2,87 | 4,33 | 10,96 | 0 | 0,542 | 598,000 |
| 3 | 3,45 | 2,76 | 4,84 | 11,54 | 0 | 0,554 | 16,000 |
| 4 | 3,75 | 2,71 | 4,61 | 11,56 | 0 | 0,544 | 125,000 |
| 5 | 3,24 | 3,31 | 4,52 | 11,54 | 0 | 0,545 | 981,000 |
| 6 | 3,82 | 2,71 | 4,41 | 11,36 | 0 | 0,552 | 376,000 |
| 7 | 3,45 | 2,66 | 4,61 | 11,19 | 0 | 0,549 | 536,000 |
| 8 | 3,24 | 2,82 | 4,42 | 10,98 | 0 | 0,541 | 490,000 |
| 9 | 3,29 | 2,61 | 4,43 | 10,81 | 0 | 0,551 | 420,000 |
| 10 | 4,01 | 2,87 | 4,84 | 12,18 | 0 | 0,567 | 280,000 |
| 11 | 3,41 | 2,86 | 4,31 | 11,06 | 0 | 0,541 | 743,000 |
| 12 | 4,19 | 3,51 | 4,49 | 12,66 | 0 | 0,552 | 233,000 |
| 13 | 3,18 | 2,75 | 4,72 | 11,14 | 0 | 0,549 | 207,000 |
| 14 | 4,13 | 3,05 | 4,27 | 11,95 | 0 | 0,546 | 441,000 |
| 15 | 3,88 | 3,06 | 4,59 | 11,98 | 0 | 0,553 | 234,000 |
| 16 | 3,59 | 3,17 | 4,59 | 11,8 | 0 | 0,559 | 1375,000 |
| 17 | 3,57 | 2,69 | 4,74 | 11,47 | 0 | 0,549 | 143,000 |
| 18 | 3,47 | 2,81 | 4,53 | 11,28 | 0 | 0,551 | 717,000 |
| 19 | 4,55 | 3,11 | 4,07 | 12,12 | 0 | 0,547 | 331,000 |
| 20 | 3,23 | 2,68 | 4,53 | 10,92 | 0 | 0,546 | 907,000 |
| 21 | 3,54 | 3,15 | 4,54 | 11,72 | 0 | 0,555 | 884,000 |
| 22 | 3,39 | 2,54 | 4,48 | 10,84 | 0 | 0,557 | 520,000 |
| 23 | 3,82 | 2,83 | 4,11 | 11,21 | 0 | 0,539 | 1375,000 |
| 24 | 3,09 | 3,31 | 4,71 | 11,59 | 0 | 0,559 | 748,000 |
| 25 | 3,08 | 3,07 | 4,46 | 11,14 | 0 | 0,544 | 358,000 |
| 26 | 3,76 | 2,99 | 4,86 | 12,13 | 0 | 0,567 | 478,000 |
| 27 | 3,81 | 3,16 | 4,28 | 11,68 | 0 | 0,554 | 1969,000 |
| 28 | 2,52 | 3,44 | 4,37 | 10,83 | 0 | 0,546 | 418,000 |
| 29 | 3,66 | 2,96 | 4,73 | 11,81 | 0 | 0,571 | 249,000 |
| 30 | 3,94 | 2,96 | 4,72 | 12,11 | 0 | 0,555 | 383,000 |
| 31 | 3,42 | 2,9 | 4,44 | 11,23 | 0 | 0,543 | 976,000 |
| 32 | 3,73 | 3,34 | 3,92 | 11,43 | 0 | 0,542 | 4787,000 |
| 33 | 3,04 | 2,87 | 4,42 | 10,79 | 0 | 0,551 | 986,000 |
| 34 | 3,43 | 3,12 | 4,41 | 11,43 | 0 | 0,542 | 230,000 |
| 35 | 3,78 | 3,18 | 4,61 | 12,03 | 0 | 0,555 | 503,000 |
| 36 | 3,22 | 2,77 | 4,69 | 11,18 | 0 | 0,551 | 1986,000 |
| 37 | 2,89 | 2,66 | 4,41 | 10,45 | 1,2 | 0,514 | 112,000 |
| 38 Aggregate | 3,49 | 2,95 | 4,51 | 11,42 | 0 | 0,551 | 816,000 |

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**Table 2.** Analysis data of Havdan village

| Row Number | Fat (%) | YKM (%) | Density (%) | Protein (%) | Lactose (%) | Cryoscopic water amount (%) |
|---|---|---|---|---|---|---|
| 1 | 3,06 | 8,82 | 28,49 | 3,11 | 3,92 | 1,9 |
| 2 | 3,11 | 8,89 | 28,85 | 3,08 | 3,95 | 1,0 |
| 3 | 3,78 | 9,08 | 25,21 | 2,86 | 3,52 | 0 |
| 4 | 3,77 | 9,47 | 27,93 | 3,11 | 3,87 | 0 |
| 5 | 3,71 | 9,49 | 27,93 | 3,11 | 3,87 | 0 |
| 6 | 3,25 | 8,87 | 28,61 | 3,06 | 3,92 | 1,7 |
| 7 | 3,26 | 9,28 | 27,29 | 3,01 | 3,77 | 0 |
| 8 | 3,21 | 9,66 | 28,82 | 3,14 | 3,97 | 0 |
| 9 | 3,25 | 9,31 | 27,38 | 3,01 | 3,78 | 0 |
| 10 | 3,03 | 9,52 | 28,33 | 3,08 | 3,91 | 0 |
| 11 | 3,43 | 9,34 | 27,51 | 3,03 | 3,81 | 0 |
| 12 | 3,48 | 9,96 | 29,92 | 3,27 | 4,12 | 0 |
| 13 | 3,01 | 9,33 | 27,59 | 3,01 | 3,81 | 0 |
| 14 | 3,04 | 8,71 | 25,21 | 2,84 | 3,51 | 4,0 |
| 15 | 3,52 | 9,71 | 28,91 | 3,17 | 3,99 | 0 |
| 16 | 3,75 | 9,39 | 27,56 | 3,08 | 3,82 | 0 |
| 17 | 3,44 | 9,26 | 27,17 | 3,01 | 3,76 | 0 |
| 18 | 3,68 | 9,32 | 27,33 | 3,03 | 3,78 | 0 |
| 19 | 3,26 | 8,98 | 26,51 | 2,92 | 3,67 | 1,0 |
| 20 | 3,47 | 9,65 | 28,71 | 3,15 | 3,96 | 0 |
| 21 | 3,31 | 9,62 | 28,63 | 3,13 | 3,95 | 0 |
| 22 | 3,01 | 8,82 | 29,22 | 3,11 | 4,01 | 3,7 |
| 23 | 3,25 | 8,87 | 27,15 | 2,98 | 3,75 | 1,5 |
| 24 | 3,29 | 8,82 | 28,91 | 3,16 | 3,98 | 1,9 |
| 25 | 3,14 | 8,76 | 29,11 | 3,09 | 3,98 | 2,7 |
| 26 | 3,62 | 9,62 | 28,57 | 3,15 | 3,95 | 0 |
| 27 | 3,33 | 9,62 | 28,65 | 3,14 | 3,95 | 0 |
| 28 | 3,31 | 9,43 | 27,91 | 3,06 | 3,85 | 0 |
| 29 | 3,11 | 8,74 | 27,09 | 2,97 | 3,74 | 2,3 |
| 30 | 3,08 | 8,71 | 26,68 | 2,88 | 3,67 | 2,9 |
| 31 | 3,21 | 8,73 | 28,96 | 3,16 | 3,99 | 2,3 |
| 32 Aggregate | 3,58 | 9,12 | 26,31 | 2,99 | 3,67 | 0,8 |

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**Table 3.** Analysis data of Güleç village

| Row Number | Fat(%) | YKM(%) | Density(%) | Protein(%) | Lactose | Cryoscopic water amount(%) |
|---|---|---|---|---|---|---|
| 1 | 3,65 | 9,64 | 28,21 | 3,23 | 3,93 | 0 |
| 2 | 3,55 | 9,35 | 27,22 | 3,09 | 3,79 | 0 |
| 3 | 3,54 | 9,59 | 27,71 | 3,26 | 3,89 | 0 |
| 4 | 3,11 | 8,89 | 26,48 | 3,01 | 3,69 | 2,7 |
| 5 | 3,53 | 9,07 | 25,61 | 3,05 | 3,57 | 0 |
| 6 | 3,57 | 9,26 | 27,05 | 3,02 | 3,75 | 0 |
| 7 | 3,47 | 9,41 | 27,52 | 3,09 | 3,82 | 0 |
| 8 | 3,16 | 8,87 | 28,49 | 3,11 | 3,92 | 1,3 |
| 9 | 3,25 | 8,97 | 26,19 | 3,07 | 3,65 | 1,0 |
| 10 | 3,74 | 9,36 | 27,21 | 3,08 | 3,81 | 0 |
| 11 | 3,79 | 9,71 | 28,51 | 3,24 | 3,97 | 0 |
| 12 | 3,62 | 9,53 | 28014 | 3,13 | 3,91 | 0 |
| 13 | 3,45 | 10,12 | 30,08 | 3,42 | 4,18 | 0 |
| 14 | 3,24 | 8,82 | 26,67 | 3,03 | 3,72 | 1,3 |
| 15 | 3,75 | 9,81 | 29,21 | 3,23 | 4,03 | 0 |
| 16 | 3,79 | 9,33 | 27,31 | 3,05 | 3,79 | 0 |
| 17 | 3,24 | 8,84 | 27,42 | 3,07 | 3,81 | 1,5 |
| 18 | 3,62 | 9,43 | 27,79 | 3,07 | 3,84 | 0 |
| 19 | 3,06 | 8,81 | 26,65 | 3,08 | 3,68 | 1,0 |
| 20 | 3,11 | 8,78 | 26,91 | 3,05 | 3,73 | 2,1 |
| 21 | 3,38 | 9,57 | 28,43 | 3,12 | 3,92 | 0 |
| 22 | 3,21 | 8,82 | 28,31 | 3,13 | 3,91 | 1,0 |
| 23 | 3,07 | 8,86 | 28,59 | 3,07 | 3,92 | 1,3 |
| 24 | 3,21 | 10,21 | 30,99 | 3,36 | 4,25 | 0 |
| 25 | 3,54 | 8,97 | 28,44 | 3,14 | 3,93 | 1,2 |
| 26 | 3,31 | 9,58 | 28,49 | 3,12 | 3,93 | 0 |
| 27 | 3,75 | 9,95 | 29,73 | 3,31 | 4,11 | 0 |
| 28 | 3,87 | 9,95 | 29,81 | 3,29 | 4,11 | 0 |
| 29 | 3,21 | 9,63 | 28,71 | 3,13 | 3,95 | 0 |
| 30 | 3,51 | 8,87 | 27,32 | 3,03 | 3,78 | 2,3 |
| 31 | 3,49 | 9,45 | 27,93 | 3,08 | 3,86 | 0 |
| 32 | 3,41 | 9,98 | 30,04 | 3,28 | 4,13 | 0 |
| 33 | 3,51 | 9,93 | 29,82 | 3,26 | 4,11 | 0 |
| 34 | 3,45 | 8,94 | 25,79 | 3,07 | 3,59 | 2,9 |
| 35 | 3,71 | 9,46 | 27,81 | 3,11 | 3,86 | 0 |
| 36 | 3,29 | 10,16 | 30,78 | 3,34 | 4,23 | 0 |
| 37 | 3,87 | 9,54 | 28,16 | 3,13 | 3,91 | 0 |
| 38 | 3,56 | 9,53 | 28,22 | 3,11 | 3,91 | 0 |
| 39 | 3,12 | 8,87 | 28,24 | 3,06 | 3,88 | 1,3 |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 40 | 3,32 | 9,93 | 29,87 | 3,25 | 4,11 | 0 | |
| 41 | 3,25 | 8,92 | 26,85 | 3,02 | 3,72 | 1,0 | |
| 42 | 3,27 | 8,91 | 27,43 | 3,12 | 3,83 | 1,0 | |
| 43 | 3,85 | 9,06 | 26,01 | 3,05 | 3,64 | 0 | |
| 44 | 3,31 | 8,94 | 25,91 | 3,04 | 3,63 | 1,2 | |
| 45 | 3,73 | 9,05 | 26,13 | 3,07 | 3,64 | 0 | |
| 46 | 3,67 | 9,35 | 27,44 | 3,05 | 3,81 | 0 | |
| 47 | 3,11 | 9,54 | 28,41 | 3,09 | 3,91 | 0 | |
| 48 | 3,21 | 9,44 | 27,98 | 3,06 | 3,86 | 0 | |
| 49 | 3,76 | 9,31 | 27,27 | 3,03 | 3,78 | 0 | |
| 50 | 3,67 | 9,62 | 28,51 | 3,15 | 3,94 | 0 | |
| 51 | 3,76 | 9,71 | 28,83 | 3,19 | 3,98 | 0 | |
| 52 | 3,41 | 10,13 | 30,62 | 3,33 | 4,21 | 0 | |
| 53 | 3,78 | 9,72 | 28,81 | 3,19 | 3,99 | 0 | |
| 54 | 3,73 | 9,76 | 28,79 | 3,29 | 4,01 | 0 | |
| 55 | 3,62 | 9,83 | 29,21 | 3,26 | 4,04 | 0 | |
| 56 | 3,79 | 9,99 | 29,99 | 3,31 | 4,13 | 0 | |
| 57 | 3,71 | 9,35 | 27,32 | 3,07 | 3,79 | 0 | |
| 58 | 3,74 | 9,19 | 29,76 | 3,01 | 3,72 | 0 | |
| 59 | 3,76 | 9,49 | 27,99 | 3,11 | 3,87 | 0 | |
| 60 | 3,68 | 9,75 | 28,73 | 3,26 | 3,99 | 0 | |
| 61 | 3,07 | 9,68 | 28,97 | 3,14 | 3,98 | 0 | |
| 62 | 3,28 | 8,87 | 27,11 | 3,08 | 3,75 | 1,9 | |
| 63 | 3,09 | 8,97 | 29,03 | 3,16 | 3,99 | 1,3 | |
| 64 | 3,47 | 9,29 | 26,99 | 3,06 | 3,76 | 0 | |
| 65 | 3,27 | 8,97 | 26,81 | 3,18 | 3,71 | 1,3 | |
| 66 | 3,45 | 8,95 | 25,55 | 3,01 | 3,58 | 2,5 | |
| 67 | 3,52 | 8,89 | 27,34 | 3,08 | 3,81 | 1,0 | |
| 68 Aggregate | 3,71 | 9,47 | 27,79 | 3,12 | 3,86 | 0 | SCC 675,000 |

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**Table 4.** Analysis data of Gürçeşme village

| Row Number | Fat(%) | Protein(%) | Lactose(%) | YKM(%) | Cryoscopic water amount(%) | FP(°C) | SCC |
|---|---|---|---|---|---|---|---|
| 1 | 4,37 | 2,47 | 4,46 | 11,85 | 0 | 0,551 | 2802,000 |
| 2 | 4,03 | 2,95 | 4,43 | 12,01 | 0 | 0,566 | 2367,000 |
| 3 | 3,59 | 2,57 | 4,46 | 11,16 | 0 | 0,547 | 353,000 |
| 4 | 3,88 | 2,59 | 4,84 | 11,89 | 0 | 0,566 | 1513,000 |
| 5 | 3,75 | 2,78 | 4,43 | 11,51 | 0 | 0,549 | 2456,000 |
| 6 | 4,39 | 2,64 | 4,86 | 12,47 | 0 | 0,571 | 493,000 |
| 7 | 3,66 | 2,83 | 4,65 | 11,61 | 0 | 0,556 | 1595,000 |
| 8 | 2,35 | 2,46 | 4,57 | 10,06 | 0 | 0,549 | 510,000 |
| 9 | 4,11 | 2,77 | 4,43 | 11,82 | 0 | 0,551 | 3381,000 |
| 10 | 3,33 | 2,97 | 4,86 | 11,85 | 0 | 0,557 | 264,000 |
| 11 | 3,66 | 2,64 | 4,68 | 11,51 | 0 | 0,555 | 24,000 |
| 12 | 3,51 | 2,88 | 4,56 | 11,48 | 0 | 0,554 | 956,000 |
| 13 | 3,79 | 2,96 | 4,53 | 11,78 | 0 | 0,559 | 200,000 |
| 14 | 3,23 | 2,41 | 5,02 | 11,25 | 0 | 0,578 | 51,000 |
| 15 | 3,58 | 2,87 | 4,73 | 11,75 | 0 | 0,555 | 2755,000 |
| 16 Aggregate | 3,71 | 2,77 | 4,57 | 11,62 | 0 | 0,561 | 1575,000 |

**Average values of milk samples gathered from certain villages of Biga (Canakkale) region**

In this study, the number of somatic cells and the chemical properties of milk, which is the criterion for whether raw milk produced from different regions is produced in compliance with food safety standards, has been examined.

In this scope, four different regions were selected and raw milk samples were taken from each region. Fat, fat free dry matter, protein, somatic cell count, freezing point, cryoscopic water content, lactose and density values of raw milk samples were examined. The mean and standard errors related to the nutrient content of the milk collected from the four regions studied are given in Table 5.

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**Table 5.** Average values of milk samples gathered from villages and aggregate

| Villages | n | Fat (%) | Protein (%) | Lactose (%) | YKM (%) | Density (%) | FP (°C) | SCC |
|---|---|---|---|---|---|---|---|---|
| Danişment | 37 | 3,53 | 2,96 | 4,49 | 11,46 | - | 0,371 | 800,000 |
| Güleçköy | 67 | 3,47 | 3,13 | 3,87 | 9,38 | 28,05 | - | - |
| Havdan | 31 | 3,32 | 3,06 | 3,85 | 9,21 | 27,94 | - | - |
| Gürçeşme | 15 | 3,68 | 2,71 | 4,63 | 11,6 | - | 0,157 | 1314000 |
| Mixed | - | 3,62 | 2,95 | 4,15 | 10,40 | 54.1/2=27,05 | 1.112/2=0,556 | 1022000 |

## 4. RESULT AND RECOMMENDATIONS

The mean and standard errors for the nutrient content of the milk collected from the four working stocks are given in the Table 6. Accordingly, the village as a whole is a statistically significant source of variation. When the differences between the villagers are examined, milk collected from Havdan village in terms of milk fat ratio shows a statistically lower average value than milk collected from other villages (P <0,05). In terms of milk protein, all the villagers are statistically significantly different from each other (P <0.05). Güleç village has the highest value, while the lowest milk protein average is Gürçesme. In terms of lactose ratio, Güleç and Havdan had a similar average (P> 0.05), whereas Danişment had a significantly higher average lactose ratio (P <0,05) than these villages. The highest mean lactose content was obtained from the milk collected from the Danişment village, which is statistically significantly higher than the average of the other villages (P <0.05).

**Table 6**. Variance analysis table.

| Features | Milk Fat, % | | Milk Protein, % | | Laktoz, % | | YKM % | | *P* |
|---|---|---|---|---|---|---|---|---|---|
| Villages | $\bar{X}$ | SH | $\bar{X}$ | SH | $\bar{X}$ | SH | $\bar{X}$ | SH | |
| Danişment | $3,54^{ab}$ | 0,052 | $2,98^{a}$ | 0,029 | $4,50^{a}$ | 0,028 | $11,46^{a}$ | 0,072 | 0,0035 |
| Güleç | $3,47^{b}$ | 0,038 | $3,14^{b}$ | 0,022 | $3,88^{b}$ | 0,022 | $9,38^{b}$ | 0,054 | <0,0001 |
| Gürçeşme | $3,68^{a}$ | 0,082 | $2,72^{c}$ | 0,046 | $4,63^{c}$ | 0,045 | $11,60^{a}$ | 0,114 | <0,0001 |
| Havdan | $3,32^{c}$ | 0,057 | $3,06^{d}$ | 0,032 | $3,86^{b}$ | 0,032 | 9,22b | 0,079 | <0,0001 |

Danişment and Gürçesme, which have values in terms of number of somatic cells, are compared. Accordingly, the difference in SHS between the milk collected from these villages is statistically insignificant (P = 0.4354). The SHS geometric mean of the milk collected from the Danişment village was 496,389 cells / ml whereas the same value was calculated as 660,969 cells / ml in the milk collected from the Gürçesme village.

Average fat rates of milk samples fit the criteria's stated in Raw and Heat-Treated Drinking Milk Communiqué of Turkish Food Codex. Fatless dry matter rates are also fit the criteria's stated in RHTDMC of Turkish Food Codex. Protein contents of milk samples are also fit the criteria with the exception of samples from Gürçeşme village which are lower than expected values. According to RHTDMC of Turkish Food Codex, raw cow milk should

contain 500,000 SCC per ml at maximum. Study shows that SCC values of milk from our villages are above set values.

In order to achieve world standards thresholds of SCC which is taken as important criteria in determination of raw milk quality, the producers of dairy production sector should be made aware of this issue (Kavakoğlu *et al*., 2015).

Analysis data shows that SCC values are higher than they should be. Measures to reduce SCC which has a great importance in determination of raw milk quality and a big role in pricing of milk should be taken. In the research literature shows that every producers aims to produce milk that has low somatic cell count. In order to achieve world standards thresholds, dairy producers should be made aware of SCC, protective veterinary medical science practices and natural organic feed mixtures should be used.

First step of reducing SCC is using protective medical science practices. Mainly, protective medical science is practices that are carried out in order to improve nurture-feeding and housing conditions and without the need to use antibiotics. Paying attention to milking rules, vaccinating, precautions related to cleanliness and hygienic, adding materials that will increase the resilience of breast tissue will reduce SCC. In order to ensure hygiene, a milking machine that works regularly and for each cow a different cloth that is dipped in disinfectant solution and used to wipe the cow's breast before and after the milking should be used. This application is called with the slogan as "a towel for each cow" in order to acquire its prevalence (Ayaşan *et al*.,2011).

Another precaution for reducing SCC is reducing the usage of antibiotics or using natural materials that act as antibiotics. These materials consist of essential oils and other medicinal plants. Mostly essential oils act like antibiotics in the body and halt the growth of microorganisms at certain concentrations. Using medicinal plants such as fenugreek, artichoke leaf and ginseng reduces antibiotic usage to minimum. Adding essential oils such as thyme oil, peppermint oil, rosemary oil, clove oil and cinnamon oil to feeds in certain amounts help reducing antibiotic usage by keeping microorganisms under control. Adding selenium, vitamin E and zinc supplements that will increase body resistance to the feeds is another method of reducing SCC. Another method of reducing antibiotic usage is mannoliglisacharides derived from yeasts. Mannoliglissacharides reduce anitibiotics usage by stimulating the immune system of the body along with preventing attachment of harmful microorganism to the intestines and halting their reproduction.

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