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# The effects of galanin on the mean plasma concentrations of growth hormone, Triiodothyronine, thyroxine and milk fat in dairy goats sannan

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## ABSTRACT

This study investigated the effects of five levels of galanin on plasma concentrations of growth hormone , Triiodothyronine, thyroxine and milk fat in dairy goat breed was sannan .15 breeds of dairy goats sannan all about the same age and weight were selected for this study and were randomly divided into five treatments ( three replicates per treatment ). Levels of the hormone injection of galanin in the experiment (0, 0.2, 0.4, 0.8, 0.16, µg/ml galanin hormone per kg of body weight), respectively. Finally, experimental growth hormone was increased hormone galanin ($P < 0.05$). If a depressing effect on plasma hormone and thyroxine, Triiodothyronine was not statistically significant ($P > 0.05$). This hormone also reduced the mean body fat percentage was not statistically significant ($P > 0.05$).

**Keywords:** Galanin - GH - Triiodothyronine - thyroxine - fat milk - dairy goats

## Introduction

Studies have shown that milk production and milk fat also controls metabolic hormones such as growth hormone and thyroid hormones (triiodothyronine and thyroxine) is (Machlin, 1973). Neurotransmitters different on growth hormone, thyroxine and Triiodothyronine influence. This is one of the neurotransmitters galanin. Galanin is peptide with 29amino acids in large quantities in the central region and the peripheral nervous system, particularly the hypothalamus and pituitary region has been found (Tatemoto et al., 1983). Since galanin on neurons shows that nerve cells secrete growth hormone releasing hormone releasing hormone secretion confirms be have thyroid stimulating hormone (Tatemoto et al., 1983). The purpose of this study was to determine the effect of galanin on the mean plasma concentrations of growth hormone, thyroxine and triiodothyronine and the milk fat content in dairy goat breed is sannan.

**Material and method**

15 dairy goats sannan first race of approximately the same weight and age (weighing 40 to 50 kg) were separated from the herd and randomly assigned to 5 treatments. First treatment or control saline through the jugular vein and the rest of the treatments received different doses of galanin.But before injection to determine the concentration of growth hormones; thyroxine and triiodothyronine in normal goats of all the hours of 9 am Blood samples were taken within 2 days of this period, the period before they are injected. After 10 days at 9 am each dose treatments they are injected. After 10 days at 9 am and the doses received each of the treatments and the control saline, and two hours later were bled from the jugular vein .This time period, called the injection period .After this period of notice of changes in blood hormone concentrations after discontinuation of animals injected with hormones for 2 days in morning blood samples were taken in this period the period after the injection say. In order to isolate the serum, blood samples within 20 minutes centrifugation $3000_{RPM}$ was put away and after separating the serum, blood samples into the freezer with a temperature of - 20 ° C were transferred. Milk production in the morning and afternoon daily record was recorded and milk samples were taken to determine milk fat by milk scan. To measure the concentration of growth hormones and thyroid hormones were used in these kits using radioimmunoassay (RIA) and growth and thyroid hormones were measured. For GH assay, bovine GH(USDAoGH-I-1) and antisera against GH were provided by Dr. A. F Parlow (Director of Pituitary Hormones and Antisera Center, Harbor-UCLA Medical Center, 1000 West Carson Street, Torrance, CA. Ovine GH (USDA-oGH-I-1) was used for iodination. A sevenpoint standard curve ranging from 0.04 to 10 ng GH was used. An average assay binding of 40% was achieved using an initial 1:20,000 dilution of GH antiserum for GH assays. For $T_3$ assay, $T_2$ were purchased from Sigma Chemical Company and $T_3$ antisera were purchased from Chemicon Co. (Temmecula, Ca). $T_2$ were used for iodination. A six point standard curve ranging from 0.32 to 5.2 ng $T_3$/ml was used. An average assay binding of 70% was achieved using an initial 1:5000 dilution of $T_3$ antiserum for $T_3$ assays. For $T_4$ assay, $T_3$ were purchased from Sigma Chemical Company and $T_4$ antisera were purchased from Chemicon Co. (Temmecula, Ca). $T_3$ were used for iodination. A six-point standard curve ranging from 2.2 to 25 ng T4/ml was used. An average assay binding of 60% was achieved using an initial 1:5000 dilution of $T_4$ antiserum for $T_4$ assays (Khazali et al.,2006). In addition, this experiment is to compare different treatments, including different doses of galanin in the blood, which contains three periods before injection, was injection and after injection were compared. Statistical design of experiments, repeated measures design was based on the general linear model. Analysis of variance and mean comparison using SPSS software and Duncan's test was performed to compare the mean milk fat.

**Results**

The results showed that levels of the hormone injection of galanin increases the mean plasma concentrations of growth hormone ($P<0.05$), (Figure1).But decreased the plasma concentrations of the hormone thyroxine, triiodothyronine, which is not statistically significant ($P>0.05$), respectively (Figures 2 and3). The results also showed that galanin reduces the fat content of milk is hormone injection that is not statistically significant ($P <0.05$), ( Figure4) results also showed that the effect of time ( before ( days 1-2) , time (3-12 days ) and after (days 13-14 injections ) and the interaction between the mean plasma GH is significant ($P<0.05$), (Figure5). but the effect of injection duration and effect its interaction with treatment -related hormones thyroxine and

also triiodothyronine and milk fat percentage were not significantly different (P>0.05), respectively ( Figures 6, 7 and 8).

**Discussion**

The results showed that the effect of growth hormone hormone injection of galanin in all experimental groups compared with the control group increases, this increase is statistically significant. Shows the growth hormone-releasing hormone secreted by the hypothalamus, the effect of GHRH on pituitary GH secretion is induced (Gustina et al., 1995).

The results with the results obtained by Murakami et al (Murakami et al., 1989), Maytr and colleagues (Maiter et al., 1990), on mouse (Davis et al.,1987 and Giustina et al., 1993 and Marinis et al.,(2000 on human and (Spencer et al., 1994 and Salry et al., 1999), correspond to the sheep.

Results regarding the effect of galanin on hormone mean plasma concentrations of growth hormone in groups (II, III, IV and V) show that the mean plasma concentrations of growth hormone at all levels of the hormone injection of galanin increases, which is the highest increase in five groups. Mean plasma levels of growth hormone in the course of the study (before, during and after injection) was observed in groups (II, III, IV and V), the period during injection of the hormone to the period before and after injection, the mean increase which was found to be statistically significant. However, certain changes in the control group did not significantly differ among the three treatment periods were observed, however, galanin Groups received hormone to growth hormone injections growth period and we can conclude that these changes are caused by hormone galanin. However, it was observed that the mean concentration of growth hormone was the fifth largest increase in the galanin receptors at higher doses may be more sensitive to the show. And thus increasing doses, increase growth hormone levels were higher.

Studies have shown that cells confirms the synthesis of somatostatin (inhibition confirms confirms the growth hormone releasing hormone) in the area of preiventricular inhibit GHRH (Dickson et al.,(1994 , and also indicated that galanin receptors are found in abundance in the area preiventricular (Chan et al.,(1996 , and in tests has been shown that galanin can increase growth hormone secretion, by inhibiting the release of somatostatin, but the mechanism by which this occurs is unknown.

The results of this study showed that injections of the hormone thyroxine hormone and galanin triiodothyronine in all experimental groups compared with the control group, which decreased, but the decrease is not significant. Studies show that hormone release shows (TRH) secreted by the hypothalamus affecting Thyrotroph cells in the anterior pituitary increased thyroid stimulating hormone (TSH), which causes the release of hormones affecting thyroid hormones are thyroxine and triiodothyronine.

These experiments conclude that Ottlecz and colleagues (Ottlecz et al., 1988) conducted on male mice corresponded. However, in an experiment by Baranvska and colleagues (Baranowska et al.,(1999 performed on mice injected with no significant change in the effect of galanin on hormone (TSH) occurred. Results regarding the effect of galanin on the mean plasma concentrations of thyroid hormones in groups (II, III, IV and V) show that the mean concentrations of triiodothyronine and thyroxine injected with the higher dose reduced the maximum These two hormones were lower in group V.Mean plasma levels of thyroid hormones in the course of the study (before, during and after injection) was observed in groups (II, III, IV and V) during the infusion period, the mean concentration of these hormones is reduced compared to the period before and after injection These differences were not statistically significant. But in the control group was unchanged, and no differences were observed between periods. And where we see a further reduction of these hormones were injected with increasing doses, so It is concluded that this decrease is due to the hormone injection of galanin. As noted in the fifth group were significantly lower than those concluded Higher dose of galanin receptors may be more effective in reducing these hormones has Galanin are more sensitive to higher concentrations of these neurotransmitters, so the highest dose had a greater effect.

Studies have shown that galanin may decrease hormone levels of TSH and thyroid hormone concentrations decreased. For example, in an experiment by Ottlecz and Colleagues (Ottlecz et al., 1988) were performed on male mice were injected with the hormone galanin to rats decreased serum TSH hormone thyroid hormones and therefore should be expected to decline.

The results of this study indicate that milk fat hormone injection of galanin decreased in all experimental groups compared with the control group who used the This reduction was not statistically significant compared with the control group. Results regarding the effect of galanin on hormone milk fat groups (II, III, IV and V) show that the percentage of milk fat with increasing doses reduced the largest reduction were observed in the fifth group. The mean percentage of milk fat with periods (before, during and after) viewing The groups (II, III, IV and V) during the injection period, the average milk fat content decreased with time after injection that was not statistically significant, and due to the control of fat was unchanged in the three periods. It is concluded that milk fat% is a result of hormone injection of galanin. As noted in the fifth highest milk fat% done Galanin was showed the strongest effect on milk fat hormone occurs at high doses. Milk fat are influenced by thyroid hormones, for example, in an experiment by on dairy cows Was observed that milk fat content was increased by injecting the hormone thyroxine. However, the experiments were carried out on the effect of growth hormone, for example, in an experiment By (Lana et al., 1992 and Machlin et al., 1973) was conducted on dairy cattle was observed that administration of growth hormone increases milk production, but no Significant changes in relation to fat content, milk is not created. Meanwhile, we see a decrease in this experiment were injected with increasing doses of thyroid hormones and thyroid hormones as mentioned above, one of the key factors are the percentage

of milk fat. It seems natural that decreased thyroid hormones in milk fat percentage falls, so as our greatest decrease in thyroid hormones The fifth group had the greatest reduction in milk fat content, so it is natural that we are in the fifth group. However, as noted, growth hormone does not cause any changes in percentage of milk fat. It is inconceivable that an increase or decrease in growth hormone may induce changes in milk fat content.

**Conclusion**

According to the results obtained in these experiments and cited sources, injection of galanin increases testosterone, growth hormone, and decreased plasma levels of hormones in dairy goats is triiodothyronine and thyroxine, and in higher doses, a greater effect on growth hormone and a decrease in thyroid hormones and also has a milk fat content. Galanin thus cannot be used to increase milk fat percentage. Since the mechanism of action of galanin on growth hormone and thyroid hormone interaction with other hormones, neurotransmitters, this is not entirely clear; it is suggested to investigate the effects of the future research.

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Figure 1 - Comparison of mean serum GH concentrations among the different experimental treatments in the experiment

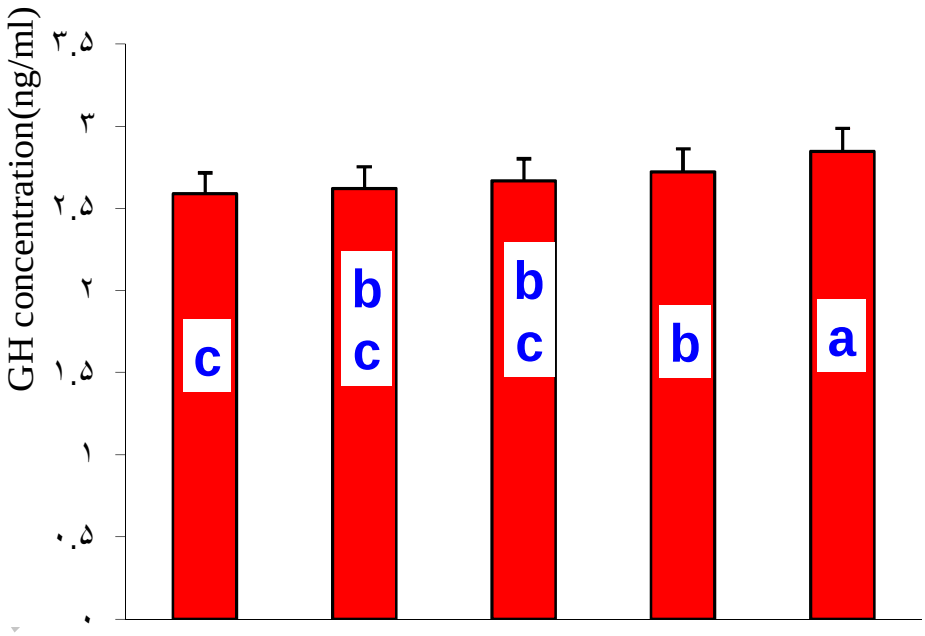


Figure 2 - Comparison of mean plasma concentrations of triiodothyronine hormone treatments across the entire experimental period

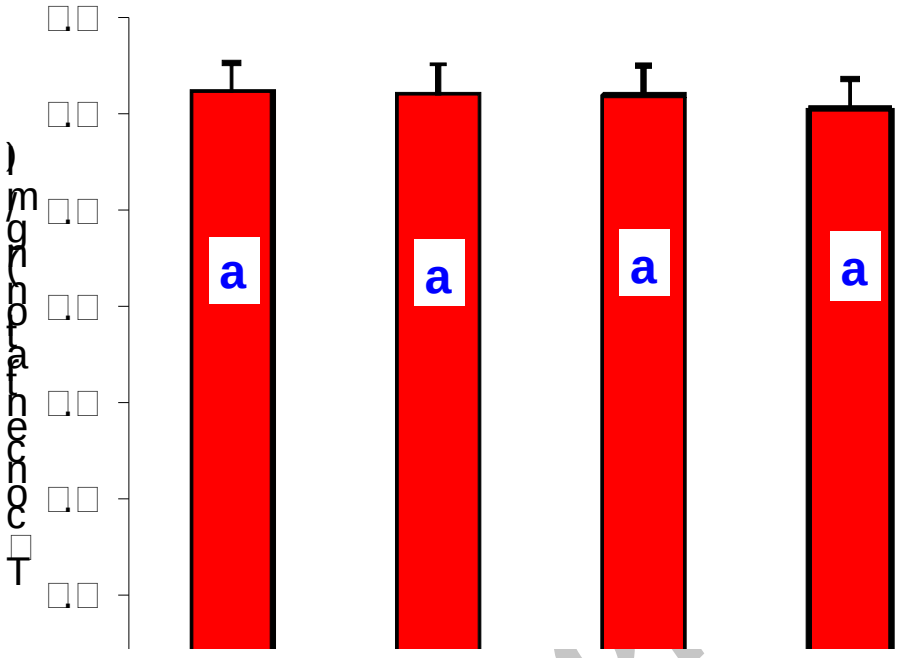



Figure 3 - Comparison of mean plasma concentrations of thyroxine hormone treatments for the whole period of the experiment

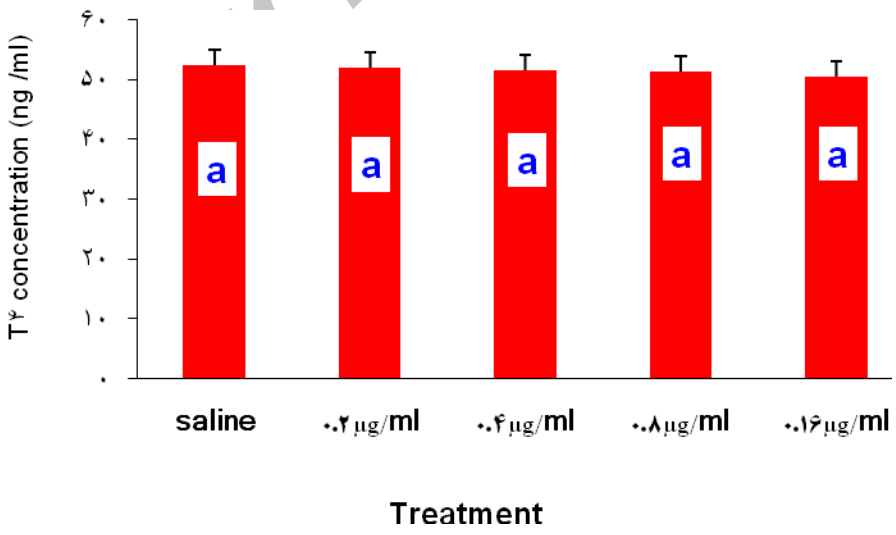


Figure 4 - Comparison of the mean percentage of milk fat between the different treatments of the experimental period

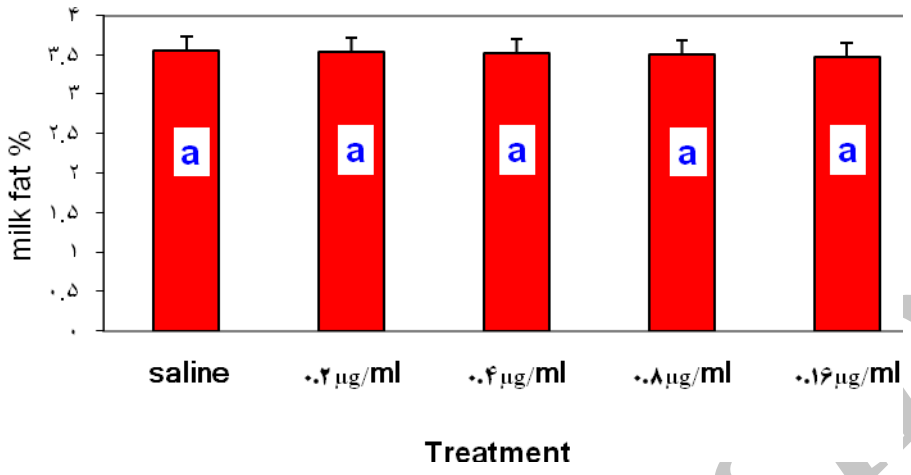



Figure 5 - Comparison of mean plasma concentrations of growth hormone in different periods experiment with different treatments

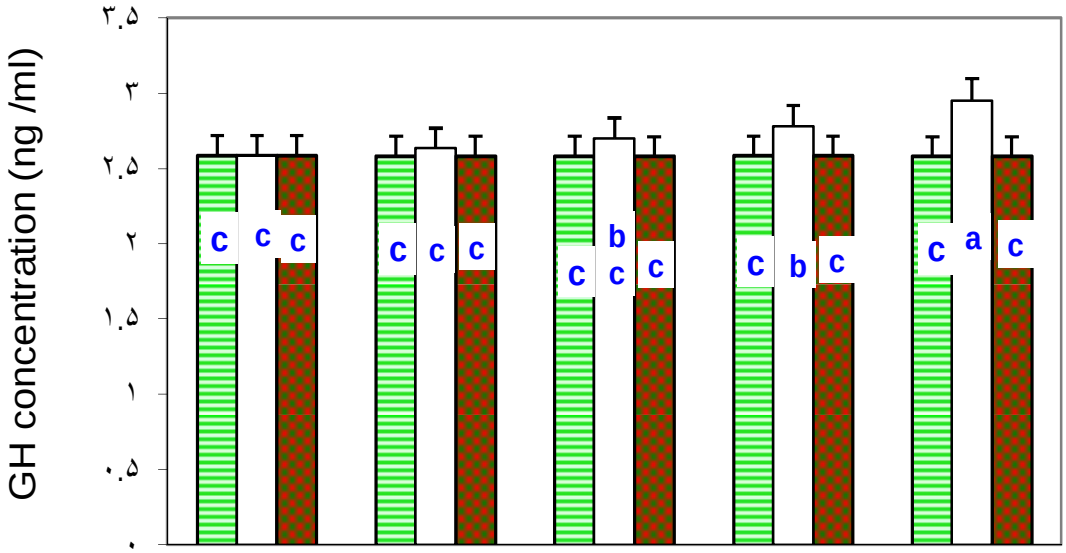


Figure 6 - Comparison of mean plasma concentrations of hormones triiodothyronine in different periods experiment with different treatments

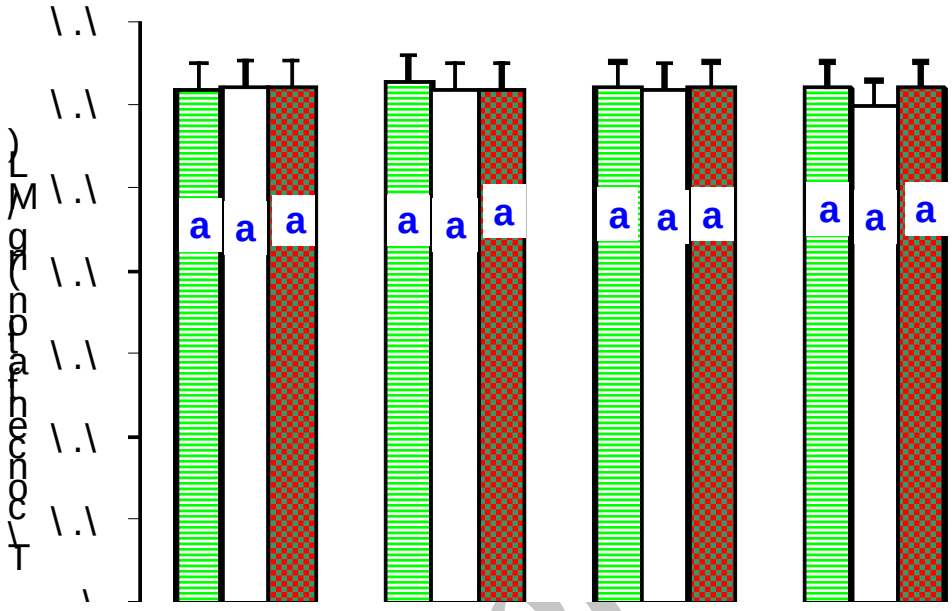



Figure 7 - Comparison of mean plasma concentrations of thyroxine hormone in different periods for different treatments

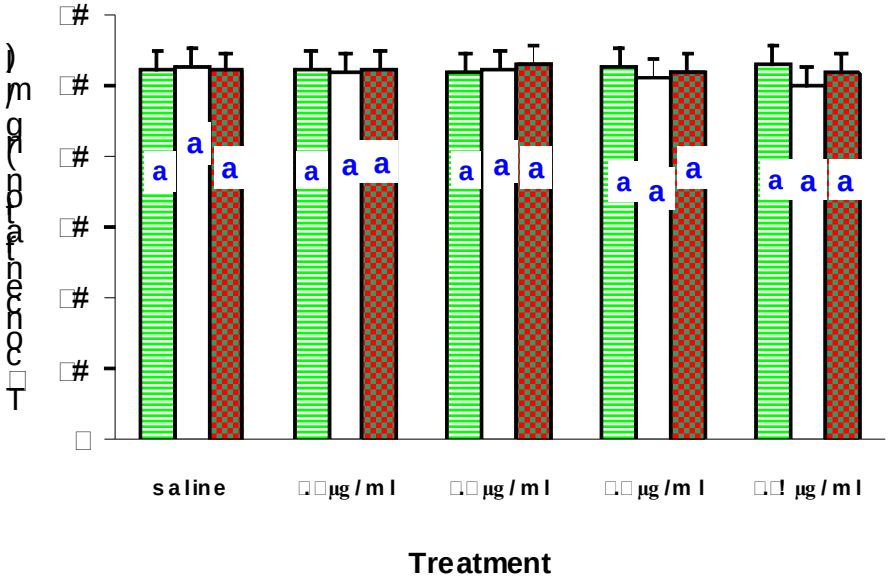
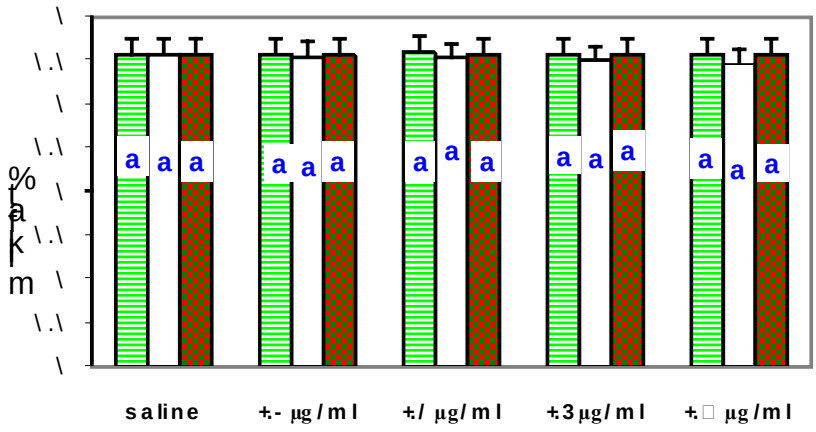


Figure 8 - Comparison of the mean percentage of milk fat between different periods in different treatments




Treatment