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Evaluation of a Polyherbal Spray as Supportive Therapy for Wound and Arthritis Pain in Cows

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ABSTRACT

Background: This study evaluated the effectiveness of a polyherbal spray (PHS) as a supportive treatment for pain and inflammation in dairy cows with wounds and arthritis. Fifteen cows experiencing pain and inflammation were treated with PHS for 14 days or until recovery. Researchers monitored pain, swelling, activity level, recovery time and product performance.

Methods: Pain and swelling were reduced as early as day 2 of PHS application, corresponding improving the activity level. The average recovery time was 3.4 days and the owners rated the product performance highly.

Result: These findings suggest that PHS could be a valuable supportive therapy for managing pain and inflammation in dairy cows with wounds or arthritis.

Key words: Arthritis, Hard tissue swelling, Inflammation, Pain, Polyherbal Spray (PHS), Wound.

INTRODUCTION

Animals experience pain, which can be acute or chronic, resulting from tissue damage, inflammation and nerve damage (Maurer, 2001), (Woolf and Salter 2000). Chronic pain can last for months and significantly impairs animal welfare (Woolf and Mannion, 1999). Wounds occur when the outer layer of skin breaks and exposes the underlying dermis (Maurer, 2001) and nutrition has been reported to be a crucial part of the wound healing process as malnutrition has been well documented to impede wound healing (Reedman *et al.,* 2022). Pain management is crucial for wound healing, as excessive pain caused by stress hormones can inhibit the process (Wang *et al.,* 2018 and Lindholm and Searle, 2016). Lameness in dairy cattle hurts animal welfare and farm profitability due to reduced milk production, fertility and premature slaughter (Fabian *et al.,* 2014), (Bruijnis *et al.,* 2012), (Ettema *et al.,* 2007, Bicalho *et al*., 2007 and Booth *et al.,* 2004).

Osteoarthritis, a degenerative joint disease, is common in livestock and can cause joint deformities, inflammation and abnormal bone growth (Desrochers, 2013), (Persson *et al.,* 2007 and Heinola *et al.,* 2013). Treatment options for osteoarthritis include steroids, NSAIDs and analgesics (Smolen *et al.,* 2014). However, NSAIDs and analgesics causes serious side effects such as gastrointestinal ulcers, bleeding and kidney problems (Abdel-Tawab *et al.,* 2011), (McAlindon *et al.,* 2014), (Achmad *et al.,* 2021) and steroids have serious adverse drug reactions and considered toxic for long term usage (Reddy and Raju, 2018). Tumor-related pain is another major problem in dairy cows, affecting fertility and milk production (Matucci *et al.,* 2016). Herbal remedies are natural products obtained from medicinal plants, which are a highly diverse source of bioactive compounds, namely, phytochemicals. The application of natural products as an alternative therapeutic approach is in continuous growth worldwide. Plant extracts are wealthy in phenolic and different compounds with appropriate antioxidant, anti-inflammatory, anti-atherogenic and antimicrobial activities (Mihai *et al.,* 2019), (Okonogi *et al.,* 2023). Himalaya Wellness Company has developed Polyherbal Spray (PHS) to relieve pain and inflammation in dairy cattle with injuries and hard tissue damage caused by arthritis. The purpose of this study was to evaluate the effectiveness of PHS as a supportive treatment in reducing pain and swelling associated with inflammation.

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MATERIALS AND METHODS

PHS

RumInfla, a PHS from Himalaya Wellness Company, can resolve pain and swelling in both soft and hard tissues. It combines the power of nature with extracts like citrus, turmeric, mint and cinnamon. Many plants growing in the wild will have diverse pharmacological action on many diseases (Paliwal, 2022) and many plants are used as the

primary source of medicine (Sahoo *et al.,* 2024). The essential oils in PHS might help regulate inflammation, while curcuminoids from turmeric offer their well-known anti-inflammatory benefits. Furthermore, PHS may provide temporary pain relief by influencing nerve signals.

Ethical approval

The animal usage for this study was approved by The Committee for Control and Supervision of Experiments on Animals (CCSEA), protocol no.: AHP/LA/12/22.

Study animals

The study examined 15 dairy cows from Nelamangala, Bengaluru District, Karnataka, owned by individual clients. These cows were a mix of Holstein Friesian cross (HFx) and Jersey breeds, aged between 3.0 and 7.0 years. All cows suffered from pain and inflammation associated with hard tissue swelling caused by wounds or arthritis. Inclusion and Exclusion Criteria: Dairy cows with lacerated wounds, arthritis, swelling, injury, pain and inflammatory conditions associated with joint till were included in the study. Where, dairy cows with mastitis with udder abscess, ascites and fatty liver syndrome, FMD, fever from any infections and severe disease conditions (TB, Metritis, Prolapse) were excluded from the study.

Study design

All 15 cows were included in a single group (n= 15) and received PHS treatment for 14 consecutive days or until their condition fully recovered. Total duration of study was 4 months. Each cow served as its control, meaning their pretreatment condition (day 0) was compared with their condition during treatment (14 days). To isolate the effects of PHS, no other herbal pain relievers or anti-inflammatory medications were used during the study.

Animal care

The cows remained with their owners throughout the study and were kept in their usual housing conditions. Their regular diet of concentrated feed (approximately 10 kg/day/cow) and roughage (approximately 34 kg/day/cow) was maintained and they had continuous access to drinking water.

Evaluation

Pain, swelling, activity level, recovery progress and product performance were assessed during pretreatment (day 0) and during the treatment (14 days) based on subjective assessment (Visual Analogue (VAS) Scale) (Chaithra *et al.,* 2022). Table 1 displays the details of these assessments. The effectiveness of PHS was determined based on the overall improvement observed in these parameters.

Statistical analysis

The data are expressed as Mean ± standard error of mean (SEM). Data were subjected to statistical analysis using one-way ANOVA followed by Dunnett's multiple comparison tests to draw a comparison between control and treatment groups. $p \leq 0.05$ was considered as statistically significant. SPSS (Statistical Package for Social Sciences) version 20. (IBM SPASS statistics [IBM corp. released 2011] was used to perform the statistical analysis.

RESULTS AND DISCUSSION

The study showed significant improvements in the cows' pain and swelling as early as the second day of using PHS ($p<0.001$). On days 3 and 4, the majority of cows experienced complete relief from pain and swelling, respectively (Table 2). Further more, their activity levels significantly improved ($p< 0.001$) starting from day 2 of the PHS application (Table 2). The average recovery time was 3.4 days and client satisfaction scores with the product were very high (4.00 ± 0.00) (Table 3). No adverse effects were observed on the application of spray in any of the animals, suggesting the PHS is safer to use.

These results suggest that PHS may be effective in alleviating pain, inflammation and swelling in dairy cows with wounds or arthritis. The topical application of PHS on cows at veterinary clinics appeared to completely resolve

Table 1: Assessment parameters grading system.

Parameter	Description	Score
Pain Score	No pain	3
	Mild to moderate	2
	Severe	1
Swelling Score	No swelling	3
	Mild to moderate	2
	Severe	1
Activity Level Score	Normal-Active and alert	3
	Dull and depressed	2
	Sluggish and Lethargy	1
Product Performance/ Satisfaction Score	Highly Satisfied	4
	Moderately Satisfied	3
	Neither satisfied nor dissatisfied	2
	Not Satisfied (No relief)	1

Table 2: Effect of PHS on assessment parameters in dairy cows.

Parameters	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
Pain score	2.73±	2.73±	***2.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±
	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Swelling score	2.73±	2.73±	***2.00±	***1.20±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±	***1.00±
	0.12	0.12	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Activity level score	1.00±	1.00±	***1.93±	***2.33±	***2.67±	***3.00±	***3.00±	***3.00±	***3.00±	***3.00±	***3.00±	***3.00±	***3.00±	***3.00±	***3.00±
	0.00	0.00	0.07	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Values are expressed as Mean ± SEM; n=15; ***p<0.001 as compared to day 0 based on repeated measures one-way ANOVA followed by dunnett's multiple comparison *post-hoc* test.

these issues, indicating its potential analgesic, anti-inflammatory, immune-modulating and antibacterial properties (although further research is needed to confirm these mechanisms). Improvement in activity levels suggests that PHS may also help restore the normal activity of cows suffering from these conditions. Client satisfaction with PHS for treating pain and inflammation associated with hard tissue swelling was high, potentially due to the presence of ingredients such as *Citrus deodara*, *Curcuma longa* (turmeric), *Mentha arvensis* (mint), *Cinnamomum camphora* and *Cinnamomum zeylanicum* (cinnamon) in the spray.

The positive effects in this study may be due to the combined properties of herbal ingredients in PHS. The potential contributions of some key ingredients are described as follows

Curcuma longa (turmeric)

Chattopadhyay *et al.,* 2004 suggest that extracts and volatile oil fractions from *C. longa* possess anti-inflammatory properties. ElHage and Mathew, 2005 further demonstrated curcumin, the main active component of turmeric, has anti-inflammatory effects comparable to the common drug phenylbutazone, which is potentially beneficial for both acute and chronic inflammation. Further more, curcumin may regulate cytokine secretion from immune cells, exerting both anti-inflammatory and immunomodulatory effects (Kang *et al.,* 1999). *In vitro* studies have reported curcumin's ability to inhibit pro-inflammatory Th1 cytokines, potentially regulating Th1-controlled immune disorders (Kang *et al.,* 1999). Overall, the established anti-inflammatory and immunomodulatory properties of *C. longa* in these studies indicate their contribution to PHS's ability to alleviate pain and inflammation associated with hard tissue swelling in dairy cows.

Mentha arvensis (mint)

The menthol in PHS, derived from *M. arvensis*, provides a cooling sensation upon topical application. This effect is caused by menthol-stimulating cold receptors by inhibiting calcium currents in neuronal membranes (Peier *et al.,* 2002). Furthermore, menthol possesses anti-inflammatory properties by inhibiting the release of inflammatory mediators such as leukotrienes, prostaglandins and interleukins from monocytes, as well as serotonin and neuropeptides (Peier *et al.,* 2002).

Citrus deodara

Published reports indicated that *C. deodara* wood has been used traditionally in Ayurvedic medicine for treating severe inflammations and joint disorders (Al-Hindawi *et al.,* 1989). Studies have shown its effectiveness in inhibiting polyarthritis and suppressing paw edema in rats with adjuvant-induced arthritis (Uma Chandur *et al.,* 2011 and Shinde *et al.,*1999). The volatile oil extract of *C. deodara* wood also significantly inhibited rat paw edema caused by carrageenan at specific doses (Winter *et al.,* 1962). Furthermore, this extract

Table 3: Effect of PHS on the recovery period and product performance score in dairy cows.

Parameters	Score
Recovery period (Days)	3.40±0.13
Product performance score	4.00±0.00

Values are expressed as Mean ± SEM; n=15

displayed both anti-inflammatory and analgesic activities in pain models using mice (Newbould, 1963 and Shinde *et al.,* 1999). These findings suggest that the anti-inflammatory, analgesic and anti-arthritic properties of *C. deodara* might have helped reduce pain and inflammation associated with wounds and arthritis-induced hard tissue swelling in cows treated with PHS.

The observed improvement in hard tissue swelling associated with wound healing in our study could be partly attributed to the potential antibacterial properties of *Cinnamomum camphora* and *Cinnamomum zeylanicum*. Infections and prolonged inflammation are known to hinder wound healing (Jorge *et al.,* 2010). Cinnamaldehyde, a key bioactive component found in both *Cinnamomum* species, has demonstrated a significant antibacterial activity against both Gram-positive and Gram-negative bacteria in laboratory experiments (Lee and Ahn, 1998), suggesting that PHS may help reduce bacterial burden in wounds, potentially promoting faster healing. Further more, studies have shown cinnamaldehyde's ability to inhibit the growth of various fungi, including yeasts, molds and dermatophytes (Ooi *et al.,* 2006). Furthermore, it may even be effective against human head lice eggs and adult females (Ooi *et al.,* 2006). As further research is needed to confirm these effects in the context of wound healing with PHS, these findings indicate a potential benefit of cinnamaldehyde for wound health.

Compared with traditional routes such as oral medications or injections, topical applications offer several advantages for treating cows. Topical applications generally have a better safety profile because they bypass the digestive system, avoiding potential gastric upset associated with oral medications (Jorge *et al.,* 2010). Furthermore, they minimize the risk of complications such as inconsistent drug levels in the bloodstream or first-pass metabolism by the liver, which can occur with oral medications. Topical treatments deliver the medication directly to the inflammation source, allowing for a higher concentration of active ingredients at the site of pain, maximizing their effectiveness while minimizing systemic effects throughout the body (de Paula *et al.,* 2010). Unlike injections, topical applications are noninvasive and painless for the cows, which eliminates the stress associated with injections and the potential for needle-related injuries or disease transmission (Miller and Pisani 1999). Topical treatments are commonly easier and less expensive to administer compared with other methods. Farmers can readily apply them without requiring veterinary assistance, improving treatment accessibility and reducing overall costs.

CONCLUSION

Dairy cows suffering from wound- and arthritis-induced hard tissue swelling-associated pain and inflammation were completely ameliorated following a topical application of PHS for 3 consecutive days along with standard treatment. Therefore, PHS could be recommended as supportive therapy to ameliorate wound- and arthritis-induced hard tissue swelling-associated pain and inflammation in dairy cows.

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Conflict of interest

The authors declare no conflicts of interest.

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