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ABOUNDANCE CHEESE: EFFECT OF MILK OF HYBRID DAIRY COW'S (BALADI)) ON THE QUALITY AND PROPERTIES OF THE RESULTANT CHEESES

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ABSTRACT

Dairy cows belonging to three different genetic types (pure Baladi (B), and their F2 crossbreds, with French Aboundance (A×BA) and Tarentaise breed (T×BT) , were feeding on diets contained similar proportions of concentrate feed , energy and nitrogen contents. Milks yielded from these different crossbreds dairy cows were used in the manufacture of Aboundance cheeses (a semi-hard cheese) .Cheeses were analysed phsico-chemically , bacteriology and organoleptically when fresh ,and after 30 , 60 and 90 days of ripening .

Results indicated that, the milk fat in Baladi cows breed (B) was relatively lower than the other two groups T X B T and A X BA, while milk protein, lactose, ash, total solids, solids not fat and titratable acidity were slightly higher in crossbred cow's milk. Milk of A×BA breed had slightly best chemico-physical properties than the other two groups .

Aboundance cheese manufactured from A X AB milk had slightly higher values of dry matter (DM), Fat/DM, Protein / DM, Salt / Moisture and Titratable acidity and lower values of moisture /non-fat solids and pH compared with T X B T and B cheeses either when fresh or within ripening period. Most of these parameters were increased in all cheeses during ripening. Concerning the values of cheese ripening indices and total volatile fatty acids, it was found that A × BA cheeses recorded the highest values, along the ripening period .

Sensory evaluation revealed that cheeses of Aboundance were slightly preferred organoleptically, all over the ripening period, than the Tarentaise or Baladi cheeses. It characterized by clean flavor, firm and good body and texture.

INTRODUCTION

Aboundance cheese is a semi-hard cheese with a subtle hazelnut flavor that is often enjoyed as is or melted. It has enjoyed Protected Designation of Origin (PDO) status since 1990, meaning that it can only be made in a certain geographical area using time-tested traditional

methods of production. It gets its name from one of the primary breeds of cattle that are used to make it, and also the Abondance Valley where it's made in the Haute Savoie department of southeastern central France, in the Alps. The valley is located in a mountainous area of the department on the border of Switzerland. Only three breeds of cattle are authorized for making Abondance cheese ; Abondance (of course), Tarentaise and Montbéliarde. After 2020, at least 55% of each herd is used for the production of the cheese, **(Bugaud, et al., 2001)** .

Abondance cheese has a strong smell, an intensely fruity, buttery and hazelnut flavour, with the balance of acidity and sweetness, followed by a lingering aftertaste. Unearth an aroma of nutty vegetation as you slice the cheese. Firm but supple and slightly grainy, the texture of the ivory-yellow pâté is creamy and velvety. Its rind is smooth with an amber colour showing canvas marks. The affinage takes at least 100 days, so all the subtle aroma is realized.

The quality of cheese depends on a number of factors linked both to cheese-making technology and to the chemical and microbiological characteristics of the raw materials used. These characteristics are themselves dependent on upstream factors (genetic, physiological or dietary). The ultimate goals of cheese making are not only high predication efficiency and maximum yield but also quality characteristics such as flavor and texture. The major factor in the cheese quality is the starter culture. The ability of starter culture to grow and produce sufficient lactic acid and enzymes depends on some environmental factors such as chemical composition and pH of milk. Titratable acidity plays an important role in all phases of milk coagulation **(Ali, 2006).** Curd firmness of milk plays an important role in determining the suitability of milk for some purposes. The low curd firmness milk is not recommended for cheese making **(Ali, 2006).** In cheese making process, the properties of the curd affect greatly on the characteristics of the produced cheese. Syneresis of curd formed by rennet is an essential step in cheese making which control the moisture content **(Marshal, 1982).** On the contrary, few reports have been published concerning the crossbreeding of the cows Baladi cattle with Aboundance and Tarentaise breeds. The upgrading of the Baladi cattle with the European breeds was aimed to increasing milk and meat production in the country **(Afifi et al., 2001).** The two breeds, Abondance and Tarentaise are distinctive in their ability to stand extreme variations in temperature and forages **.**

Some authors found inter-breed differences in milk fat (MF) composition, resulting in different technological properties with the potential to produce unique milk products **(Auldist et al., 2004; De Marchi et al., 2007).**

Two breeds, Holstein (Friesian) and Jersey, have been tested most frequently **(Croissant et al., 2007)**. Nevertheless, inter-breed differences in MF composition were reported in other breeds, such as Belgian Blue, Brown Swiss, Montbéliarde, Salers and Simmental **(Barlowska et al., 2009),** particularly in comparison with the Holstein. Numerous studies compared MF composition of indigenous and universally used breeds, including their crossbreds (**Palladino et al., 2010).**

According to the above-mentioned considerations, the present work was carried out to evaluate the variations in milk constituents, characteristics, quality and properties of Aboundance cheese resulting from multiparous Baladi Cows (B) and their crossbreds with Abondance ($A \times BF_2$) and Tarentaise ($T \times B F_2$), during ripening

MATERIALS AND METHODS

1. Materials

- **Milk**: Fresh cow milks of Abondance, Tarentaise and Baladi cows were obtained from the herd of Sides Experimental Station, Animal Production Research Institute , Agriculture Research Center , Egypt .
- **Starter**: Consisted of (Streptococcus thermophilus, Ldl: Lactobacillus delbrueckii subsp. Lactis) was obtained from Cairo Microbiological Resource Center (MIRCEN), Faculty of Agriculture, Ain Shams , Univ., Egypt .
- **Chemicals**: All chemicals used in this study were of analytical grade and supplied by BDH, Sigma and Prolabo chemical companies·
- **Salt**: Commercial salt was obtained from El-Naser Company, Alexandria, Egypt.
- **Rennet**: Hansen's powder rennet was obtained from CHr. Hansen's Laboratories, Copenhagen, Denmark.
- **Ready-made media**: Trypton Glucose Extract Agar Medium Code CM127 (TGEA) and Nutrient Agar Medium, were bought from Oxoid Division of Oxoid LTD., London.

2. Methods

2.1. manufacturing of cheese:

Cheeses were made from raw milk as the method described by (**Bugauda et al., 2001**).

2.2. Analytical methods:

pH values was measured using digital pH-meter (M 41150, USA) equipped with glass electrodes.

Titratabel acidity, moisture, **fat** and total nitrogen contents were determined according to **Ling (1963).**

Salt was determined according to **Simov** (**1980**).

Proteolysis water soluble nitrogen (WSN) according to **Kuchroo & Fox (1982),** Non protein nitrogen **(IDF,1993)** and Phousphotungstic acid (5%) soluble nitrogen **(Jarrett et al. , 1982)** and measured using the methods described in **Ardö and Polychroniadou (1999).**

Total volatile free fatty acids : **(Kosikowski** ,**1982**) and expressed as ml of 0.1N NaOH/ 10 g cheese .

Total bacterial count was determined by the plate count method according to American Public Health Association Method (**APHA, 2004**).

Rennet coagulation time: was determined using o.1 ml of 1% (w/v) powder rennet in distilled water per 10 ml of milk in a thermostatically controlled water-bath, at 37ºC and the time taken to the first sings of coagulation was measured for all the samples.

Curd tension (firmness): …… **Shalabi (1987)**.

Synersis (whey separation): ….. **Marshall (1982).**

Organoleptic properties: Cheese samples were scored according to **(Pappas, et al., 1996)** by a panel test of the staff members of both Sidis Experimental Station and Dairy Technology Department, Animal Production Research Institute. The scoring was based on the following scale: Flavour: 50 points, Body & texture: 35 points, appearance: 5 and color 10 points (Total scores 100 points).

RESULTS AND DISCUSSION

A - Effect of cow breeds on physico-chemical properties of raw milks:

1- Physical properties :

1.1 - Rennet coagulation time (RCT): Results indicated that the cow breed has slightly effect on the RCT and a low value was observed in A × BF_2 milk than the other 2 breeds Table (1). The average values were 9.23, 9.72, and 10.34, min for A × BF_2 , T × BF_2 , and B breed, respectively . These results are agreed with those reported by **Davoli et al., (1990)**. **DeMarchi et al. (2007),** also, said that in the 5 cattle breeds; Holstein-Friesian (HF), Brown Swiss (BS), Simmental (S), Rendena (R) and Alpine Gray (AG), a better RCT was noticed in R breed than in the other breeds. They added that no differences for RCT values (16.1, 16.2 and 16.0, min.) were recorded among BS, S and AG respectively. The HF breed had the worst milk coagulation values (18.0, min).

1.2 -Curd tension (CT): CT of milk plays an important role in determining the suitability of milk for cheese-making, so the low **CT** is not recommended. It was observed that the **CT** was increased in milk of A × BF_2 breed than the other two breeds. The averages values

were 48.27, 46.19 and 44.32, gm. for A × BF_2, T × BF_2, and B breed, respectively. These results are in agreement with those reported by **DeMarchi et al., (2007)** who stated that the type of milk used for cheese production can be critical when it comes from protected geographic indication, e.g., European label protected denomination of origin. At the current time, very little information's has been published regarding the influence of cow breed on the properties and quality of different cheeses. Many reports indicate small differences in color, fat, composition, and rate of milk coagulation.

1.3 -Curd Syneresis (CS): In cheese making, syneresis of the curd is an essential step in cheese making controlling the moisture content **(Marshal 1982).**

It was seen that the rate of whey separation (ml / 100ml milk) was slightly low among all cow breeds, Table (1). The average values were 75.3, 77.4, and 79.2 ml /100 ml milk for A × BF_2, T × BF_2, and B breed, respectively. Titratable acidity plays important role in that and depends on individual and herd animals, reactivity between rennet and casein, aggregation rate of paracasein micelles, and syneresis ability of the curd **(Summer et al., 2002)**. **Grandisan et al. (1984)** added that titratable acidity represents an important parameter for the technical evaluation of the quality of milk. In addition, they studied the effect of 4 Friesian cows during the first 9 weeks of lactation on the coagulation properties of milk. They noticed that considerable variations were occurred in the relative proportions of α, β and κ-casein. These variations were associated with decreasing the coagulum strength and increasing of whey separation, while rennet clotting time (RCT) did not follow the former significant trend.

1.4-**Titratable acidity**: Low acid levels in milk manifested considerably longer RCT. In fact, 30 min after rennet addition, such milk supplied a curd with very low firmness if compared with that of milk with normal titratable acidity. Table (1) showed that there were no obvious differences were noticed among the three cow breeds. So the average values were 0.172, 0.173 and 0.175% for B, T × BF2 and A ×BF2, in order .These results were similar to those reported in Holstein-Friesian breed by (**Formaggioni et al., 2001).**

2 – Chemical composition of milk:

* Results presented in Table (1) showed that, the milk fat in Baladi cows (B) was relatively lower compared with the other two breeds T × BF_2 and A × BF_2. These obtained results are in agreement with

Bassiouni (2010) who found that, the fat percentage was insignificantly decreased in Baladi cow's milk compared to Tarentaise and Abondance breeds.These values were 3.70, 3.73 and 3.85, respectively (Table 1).

* The A × BF_2 breed had the highest percentage of total solids, protein, fat and ash than the other 2 breeds. The mean values of total solids in B , T × BF_2 and A × BF_2 were 12.50, 12.67 and 12.91, respectively, while the percentage values of protein were 3.29 ,3.38 and 3.51 and ash were 0.77, 0.78 and 0.80 % respectively. These differences in chemical composition among the 3 groups might be related to the differences recorded in its milk constituents.

Table (1): Effect of cow breeds on the phycico-chemical properties of raw milk of Baladi (B) and their F_2 crossbreds (A × BF_2 and T × BF_2).

Chemical composition of cow's milk	Cow breeds		
	B	T × BF_2	A × BF_2
Fat (%)	3.73	3.77	3.85
Protein (%)	3.29	3.38	3.51
Lactose (%)	4.71	4.74	4.75
Ash (%)	0. 77	0.78	0.80
Total solids (%)	12.50	12.67	12.91
SNF (%)	8.54	8.81	9.01
pH	6.6	6.5	6.4
Titratable acidity	0.172	0.173	0.175
Rennet coagulation time (min.)	10.34	9.72	9.23
Curd tension (g)	44.32	46.19	48.27
Syneresis (ml/100ml milk)	79.2	77.4	75.3

Effect of cow breeds on activity and growth of starter bacteria in milk:

* Table (2) there was no clear differences among breeds for pH value and titratable acidity (TA) during four hours of incubation period, but there were slight differences in its total bacterial counts.
*. The ability of starter culture to grow and produce sufficient amounts of lactic acid and enzymes depends on several factors such as chemical composition and pH value of milk, activity of starter, type of incubation media, presence of antimicrobial substances, incubation temperature and type of microorganisms in the starter.
* The average values of acidity in A × BF_2 breed were 0.176, 0.44, 0.60, 0.72 and 0.81% after zero, 1, 2, 3, 4 h. of incubation time. The corresponding values of the acidity for T × BF_2 breed, were 0.173, 0.43, 0.59, 0.68 and 0.78, and 0.170, 0.38, 0.57, 0.64 and 0.73 for the B breed. pH values of all breeds behaved reverse trend to titratable acidity .

* Concerning the total bacterial count (TC) results indicated that the TC in A × BF_2 breed was higher than T × BF_2 and B breeds. It was 21.30 × 10^5 / g cheese after 4 h. of incubation period. The corresponding ones of T × BF_2 and B breeds were 20.80 and 19.60 × 10^5 / g cheese. These variations were probably due to the genetic - types of the cows breed.

Table (2): Effect of cow breeds on activity and growth of starter bacteria in milk (pH value, titratable acidity (T.A) and total bacterial counts, T.C (cfu × 10^5)

Cow breeds	Property	Incubation time (hr)				
		zero	1	2	3	4
B	pH	6.65	6.37	6.04	5.30	4.46
	T.A	0.170	0.38	0.57	0.64	0.73
	T.C	8.3	9.4	17.5	18.2	19.6
T × BF_2	pH	6.60	6.35	6.00	5.24	4.40
	T.A	0.173	0.43	0.59	0.68	0.78
	T.C	8.3	9.6	17.9	18.8	20.8
A × BF_2	pH	6.60	6.32	5.95	5.21	4.37
	T.A	0.176	0.44	0.60	0.72	0.81
	T.C	8.3	9.8	18.7	19.7	21.3

B - Physico-chemical composition of Aboundance cheese

Results present in Table (3) illustrated the physico-chemical composition of Aboundance cheese, during ripening.

Dry Matter (DM, %):

DM or total solids was found the lowest in B cheese (B) than in the other 2 treatments (T × TB and A × AB cheeses), respectively. DM% contents in B fresh cheese was 61.79% increased to 62.08%, after 90 days of ripening period , while the similar ones of T × TB and A × AB cheeses were 62.86 and 63.68 % in fresh cheeses increased to 63.14 and 64.17 % **,** respectively. Differences of TS among the milk of the 3 breeds may be responsible for that.

Fat on Dry Matter (F/DM, %):

The Fat / DM of Aboundance cheese was slightly higher in A×AB fresh cheese (52.1%) than the other ones B and T which were 51.7 and 50.2 %, respectively. Fat / DM contents were decreased in all treatments during ripening period as a result of the action of the lipolytic bacteria as well as the decreasing of moisture**.** These finding were similar to that reported by **Belewu (2006)**. The variations in fat contents may be attributed, also, to the different genetics and physiological status of the cow breeds **(Frank, 1988).**

Protein on Dry Matter, salt on moisture and moisture on non-fat dry matter:

A × AB cheese had slightly higher values of protein / DM , salt / moisture and Moisture / **Non-fat dry matter** than in T × TB and B cheeses , respectively, (Table ,3). These results are in agreement with **Myburgh et al. (2012)** and **Adesina (2012)** whom reported that no significant differences were observed in the protein contents in the cow milk

of the following three breeds: White Fulani, Red Bororo and Muturu. However, several authors were reported a significant effect of type of breed on the milk protein content **(Back and Lopez Villalobos, 2007).**

Titratable Acidity (TA, %) and pH value :

TA was found low in B cheeses than in the other 2 cheeses of (T × TB and A × AB cheeses), respectively, along the ripening period. TA after 90 days of ripening was 1.23, 1.17 and 1.12 % for A, T and B cheeses, in a deciding order.

pH values of all cheeses behaved reverse trend to TA, during the ripening period. pH was found slightly higher in the fresh Baladi cheeses (B) and during 90 days of storage period than those of Tarentaise and Abondance cows' cheeses, respectively.

Table (3) Effect of cow breeds on the physico-chemical composition of Aboundance cheese made from milk of Baladi (B) and their F_2 crossbreds Aboundance (A×B) and Tarentaise (T×B) cows , during ripening.

parameters	Ripening period (days)	Cow Breeds		
		B	T X BF2	A X BF2
Fat / DM (g.100 g^{-1})	Fresh	50.2	51.7	52.1
	30	49.8	50.7	51.3
	60	48.9	49.8	50.6
	90	48.6	49.2	49.8
Protein / DM (g.100 g^{-1})	Fresh	47.89	48.34	48.97
	30	46.67	47.16	47.68
	60	46.23	46.87	47.11
	90	45.26	46.12	46.77
Salt / Moisture (g.100 g^{-1})	Fresh	4.93	5.10	5.42
	30	5.11	5.23	5.65
	60	5.24	5.44	5.78
	90	5.36	5.76	6.02
M /NFD (g.100 g^{-1})	Fresh	53.9	53.2	52.6
	30	54.2	53.6	52.8
	60	54.5	53.9	53.4
	90	54.7	54.2	53.8
DM %	Fresh	61.79	62.86	63.68
	30	61.84	62.91	63.87
	60	61.92	62.99	63.94
	90	62.08	63.14	64.17
pH value	Fresh	5.86	5.78	5.72
	30	5.67	5.64	5.59
	60	5.52	5.51	5.48
	90	5.49	5.46	5.43
Titratable acidity %	Fresh	0.75	0.77	0.78
	30	0.85	0.89	0.91
	60	0.94	1.09	1.15
	90	1.12	1.17	1.23

M/NFD: moisture on non-fat dry matter . NaCl /M: salt in moisture. F/DM: fat on dry matter. DM: dry matter.

B: Baladi Cows; T × BT: F2 crossbreds with French Tarentaise ; A × BA: F2 crossbreds with French Aboundance

Proteolysis and lipolysis:

Proteolytic **(cheese ripening indices**) activity in cheese can be estimated by the release of a small nitrogen-containing fractions (water

soluble nitrogen/total nitrogen (WSN/TN), the pH 4.4-SN/TN and phospho-tungstic acid-soluble nitrogen/total nitrogen (PTA - SN/TN) **(Visser, 1977).**

Values of WSN /TN , 4.4-SN/TN and PTA-SN/TN were found higher in A × BA cheeses than in T × BT and B cheeses (Table 4) . Values of WSN / TN were 6.16, 6.34 and 6.72% in fresh cheeses of B, T × BT and A × BA cheeses, respectively. At the end of the ripening period these values were increased gradually to 27.87, 27.91 and 28.18 % for the same cheeses. Microorganisms of starter as well as rennet enzymes and the chemical composition of the milk playing an important role in that.

Lipolysis:

- Total volatile fatty acids: have strong sensory properties and are important compounds in the flavor and aroma of many dairy products, especially cheese and fermented dairy products **(Collins et al., 2003).**
- The values of TVFAs of B , T × BT and A × BA, cheeses , shown in Table (4) , were approximately near in fresh and ripened cheeses of B, T × BT and A × BA . These values were increased gradually in all cheeses , during ripening .
- A × BA cheeses had slightly higher values of TVFFAs compared with the B, T × BT cheeses, during storage.
- The TVFFAs contents in B, T × BT and A × BA fresh cheeses were 7.2, 7.6 and 7.9, respectively, increased to 21.7, 22.1 and 22.9 %, at the end of the ripening period, respectively.
- These results are in agreement with **(Dumont and Adda, 1978).** The influence of a cow's breed on the milk fatty acids profile could in part be explained by the differences between breeds in the activity of the mammary enzyme stearoyl coenzyme A desaturase which oxidizes C16:0 to C16:1 and C18:0 to C18:1 and is involved in CLA production **(Grosclaude , 1988)**.

Table (4) Effect of cow breeds on the cheese ripening indices and total volatile free fatty acids (TVFFAs) contents of Aboundance cheese made from milk of Baladi (B) and their F_2 crossbreds with French Aboundance (A×B) and Tarentaise (T×B) cows, during ripening.

Treatments	Ripening period (days)	Property			
		WSN / TN	pH 4.4-SN/TN ($g\text{-}100g^{-1}$)	PTA-SN/TN ($g\text{-}100g^{-1}$)	TVFFA
B	Fresh	6.16	5.22	4.23	7.2
	30	18.44	9.48	7.77	12.7
	60	24.23	14.62	8.98	19.5
	90	27.87	19.65	10.32	21.7
T × BT	Fresh	6.34	5.36	4.61	7.6
	30	18.78	9.92	8.12	13.2
	60	24.77	15.64	9.16	20.3
	90	27.91	20.11	10.72	22.1
A × BA	Fresh	6.72	6.72	4.76	7.9
	30	19.84	10.13	8.13	13.6
	60	25.86	16.00	9.27	20.6
	90	28.18	20.74	11.03	22.9

Organoleptic properties of Aboundance cheese

The few studies undertaken on the effect of breed on the sensory characteristics of cheeses were mainly initiated following questions raised by the PDO cheese channels on the relevance of restricting, as part of their specification requirements, milk production to certain breeds only, and in particular to those traditionally breed locally. Early studies in Auvergne did not elicit any significant sensory differences between Saint-Nectaire cheeses made with milk from either Holstein or Montbéliarde cows (**Garel and Coulon, 1990).** The Tarentaise cattle breed, included in the PDO Beaufort specifications, differs from other dairy breeds in its higher frequency of rare variants of αs2, β and κ-caseins. The cheese-making consequences of this particularity have been explored. This study revealed the originality of variant C of β-casein, whose frequency was as high as 17% in the Tarentaise breed, whereas it was nearly non-existent in most other dairy breeds in France **(Grosclaude, 1988).**

Results in Table (5) showed cheeses made with Baladi cows B milk (B , control) were more yellow in color and tended to be slightly bitter. The sensory properties of the other two cheeses (A× BA and T × BT) were slightly superior than B cheese. Cheeses made from Abondance and Tarentaise cow milk were firmer, more melting and tastier than those made with the milk of Baladi cows. Sensory evaluation revealed that cheeses of Aboundance were slightly preferred organoleptically, all over the ripening period, than the Tarentaise or Baladi cheeses. Abondance cheeses were characterized by clean flavor, firm and good body and texture.

Table (5) Organoleptic properties of Aboundance cheese made from cows milk of Baladi (B) and their F2 crossbreds (French Aboundance (A×BA) and Tarentaise (T×BT), during ripening.

Treatments	Ripening period (days)	Components (%)				
		Flavour (50)	Body & Texture (35)	Appearance (5)	Color 10	Total (100)
B	Fresh	44.42	31.8	4.2	8.4	88.82
	30	45.15	32.2	4.4	8.5	90.25
	60	46.00	32.7	4.4	8.6	91.70
	90	46.53	32.8	4.5	8.6	92.43
T × BT	Fresh	44.68	32.8	4.3	8.8	90.58
	30	45.77	33.5	4.4	8.9	92.57
	60	46.35	33.6	4.4	8.9	93.25
	90	46.79	33.8	4.5	8.9	93.99
A × BA	Fresh	44.91	33.1	4.3	9.0	91.31
	30	45.94	33.9	4.5	9.1	93.44
	60	46.62	34.2	4.5	9.1	94.42
	90	46.96	34.3	4.6	9.1	94.96

Differences in cheese quality can be due to intrinsic animal characteristics and this was apparent in Beaufort type cheeses or traditional Caprine cheeses which depended on the type of milk and / or α-s1 casein variants **(Marie and Delacroix-Buchet, 1994 and Vassal et al., 1994**), while differences in color and f1avour depended on breed of Friesian vs Jersey herds (**Keen and Wilson, 1993). Martin and Coulon (1995)** added that the variations in the sensory qualities are initially controlled by the cheese making technology and especially by the kinetics of acidification during the manufacture.

CONCLUSION

It is clear that the superiority of crossbred cows especially the second generation of Aboundance or Tarentaise breeds with Baladi (A×BA and T× BT) was over than pure Baladi (B) cow's and it could be recommended from the economical point of view to improve milk quality and its properties and cheese made from that milk . Certain differences in cheese characteristics were depended on the type of animal breed, feeding and the numerous empirical observations **(Urbach, 1990).**

Our study revealed that the milk of the three breeds (Aboundance ,Tarentaise and Baladi cow) were of good quality, as a general, and was suitable for manufacturing Aboundance cheese. Milk of Aboundance breed (A×BA) was slightly preferred and followed by Tarentaise (T× BT) and Baladi cow, in order.

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الجبن الابندانس : تأثير سلالة الابقار على جودة وتركيب اللبن والجبن

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مركز البحوث الزراعية – معهد بحوث الانتاج الحيواني – قسم بحوث تكنولوجيا الالبان

يهدف هذا البحث الى دراسة تأثير سلالة الابقار البلدي وخليطها من الجيل الثاني مع السلالات الفرنسية الابندانس والترانتيز علي جودة اللبن والجبن الناتج منه من خلال تقدير

التركيب الكيماوي والصفات الطبيعيه ونشاط ونمو بكتريا البادئ في اللبن ، وكذلك دراسة تأثيرهذا اللبن على الخواص الكيمياوية والحسية للجبن الابندانس خلال مدة ثلاثة شهورمن تسوية الجبن .

تم تصنيع الجبن الابندانس من اللبن البقري الخام ، دون بسترة ، من ناتج السلالات الثلاثة (سلالة البقر البلدي النقي وسلالة البقر الترانتيز الجيل الثانى الناتج من خلط أبقار الجيل الاول مع الترانتيز، وسلالة البقر ا لابندانس الجيل الثانى الناتج من خلط أبقار الجيل الاول مع الابندانس.

تشير النتائج المتحصل عليها الى :-

* تلاحظ ارتفاع طفيف للدهن والبروتين واللاكتوز والرماد والمواد الصلبة الكلية والمواد الصلبة اللأدهنية
* والحموضة بالنسبة للبن سلالة الابندانس الخليط يليها سلالة البقر الترانتيز وأخيرا سلالة البقرالبلدي على التوالي .
* تلاحظ زيادة نمو ونشاط بكتريا البادئ فى لبن سلالة الابندانس.
* تلاحظ ان لبن سلالة الابندانس أفضل في صفات التجبن سواء زمن التجبن وقوام الخثرة والتشريش،
* تلاحظ ارتفاع بسيط في كل من المادة الجافة ، والدهن بالنسبة للمادة الجافة، والبروتين بالنسبة للمادة الجافة ، والملح في الرطوبة ، والحموضة وانخفاض طفيف للرطوبة في المادة الصلبة الغير دهنية في الجبن الابندانس المصنع من لبن سلالة الابندانس الخليط يليها سلالة البقر الترانتيز بالمقارنة بسلالة البقر البلدي النقي .
* ارتفاع لقيم دلائل تسوية الجبن الابندانس المتمثلة في النتروجين الذائب في الماء والنتروجين الذائب في حامض الفوسفوتنجستك والنتروجين الذائب على رقم هيدروجيني 4.4 وكذلك الاحماض الدهنية الطيارة في الجبن الابندانس المصنع من لبن سلالة الابندانس الخليط يليها سلالة البقر الترانتيز بالمقارنة بسلالة البقر البلدي النقي.

حصل الجبن الابندانس المصنع من لبن سلالة الابندانس الخليط على درجات فى التحكيم الحسي افضل خصؤصا في النكهة والقوام والتركيب والمظهر واللون يليها سلالة البقر الترانتيز بالمقارنة بسلالة البقر البلدي النقي .طبقا لجودة وتركيب وصفات اللبن المستخدم في التصنيع ..