Opaleye, O., Rose, R.S., Whittaker, M.M., Woo, E.J., Whittaker, J.W. and Pickersgill, R.W., (2006) Structural and spectroscopic studies shed light on the mechanism of oxalate oxidase. *Journal of Biological Chemistry*, **281**(10) : 6428-6433.

Rai, M. and Gupta, S.S., (1967) Experimental evaluation of Tinospora cordifolia (Guduchi) for dissolution of urinary calculi. *J Res Ind Med*, **2**(1) : 115-16.

Robinson, M.R., Norris, R.D., Sur, R.L. and Preminger, G.M., (2008) Urolithiasis: not just a 2-legged animal disease. *The Journal of urology*, **179**(1) : 46-52.

Trott, O. and Olson,A.J. (2010). AutoDock Vina: Improving the speed and accuracy of docking with a new scoring function, efficient optimization and multithreading.*Journal of computational chemistry*,**31**: 455-461.

Vanachayangkul, P., Chow, N., Khan, S.R. and Butterweck, V., (2011) Prevention of renal crystal deposition by an extract of Ammi visnaga L. and its constituents khellin and visnagin in hyperoxaluric rats. *Urological research*, **39 :** 189-195.

Wang, Z., Zhang, Y., Zhang, J., Deng, Q. and Liang, H., (2021) Recent advances on the mechanisms of kidney stone formation. *International journal of molecular medicine*, **48**(2) : 1-10.

Weber, G.F., Ashkar, S., Glimcher, M.J. and Cantor, H., (1996) Receptor-ligand interaction between CD44 and osteopontin (Eta-1). *Science*, **271**(5248) : 509-512.

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A Case Study on Medicinal Plants for Swine Dermatophytosis

R. Nithiaselvi[1]*, K. Shibi Thomas[2], M. Dhanalakshmi[3] and S. Maheshwari[4]

Veterinary College and Research Institute, Orathanadu-614 625, TANUVAS

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Abstract

The present work is a case study that was conducted at the Livestock Farm Complex, Veterinary College and Research Institute; Orathanadu (Tamil Nadu) to assess the efficacy of topical herbal plant mixtures on swine dermatophytosis. Dermatophytosis is a contagious fungal disease affecting various animal species and is a high economic burden with limited antifungal agents. Skin disease in swine can significantly impact production, carcass value and reputation; diagnosing and treating these diseases can be challenging. Eight adult sows in the farm exhibiting moist, reddish brown colour irregular foci on different parts of the body with itching were selected for the study. A mixture of three medicinal plants were selected and combined with common salt in the ratio of 5:2:2:1, comprising *Acalypha indica and Azadirachta indica* leaves*, Curcuma longa* rhizome and salt, respectively. The herbal mixture was well grounded fresh every time to make a topical paste, which was applied over the affected area three times a day for five days. The response to the treatment was assessed based on the successful reduction of the severity of the cases. The current study's findings suggest that the plants chosen for the study have the potential to

**Corresponding author* : Email : nithisa121210@gmail.com
Livestock Farm Complex[1,2,4],
Department of Veterinary Public Health and Epidemiology[3],
Veterinary College and Research Institute, Orathanadu-614 625, TANUVAS.

alleviate pig's skin disorders.

Key words: *Acalypha indica, Azadirachta indica, Curcuma longa,* Dermatophytosis, Salt, Swine

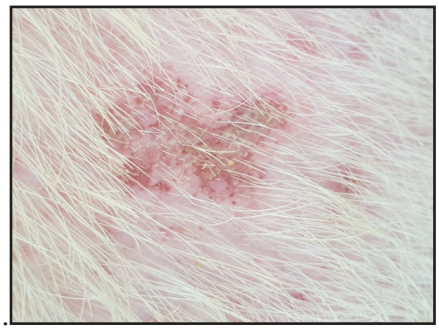
Dermatophytosis, a ringworm infection, is highly contagious and can be transmitted through direct contact with infected animals or contaminated objects. These fungi have the ability to invade and thrive in the keratinized structures of the skin, hair and nails, leading to various clinical manifestations. Dermatophytosis is one of the most common skin disease worldwide (Fratti *et al*., 2023), with circular or irregular alopecic lesions and ring-shaped rashes, with scaling or crusting and itching. These lesions, can range in size from small patches to larger areas are characterized by inflammation with brown discoloration (Pittman and Roberts, 2005). Dermatophytosis in pigs is usually caused by *Microsporum nanum*, is a significant concern in the swine industry. Affected pigs may have a lower marketability and require more expensive treatments (Pena *et al*., 2020). Dermatophytosis is a self-curing disease and treatment is used to shorten the course of the disease. There are various treatment options available for dermatophytosis in pigs and one common approach is the use of topical and oral antifungal medications, such as miconazole or clotrimazole, with good hygienic to prevent the spread of dermatophytosis and reduce the risk of reinfection.

The use of antifungal agents is very costly; hence medicinal plants were tried in this study with the aim to investigate the potential benefits of ethnoveterinary medicine in managing skin diseases in swine. A mixture of medicinal plants comprising *Acalypha indica and Azadirachta indica* leaves, *Curcuma longa* rhizome with salt were selected and combined to study the efficacy in treating dermatophytosis in pigs.

Materials and methods

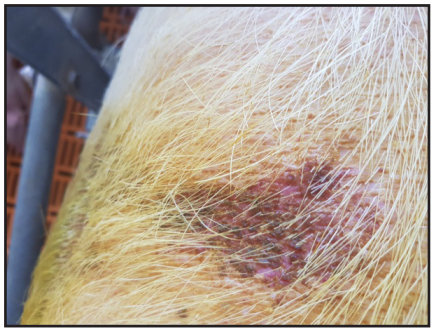
Animal samples

Dermatological samples were collected from affected animals by taking hair shafts and skin scrapings with a sterile scalpel and the collected material was covered and kept in a properly



(a) Affected area shows the reddish brown moist lesions

(b) Application of herbal mix over the lesions



(c) Day 2 of treatment

(d) Day 5 of treatment

Fig. 1 Effect of medicinal plants in swine dermatophytosis

labelled plastic bag. The samples were sent to the department of Veterinary Microbiology for further diagnosis.

Sample processing

The collected hair shaft and skin scrapings were stained with lactophenol cotton blue stain and the fungal hyphae were examined under a microscope. The examination under the microscope revealed the presence of intensely blue elements, suggestive of a fungal (Larone, 1995).

Preparation of ethnoveterinary medicine

Neem decoction was prepared by boiling 100gms of fresh neem leaves in one litre of water. The prepared decoction was used for washing the infected area and wiped out excess water with clean cotton towel. The plants were collected freshly in the morning and washed thoroughly. To make an herbal mixture *Acalypha indica* leaves 250gms, *Azadirachta indica* leaves 100gms, *Curcuma longa* rhizome 100gms and salt 50 gms were collected and ground to make a paste (Vijayakaran *et al*., 2020). This topical application was repeated three times a day for a period of 5 days, ensuring thorough treatment of the infection.

Results and Discussion

A total of eight adult sows in the farm presented with non-pruritic alopecia with reddish brown colored, irregular shaped crusts and erythema in the dorsal region of the neck and chest, sternum and pelvic limb (Fig.1a). These lesions appeared to be spreading rapidly, affecting a larger area of the pig's body each day. Upon closer examination, it was observed that the affected skin was also thickened and inflamed, causing discomfort to the animals. The pigs were observed scratching and rubbing their bodies against surfaces in an attempt to alleviate the itchiness and discomfort. The intensity of these behaviours increased as the lesions worsened, indicating the significant distress to the animals. This study backs up the findings of Nweze, 2011 in swine. Dermatophytes are a group of fungi that could use keratin as a substrate. The infection of the keratinized tissue is termed "tinea" or ringworm (Valandro *et al*., 2017). In this study, keratinolytic fungai, which degrade the keratin in the hair shaft (Fig. 2) were detected in lactophenol cotton blue staining, which confirmed the fungal infection in swine.

Acalypha indica is known as a rich source of glycosides, flavanoids and tannins (Chekuri *et al*., 2020) and is used as anti-cancer, anti-diabetic, anti-oxidant, anti-bacterial, antifungal, hepatoprotective, anti-inflammatory and treatment for ulcers and wound healing.

Pankaj *et al*. (2011) stated that *Azadirachta indica* or (neem) have antiallergic, antidermatic, antifeedent, antifungal, anti-inflammatory, antipyorrhoeic, antiscabic, cardiac, diuretic, insecticidal, larvicidal, nematicidal, spermicidal and other biological activities. Cyclic trisulphide and cyclic tetrasulphide are major chemical components present in the neem leaves and possesses antifungal activity. The application of the neem decoction and the homemade paste provided immediate relief to the infected area Fig.1(b & c). The neem decoction, with its antibacterial properties, helped to cleanse the wound and prevent further infection.

Curcumin, demethoxy curcumin and bis-demethohydroxycurcumin, are three pharmacologically important Curcuminoids that have been isolated from *Curcuma longa* (Gupta *et al*., 1999). They have been shown to possess anti-inflammatory, anti-carcinogenic, anti-mutagenic and anti-cancer properties. The therapeutic properties of *Curcuma longa* include insecticidal, antimicrobial, antifungal, antimalarial, antiviral and antioxidant properties (Vijayakaran *et al*., 2020).

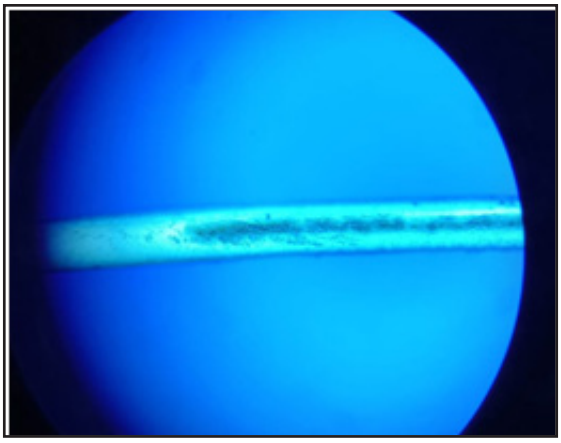


Fig. 2 Lactophenol cotton blue staining show the keratin degradation in hair shaft.

Sodium chloride is also a known antifungal agent (Blomberg and Adler, 1993). Vijayakaran *et al*. 2020 were studied to determine the most effective combination of crude plant extracts and saturated salt solution against canine dermatophytes and suggests that a 7:2:1 polyherbal combination containing *Acalypha indica, Curcuma longa* and sodium chloride can effectively reduce fungal infections in pet animals for 10 days.

This herbal paste not only acted as a natural antiseptic but also helped to soothe the wound and alleviate any discomfort. As the days progressed, the healing process accelerated, and by the fifth day Fig.1 (d), the lesions were completely dried and the wound healed without leaving behind any noticeable scars. By the third day, there had been a significant decrease in itching, further proving the effectiveness of this homemade remedy.

Summary

A mixture of medicinal plants comprising *Acalypha indica and Azadirachta indica* leaves, *Curcuma longa* rhizome and salt in the following ratio 5:2:2:1 has been effective in treating dermatophytosis in pigs. This finding suggests that exploring the antifungal properties of different herbs in combination could lead to the development of more effective treatments for fungal infections. Additionally, investigating the specific mechanisms by which these herbs inhibit fungal growth could provide valuable insights for the development of novel antifungal drugs.

References

Blomberg, A. and Adler, L. (1993) Tolerance of fungi to NaCl. *Mycology series*. 209-231

Chekuri, S., Lingfa, L., Panjala, S., Bindu, K.C. and Anupalli, R.R. 2020. Acalypha indica L.-an important medicinal plant: a brief review of its pharmacological properties and restorative potential. *European journal of Medicinal plants*, **31(11)**:1-10.

Fratti, M., Bontems, O., Salamin, K., Guenova, E. and Monod, M. (2023) Survey on Dermatophytes isolated from Animals in Switzerland in the context of the Prevention of Zoonotic Dermatophytosis. *Journal of Fungi*, **9(2)**: 253.

Gupta AP, Gupta MM, and Kumar S. (1999) Simultaneous determination of Curcuminoids in curcuma samples using High Performance Thin Layer Chromatography. *Journal of Liquid Chromatography and Related Technologies*, **22**:1561-69.

Larone DH (1995) Medically important fungi: a guide to identification. Washington DC: ASM Press.

Pankaj, S., Lokeshwar, T., Mukesh, B. and Vishnu, B. (2011) Review on neem (Azadirachta indica): thousand problems one solution. *International research journal of pharmacy*, **2(12)**: 97-102.

Peña ST Jr., Bolambot SMG, and Lañada EB. (2020) Prevalence of Dermatophyte infection in pigs among smallholder farmers in Baybay city, Leyte, Philippines and associated risk factors. Explor. Anim. Med. Res., **10**(2): 179-187.

Pittman, J.S. and Roberts, J.D. (2005) Ringworm in lactating sows. *Journal of Swine Health and Production*, **13(2)**: 86-90.

Nweze, E.I. (2011) Dermatophytoses in domesticated animals. *Revista do Instituto de Medicina Tropical de São Paulo*, **53**: 94-99.

Valandro, M.A., da ExaltaçãoPascon, J.P., de Arruda Mistieri, M.L. and Lubeck, I. (2017) Dermatophytosis due to Microsporumnanum infection in a canine. *Semina: CiênciasAgrárias*, **38(1)**: 317-320.

Vijayakaran, K., Ranganathan, V. and Kumar, P.S. (2020) Antifungal activity of selected medicinal herbs against canine dermatophytosis. *Journal of Entomology and Zoology Studies*, **8(6)**: 1618-1622.