

## Histopathological Study about effect of *T.verrucosum* on skin of the rabbits and treated by yellow sap and gel of Aloe vera

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### Abstract

**Background :** The dermatophytes are taxonomically related fungi causing different skin infections referred to as tinea in man or ringworm in man and animals .

**Objective:** This study was established to investigate the effect of yellow sap and gel of Aloe vera on skin of the rabbits which infected with *T.verrucosum*.

**Methods :** Twelve skin biopsies were taken from rabbits for histopathological study to know the effects of the *T.verrucosum* and treated with yellow sap and gel.

**Results :** The results of histopathological study of effect of yellow sap and gel of Aloe vera on skin of the rabbits which infected with *T.verrucosum* showed the concentration of the gel of aloe vera at 75% was more effective to treat the infective area of skin with *T.verrucosum* compared with the skin which treated with yellow sap at 20% in spite of what gave recovery the infective skin by *T.verrucosum* after 18 days.

**Conclusion** This study concludes that Aloe vera may be used as antifungal.

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### I. Introduction

The dermatophytes are taxonomically related fungi causing different skin infections referred to as tinea in man or ringworm in man and animals . the zoophilic dermatophyte *Trichophyton verrucosum* is associated principally with cattle and camel ringworm (1) . but it has been reported to infect a wide range of animal hosts together with man (2) . Ringworm has long been associated with rodents and rabbits , it is common in rabbits and guinea pigs (3). In animals the lesion starts with thickening of skin , alopecia and scaldiness they may involve small circular area or become confluent in extensive area , the exudates of inflammatory process glue hair together in thick grey asbestos-like crusts which reveal bleeding ulcerated area on removal (4). One of medicinal herbs used is *Aloe vera* , it belongs to family: Asphodelaceae , genus : Aloe L , Species : *Aloe barbadensis miller* (5) . The plant has stiff gray-green lance shaped leaves , containing clear gel in central mucilaginous pulp and when leaf is cut an orange yellow sap drips from the open end this called yellow sap and when the green skin of leaf is removed mucilaginous substance appears that contains fibers this called the gel of *Aloe vera* . consist of 93.3% water , the remaining 0.7% is made solid with glucose and mannose (6). *Aloe vera* extract are largely used as medicinal drug to treat animal disease from dermatitis to cancer (7). And used at this time to treat skin diseases as antibacterial , antiviral , antifungal and ulceration . *Aloe vera* another medical use like treated wound and burn as well as use the gel of *Aloe vera* to treat X-rays burn in skin cancers (8,9).

### II. Materials and methods

- 1- Pure culture of fungi (*T.verrucosum*) was collected and examination in microbiology laboratory.
- 2- method of extraction of the yellow sap and gel of *Aloe vera*:

**a-The yellow sap :** wash the plant with D.W and then with sharp scalpel cut the leaves from the base of stem of plant , put it in disinfected glass ( Becare) . wide base of leaves in lower (in side becare), overlook and lift up after few hours so the golden yellow sap is collected and filtered used directly after prepare the concentration 20% this concentration is benefit to inhibit to growth of *T.verrucosum* in vitro (10).

**b-The gel :** after take the yellow sap the leaves were used to obtain the gel by remove the green skin of leaves by sharp scalpel so the gelatinous substance inside the leaves take it and put it in clean container and take it to mix

by electrical blender for 15 second and filtered and direct used after prepare the concentration 75% this concentration is benefit to inhibit to growth of *T.verrucosum* in vitro (10).

3- experimental animals : used 12 rabbits for 4 groups:

**Group 1** : 3 rabbits used as negative control group without infection.

**Group 2** : 3 rabbits used for induce the infection by *T.verrucosum* by choose area of skin of rabbits then clipping and shaving the skin , then used 2 blunt scalpels to make scratch of skin , after that the skin becomes ready for adding the fungus *T.verrucosum* . This group treatment only by D.W.

**Group 3** : 3 rabbits infected with *T.verrucosum* and treated with yellow sap at concentration 20%.

**Group 4** : rabbits infected with *T.verrucosum* and treated with the gel at concentration 75%.

4- **histological study** : take skin biopsy from each groups , skin biopsy was excised for histopathological study to know the effect of both extracted on infected skin with *T.verrucosum*.

### III. Results

The results of the skin infection depend groups :

**group 1** : the skin sections showed no pathological changes.

**group 2** : the lesion appear after 3 weeks characteristic by inflammation , redness , scaling , alopecia . this group is treated with D.W (type of the solvent that used for preparation of concentration of yellow sap and the gel of aloe vera . The skin section showed hyperkeratosis and a canthosis with congestion of blood vessel of dermis (fig1). Furthermore there is deep ulceration with severe hemorrhage on the surface , the subcutaneous tissue showed extensive area hemorrhage with dilated and congestion of blood vessel of dermis (fig 2,3).

**group 3** : in the area of skin the infection with *T.verrucosum* appear after 3 weeks then treated with yellow sap at concentration 20% for 18 days compare with control group ( treated with only D.W.) showed disappearance of redness , scaling and growth of hair not complete . The histopathological showed marked section of dermis especially around groups of hair follicles (fig 4) . the mild infiltration of neutrophils in the dermis (fig.5), with abscessation of hair follicles are also seen (fig 6).

**group 4** : in the area of the infection with *T.verrucosum* appear after 3 weeks then treated with *Aloe vera* gel at concentration 75% for 19 days compare with control group ( treated with only D.W.) showed disappearance of redness , scaling and growth of hair completely . The histopathological showed completely regeneration of epidermis and sclerosis of dermis layer seen in (fig 7,8).

### IV. Discussion

In vivo , the use of yellow sap of *Aloe vera* at 20% gave complete restoration of infected areas after 18 days of treatment , which confirmed by the disappearance of scales , redness as well as growth of hair in the treated area compared with control areas, and the infected areas treated with vehicle only . The yellow sap of aloe vera contain the anthraquinones which used as antifungal (11) , and contain also the saponins , tannins these composition which acts as antibacterial and antifungal (12). The tannine which isolated from the medicinal plants which have antifungal effect (anti- Dermatophyte effect because have ability to bind with protein so as effect on enzymes and change it.

In vivo, the use of 75% concentration of gel for the treatment of skin infections in rabbits with *T.verrucosum* , gave restoration after 16 days of treatment , which was confirmed by the disappearance of scales , redness and the growth of hair in the treated areas compared with control area as well as result the infected area treated with vehicle only. the used high concentration 75% have more effects on infected skin of rabbits because the *Aloe vera* gel have more components like succinic acid and malic acid which used for treated the skin diseases also contain mineral like magnesium and salicylic acid were work as aspirin was inhibited production of prostaglandin which prevent the pain and inflammation on infected area (10). and contain the enzymes like Bradykininase was used for relieving pain , itch , congestion and arterial contraction to reduce the edema and redness in infected area due to infection . also contain the saponins which using a modify way which succeed in disposing polysaccharides and glycosides which obstructs the appearance of saponins (13). Acemannan had shown to bind tissue growth factors and stabilize their activity , protection them against heat and enzyme degradation (14). Acemannan effect on repair the skin from fungal infection.

### References

- [1]. Fudlelmula A Agab H Lehorgene JM Abbas B and Abdalla AE (1994). First Isolation of *Trichophyton verrucosum* as etiology of ringworm in the Sudanese camels (camelus dromedaries) Rev.Elev.Med. Vet.Pays.Trops. 47(2):184-187.
- [2]. Emmons CW Binford CN Utz JP and Kwon-chung KJ (1977) Medical mycology 3rd ed. Lea&Febiger Philadelphia.
- [3]. BVSc Thomas M Donnelly DVM Elizabeth M Rusha and DVM Petra A lackner (2000). Ringworm in small exotic pets Vol.9 issue 2 page 88- 93 fungal disease .
- [4]. Fudlelmula A and Mackenzie DWR (2002). non-specific Immune Responses elicited by Phagocytes on the Dermatophytes Scientific J. of king faisal Univ. Vol. 3, No.1.
- [5]. Angiosperm Phylogeny Group (APGII system) of molecular classification of plants. (2003). Botany Department. University of Hawaii

- [6]. Agarry O OOlaleye M T and Bello-Michael C O (2005). Comparative antibacterial activity of *Aloe veragel* and leaf African Journal Biotechnology . Vol. 4 (12) , PP: 1413-1414 .
- [7]. Kathi J K and Victoria C (1999) . *Aloe vera*The Longwood Herbal Task Force The Center of Holistic Pediatric Education P : 1- 24 .
- [8]. Maddocks J W Wilkinson J M and Shillington D (2006) . Novel approaches to radiotherapy-induced skin reaction . Complement – Ther-Clin-Pract . 11 (4) : 224-231.
- [9]. Richardson J Smith JE McIntyre M Thomas R. and Pilkington K (2005). *Aloe vera*for preventing radiation- induced skin reactions Clin-oncol-(R-Coll-Radiol ) 17(6) .
- [10]. 10-Hassan H F (2008). Isolation and Identification of some cutaneous mycoses in sheep and cattle and their treatment with yellow sap and gel of aloe veraMsc.thesis in microbiology /collage of Vet.Med. Univ.of Baghdad.
- [11]. Kerasasny M F (2006) . histological study of effect of yellow sap of Aloe veraL.on growth of different types of diseasalfungas on poultry . Phd. Sc.thesis college of Sc. Al-mustansirya University.
- [12]. Valerie A F Bradburg F Pamela C Eisin S RhmanSabita R and William
- [13]. H S (2003) . In vitro susceptbility of Shigellaflexneri and Streptococcus pyogenes to inner gel of *Aloe barbedensis Miller* .Antimicrobial agents and chemotherapy . Mar . pp. 1137-1139 .
- [14]. Al-Waaly T K (2005). Study of some chemical compositions of Aloe barbadensis and the effect of its crude extracts against some pathogenic microorganism Msc.Thesis collage of science . Uni.of Baghdad.
- [15]. Tizard I Busbee D Maxwell B and Kemp M C(1994). Effects of acemannanacomplex carbohydrate on wound healing in Young and Aged Rats. Wounds: A Compendium of Clinical Research and Practice 6 (6) pp.201 -209.

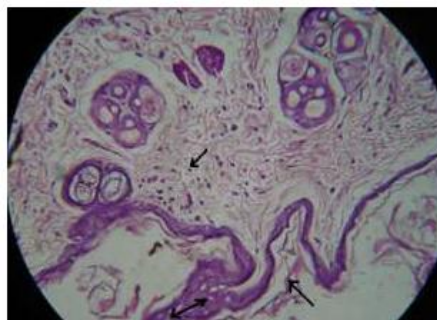


Fig 1: showing hyperkeratosis and acanthosis with congestion of blood vesssels. (H&E X40

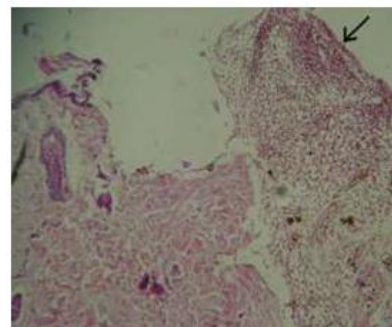


Fig 2: showing mild lymphocyticinfiltration in the dermis (H&E X40)

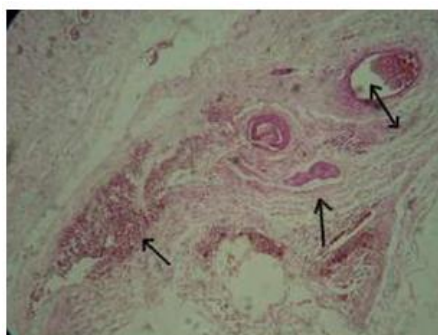


Fig 3: showing mild lymphocytic infiltration in the dermis (H&E X40)

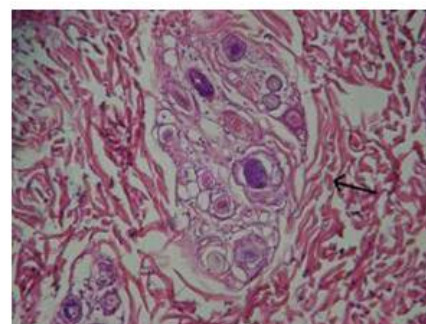


Fig 4: showing sclerosis of the dermis (H&E X40)

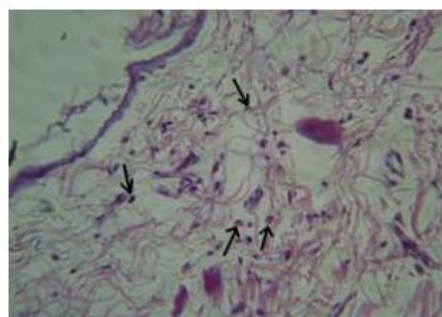


Fig 5:showing mild infiltration of neutrophils in the dermis (H&E X40)

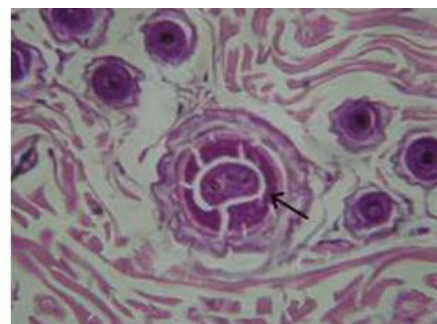


Fig 6: abscessation of hair follicles (H&E X40)

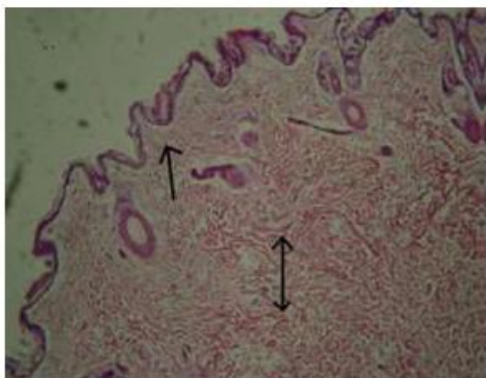


Fig 7: showing complete regeneration of epidermis and sclerosis of dermis layer (H&E X40)

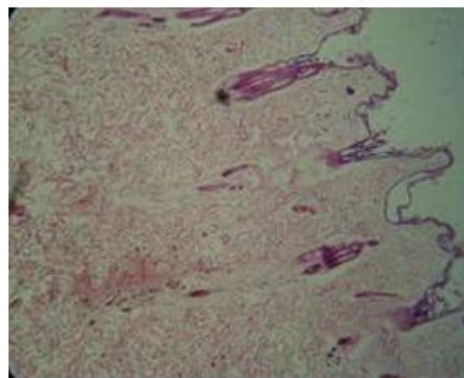


Fig 8: showing complete regeneration of epidermis and sclerosis of dermis layer (H&E X40)

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