OBSERVATIONS CONCERNING THE USE A BIODEGRADABLE PROPOLIS EXTRACT, FOR METAPHYLAXIS AND TREATMENT OF PODAL DISEASES IN DAIRY COWS – PRELIMINARY STUDY

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Abstract: *Propolis is one of the few natural remedies that has maintained its popularity over a long period of time. The pharmacologically active molecules are flavonoids, phenolic acids, and their esters. These components have multiple antimicrobial effects on bacteria, fungi and viruses and in addition, propolis have anti-inflammatory, immunomodulatory activities, and antitumor activity. The majority of lameness (> 90%) involves the foot and the primary cause of lameness in most herds are confinement on concrete. Footrot, interdigital dermatitis, and digital dermatitis are diseases with an infectious component responsive to antibiotic treatment, particularly when identified early-on in the course of disease.*
The objective of this study was to identify the most prevalent podal diseases on a dairy herd, and based on well known Propolis properties to investigate the effectiveness of different therapeutic and metaphylactic protocol on podal diseases management(3) . We used a hygiene scoring assessment to determine the therapeutic and methaphylactic protocol in corelation with lamness scoring. Score the manure accumulation on the hoof and leg of the rear feet on a four-point scale where 1=clean, 2=splashes, 3=plaques but hair visible and 4=plaques and no hair visible.The protocol included the podal topical treatment(hoof functional and therapeutic trimming, bandages, medication application completed with footbathing.
In herds with fewer than 25% of cows scoring a 3 or 4 score, footbathing can be done as needed. Conversely, where herds are >75% 3 and 4 scores, then footbathing is probably a necessity 7 days per week, as methaphylactic protocol.

Key words: propolis, methaphylaxis, treatment, dairy cows

INTRODUCTION

Metaphylaxis and control of podal diseases in dairy herds is a challenging task, which include many uncontrolled factors and contributing factors like: nutrition, hygiene, cow comfort (freestall management), walking surfaces, time spent standing on concrete, hoof health, and hoof trimming.

Lame cows with podal diseases must be identified through locomotion scoring and be individually examined. Prevention and metaphylaxis are more economical and better than treatment, but close observation and prompt treatment of lame cows will decrease the duration and thus the cost of each case(6). Footbaths are used for methaphylaxys and prevention, not treatment of active painful lesions. It does not treat active lesions or infections, it helps control the spread of infection from cow to cow. Footbaths are often poorly designed and located. Footbath solutions may help clean the foot of manure and disinfect the interdigital space. Some solutions are probably primarily cleaning agents; other chemicals are disinfectants; antibiotics should only be used in outbreak situations where the

infection rate must be brought under control. There are several commercial products available, most of them are very expensive and not environment friendly. The Propolis based extract is an alternative, effective and environment friendly solution(3).

Propolis has several therapeutic properties, such as antibacterial, anti-inflammatory, healing, anesthetic, anticaricinogenic , antifungal, antiprotozoar and antiviral activities(5,8). Because of these properties the Propolis is a effective-cost potential anti-inflammatory agent for both acute and chronic stages of podal diseases in dairy cows.

MATERIAL AND METHODS

The observations from the study were performed on a herd with 200 milking cows from Holstein breed. Hygiene scoring and identifying the diseases in the herd, was followed by podal topical treatment(hoof functional and therapeutic trimming, bandages, medication application) completed with Propolis biodegradable extract footbathing. We scored the cows from the study based on the scoring chart according with manure contamination on the lower legs(Table 1.).

Hoof & leg hygiene scoring chart. Table 1.

Score 1	Score 2	Score 3	Score 4
-Legs and feet are clean; -Little or no manure contamination of lower limbs.	-Legs and feet are slightly dirty; -Lower limbs are lightly splashed with manure.	-Legs and feet are moderately dirty; -There are distinct placques of manure on the foot, progressing up the leg.	-Legs and feet are very dirty; -There are confluent placques of caked-on manure on the foot and higher up the lower leg.

All the lame cows were examined and the podal diseases were identified based on clinical signs and lameness scoring. The major podal diseases identified in the herd were: digital dermatitis, interdigital dermatitis, interdigital hyperplasia, sole ulcer, traumatic and septic pododermatitis, foot rot, exongulations, and others.

After hygiene scoring, podal diseases identifying, all the cows from the herds were trimmed during a week with a rotoclip disc, by restrain in the hoof trimming chute(9)(Fig.1).

Fig.1. Cow restraing in trimming chute.

For this study we used two different discs : rotoclip aluminium disc with carbide steel blades fitted to them(Fig.2.) and tungsten carbide tipped chain saw disc. A correct functional hoof trimming were done with these disks using a standard sole thickness of 5 mm in the toe area(2).

Fig.2.Hoof trimming with rotoclip disc

After a regular functional trimming, all the cows with podal lesions were surgically debrided, topical Propolis spray or Oxytetracycline powder applied, after that were bandaged and wrapped with Vetotape, and sometime a block was applied(Fig.3.).

a.

b.

c.

Fig. 3.Topical treatment and bandaging.

Because of high incidence of podal diseases in the herd(especially digital dermatitis) correlated with hoof & leg hygiene scoring, the entire herd were passed through the footbath with Propolis extract three times per day after every milking.

Later the protocol of metaphylaxis, were reduced after 3 months at one day per week. Twin footbath were applied, because of high percentage of score 3 and 4 in the herds(Fig.4).

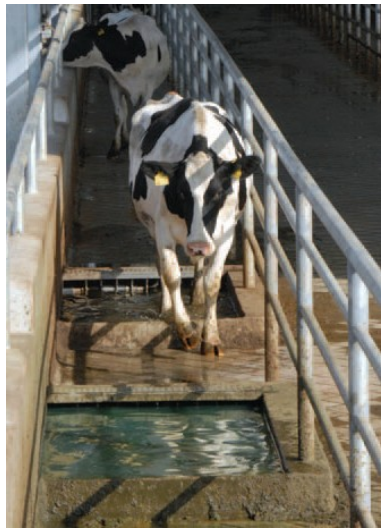

Fig.4. Twin footbath.

RESULTS AND DISCUSSIONS.

Distribution of the herd correlated according the hoof & leg hygiene scoring chart was as presented in the next chart(Chart 1)

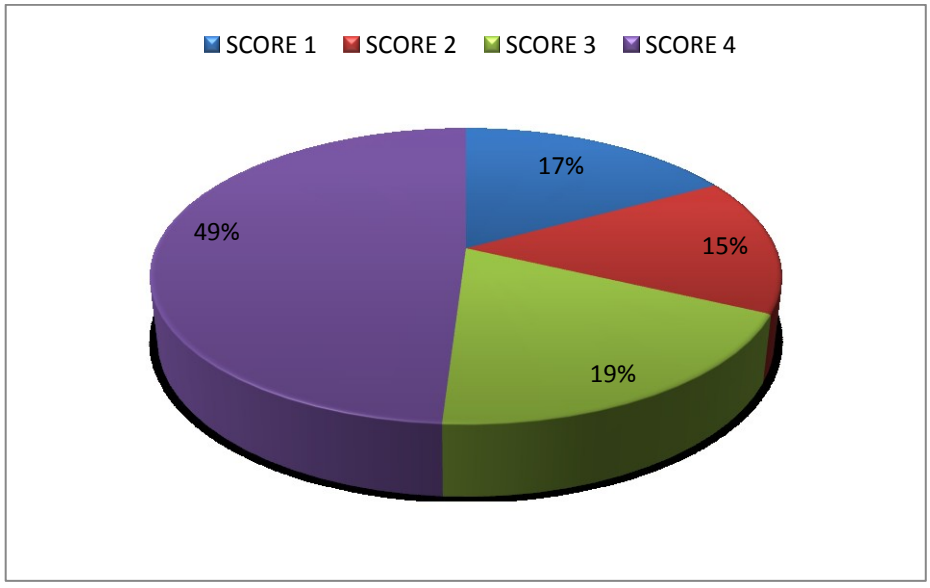

Chart 1. Hoof & leg hygiene scoring

From the previous chart is observing that at the beginning of the study the percentage of the score 3 and 4 were 66%. Because of this quite high incidence correlated with high proportion of the podal diseases with an infectious component in the herd, to trigger the

metaphylaxis effect were applied footbathing for a week, three times daily after each milking. The footbathing complemented the therapeutic measures as hoof trimming, topical medication applying and bandages. Because of this aggressive control protocol of podal diseases, the new clinical cases did not appear, and on top of this the number of cows with lameness decreased after first week of footbathing with Propolis extract(3). Increasing the quality of cleaning-scraping of manure operation, associated with appropriate bedding, improved the percentage of animals with score 1 and 2 at 70% which allowed to decrease the the number of metaphylaxis protocol at 3 days per week for the next months, and after to 1 day per week, three times daily.

The healthy status of the herd and the major podal diseases identified in the herd were distributed as are presented in the next table(Table 2).

Table 2. Status of podal health in the herd

Status or disease	Number of cows	Procentage	Ratio
Healthy cows	105	52,5%	**54,5%**
Digital dermatitis	58	29%	**45,5%**
Interdigital dermatitis	7	3,5%	
Interdigital hyperplasia	5	2,5%	
Sole ulcer	4	2,0%	
Traumatic and septic pododermatitis	9	4,5%	
Foot rot	3	1,5%	
Exongulations	3	1,5%	
Others	3	1,5%	

The high incidence cows lame with podal diseases with an infectious component in this study, justified the need of an metaphylaxis protocol to include an anti-infective agent. Because of restricted use of antimicrobial agents in dairy farms, we decided to use an natural product extract as is Propolis. Propolis has been used in popular medicine for a very long time; however, it was not a drug intended for all diseases. The aim of this study is to discuss the use of propolis with emphasis on its antimicrobial, anti-inflammatory and healing properties(5,7,8).Many other biological and pharmacological properties of propolis have been noted like open lesions healing and tissue regeneration, immunological properties and antioxidant and immunomodulatory actions. Consequently, these properties motivated the increasing interest on Propolis extract in this study.

The clinical results obtained in this study, translated by decreasing the number of cows in lameness in the herd and not expansion of podal diseases with an infectious component, proved the efficacy of Propolis extract footbathing in the metaphylaxis protocol.

The following are the most common hoof diseases that lead to lameness:

Digital dermatitis (papillomatous digital dermatitis, footwarts, heel warts,) is a superficial dermatitis that occurs most often on the rear feet at the commissure of the interdigital space near the heels. It is thought to be a multifactorial disease with bacterial involvement. Response to topical antibiotics is good but recurrence is common. *Interdigital phlegmon (foul in the foot, footrot)* is a bacterial disease that is generally caused by a synergism between two bacteria. It has a very characteristic smell and causes necrosis in the

interdigital skin. It can invade the deeper tissues if not treated early with antibiotics. *Sole and white line hemorrhages* originate from damage to corium with the blood being incorporated into the horn as it grows. These will become visible several weeks after the insult depending on the thickness of the sole and rate of growth. A sole abscess or white line abscess can occur if the hemorrhage becomes infected. *Sole ulcer* is a continuous opening in the sole horn that exposes the corium. The typical site is the rear middle part of the sole, which corresponds to the rear part of the pedal bone. The prognosis for sole ulcers depends on the damage to the horn producing tissue and the condition of the other claw. *Toe ulcer* occurs when the sole is worn too thin at the toe, or the toe drops inside the horn due to laminitis, or if the toe is accidentally trimmed too thin. Toe ulcers will always require an orthopedic block on the opposite claw. *White line disease* starts with fissures due to hemorrhage and poor quality horn formation. Rocks and gravel can become embedded in these and cause further problems. The problems with the stones or gravel are more likely the result of white line disease rather than the cause of the disease. (1,4,8).

CONCLUSIONS

1. The Propolis extract for footbathing are useful as a metaphylactic protocol for control of podal diseases in dairy cows
2. The efficacy of footbathing with Propolis depending by the hygiene score of the herd. The higher percentage of score 3 and 4, the higher will be number of days of foothbathing.
3. For obvious improvements of podal herd health status in herds with high incidence of podal diseases with infectious components, minimum a week with three times daily footbathing with Propolis extract are necessary.
4. Prevention and metaphylaxis protocol of footbathing with Propolis extract in dairy herds is completing and adequate hoof trimming, treatment, bandaging and an appropriate manure management.
5. Footbaths with Propolis extract are used for prevention and metaphylaxis, not for treatment of active painful lesions.

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