“The Effects of Extracts of Plants (Medicago Sativa, Trigonella Foenum and Carum Carvi) on Milk Production in Dairy Cows”

Mohammad Ali Dadkhah and Mahdi Yeganehzad

Department of Veterinary Medicine, Sarab Branch, Islamic Azad University, Sarab, Iran.

Mohammad Ali Dadkhah and Mahdi Yeganehzad, The Effects of Extracts of Plants (Medicago Sativa, Trigonella Foenum and Carum Carvi) on Milk Production in Dairy Cows”.

ABSTRACT

Lactogenesis in cow is a process in which udder epithelial cells changes from non-secretion to secretion. It widely takes place a little before parturition and produces covering cells of udder alveolus, proteins, fats and lactose and sends them to alveolar duct. Milk synthesis control is affected by hormone axis. Hypophysis hormones especially prolactin, oxytocin, placental lactogen, adrenal steroids, ovarian steroids, growth hormone, thyroxine and insulin play a role in milk synthesis and secretion. At present, use of different plans is populated in medicine and, to some extent, in veterinary. The effective materials of these plants with physiological effects on structure and function of different body tissues and plants are extracted and can be used ssin treating most diseases and preventing them. Traditionally, extract of some plants was used in nursing mothers as a galactagogue. Accordingly, this study considers effects of three Carum Carvi, Trigonella Foenum and Medicago Sativa plants on milk production in dairy cows. For this purpose, 12 Holstein dairy heifer were selected. The heifers, were at the first stage of lactation, kept with the same management and their diet consisted of Medicago Sativa, livestock concentrates. These cows are divided into two placebo and control groups of 6 cows each. These groups were exactly monitored for 8 weeks. The measures include:

1- Preparing plant extract from three Carum Carvi, Trigonella Foenum and Medicago Sativa plants.
2- After milking the cows, the prepared plant extract was orally and daily given to six of control cows at the amount of 60 cc and twice a day (morning and night). This lasted for eight successive weeks. During this period, the amount of milk produced daily by each cow was exactly weighted and recorded.
3- At the end of the every week, i.e. Fridays, blood samples were taken from jugular vein of the groups. They were sent to laboratory to be assayed. This was done for 8 weeks.

In laboratory, prolactin and insulin levels of the control and placebo cows was evaluated by Chemiluminance method using ELISA kit (Holzel Diagnostika Company, Germany). Blood glucose level was determined with glucose oxidase(GOD) method and inserted in tables. The resulted outcomes indicate increase of 20-40% of daily milk production in control cows (and in some cases more than this amount) due to using the plant extract in six of control cows in comparison with those of placebo that has not received the mentioned plant extract. Additionally, prolactin and insulin levels of control cows and their blood glucose had a 12-25.2% and 3-17% increase, respectively. Increasing of appetite was observed in control cows. They were really fresh, their general conditions and health were noticeable and no undesirable physical changes including undesired color, odor or flavor were observed in control cows' milk.

Key words: Plants extracts, lactation, milk production, dairy cows.

Introduction:

Nowadays, consumption of milk and its different products is stated as one of human society development indexes. There is a close relation between these products and health level of people considering efficiency, intelligence quotient, contacting infectious diseases and regulating body metabolic activities. Amount of milk produced by a dairy cow depends on its genetic capability, nutrition diet, cattle management and hygiene of the farm [1]. Nutrition and management programs should be developed in cattle parallel to their genetic development so that conditions required for manifesting genetic potential of cows can be created. Also, it is necessary to have an exact reproduction and general management plan and regulated program to prevent, control and treatment of diseases in farms. Milk production leads to food consumption and the more the food consumption, the more the
milk production. Evidently, stimulating and encouraging cows of a farm to consume more food is a important key in success of the farmer in having cattle with desired reproductive efficiency and more milk production [2]. This research considers use of some herbs extract regarded as galactogogue in nursing mothers. These herbs have not yet practically used to increase milk production of cows and further studies are required [3].

Lactogenesis control is affected by different hormone axis. Hypophysis hormones especially prolactin, placental lactogen, adrenal steroids, ovarian steroids are regarded as compounds required for milk production. Estrogen and prolactin have synergism effect on milk production, but progesterone negatively affects it [4]. This can be attributed to decreasing of α-lactalobomin- one of the components of lactate synthesis enzyme- leading to non-production of lactose and as a result non-production of milk [5]. Prolactin plays a role in beginning of lactogenesis and existing of growth hormone is necessary to continue milk. Oxytocin is also involved in galactopoiesis. Thyroxin hormone and insulin play a role in milk synthesis mechanism. Cow milk has been consisted of 87.3% water, 3.9% fat, 3.2% protein, 4.6% lactose and 0.7% ash. Milk synthesis begins through nervous and hormonal control after parturition [2].

Nowadays, different plants found in nature are widely used in different fields including medicine, pharmaceutics, food and health industries, but these plants are not widely used in veterinary. Medicago Sativa is a Leguminous plants and rich of protein, calcium and kinds of vitamins. This plant is regarded as the best leguminous for cow nutrition due to its appetitive features and low level of cellulose [6].

Amino acids found in this plant include lysine, arginine, histidine, adenine, Cysteine, phenylalanine, Asparagines, carbohydrates, diastase, ketone, phosphoric acid, calcium carbonate, and A, E, C and K vitamins. Vitamin C is found at the amount of 280 mg/100 and vitamin A appears as β-carotene at the amount of 3000-5000 unit/100. There are a lot of carbonate calcium (three times of milk), potash, phosphoric acid, magnesium, ferrous and little amounts of silica and arsenic in lucerne ash [3]. This plant is especially important because of having proteins and vitamins. calcium carbonate found in this plant plays a role in structuring cow bones and supplying its growth and production needs. Trigonella Foenum has 7.36% fat, 40.72% carbon hydrates, 28.91% protein and high amounts of choline, phosphorus, an alkaloid known as troigonelline and nicotinic acid. Acid nicotinic prevents occurring of pellagra, cerebral, dermal and metabolic disorders [7]. It has been showed that consumption of high amounts of acid nicotinic lead to dilation of blood vessels. This plant is useful in remedying dermal irritation and regarded as an anabiotic agent [8]. Phosphorus, ferrous, carbohydrates and diastases found in this plant lead to remedying all disorders resulted from cachexia, weakness and loss of weight, strengthening pancreas function including increasing insulin secretion and regulating body natural metabolism [9]. Seed of the plant was traditionally used by Iranian and Arab physicians to treatment of diabetes. At present, this plant is used to cure gastritis, enteritis, diarrhea, and metritis [10]. Carum carviin health, Beauty pharmaceutical, and Food industry is used in abundance. This plant have 8% Tamin,20% protein and carbohydrate material [11]. This plant represents a work force, digestion effect of food and human milk booster. Livestock industry in efforts to increase the quantity and quality of cow milk production, and today using various techniques such as embryo transfer properties try to improve livestock production. It is hoped this research step is increase livestock production.

Materials and Methods

This research considers use of extracts of three Medicago Sativa, Trigonella Foenum and Carum Carvi plants- traditionally used as a galactogogue in nursing mothers- in dairy cows and study the resulted outcomes. Therefore, the objectives include determining amount of cows’ milk while consuming plant extract prepared from the above-mentioned plants, determining amount of hormones involving in milk synthesis such as prolactin and insulin in control and placebo cows blood, determining blood glucose level of the cows as follow;

1- Preparing extract of Medicago Stiva, Trigonella Foenum, Carum Carvi plants: to do this, 12kg of the above-mentioned plants was rinsed and steeped and after 8 hours, the extract of the mentioned plants was prepared through distillation in special pots.

2- 12 Holstein dairy cow were selected. The heifers, were at the first stage of lactation, housed with the same management and their diet consisted of Medicago Sativa, livestock concentrates. The cows were at the same management and environmental conditions. These cows were divided into two placebo and control groups of 6 cows each and their daily milk production and health conditions were monitored for 8 weeks. After milking the cows, the prepared plant extract was orally and daily given to six of control cow at the amount of 60 cc and twice a day (morning and night). This lasted for eight successive weeks. During this period, the amount of milk daily produced by each cow was exactly weighted and recorded in tables.

3- At the end of the every week, i.e. Fridays, blood sample was taken from the control and placebo cows. It was sent to laboratory to be tested. This was done for 8 weeks.
In laboratory, prolactin and insulin levels of the control and placebo cows was assayed by Chemiluminance method using ELISA kit (Holzel Diagnostika Co. Germany). Blood glucose level was determined with glucose oxidase method and inserted in the tables. This findings in agreement with results of [12,13,14,15,16].

**Results and Discussion**

The resulted outcomes indicate increase of 20-40% of daily milk production in control cows (and in some cases more than this amount) due to using the extract of Medicago Sativa, Trigonella Foenum and Carum Carvi plants in control cows in comparison with those of placebo that has not received the mentioned plant extract. Additionally, prolactin and insulin level of the control cows and their blood glucose had a 12-25.2% and 3-17% increase, respectively (Figure 1-4). Increasing of appetite was observed in control cows. General conditions and health of the cows were noticeable and no undesirable physical changes including undesired color or odor were observed in cows' milk.

Use of this plant extract is recommended in less-productive cows and those using pharmaceutical combinations such as penicilllin and dexamethasone due to suffering from infectious diseases because these combinations lead to decreasing of milk production in cow and using of the mentioned plant extract will prevent from reduction of these cows milk production. It is hoped that profitable actions can be taken in blossoming state farming industry and increasing cows' milk production through relying on Divine dispensations and conducting further researches.

![Fig. 1: Glucose level(mg/kg) in placebo groups(from 1st-8th week).](image1)

![Fig. 2: Insulin level(µρ/μl) in placebo groups(from 1st-8th week).](image2)
Fig. 3: Prolactin level (ng/ml) in placebo groups (from 1st-8th week).

Fig. 4: Daily Milk production (kg) in placebo groups (from 1st-8th week)

Fig. 5: Glucose level (mg/kg) in control groups (from 1st-8th week).
Fig. 6: Insulin level (µU/ml) in control groups (from 1st week-8th week).

Fig. 7: Prolactin level (ng/ml) in control groups (from 1st-8th week).

Fig. 8: Daily milk production (kg) in control groups from (1st-8th week).

Acknowledgements

The study was supported financially by Sarab Branch, Islamic Azad University, Sarab, Iran.

References

1. Portoni, A.I., 1992. Composition and technological properties of milk of high
producing cows during feeding with aromatic supplement, Vestel Academy Agranykh Navuk, Belarusia, 1: 64-66.


