

## Chapter 32

# Homeopathic Veterinary Medicine as an Alternative Treatment in Ruminants

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### ABSTRACT

Within the complementary medicines used in the veterinary field, homeopathy is defining new horizons in both the prevention and treatment of diseases, contributing to animal health and well-being. Being a natural medical system that provides comprehensive care for the animal, it offers the possibility of non-invasive intervention for many diseases that affect ruminants. In addition to offering effective treatment, options with almost zero side effects, its low cost and range of options profile it as a fundamental element in sustainable livestock farming. Due to the natural origin of their compounds, they do not generate a negative impact on the environment. Conventional medications tend to accumulate in the body and contaminate products (meat and milk) and the environment, causing significant losses to producers and severe damage to ecosystems. In comparison, homeopathic treatments do not emit pollutants into the environment. This guarantees food production without organoleptic changes and free of medicine, which reduces the incidence of diseases, associated with toxicity due to the accumulation of medicine, contributing to the availability of safe foods.

### KEYWORDS

Medicine, homeopathy, Natural and mineral extracts, Nosodes, ruminants, Animal production

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### INTRODUCTION

Homeopathy, established as a therapeutic method in the 18th century, over the years has moved between two opposing positions. One, in which those who recommend its use and prescription are located due to its proven effectiveness and practically no side effects. Another, more orthodox, integrates those who consider it a pseudoscience of reduced scope. From this perspective, the infinitesimal dilutions used in the preparation of homeopathic medicines significantly reduce the active ingredient used, which is equivalent to providing placebos (Carreras et al., 2014; Aversa et al., 2016; Ochoa, 2018). However, double-blind research in both humans and animals shows the superiority of homeopathy over placebos (Linde et al., 1997; Cucherat et al., 2000; Mathie et al., 2014; Antunes et al., 2023). Regardless of this controversy, the truth is that homeopathy as alternative medicine shows progressive advances to be on par with conventional medicine (Harrer, 2013; Macías-Cortés et al., 2015; Waisse, 2017; Weiermayer et al., 2022).

As in human medicine, the foundations of Veterinary Homeopathy are a series of «Principles» and has the particularity of being a natural medical system, aimed at treating the causes of the disease, rather than the clinical manifestations. It starts from considering that each animal gets sick differently, depending on its physical condition, age and breeding conditions (Principle of individualization). Therefore, rather than having medications that address a particular disease, these are formulated based on specific needs (Principle of the single remedy). Likewise, it seeks comprehensive care, addressing both the therapeutic and semiological aspects (study of signs) of the patient, in order to provide the most suitable treatment. Medicines made from natural extracts of substances of natural origin, whether animal, vegetable or mineral; use harmless quantities in treatments (Principle of minimum-infinitesimal dose). The purpose of the administration of these substances is to stimulate the animal's immune system to boost its natural reaction and healing mechanisms, without generating side effects. This is achieved by potentiating the action of the extracts, by bringing them to the highest degree of division through multiple dilutions (Principle of similarity) (Obando, 2007; Avello et al., 2009; Lucca et al., 2019).

This Hippocratic principle of similarity *similia similibus curantur* "like is cured by like" is fundamental for homeopathy, maintaining that the symptoms caused by a toxic substance can be cured by a remedy prepared based on that same substance, but supplied in low quantities. Among many examples, such is the case of digitalis (present in the leaves of *Digitalis purpurea*). A glycoside-cardiotonic toxin that affects cardiac function by producing acceleration and irregularities in the heart rhythm. In homeopathy, it is used in tinctures of 1/1000 concentration (homeopathic dilution D3) to treat atrial fibrillations and cardiac arrhythmias, with good results (Briones, 2006; Esteva 2006).

The importance that homeopathy has achieved today is not only reflected in its proven effectiveness, but also in the increase in professional training options in different universities around the world, its incorporation into public health systems and the number of researchers who address this theme. In the field of veterinary medicine, the increase in demand for homeopathic medicines has led to regulating their registration, including, among other aspects: the name of homeopathic strains or mother tinctures, physical and chemical microbiological characteristics associated with the nature of the product, dynamization scale, target species and pharmaceutical form, mainly (BOE, 1995; SENASICA, 2012; ICA, 2020).

### **About Homeopathic Medicines**

Homeopathic medicines are prepared from an original substance (strain, mother solution, mother tincture) in a 1:10 ratio, with which subsequent dilutions are prepared. This solution integrates an active component (isolated from fungi, plants, animals or minerals), diluted in distilled water, alcohol, glycerin, inert sucrose globules or a mixture of lactose and starch. From the original substance, the dilutions are prepared using three methods: the Hahnemanian (the most used), the Korsakovian and the fiftieth-simal (Lucca et al., 2019).

In the Hahnemanian method, decimal dilutions (expressed as 1D, 1DH, 1X or 1XH) are prepared by dynamization or vigorous stirring, from one part of the original substance and 9 of the solvent. The centesimals, 1:100 (1C or 1CH) with one part of the substance and 99 of the solvent. Thus, a 6DH medication is prepared by diluting it six times on a decimal scale (1:10) and a 6CH medication is prepared from six centesimal dilutions (1:100) and so on. An important aspect in the preparation is that after each dilution the material goes through a process of succussion or vigorous shaking, to potentiate (invigorate) its effects. In homeopathy, the more diluted and energized the original substance is, the greater its effects. However, it is important to consider that the potentiation of each medication will depend on the degree of development of the disease (acute or chronic) (Etchaberry, 2007; Aversa et al., 2016).

The most abundant medicines in homeopathy are of plant origin. They are prepared with the whole plant, some of its parts or from extractive products. Those of animal origin include the use of whole animals (bees, ants, scorpions, spiders); some of its parts (gastropod shells), organ extracts (liver, kidney) and secretions. Within these, «Nosodes» are prepared from the etiological agents that cause the disease. The base material is diseased tissues, metabolic products of the sick animal (saliva, urine, and blood), contaminated milk, and dust mites, among others. The administration of these preparations has the purpose of activating a specific immunity. While «Biotherapeutics» are prepared from proteins and other substances produced by the living organism. Finally, those of mineral origin are prepared from minerals obtained in their natural form, purified or from standardized processed chemical mixtures (Briones, 2006; Almeida and Coutinho, 2018; Goulart, 2019). Regardless of their origin, these medications generate a primary effect in the animal, with changes associated with the activation of the immune system. While the side effects reflect the process of recovery and improvement in the animal's health (Giordano, 2018).

### **Advantages of Veterinary Homeopathy in Livestock Production**

Advances in veterinary homeopathy are defining new horizons in animal health, by providing alternatives for the prevention and treatment of diseases. In addition to treatments that follow the principle of individualization, in the field of livestock production, «population homeopathy» becomes very relevant. Given that the geographical, climatological and breeding conditions are common to herds or flocks, in this aspect, rather than treating individuals, the treatment is extensive for the entire population. This allows us to address the occurrence of diseases that, due to their very nature, forms of contagion and prevalence, manifest collectively. From these considerations, the administration of medications is widespread, including healthy animals, for whom it will serve as a preventive measure (da Costa et al., 2014; Lucca et al., 2019).

Likewise, the use of homeopathic therapy in livestock farming seeks to introduce natural, less aggressive treatments that benefit the health and well-being of animals. Indirectly it provides benefits to humans, both in the availability and safety of the products. This aspect is of great relevance today, joining efforts to develop sustainable livestock farms with less environmental impact, with the production of drug-free foods (Casali et al., 2011; Goulart, 2019). The advantages of using homeopathic medicines in livestock production include:

- a) **Economical:** They are less expensive than allopathic medicines, with benefits for the producer (Corrêa et al., 2009; Giordano, 2018; Almeida and Coutinho, 2018).
- b) **Environmentally friendly:** Due to their natural origin, they do not emit pollutants, avoiding damage to water and soil, as well as to biocenoses that provide services to the ecosystem (da Costa et al., 2014; Almeida and Coutinho, 2018; Lucca et al., 2019; Pinheiro et al., 2021).
- c) **Easy and non-invasive administration:** The administration of oral homeopathic medicines, together with food, mineral salts or water, avoids trauma or restraint procedures associated with the use of injections. Likewise, in water or mineral salts, in outbreaks or cases in which the entire flock must receive prevention or control treatments. In the case of tablets or powders, they can be diluted in water, or sprinkled on the mucous membranes, or nose, so that the animal ingests it by licking it (Corrêa et al., 2009; Almeida and Coutinho, 2018; Lucca et al., 2019).
- d) **Stress reduction:** The energetic power of homeopathic medicine contributes to reducing animal stress and promoting animal well-being. The decrease in stress during breeding increases quality production (da Costa et al., 2014; Lucca et al., 2019).
- e) **They do not cause adverse effects in the animal:** The correct use of the homeopathic medicine avoids therapeutic shock due to intoxication and saturation of the organism, which prevents the development of resistance (Corrêa et al., 2009; da Costa et al., 2014; Asanza et al., 2017).

f) Animal products free of residues: Unlike drugs, homeopathic medicines do not accumulate in the body. This implies the production of food without organoleptic changes, free of medicines, reducing the incidence of diseases associated with toxicity due to the accumulation of medicines in meat and milk (Casali et al., 2011; Almeida and Coutinho, 2018; Lucca et al., 2019; Pinheiro et al., 2021).

**Table 1:** Homeopathic medicines used in the treatment of bovine mastitis

ORIGIN	MEDICATION	DILUTION
VEGETABLE	<i>Aconitum napellus</i>	6CH
	<i>Arnica montana</i>	30CH
	<i>Asa foetida</i>	6DH
	<i>Atropa belladonna</i>	30DH, 12CH y 30CH
	<i>Bryonia alba</i>	30DH y 30CH
	<i>Calendula officinalis</i>	30DH
	<i>Conium maculatum</i>	30CH y 200 CH
	<i>Ipecacuanha</i>	30CH
	<i>Phytolacca decandra</i>	12DH, 30DH, 6CH, 12CH, 30CH y 200CH
	<i>Pulsatilla nigricans</i>	6DH, 30DH, 6CH y 30CH
ANIMAL	<i>Urtica urens</i>	30DH e 30CH
	<i>Apis mellifica</i>	30CH
	<i>Calcarea carbonica</i>	6DH y 6CH
	<i>Carbo animalis</i>	12CH
	<i>Lachesis muta</i>	6DH y 12DH
	<i>Sepia succus</i>	6DH
MINERAL	<i>Calcarea fluorica</i>	200CH
	<i>Calcium phosphoricum</i>	6DH
	<i>Hepar sulphur</i>	200DH, 12CH y 30CH
	<i>Kalium muriaticum</i>	6DH
	<i>Lac vaccinum</i>	12CH
	<i>Magnesium fluoricum</i>	200DH y 12CH
	<i>Mercurius solubilis</i>	6DH, 6CH y 30CH
	<i>Phosphorus albus</i>	12CH, 30CH y 200CH
	<i>Silicea terra</i>	6DH, 30DH, 6CH, 12CH y 30CH
	<i>Sulphur</i>	6DH, 30DH y 12CH

**Source:** Own elaboration based on the information reported by Almeida and Coutinho (2018).

### Health Problems in Ruminants

At a global level, animal production faces the challenge of preventing, containing and eliminating animal diseases, due to the impacts they generate. In addition to the effects on production, productivity, profitability and food security, the implications that these diseases have for human health stand out (FAO, 2009). According to the World Organization for Animal Health, 60% of the pathogens that affect human health originate in domestic and wild animals. 75% of emerging diseases that affect human health have their origin in animals (WOAH, 2018).

The problem is complex, especially if one considers that at the human-animal-environment interface, the number of diseases tends to increase. In addition to the increase in zoonoses and the impact on food security due to the loss of sick animals, the scale and intensity of diseases is varying (FAO, 2024). In livestock, diseases associated with stress are increasingly common, mainly in intensive systems. The increase in the prevalence and distribution of originally endemic diseases and the growing resistance to antimicrobials represent a serious threat (WOAH, 2018; Weiermayer et al., 2022).

In ruminants integrated into livestock production, various diseases are generating negative effects. In cattle, the most notable are bovine brucellosis, foot-and-mouth disease, tuberculosis, contagious nodular dermatitis, bovine viral diarrhoea, vesicular stomatitis, Rift Valley fever, enzootic bovine leukosis, contagious bovine pleuropneumonia, bovine trichomoniasis, bovine papillomatosis and infectious bovine rhinotracheitis. In small ruminants (sheep and goats), foot and mouth disease, scrapie, «peste des petits ruminants», vesicular stomatitis, Rift Valley fever, brucellosis, smallpox and contagious agalactia, mainly. Added to these diseases are reproductive disorders and parasitosis, caused by the action of endo- and ectoparasites (Aversa et al., 2016; MAPA, 2021; Ojeda et al., 2022).

### Efficacy of Homeopathic Therapy in Ruminants

Given the global health challenges faced by livestock production, various studies carried out demonstrate the effectiveness of homeopathic therapy in the prevention and care of diseases in ruminants of livestock importance. The work carried out by Doehring and Sundrum (Doehring and Sundrum, 2016) exemplifies this diversity. From the review of works published from 1981-2014, they identified 4,448 scientific articles and 50 doctoral theses. They include individual trials, and mostly population trials. Methodologies vary with unblinded, single-blind, double-blind and mostly randomized

controlled trials (RCTs), 34% used single medications, 56% combined homeopathic therapies and the remaining 10%, it was not possible to integrate them into this differentiation. The origin of the ingredients is variable (animal, vegetable, mineral, nosodes). In individual therapies (8%), the route of administration included oral, subcutaneous or topical (aerosols and cream). In the population, the route was always oral, 85% of the studies were carried out with dairy cows, with preventive and care treatments. Among the preventives, postpartum disorder and mastitis stand out. In care, acute or subclinical mastitis, reproductive disorders (retained placenta and endometriosis), mainly.

**Table 2:** Efficacy of homeopathic therapies in cattle

Animal Diagnosis Country	Treatment	Results	References
Holstein cows with cystic ovarioathy/50 days postpartum (Brazil)	Comparative Homeopathic (H): <i>Thuya occidentalis</i> 6CH, <i>Apis mellifera</i> 6CH and <i>Oophorium</i> 6CH Allopathic (A): Ovsynch® Control (C): No treatment	Return to estrus rate C=100%; H=93.5%; A=11.11%; Pregnancy rate after the 1st Artificial Insemination (AI) C=0%; H=62.6%; A=22.22% Pregnancy rate after the 2nd AI C=31.82%; H=87.5%; A=55.56% Cystic persistence rate C=68.18%; H=12.5%; A=44.44% Number of services per conception C=3.36; H=1.40; A=2.14	(Rangel et al., 2003)
Crossbred cows with true anestrus (India)	Homeopathic treatment <i>Calcarea phosphorica</i> 30C <i>Aletris farinosa</i> 30C <i>Pulsatilla</i> 30C <i>Aurum muriaticum natronatum</i> 30C <i>Sepia</i> 30C <i>Phosphorus</i> 30C	100% of cows in anestrus presented estrus with an interval of 27.5±5.3 days All animals conceived with a rate of 54.5% with 1.83 services per conception Increase in serum estradiol concentration (20.88 pg/mL) compared to pretreatment (11.71) and control (10.43).	(Rajkumar et al., 2006)
Holstein, Jersey and Brown Swiss calves Diarrhea prevention (Honduras)	Homeopathic (H): Milk replacer added with homeopathic medicine Factor Infecciones® Control (C): No treatment	Prevalence of minor diarrhea in H calves (38.89%) compared to C (61.11%)	(Asanza et al., 2017)
Holstein cows. Early breast inflammation (France)	Homeopathic medicine Dolisovet® ( <i>Belladonna</i> 1DH, <i>Calendula</i> MT, <i>Equinacea</i> 1DH, <i>Dulcamara</i> 1CH)	Decrease in electrical conductivity, measured in the automated milking system Improvements in milk quality Disappearance of inflammation	(Aubry et al., 2013)
Cow with recurrent mastitis (Brazil)	Individual treatment Start: <i>Hepar Sulphur</i> 18CH y <i>Belladonna</i> 18 CH Change 1: Milk nosode and <i>Pulsatilla</i> 18 CH Change 2: <i>Pulsatilla</i> y <i>Arnica</i> 18 CH	Total recovery from recurrent mastitis Increase in daily milk production	(Kriquer et al., 2015)
Swiss cows drying Mastitis prevention (Swiss)	Comparative Homeopathic (H): Biotherapeutic 10CH Allopathic (A): Orbeseal® Control (C): No treatment	Incidence of H<A<C mastitis Normal milk secretion in H	(Klocke et al., 2010)
Lactating dairy cows Mild and moderate mastitis (Kazakhstan)	Homeopathic (H): Homeopathic preparation (Kazakhstan Agrotechnical University) Control (C): No treatment	Faster recovery from mastitis in H Higher concentration of $\gamma$ -globulins in H (5.16%) vs 3.27% in C Increased calcium and phosphorus in blood serum H (12.2%) vs C (9.4%)	(Kukeyeva et al., 2023)
Holstein cows. Antibiotic-resistant mastitis (Brazil)	Comparative Homeopathic (H): Homeopathic complex 20g/d/60d Placebo (P): CaCO <sub>3</sub> 20g/d/60d	Better results in H than in C, in: Somatic cell count (cell/mL) Milk production (kg/d) Milk components (% protein, fat, lactose and total solids) Serum levels of lactic acid, glucose, ammonium and cortisol	(Antunes et al., 2023)

Crossbred cattle with massive flat and pedunculated papillomatosis (Brazil)	Homeopathic (H): <i>Thuja occidentalis</i> 30CH Phytotherapeutic (Ph): Mother tincture of <i>Thuja occidentalis</i> Control (C): No treatment	Higher percentage of animals recovered in H (61.1%). Cure percentage, Ph 50% and C 16.66% by spontaneous regression. Greater effectiveness in homeopathic treatment	(Siqueira et al., 2014)
Holstein cows with papillomatosis (Brazil)	Homeopathic treatment <i>Thuja</i> 18 CH	Progressive loss of warts post-treatment Significant reduction in warts	(Kriger et al., 2015)
Cows with tick infestation (Cuba)	Comparative Homeopathic (H): <i>Ledum palustre</i> 200CH, <i>Psorinum</i> 200CH Allopathic (A): Esteladón 300	High effectiveness of H (92%) vs A (87%), with a lower cost equivalent to 1/3.	(López et al., 2008)
Holstein X Zebu Bulls Fascioliasis (Cuba)	Homeopathic treatment Nosode (30CH) of larvae and adults of <i>Fasciola hepatica</i>	Reduction in the proportion of parasites from 47.5% to 10%	(Cabezas and Fernández, 2008)
Dual purpose mixed breed cattle Gastrointestinal nematodes (Ecuador)	Comparative Homeopathic (H): <i>Artemisa cina</i> (H1), <i>Sulphur</i> (H2), <i>Arsenicum album</i> (H3) Allopathic (A): Fenbendazole 10% Control (C): No treatment	100% Egg reduction percentage (%ER) in H A: 88.5% in the fourth week, with a decrease in the 7th-9th week from 42.68 to 5.32%. H: Greater effectiveness in H1 (93.62%) followed by H2 (84.57%) H1 the most effective	(Pacheco-Merelo et al., 2023)

**Source:** Own elaboration, based on the references that are registered.

**Table 3:** Efficacy of homeopathic therapies in sheep and goats.

Animal Diagnosis Country	Treatment	Results	References
Pregnant sheep and lambs Supplementation (Brazil)	Homeopathic (H): <i>Natrum muriaticum</i> 10-60CH, <i>Calcium carbonicum</i> 10-30CH, <i>Silicea terra</i> 10-400CH and <i>Hypotalamo</i> 10-30CH Control (C): No treatment	H: Total protein and higher globulin in treated sheep and lambs Serum albumin without differences in H and C ewes, higher in H lambs	(Dias et al., 2021)
Goats infected with <i>Mycoplasma agalactiae</i> cause: contagious agalactia, mastitis and arthritis (Brazil)	Comparative Homeopathic (H): Biotherapeutic prepared with <i>M. agalactiae</i> from milk Allopathic (A): Tilosina y oxitetraciclina Control (C): No treatment	H: Clinical cure in all animals between 7-49 days. No abortions A: Reduction of signs, but not all animals cured. 12% with agalactia, 28% with mastitis, 25% with arthritis. 12,5% abortions C: Persistence of diseases, development of keratoconjunctivitis in one animal and death of another due to chronic disease. 28.6% abortions	(Souza et al., 2013)
Suffolk Lambs with <i>Haemonchus contortus</i> Hemoncosis (Mexico)	Comparative Homeopathic (H): <i>Artemisa cina</i> 30CH, 1mL/5 kg body weight Allopathic (A): (A1) Albendazole (50mg/mL) 7.5mg/kg body weight; (A2) Levamisole 7.5mg/kg body weight Control (C): No treatment	IEH (Inhibition of egg hatching): 100% in H, 93% in A1. ILM (Inhibition of larval migration): 65,7% in H, 0% in A2 (100% lethality), in C 92,0 ± 12,4% FAMACHA index (at 28 days): (H) 2,0 ± 0,31, (A1) 1,0 ± 0,22, (C) 3,0 ± 0,71	(Higuera-Piedrahita et al., 2020)
Parasitized sheep and goats (Spain)	Comparative Homeopathic (H): Yvercit® Allopathic (A): (A1) Levamisole, (A2) Ivermectin, (A3) Fenbendazole (A3)	H: 90% efficiency A1: 90% effectiveness A2: 0% efficacy/15d post-treatment (anthelmintic resistance) A3: 60% efficiency	(Oros, 2018)
Suffolk sheep with gastrointestinal parasites (Mexico)	Comparative Homeopathic (H): Parafil® ( <i>Allium sativa</i> 30C, <i>Sulphur</i> 30 C y <i>Stannum metallicum</i> 6C) Allopathic (A): Ivermectina Control (C): No treatment	H: Greater weight gain (3,7), lower FAMACHA index (1.93), eggs per gram of feces (EPG) 564±462 A: Less weight gain (2.5), FAMACHA 2.95 and EPG 1027±462 C: FEC 3037±462	(Luna et al., 2017)

**Source:** Own elaboration, based on the references that are registered.

## Cattle

The main problem in dairy cattle during the production period is mastitis. Mastitis is the most important cause of losses, due to the decrease in milk production, the disposal of milk contaminated with antibiotics and the costs of premature culling of cows of high genetic quality with high milk production potential. Its etiology is multifactorial (infectious agents, genetics, nutrition and condition of the animal, facilities, management, milking hygiene), so its prevention and treatment represents a great challenge, especially due to microbial resistance associated with the indiscriminate use of antibiotics (Almeida and Coutinho, 2018). Table 1 lists the homeopathic medicines used in the treatment of bovine mastitis.

As examples, in the study carried out with dairy cows in India by Varshney and Naresh (Varshney and Naresh, 2005) compared the effectiveness of allopathic and homeopathic medications in the treatment of mastitis. The homeopathic complex applied (Healwell VT-6) was a combination of *Phytolacca*, *Calcarea fluorica*, *Silica*, *Belladonna*, *Bryonia*, *Arnica*, *Conium* and *Ipecacuanha*. Allopathic treatment included a combination of Novobiocin sodium and procaine penicillin G. Although the average recovery period was shorter in allopathic treatment (4,5 days) than homeopathic treatment (7,7), the efficacy and costs of treatment were more satisfactory in homeopathic treatment; 86.6% of cows responded positively, with a cost of 21.4 rupees (€0.39; US\$0.47) compared to allopathic treatment, with 59.2% efficacy and a cost of 149.20 rupees (€2.69; US\$3.28).

For their part, Ribeiro et al. (Ribeiro et al., 2007) carried out a study in Brazil, with 32 cows with subclinical mastitis confirmed with the California Mastitis Test (CMT), using a homeopathic complex for treatment, made up of four groups based on their pathogenic action. Group A, included medicines that increase milk production, *Phytolacca* D30, *Urtica urens* D3 and *Asa foetida* D6. Group B, three medicines used against subclinical mastitis, *Phytolacca* D12, *Magnesium fluoricum* D12 and *Kalium muriaticum* D6. Group C, other medicines used for subclinical mastitis, *Hepar sulfur* D200, *Magnesium fluoricum* D200, *Streptococcinum* D200 and *Stafilococcinum* D200. Group D, anti-inflammatory medications, *Urtica urens* D30, *Lachesis* D12 and *Pulsatilla* D30. The homeopathic complex was prepared on decimal scales from the mother tinctures, with a mixture of the medications from each group, administered in the diet at a dose of 300g/day. The start of follow-up (day 0) started from the number of cases detected before treatment and continued at 30, 60 and 90 days. The 44.5% of CMT positive cases decreased to 28.1%, 13.3% and 3.9% at 30, 60 and 90 days, respectively. These results showed the effectiveness of the treatment and a statistically significant reduction in the number of cases.

Although mastitis is the main problem in cattle farming, other diseases and conditions affect cattle. Among these, infestations by *Rhipicephalus microplus* ticks. In addition to damaging the health of animals, directly through blood consumption, they can also be transmitters of bovine babesiosis. This generates important impacts because the conventional control measures used based on chemical products contaminate the environment and the products (milk and meat), in addition, as in the case of antibiotics, there are reports of resistance and multiple resistance to Ixodidocides. Likewise, satisfactory results are reported from homeopathic treatments to treat bovine papillomatosis, diarrhea, different reproductive problems (uterine prolapse, cystic ovarioopathies, induction of estrus, reduction of the puerperal period, improvements in the pregnancy rate, infertility); activation of ruminal fermentation, hepatic (liver modulation and hepatoprotection), among others (López et al., 2008; da Costa et al., 2014; Pinheiro et al., 2021). Table 2, compiles some results that show the effectiveness of homeopathic treatments in cattle, in the prophylaxis or care of ailments.

## Sheep and Goats

Although the studies carried out in small ruminants are not so numerous, they do coincide in addressing the diseases that most affect health and productivity. Most of them address gastrointestinal parasitosis, which is of great relevance due to the impact they have on the sheep and goat production chain. The main effects are associated with losses due to delayed growth, low weight gain, compromised reproductive performance, low fertility, and drop in milk production, among others. The most frequent and recurrent are those caused by nematodes, highlighting *Haemonchus contortus*, as well as *Trichostrongylus colubriformis*, *Oesophagostomum columbianum*, *Strongyloides papillosus* and *Trichuris ovis*. The resistance to anthelmintics manifested in flocks around the world supports the search for new alternatives as part of integrated control strategies, where homeopathy plays a relevant role (Crook et al., 2016; Higuera-Piedrahita et al., 2020; Ojeda et al., 2022).

Studies on diseases and illnesses in small ruminants are scarce. Table 3 includes some examples of studies carried out with these species, which show the effectiveness of homeopathic medicine.

## Conclusion

In the current conditions in which the search for sustainability in production is imperative, in order to guarantee the availability and safety of food, as well as the preservation of the environment; Homeopathic medicine represents an alternative to ensure the health and well-being of ruminants of livestock importance. Its low costs, ease of non-invasive application, its proven effectiveness, the non-toxicity of livestock products and the environment, appear as a condition of possibility to improve competitiveness and productivity, strengthening the transition towards sustainable livestock farming. Currently, these aspects are of great relevance, especially due to the increase in demand for proteins of animal origin. Unlike conventional medicine, which, due to accumulation in the body, contaminates meat and milk intended for human consumption, homeopathy offers the production of foods free of contaminants. The possibility of carrying out

extensive treatments in livestock production units serves a dual purpose because, in addition to addressing the health problems manifested in some animals in the herd or flock, it serves as a preventive measure for healthy animals. This reduces the incidence of sick animals, minimizes treatment costs and reduces economic losses for producers.

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