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Use of Medicinal Plants with Galactogenic Effect, as a Food Supplement, in Order to Increase Milk Production, in Dairy Animals: A Review

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ABSTRACT

Raising animals at the household level occupies an important place in the rural economy, providing families with a relatively constant income and a source of food. The demand for organic products of animal origin, the prohibition or limitation use of medicinal substances for various treatments and the search for alternatives to feed additives, are the key factors that determine the pursuit for natural solutions to increase milk production. Herbal spices can influence the way animals are fed and ultimately have the beneficial effect of stimulating the level of secretory tissue of the mammary gland, which would result in an improvement in milk production. The paper aims to contribute to the review of various studies on galactogenic plants with effect on milk production. The study considered the follow-up of research published in the last few years. Galactogenic plants have triggered a special interest because of their availability, low cost and no toxic residues left in milk. Phyto-pharmacological research on medicinal plants can contribute to the discovery of some new ways of using galactogenic plants in the diet of dairy animals. Following the bibliographic study carried out in the paper, it was established that there are several milk-producing species that can be fed galactogenic effect plants (cows, goats, sheep, buffaloes) and there are a series of medicinal plants more common in making feed mixtures in order to stimulate the growth of milk production (*Asparagus racemosus, Trigonella foenum-graecum, Cuminum cyminum, Carum carvi, Nigella sativa*). Researches about natural alternatives to increase milk production in dairy animals is still limited. It is necessary to carry out further studies about plants with a galactogenic effect on the physiology of milk production in livestock species.

Key words: Dairy animals, Galactogenic effect, Medicinal plants, Milk.

Animal husbandry at the household level, has an important place in the rural economy, providing families with a relatively constant income and a source of food.

The demand for organic products of animal origin, the prohibition or limitation of the use of medicinal substances for various treatments, which would have a residual effect and increase production costs, the search for alternatives to feed additives, are factors that determine the search for natural solutions for growth and improvement of milk production.

Herbal spices can influence the way animals are fed, the growth of favourable microorganisms in the rumen and the stimulation of digestive enzymes, all of which ultimately have the beneficial effect of stimulating the secretory tissue of the mammary gland, which would result in an improvement in milk production.

Galactogens are substances used to induce, maintain and increase milk production, both in humans and in the animal milk industry and can be synthetic, plant-derived or endogenous products. They act by exerting an influence on the hypothalamic-pituitary-gonadal axis, by blocking hypothalamic dopaminergic receptors or by inhibiting dopamine-producing neurons, increasing prolactin secretion by antagonizing dopamine receptors. Synthetic drugs, used to improve milk production, commercially available, induce adverse effects on the neuro-endocrine axis of lactation physiology. Prolonged use has caused toxicity, leading to abnormal conditions in both humans and animals.

Thus, researchers have developed a special interest in galactogenic plants because they are available, cheap and do not leave toxic residues in milk. Phyto-pharmacological research on medicinal plants can contribute to the discovery of new ways of using galactogenic plants in the diet of dairy animals.

A fairly large number of plants contain a large number of chemically active principles, having galactogenic

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properties and can be used as herbal medicine to increase milk production in animals.

There are several milk-producing species that can be fed galactogenic effect plants (cows, goats, sheep, buffaloes) and there are a series of medicinal plants more common in making feed mixtures in order to stimulate the growth of milk production (*Asparagus racemosus, Trigonella foenum-graecum, Cuminum cyminum, Carum carvi, Nigella sativa*).

Herbal preparations are known to increase milk production in women, goats and cows. This area of research is very important for the medicine of human breastfeeding and in the breeding of dairy animals. However, research about natural alternatives to increase milk production in dairy animals is quite limited.

It is therefore necessary to carry out further research into the various effective mixtures of plants with a galactogenic effect, the active principles in the chemical composition of these plants, the doses used, the beneficial effects but also the long-term and/or short-term harmful effects. Before using them as such or turn them into medicines.

The paper aims to review the research literature on the use of medicinal plants with galactogenic effect, to increase and improve the milk production. The bibliographic study was carried out within University of Agronomic Sciences and Veterinary Medicine of Bucharest, between between May 2021-February 2022 and the obtained paper can provide information on how supplementing the diet with galactogenic plants can be beneficial for increasing milk production and on the results achieved in previous researches done so far.

Herbs have a long history of use in all cultures as galactagogues, to stimulate milk production both in women and in dairy animals. Abascal and Yarnell (2008) made some suggestions on how studies might be conducted to bridge the gap between common uses and lack of studies on the safety and effectiveness of these herbs in lactation. Coverage in this article included *Trigonella foenum-graecum* seed, *Galega officinalis* herb, *Foeniculum vulgare* seed, *Vitex agnus-castus* seed, *Epilobium spp. herb*, *Pimpinella anisum* seed, *Cnicus benedictus* herb, *Silybum marianum* herb, *Urtica dioica* herb and *Gossypium spp.* root.

In his paper, (Mohanty *et al*., 2014), shows the progress made in the field of commercially available galactogens in the form of a natural supplement.

Lactogenesis is a neuro-endocrine consequence of the complex neuro-physiological process that involves the interaction of several physical and emotional factors with the involvement of several hormones, especially prolactin. During calving and expulsion of the conception product and the placental gear, the concentration of progesterone decreases, resulting in the initiation of milk production. Dopamine agonists and antagonists regulate the synthesis and secretion of prolactin by interacting with the hypothalamus and anterior pituitary gland and thus controlling milk production. After the onset of lactation, prolactin levels gradually decrease, but the amount of milk is maintained or increased by local feedback mechanisms. Therefore, an increase in prolactin levels is required to increase milk production, but not to maintain it.

Lactogenesis and milk ejection are both stress-generating processes in cows and in turn are affected by stress caused by other processes or other factors. Because the hormonal action is completely dependent on stress factors, stress control is a main element that must be followed, to ensure good lactogenesis.

Bora *et al*. (2019) designed a study to develop and standardize a novel polyherbal formulation (PHF) for augmenting milk production in healthy dairy cattle. Five raw plant drugs: tubers of *Asparagus racemosus*, whole plant of *Eclipta alba*, seeds of *Trigonella foenum-graecum* L., fruits *of Foeniculum vulgare* and *Anethum sowa*, were used to prepare hydroalcoholic extracts using the Soxhlet method. Pharmacognostic authentication and chemical identification were done by macroscopic and microscopic studies, phytochemical screening, physicochemical analysis and high performance thin layer chromatography (HPTLC) fingerprinting. The safety studies of galactagogue preparation were performed through heavy metals, microbial contamination, aflatoxins and pesticide residue analysis. The work first claims the standardization of this unique, cost-effective, nonhormonal, Ayurvedic galactagogue in-house preparation, *i.e*., PHF for augmenting milk yield in dairy herd. It proves that all batches have similar characteristics and uniformly composed. It serves as a reference for identifying and distinguishing the galactagogue herbs.

The study of (Penagos *et al*., 2014), aimed to report the state of the art on the possible mechanisms of action, efficacy and side effects of galactogogues, including potential uses in veterinary and human medicine. Knowledge gaps in the use of galactogenic substances in animal husbandry have been taken into account, in particular in the standardization of the lactogenic dose in some herbal preparations.

Nowadays, herbal preparations are known to increase milk production in women, goats and cows. This area of research is very important for the medicine of human breastfeeding and in the breeding of species of milk-producing animals. The use of herbal products with a galactogenic effect in raising dairy cows is based on the new trend in the milk production sector, namely the maintenance of animals in organic systems and obtaining organic products.

However, research into natural alternatives to increase milk production is quite limited to dairy animals. There are studies on herbal supplements and milk production, mainly based on human studies and are rare in goats and cows. The information is unstructured and therefore difficult to track and classify.

Several factors explain the tendency to use botanical galactogens in animal nutrition: the adverse effects of synthetic drugs and the need for a better understanding of the influence of medicinal plants in animal nutrition, with improved animal health.

The work of Penagos *et al.* (2014), reviews the use of galactogenic substances in human medicine and animal husbandry, both for use in clinical treatments and feeding practices of dairy animals, with emphasis on the effectiveness and adverse effects. It also exposes lack of knowledge about galactogens in veterinary clinical practice. Due to the limited literature on this topic in veterinary practices, it is of interest to study phytochemical composition, mechanisms of action and possible side effects and standardization of the dose of herbal preparations.

Some plants have long been used to stimulate milk production in women and dairy animals. The galactogogue effect of different plants has been studied and there is evidence that milk synthesis can be increased and that most of them are safe in humans. Several herbs have been reported as safe substances that can be used therapeutically in domestic animals and in dietary supplements in dairy cows.

It is necessary to develop well-designed and well-conducted clinical trials to demonstrate the efficacy and safety of galactogenic plant products. Research can also lead to studies to establish the nutritional values (macro and micronutrients), as well as the potentially therapeutic ones of galactogenic plants.

This is still an innovative field of research that could be considered as an element of a sustainable strategy for increasing and optimizing milk production in cows and sows (as a result, for example, weaning weight can be improved in pigs). These plants could be administered as supplements in food rations or as concentrated extracts (essential oils, alcohol extracts and lyophilized extract). These supplements are compatible with animal welfare, but it is suggested that basic and applied research be carried out on this issue.

Patel *et al.* (2017) were undertaken a study to evaluate the efficacy of herbal galactogogue mixture containing *Asparagous racemosous*, *Leptadenia reticulata* (Jivanti) and *Trigonella foenum-graecum* on production performance of lactating Kankrej cows. The dry matter intake was comparable among all the treatment groups. Average daily milk yield and 4% fat corrected milk yield were significantly ($P<0.05$) higher in herbal galactogogue supplemented groups as compared to the control group. No significant differences were observed in milk composition among the different treatments. Supplementation herbal galactogogue mixture of Shatavari, Jivanti and Fenugreek in equal proportion at the dose rate of 60 g/cow/day resulted in significant increase in milk yield and daily return income in lactating Kankrej cows.

Plants containing essential oils can be a cost-effective means of improving efficiency of milk production and optimizing milk composition of dairy cows. *Cuminum cyminum* belongs to the *Apiaceae* family and is a well-known herbal medicine in Iran. The medicinal properties of green cumin may have beneficial effects on milk production. However, very few studies have been reported where by cumin has been fed to ruminants. The study conducted by Bhargav *et al.* (2021) investigated the effect of cumin supplementation on milk yield, milk quality and udder health of lactating dairy cows. The results indicated that overall mean body weight, average DMI was statistically similar in all studied animals. The average milk yield (kg) of animals was statically non-significant, but numerically 20.64% higher milk yield was observed in cumin seed supplemented group than control group. There was no effect of cumin supplementation on chemical composition (Fat, TS, SNF, Lactose and Protein) of milk in dairy cows. Overall mean milk pH and somatic cell count (SCC) in both groups were statistically similar but numerically lower in treatment group. It can be deduced that the cumin seed supplementation improves milk yield. However, it has no effect on composition of milk in dairy cows. Supplementation improved the udder health and found no effect on dry matter intake (DMI) in dairy cows.

Patel *et al.* (2016) refers to 3 medicinal plants, with galactogenic effect, which can be introduced into animal feed, to increase productive performance, to improve efficiency in food digestion, to maintain animal health and to alleviate the adverse effects of stress. The paper showed that galactogenic substances ingested by consuming these plants (*Asparagus racemosus*, *Leptadenia reticulata*, *Trigonella foenum-graecum*), stimulate the activity of alveolar tissue in the mammary gland and increase secretory activity in the glandular acini and therefore restore and regulates milk production.

It has been established that among many other benefits for human and animal health, a major action of asparagus is galactogenic and mammogenic, increasing the level of prolactin in the blood and stimulating cellular activity in the histostructure of the mammary gland. Supplementing the diet with a polyherbal mixture (50 g/day/animal) in lactating cows has improved milk production. There was also a superior improvement in lactating buffaloes, fed with a plant supplement in which asparagus occupies 25%. Feeding with asparagus supplements, in the amount of 50 g day/animal, for a period of 60 days, had the effect of increasing milk production in buffaloes by about 10% and by 13% in cows. This additional feeding also improved the quality of the milk, the level of fat, protein, lactose, non-fat dry matter, during administration, but also post-administration.

Nurdin *et al.* (2011) experiment aimed to observe the effect of herbs (Black cumin, *Curcuma zeodharia*, *Curcuma mangga* and *Curcuma aeruginosa*) supplementation on milk yield and milk quality (milk fat, milk protein and milk lactosa and mastitis status) in lactating dairy cows suffering with mastitis. In the experiment there were used cows between the second and fourth lactation and which were suspected of subclinical mastitis (++). The results showed that supplementation of herbs significantly increased ($P<0.01$) milk yield, protein and lactosa and significantly decreased mastitis status and did not have significant effect on milk fat.

Fenugreek has a long history of use in medicinal purposes, in Ayurvedic and Chinese medicine and is used for inducing labour, stimulating lactation (rich in essential

fatty acids) and improving digestion and as a general stimulant for improving health and metabolism. Fenugreek's leaves and seeds can be used as daily spices in animal recipes. Preliminary animal and human trials suggest possible hypoglycemic and antihyperlipidemic properties of oral fenugreek seed powder (Sinha *et al*., 2015).

Sinha *et al.* (2015) reviewed the available data regarding medicinal activities of *Trigonella foenum-graecum* both in human and nonhuman subjects searching the Google, HINARI, PubMed for articles published in English using keywords 'Fenugreek', 'Trigonella foenumgraecum', 'Hypolipidemic effects', 'hypoglycemic effects'. Phytochemically, it contains trigonelline, sapogenins, 4-hydroxyisoleucine, diosgenin, aponins, *etc*. possessing hypolipidemic, antihyperdipidemic and many other properties. Lack of adequate better controlled human trials has limited use of fenugreek and still far from recommending it as an antihypercholesteric and antidiabetic agent.

Trigonella foenum-graecum is a legume and has been used as a spice worldwide to enhance the sensory quality of food. It is known for its medicinal qualities, such as antidiabetic, anticarcinogenic, hypocholesterolemic, antioxidant and immunological activities. Fenugreek, among many other therapeutic effects, has been recommended for stimulating lactation (Sajad and Pradyuman, 2016).

In a study, in Agrawal *et al*. (2015) evaluated physico-chemical properties of fenugreek seeds. Physical properties were evaluated for storage and equipment design whereas chemical properties were evaluated for nutritional study and product development. Results show that fenugreek seeds contain a highest percentage of proteins and lowest percentage of ash. The germinated fenugreek seed sample showed higher moisture, protein and ash content as compared to raw fenugreek seed sample but the fat content of germinated fenugreek seed sample was lower as compared to raw fenugreek seed.

The effect of feeding fenugreek seed, as part of a dairy goat ration, on milk yield and fat percentage was studied on lactating dairy goats by Al-Shaikh *et al.* (1999). Milk yield was recorded daily while fat percentage was determined in weekly milk samples. The group which received 25% fenugreek showed significantly higher daily milk yield and fat percentage. The group which received 50% fenugreek showed a lower daily milk yield and fat percentage than the control (0% fenugreek). Goats suckling one kid gave more milk daily than those suckling twins. There were no significant differences in plasma total protein, albumin, globulin, cholesterol, glucose and total lipids among the three groups.

Sahoo *et al*. (2020) concluded that supplementation with fenugreek in heat stressed lactating goats feed, had a positive effect on milk production, administered both individually and in combination with probiotics.

In order to investigate the effect of fenugreek on the physiological status of the animals, some blood parameters, namely glucose, cholesterol, total protein, ablumin, globulin and total lipids were measured. The results showed that these constituents were within the normal range and that treatment had no effect on any of them, suggesting that fenugreek seeds did not significantly alter the blood plasma constituents. It is difficult from the studied blood parameters to speculate on the mechanism by which fenugreek increases milk yield and further investigations are needed to determine the underlying mechanisms and the optimum level of fenugreek required to stimulate increased milk yield.

Balgees *et al*. (2013) used mature Nubian does to assess the effect of supplementing a basal diet with different levels of fenugreek seeds on feed intake, some metabolic hormones, milk yield and composition. The results revealed that both, daily feed intake and milk yield, increased significantly ($p<0.05$) with the increased levels of fenugreek seed supplement with concomitant decrease in milk fat content, while the other milk components (protein, lactose and SNF) showed an inconsistent pattern. The results highlighted that fenugreek seed supplementation boosted feed intake, milk yield, insulin and thyroxin.

Supplementing the ration of dairy cows with fenugreek seeds had a significant effect in increasing the performance of ruminant milk production. Fenugreek seeds contain phytoestrogens, which have an effect similar to the female sex hormone, estrogen and a key compound, diosgenin (saponigen steroid), which has been shown experimentally to increase milk flow. Supplementation with fenugreek seed powder (60 g per day) in goats for seven weeks, increased milk production by 13%. The addition of fenugreek seeds at a dose of 2.5-5 g/kg body weight for 7 weeks in sheep significantly increases milk production and leads to an increase in body weight (Hassan *et al*., 2012). Balgees *et al*., (2013), however, suggest that there is an inverse correlation between food supplementation with fenugreek seeds and the percentage of milk fat, so that too large an increase in the amount of supplementation results in a decrease in the percentage of milk fat and a pattern inconsistent for protein, lactose and SNF.

Supplementation with a polyherbal combination containing fenugreek, in lactating goats, 2 weeks after parturition, for a period of 12 weeks, significantly improves milk production (Galbat *et al*., 2014). Mohammed and Ghazi (2005) conducted a study to evaluate the effect of fenugreek feeding on milk production in lactating goats. It could be concluded that fenugreek feeding increased milk production in goats and this effect might be mediated *via* growth hormone stimulation. The administration of fenugreek seeds to the basal ration, in an amount of 0.6-1.2 g/kg body weight in lactating sheep, led to a significant increase in daily food intake, daily milk production, the amount of protein and dry fat in milk, while the percentage of fat and lactose decreased significantly (Al-Sherwany, 2015). It is concluded that asparagus and fenugreek seeds are effective galactogenic plants and their use as an additive in lactating animals improves the performance of animals in general and milk production in particular.

In Sanghai *et al*. (2017), conducted an experiment to evaluate the galactogenic activity of some plants, administered to cows. The cows received supplement with *Lepidium sativum* and *Dioscorea bulbifera* for 15 days and the hemato-chemical parameters (hematoglobin, serum calcium, phosphorus, protein, glycemia) and milk production were recorded on day 0, 15-1 and 30th. The study found that hemoglobin decreased with increasing milk production. Serum calcium was significantly increased, while total serum protein was significantly improved in cows at the beginning and middle of lactation and insignificantly in cows at the end of lactation. Marginal reduction in serum glucose and phosphorus was recorded in all cows, but correlated with increased milk production. In all cows, due to supplementation with galactogenic plants, there was a significant increase in milk production by 11.61% - 16.86%. Thus, it was concluded that supplementation of feed with galactogenic plants has a significant positive effect on milk production in cows regardless of the stage of lactation.

There also has been a study to evaluate the effect of feeding two herbal preparations (Ruchamax and Payapro) on the milk yield and rumen parameters in lactating crossbred cows. The results of the study indicated that supplementary feeding of herbal preparations had beneficial effects on rumen parameters, increased their milk yield and overall boosted animal productivity. Since these preparations are non-hormonal and a combination of different herbs, they can be considered as safe, cost effective and environment friendly without side effects. Therefore, the inclusion of these herbal preparations in dairy cow's diet should be encouraged to improve the efficiency of feed utilization to alleviate adverse effects of environmental stress and to enhance the overall animal performance and health (Neeru *et al*., 2009).

Monika *et al*. (2021) also concluded in study that herbal supplementation (Himalayan Batisa, Appetonic Vet powder, Ruchamax and Rumizyme powder) has a beneficial effect on the ruminal response in goats, which show an improvement in yields.

A study to quantify the drop in milk production in cattle due to cold climate and subsequent nutritional amelioration in temperate Kashmir was conducted at Mountain Live stock Research Institute (MLRI), SKUAST-Kashmir and in various dairy farms in the vicinity (Ovais *et al*., 2020). The animals were provided with 150 grams of jaggery and 200 grams of crushed fenugreek daily in addition to normal feeding schedule. The data regarding milk yield and associated parameters were compared between winter (December to February) and spring (March to May) months. The average milk yield in treatment group was significantly ($p<0.05$) higher in the winter months. Similarly, the milk yield in the spring months was higher in treatment group as compared to control group but the difference was statistically non-significant. No significant changes were observed in milk composition in winter and spring months in both control and treatment groups. The overall milk production in the treatment group was significantly ($p<0.05$) higher in comparison to control. Prolactin, growth hormone and cortisol concentration were higher in treatment group in both winter and spring months but the difference was significant ($p<0.05$) in winter months only. In conclusion, supplementation by energy sources and galactogogues is an efficient mechanism to overcome drop in milk production in dairy cows of temperate Kashmir during long winter months and needs quantification at an earliest possible to overcome economic losses among poor and marginal farmers.

Plants with a galactogenic effect were also administered experimentally in the diet of goats. Thus, Galbat *et al*. (2014) studied the effects of administering a mixture of galactogenic plants to goats (*Cuminum cyminum*, *Trigonella foenum graecum*, *Carum carvi*, *Nigella sativa*). It was concluded that goats given polyherbal supplementation showed the best improvement in nutrient digestibility, milk production and milk composition compared to animals fed the control diet. No adverse effects on the general health of the animals were also observed. Positive and negative correlations were found between the constituents of goat's milk, which means that it is possible to use calculations to predict the effect of one constituent on another. The results of the blood tests determined the positive effect on the general health of the goats. However, further studies are needed to determine more precisely how these mechanisms work, which cause positive effects on goat's milk production.

The effect of galactogenic plants on milk production was also studied in buffaloes (Patel *et al*., 2013). The results obtained indicated that supplementary feeding of Surti buffaloes is beneficial for milk production and overall health.

A research was carried out by Değirmencioğlu *et al*. (2020) to determine the effects of cumin seeds in food diets of Anatolian water buffaloes (AWB) in shelter about gas concentration, milk yield and composition. It has been determined that 30 g cumin supplementation added to the early lactating AWB diets significantly increased total dry matter intake and milk yield of AWB ($P<0.01$). Meanwhile; there were no significant effects of diets containing cuminun seeds in milk composition, somatic cell count (SCC) and shelter about gas concentrations (CH_4, NH_3 and CO_2).

The croquettes based on galactogenic plants studied are non-hormonal and a combination of herbs can be considered safe and cost-effective. Therefore, the inclusion of such an herbal preparation in the diet of lactating buffaloes should be encouraged in order to improve the efficiency of feed use, to mitigate the adverse effects of stress and to increase the performance and general health of the animals.

A study was carried out on thirty lactating goats, after two weeks of kidding, to evaluate the effect of dried mixture of five herbal plants as natural additives on milk yield and composition of cross bred dairy goats (Mirzaei *et al*., 2012). Dry matter intake (DMI) was slightly increased and apparent nutrients digestibility and total digestible nutrients (TDN) were significantly improved by treatments. Milk yield, 4% fat corrected Milk (FCM), milk protein, fat, total solids, feed efficiency (DMI/Milk yield and DMI/4% FCM) and economic efficiency were significantly higher than control group. Glucose contents and total leukocyte count (TLC) were

higher in animals which received experimental additives than those which received control. Results clearly indicated that combination of herbal supplementation in different treatments recorded the lowest rate of dry matter digestibility (DMD) compared to control group. It could be concluded that lactating goat's rations supplemented with combination of polyherbal supplements showed the best improvement of nutrients digestibility, milk production, milk composition and economic efficiency compared to animals fed the control diet. Also, no deleterious effects on general health of the treated animals were observed. However, polyherbal supplementation of diet improved their milk production and showed that both positive and negative relationships existed between milk constituents of cross bred dairy goat which implies that it is possible to use the regression equations to predict one constituent from the other. Further studies are needed to determine the exact ratio of these combinations and respective mechanisms that elicit these positive effects on milk production on high yielding goats.

In a study conducted by Birhanu and Rita (2019), *Asparagus racemosus* administered in addition to the ration, at the time of milking, led to a significant increase in buffalo milk production. The result indicates that the effect of *Asparagus racemosus* supplementation has statistically significant effects on milk production, with a 5%, 1% increase in protein and fat, while the effect is insignificant on milk acidity and total dry matter. Therefore, feeding *Asparagus racemosus* to lactating buffaloes is advantageous and helps to improve farmers' incomes by increasing the percentage of fat and milk protein.

Abo El-Nor *et al.* (2007) concluded that supplementing lactating buffalo's diets with medicinal plants (fenugreek seeds, caraway, black seeds, lepidium sativum) is recommended as a new step in the field of animal production for improving productive performance of lactating buffalo, regarding milk yield and composition and feed efficiency. Additionally, the results revealed no negative effects on general health of the treated animals. Therefore, medicinal plant seeds can be successfully used in lactating buffaloes rations as feed additives.

At this time, the growing demand for organic food consumption and the need for profitability in animal feed, contributes to the need to establish herbal additives. The use of herbal remedies will not only improve productive efficiency, but also improve reproductive efficiency, overall health and milk production.

Therefore, further research is needed on the chemical composition, dose, beneficial effects of the compounds responsible for galactopoietic activity, as well as possible long-term and/or short-term adverse effects, before using them as such or transforming them into medicines for ruminants.

CONCLUSION

It was established that there are several milk-producing species that can be fed galactogenic effect plants (cows, goats, sheep, buffaloes) and there are a series of medicinal plants more common in making feed mixtures in order to stimulate the growth of milk production (*Asparagus racemosus, Trigonella foenum-graecum, Cuminum cyminum, Carum carvi, Nigella sativa*).

Milk production is influenced by the functioning of the female genital tract and these processes are controlled neurohormonally. Plants with galactogenic effect, intervene in the production of prolactin and in the stressors control. These plants could be administered as supplements in food rations or as concentrated extracts (essential oils, alcohol extracts and lyophilized extract). These supplements are compatible with animal welfare, but it is suggested that basic and applied research be carried out on this issue.

In milk-producing animals, researches are unstructured and therefore difficult to follow and classify. It is necessary to perform complex analyses to determine the phytochemical composition, mechanisms of action, required doses and possible side effects, which will lead to obtaining evidence of efficacy in the milk production of galactogenic herbal preparations. The use of galactogenic plants, as a natural supplement for the growth and support of milk production, is in line with global trends to ensure animal health and welfare for animals and to obtain clean production unaltered by medicinal chemicals, which can be found in milk secretion, thus ensuring the premises for food safety and security.

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