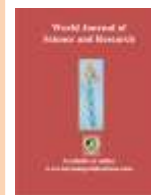




Available online at <http://www.harmanpublications.com>

## World Journal of Science and Research

Harman Publications. All rights reserved



### Research Article

### Zoology

## ANTIMICROBIAL ACTIVITY OF ANIMAL WASTE (SHEEP)

V. Pavithra and M. Thangadurai\*.

PG & Research Department of Zoology, Rajah Serfoji Govt. College (Autonomous)  
Thanjavur – 613 005, Tamilnadu

### ABSTRACT

The goat was one of the first animals to be domesticated by humans, about 9,000 years ago. Today, there are some 200 different breeds of goats that produce a variety of products, including milk, meat, and fiber (mohair and cashmere). In the present study to investigate the antimicrobial activity of sheep waste. Antibacterial activity of sheep waste confirmed against gram positive bacteria *Staphylococcus aureus* and *Bacillus subtilis*. Antibacterial activity of sheep waste also proved against gram negative bacteria *Escherichia coli* and *Pseudomonas aeruginos*. Antifungal activity of sheep waste demonstrated against fungi as *Candida albicans*, *Aspergillus flavus* and *Aspergillus niger*. Among the various extract, methanolic extract of sheep waste possess potential activity against gram positive and negative bacteria. Among the various extract, methanolic extract of sheep waste possess greater activity against fungus.

**Citation:** V. Pavithra and M. Thangadurai (2018). Antimicrobial activity of animal waste (Sheep), *World Journal of Science and Research*. 3(1): 42-46.

### Article Info:

Received on 15<sup>th</sup> Feb 2018  
Accepted on 20<sup>th</sup> March 2018  
Online March 2018

**Keywords:** Goat, Antibacterial activity, Antifungal activity, Methanol extract

**\*Corresponding author**  
**Dr. M. Thangadurai**,  
Assistant Professor  
PG and Research  
Department of Zoology,  
Rajah Serfoji Govt.  
College (Autonomous)  
Thanjavur – 613 005,  
Tamilnadu

## INTRODUCTION

The goat was one of the first animals to be domesticated by humans, about 9,000 years ago. Today, there are some 200 different breeds of goats that produce a variety of products, including milk, meat, and fiber (mohair and cashmere). Worldwide, goat meat production is higher than meat production from cattle or hogs (Holcomb, 1994).

Raising goats can be a valuable part of a sustainable farm. Integrating livestock into a farm system can increase its economic and environmental health and diversity, thereby making important contributions to the farm's sustainability. Goats often fit well into the biological and economic niches on a farm that otherwise go untapped. Goats can be incorporated into existing grazing operations with sheep and cattle, and they can also be used to control weeds and brush to help make use of a pasture's diversity (Sedivec et al., 1995). Goats eat the forages, the goats' manure replaces some purchased fertilizers, and the life cycles of various crop and animal pests are interrupted. Like other ruminant animals, goats convert plant material that is unsuitable for human consumption into high-quality animal products. Sheep's digestive tracts can process materials that otherwise would be treated as waste. And, sheep produce materials that can help manage waste in a more environmentally friendly manner (Fredricks, 1993).

The drug-resistant bacteria pathogens have further complicated the treatment of infectious diseases. In recent years, drug resistance to human pathogenic bacteria has been commonly reported from all over the world. However, the situation is alarming in developing as well as developed countries due to indiscriminate use of antibiotics. In the present scenario of emergence of multiple drug resistance to human pathogenic organisms, this has necessitated a search for new antimicrobial substances from natural sources including animal waste. In the present study to investigate the antimicrobial activity of sheep waste.

## MATERIALS AND METHODS

### Collection of plant materials

The Sheep waste were collected in December 2017 from Maramadakki, Pudukkottai district, Tamil Nadu, India. The Sheep waste dried for a week and makes a fine powder using grinder mixture. The powder materials were used for further studies.

### Determination of antimicrobial activity

The antimicrobial activity was performed by disc diffusion method. Antibiogram was done by disc diffusion method (NCCLS, 1993;

Awoyinka *et al.*, 2007) using plant extracts. Petri plates were prepared by pouring 30 ml of NA /PDA medium for bacteria/fungi. The test organism was inoculated on solidified agar plate with the help of micropipette and spread and allowed to dry for 10 mins. The surfaces of media were inoculated with bacteria/fungi from a broth culture. A sterile cotton swab is dipped into a standardized bacterial/ fungi test suspension and used to evenly inoculate the entire surface of the Nutrient agar/PDA plate. Briefly, inoculums containing bacteria specie were spread on Nutrient agar plates and fungus strains were spread on potato dextrose agar. Using sterile forceps, the sterile filter papers (6 mm diameter) containing the methanol, hydro alcohol and aqueous extracts (50µl) were laid down on the surface of inoculated agar plate. The plates were incubated at 37°C for 24 h for the bacteria and at room temperature (30±1) for 24-48 hr. for yeasts strains. Each sample was tested in triplicate. The antimicrobial potential of test compounds was determined on the basis of mean diameter of zone of inhibition around the disc in millimeters. The zones of inhibition of the tested microorganisms by the samples were measured using a millimeter scale.

## RESULT AND DISCUSSIONS

Animal wastes in the form of manures are valuable sources of nutrients and organic matter for use in the maintenance of soil fertility and crop production. Studies with animals have shown that 55–90% of the nitrogen and phosphorus content of animal feed is excreted in faeces and urine (Tamminga *et al.*, 2000) normally used as manure. Poultry and swine manure collection in confinement feeding facilities have been recovered for re-feeding to beef cattle, dairy cattle and sheep (Bell, 2002) and have been found to present no serious health hazards to ruminants and poultry. Animal waste has been traditionally used in the production of biogas in Asia, particularly in tropical areas such as Indonesia, India and Vietnam (Henuk, 2002).

Sheep's digestive tracts can process materials that otherwise would be treated as waste. And, sheep produce materials that can help manage waste in a more environmentally friendly manner (Fredricks, 1993). In the present study to investigate the antimicrobial activity of sheep waste.

### Antibacterial activate

The different extract of sheep waste was screened against *Escherichia coli*, *Staphylococcus aureus*, *Bacillus subtilis* and *Pseudomonas aeruginos* species of bacteria were evaluated using

the standard agar disc diffusion method. The disc diffusion method is used to detect the antibacterial activity of sheep waste. The solidified Nutrient agar plates were swamped with the test organism and the samples were impregnated. After the incubation the zone was measured. The antimicrobial activity of sheep waste extracts was detected by the indication of zone around the disc. The *in vitro* antibacterial activity of the sheep waste extract against these bacteria were qualitatively assessed by the presence of inhibition zones represented in the photographic plate 9. The inhibitory activities in culture media of the bacteria reported in Table 1 were comparable with standard antimicrobial viz. chloramphenicol.

After 24 hours of incubation, the inhibitory effect of sheep waste extracts (methanol, hydro alcohol and aqueous) were significant as compared to standard chloramphenicol. Zone of inhibition (ZOI) was used as a measure for comparing bactericidal activity of these sheep

waste extracts showed about methanol extracts (9.00mm), hydro alcohol extracts (7.75mm), aqueous extracts (8.50mm) and Std. (17.25mm) zone against the test organisms of *Escherichia coli*. Methanol extracts (6.75mm), hydro alcohol extracts (6.25mm), aqueous extracts (8.25mm) and Std. (19.50mm) zone against the test organisms of *Staphylococcus aureus*. Methanol extracts (6.50mm), hydro alcohol extracts (6.75mm), aqueous extracts (6.50mm) and Std. (7.50mm) zone against the test organisms of *Bacillus subtilis*. Methanol extracts (7.50mm), hydro alcohol extracts (7.25mm), aqueous extracts (7.75mm) and Std. (11.50mm) zone against the test organisms of *Pseudomonas aeruginos*. Considering the advantage of the microbicidal activities of the sample. Among the various extract, methanolic extract of sheep waste possess potential activity against gram positive and negative bacteria.

**Table 1: Antibacterial activity of sheep waste extracts**

Samples	<i>Escherichia coli</i> (mm)	<i>Staphylococcus aureus</i> (mm)	<i>Bacillus subtilis</i> (mm)	<i>Pseudomonas aeruginos</i> (mm)
Methanol extracts (50µl) (T1)	9.00±0.63	6.75±0.47	6.50±0.45	8.10±0.52
Hydro alcohol extracts (50µl) (T2)	7.75±0.54	6.25±0.43	6.75±0.47	7.25±0.50
Aqueous extracts (50µl) (T3)	8.50±0.59	8.25±0.57	6.50±0.45	7.75±0.54
Standard (30µl)	17.25±1.20	19.50±1.36	7.50±0.52	11.50±0.80

Values were expressed as Mean ± SD

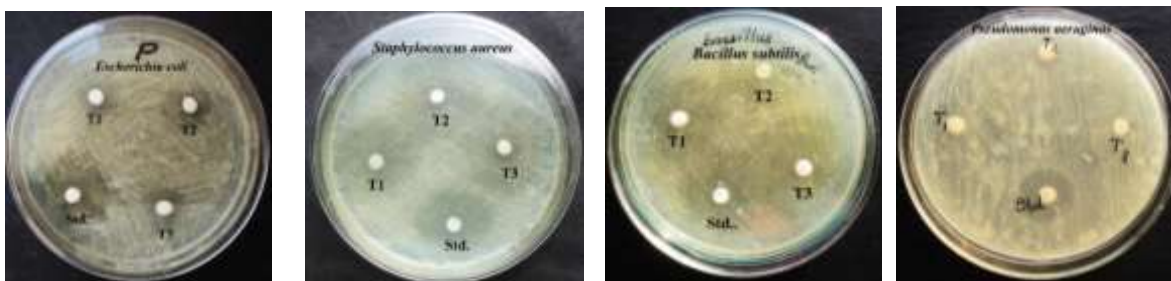
Bacterial standard : Chloramphenicol

*Escherichia coli*

*Staphylococcus aureus*

*Bacillus subtilis*

*Pseudomonas aeruginos*



**Plate 9: Antibacterial activity of sheep waste extracts**

**Antifungal activity**

The different extract of sheep waste was screened against *Candida albicans*, *Aspergillus flavus* and *Aspergillus niger* species of fungal were evaluated using the standard agar disc diffusion method. The disc diffusion method is used to detect the antimicrobial activity of sheep waste. The solidified Potato dextrose agar plates were swapped with the test organism and the samples were impregnated. After the incubation the zone was measured. The antifungal activity of sheep waste extracts was detected by the indication of zone around the disc. The *in vitro* antifungal activity of the sheep waste extract against these bacteria were qualitatively assessed by the presence of inhibition zones represented in the photographic plate 10. The inhibitory activities in culture media of the bacteria reported in Table 2 were comparable with standard antimicrobiotic viz. Fluconazole.

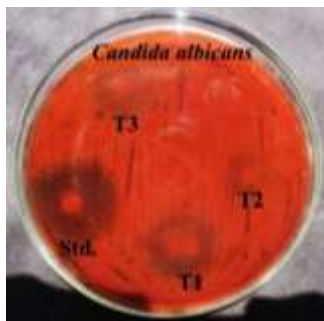
After 24 hours of incubation, the inhibitory effect of sheep waste extracts (methanol, hydro alcohol and aqueous) were significant as compared to standard chloramphenicol. Zone of inhibition (ZoI) was used as a measure for comparing bactericidal activity of these sheep waste extracts showed about methanol extracts (4.75mm), hydro alcohol extracts (4.25mm), aqueous extracts (11.50mm) and Std. (9.00mm) zone against the test organisms of *Candida albicans*. Methanol extracts (11.25mm), hydro alcohol extracts (10.50mm), aqueous extracts (5.50mm) and Std. (9.50mm) zone against the test organisms of *Aspergillus flavus*. Methanol extracts (12.25mm), hydro alcohol extracts (10.75mm), aqueous extracts (8.50mm) and Std. (4.50mm) zone against the test organisms of *Aspergillus niger*. Considering the advantage of the microbicidal activities of the sample. Among the various extract, methanolic extract of sheep waste possess potential activity against fungus.

**Table 2: Antifungal activity of sheep waste extracts**

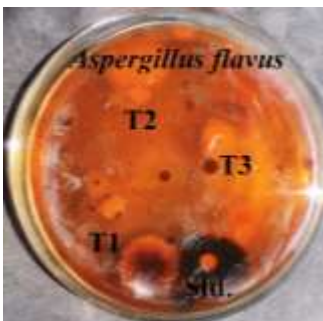
Samples	<i>Candida albicans</i> (mm)	<i>Aspergillus flavus</i> (mm)	<i>Aspergillus niger</i> (mm)
Methanol extracts (50µl) (T1)	4.75±0.33	11.25±0.78	12.25±0.85
Hydro alcohol extracts (50µl) (T2)	4.25±0.29	10.50±0.73	10.75±0.75
Aqueous extracts (50µl) (T3)	11.50±0.80	5.50±0.38	8.50±0.59
Standard (30µl)	9.00±0.63	9.50±0.66	14.50±1.01

Values were expressed as Mean ± SD  
Fungal standard : Fluconazole

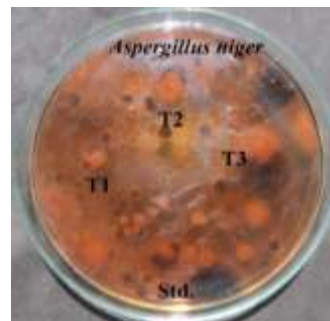
*Candida albicans*



*Aspergillus flavus*



*Aspergillus niger*



**Plate 10: Antifungal activity of sheep waste extracts**

## CONCLUSION

Over all, the present study concluded that sheep waste is good antibacterial and antifungal activity. In this study suggested that sheep waste may be used as natural antimicrobial agent instead of synthetic antimicrobial agents.

## REFERENCES

- Awoyinka OA, Balogun IO and Ogunnow AA.(2007) Phytochemical screening and *in vitro* bioactivity of *Cnidocolus aconitifolius* (Euphorbiaceae). *J. Med. Plant Res*, 1: 63-95.
- Bolivara, P., Paredesa, C.C., Hernándezb, L.R., Juárezc, Z.N., Sánchez-Arreolab, E., Av-Gaya, Y., Bacha, H., 2011. Antimicrobial, anti-inflammatory, antiparasitic and cytotoxic activities of *Galium mexicanum*. *Journal of Ethnopharmacology* 137, p141–147.
- Bowersox and John., (1999). Experimental Staph Vaccine Broadly Protective in Animal Studies, NIH. Retrieved on 2007.
- Holcomb, George B. 1994. A Small-Scale Agricultural Alternative: Dairy and Meat Goats. USDA Cooperative State Research Service, The Office for Small-Scale Agriculture, Washington, DC. 2 p.
- NCCLS-National Committee for Clinical Laboratory Standards. Performance standards for antimicrobial disc susceptibility tests. PA: NCCLS Publications; 1993, p. M2-A5.
- Needham, C., *et al.* (2000). *Intimate Strangers: Unseen Life on Earth*. *ASM Press*, Washington D.C.
- Sedivec, K., T. Hanson, and C. Heiser. 1995. Controlling leafy spurge using goats and sheep. North Dakota State University Extension Service.
- Sudhagar, S; Reddy, Rami (April 2017). "[Influence of elevation in structuring the gut bacterial communities of \*Apis cerana Fab\*](#)" (PDF). *Journal of Entomology and Zoology*. **5** (3): 2,7.
- Tamminga, S., Jongbloed, A.W., Van Eerdt, M.M., Aarts, H.F.M., Mandersloot, F., Hoogervorst, N.J.P. & Westhoek, H., 2000. The forfaitaire excretie van stikstof door landbouwhuisdieren [Standards for the excretion of nitrogen by farm animals], Rapport ID-Lelystad no. 00-2040R, Instituut voor Dierhouderij en Diergezondheid, Lelystad, The Netherlands. Pp: 71.
- [Henuk](#) Y.L.and [J.G. Dingle](#) (Practical and economic advantages of choice feeding systems for laying poultry *World's Poultry Science Journal* v [olume 58 Issue 2](#) 199-208

**Source of support: Nil;**

**Conflict of interest: None declared**