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Short Communication

Evaluation of herbal formulation for dermatitis under in vivo condition

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Abstract

Traditional medicinal practices using herbs are still playing a major role in the treatment of cattle diseases in developing countries. In the present study, different concentrations and combinations of aqueous extract of Andrographis paniculata, Lawsonia inermis and Madhuca longifolia were used for the preparation of herbal formulation to treat animals infected with skin disease caused by microbes under in vivo condition. Number of days took for the animals for complete recovery was recorded and compared with the allopathic drugs Povidone iodine ointment and Candid cream used as control. Animals treated with herbal formulations recovered faster (5-8 days) than with allopathic drugs (19-21 days). This combination of herbal drug is novel, effective, economical and safe for treating the skin disease of animals.

Keywords: Skin disease, Animal, Herbal formulations, Andrographis paniculata, Lawsonia inermis, Madhuca longifolia.

Introduction

Skin disease or dermatophytosis of animals is caused by many species of keratinophilic fungi, prevailing as a major public and health issue globally. This is considered to be serious in domestic animals because this cause loss of production, contamination of the premises, very contagious, prone to infect human and heavy economic loss due to skin damage and can spread to human also. Topical lotions / shampoos / ointments or antifungal drugs available to treat skin diseases mostly do not respond or have the tendency to relapse or reoccur and cause many side effects. Highly effective drugs are available to cure the disease but are unaffordable. To eliminate this problem, an alternative therapy is needed. Therapeutic efficacy of many indigenous plants for several disorders has been in use from the past. Herbal medicine is becoming increasing because of its effective curability, availability, affordability and less or nil side effects. Plant derived antifungal drugs could provide a niche for herbal formulations against skin disease in animals with possible better affordability and curability.

Materials and methods

Three plant materials, *Andrographis paniculata, Lawsonia inermis* and *Madhuca longifolia* were selected for the study. This is a novel and pioneer method where different concentration and combinations of herbal formulations were used for the treatment.

Plant extracts	Name of the plant	Concentrations used (µg/ml)				
Single	Andrographis paniculata	100	200	300	400	500
	Lawsonia inermis	100	200	300	400	500
	Madhuca longifolia	100	200	300	400	500
Combination (1:1)	A.paniculata : L.inermis					500
	A.paniculata : M.longifolia					500
	L.inermis : M.longifolia					500
1:1:1	A.paniculata : L.inermis : M.longifolia					500
Control	Povidone iodine ointment	100				
	Candid cream	100				

Table-1: Drugs used for treatment

Moderately infected cows at kanjampatti village in pollachi taluk of Coimbatore district, Tamil Nadu were identified and isolated from healthy animals for treatment. Aqueous extract was used for the study. The standardized concentration of herbal combinations were sprayed ad-libidum over the infected regions of the animals using sprayer twice a day (morning and evening).

Primarily, different concentrations of single plant extracts (100-500 μ g/ml) were used for the treatment. Among that, extract at the concentration 500 μ g/ml showed quick recovery within 8 days than other concentrations tested. Thus the concentration (500 μ g/ml) was used for further studies.

The combinations of the plant extracts were made at the ratio mentioned in the table 1. Standard antifungal drugs, Povidone iodine and candid cream were used as control. Infected animals were segregated into 3 groups as Group A, B and C. Each group contained 5 animals. Group A treated with the plant extracts and group B and C treated with povidone iodine and candid cream respectively. The efficacy of the drug to cure the disease was calculated by the total number of days taken for complete recovery.

Results and discussion

The plants Andrographis paniculata, Lawsonia inermis and Madhuca longifolia were used as a wonder drug in traditional siddha and ayurvedic system of medicine as well as in tribal medicine since ancient times. They were reported to possess antimicrobial, antibacterial, antifungal, anticancer, antioxidant, antiparasitic, antidiabetic, antiirritant, antiphlogistic, antimalarial, antiulcer, antipyretic, antidermatophyitc, antiinflammatory, anti helminthic and anticonvulsant properties. It is used as astringent, emollient, hypoglycaemic and general tonic¹. Since all the three plants possessed good antifungal activity they are selected and the combination of these three plants is unique and novel.

Plant materials were collected during the months of June – August because these plants were observed to possess higher phytochemical constituent during this period².

The major active constituents and antifungal compounds of the selected plants are water soluble³⁻⁵, economical and ecofriendly with no adverse effect on animals aqueous extract was used for the study. Aqueous extracts of three plants in combinations were prepared in different concentrations (100-500 μ g) and tested against moderately infected cows reared in farms. The concentration of plant extracts below 100 μ g took long period for complete recovery and hence 100-500 μ g of plant extracts was used.

The results revealed that, group 'A. took 5-8 days for complete recovery (Table-2). The animals recovered faster (5 days) when they treated with higher concentration of 400-500 μ g, whereas animals treated with allopathic drugs, group 'B' took 19 days for recovery and group 'C' took 21 days for complete recovery (Figure-1). Thus, the result proved that plant extracts were more effective to cure the infections than allopathic drugs used. The efficacy of the plants to cure diseases is due to the presence of some chemical substances present in the plants. It was supported by earlier findings.

Secondary metabolites like alkaloids, glycoside, flavonids, tannins, phenols, fixed oils, fats, terpenoids, saponins and steroids were reported in methanol extract of *A.paniculata* and *L. inermis*^{6,7}. *M. longifolia* seed extract contained alkaloids, glycosides, triterpenoids, steroids, saponins, flavonoids and glycosides^{5,8}.

All the phytochemical constituents mentioned above present in the selected three plants are responsible for curing various ailments in animals. Glycosides possess defensive property against many microorganisms⁹. Steroids are known for their cardiotonic activities, insecticidal and antimicrobial properties¹⁰. Phenols and tannins have antioxidant properties and saponins hypercholesterolemia were used for treating and hyperglycaemia. It also has antioxidant, anticancer and antiinflammatory property¹¹. Animals treated with single herbal formulations at higher concentrations took longer duration to cure the disease where as the poly herbal formulation shows quick recovery. The curability of plant extracts in poly herbal combinations is due to the combined or synergistic action of the three plant extracts.

Group	Combination of plant extracts	Concentrations of water extract used (µg/ml)	Animal treated	Recovery noticed (in days)
A	AP:LI:ML (1:1:)	100	Cow	8
		200	Cow	7
		300	Cow	6
		400	Cow	5
		500	Cow	5
В	Povidone iodine ointment	500	Cow	19
С	Candid cream	500	Cow	21

AP- Andrographis paniculata LI – Lawsonia inermis MI – Madhuca longifolia



Figure-1: Combined effect of aqueous plant extracts on infected animals

Conclusion

Skin diseases caused by fungi are considered to be a major animal health problem which causes high economic loss especially in livestock and in leather industries due to downgrading of hides and skin. It also decreases meat and milk production and at high severity leads to animal death. The selected plants Andrographis paniculata, Lawsonia inermis and Madhuca longifolia were reported to possess good higher inhibitory effect against fungal pathogens. The presence of various phytochemical compounds in these plants was known to have antifungal and various other medicinal properties. In this study, three plant extracts in combination (1:1:1) showed best result against all the fungal pathogens tested than the drug used as single. According to Siddha pharmacopeia, potency of poly herbal drugs is more than the single drug and is rightly proved in the present study. The combined action of the vital secondary phytoconsituents of the selected plants is responsible for curing the disease. This herbal formulation is economical, safe and has good curability with no side effects. Hence, it can be recommended for treating fungal borne skin diseases of domestic animals.

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