

Invitro Antibacterial Activity of Lichens against Oral Microorganism of Herbivorous and Carnivorous Animals

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Abstract— *Physcia americana*, *Parmotrema perlatum*, *Hypogymnia physodes*, *Lepraria ecorticata* are the lichens species which was tested for their antibacterial activity against oral microorganisms of both herbivorous and carnivorous animals. The zone of inhibition was found more in the species of *Parmotrema perlatum* collected from southern zone of Karnataka, Coorg. Whereas other species did not show any positive result against the animal swabs. They were investigated for their grams nature and were found to be gram positive bacilli.

Keywords— Antimicrobial activity, animal swabs, southern zone.

I. INTRODUCTION

Lichens are the mutualistic symbionts between fungus and algae, which are grown in moist places and pollution free zone areas. They are poorly found in the industrial areas and big cities (Henganuer, 1962). Lichen has major role in food and drug industries (Vartia, 1973, Richardson, 1988). Lichens produce many secondary metabolites which can be used as a protective guard against many pathogenic microorganisms (Lawrey, 1986, 1989).

Lichens have shown antibiotic, antibacterial, antiviral, antitumor, analgesic and antipyretic properties (Vartia, 1973, Critteenden and Ports 1991, Gollapudi et.al. 1994, Huneck 1999, Muller 2004). At present, a study is made to understand antibacterial activity using different lichen species obtained from various zone of southern Karnataka, both urban and rural regions, against the oral microorganisms obtained from cat, dog, cow, hen and rabbit.

II. MATERIALS AND METHODS

Microorganism Cultures: Animal oral swabs were obtained and cultured them on nutrient agar medium and were later tested for grams nature.

Lichen Sample Collection: Four lichen samples *Physcia americana* (sample no.8) from Bangalore, *Lepraria ecorticata* (sample no.1), *Parmotrema perlatum* (sample no.2) and *Hypogymnia physodes* (sample no.3) species from Coorg district of Karnataka, India was collected by scraping from the bark region using sterile blade and were preserved in the refrigerator in the vials.

Antimicrobial Assay: Animal oral swabs collected was streaked on nutrient agar medium and incubated for 24 hours and 37°C. Later appropriate inoculum was seeded in Muller Hinton agar medium. The entire four lichen sample used in the

present study were tested for their antimicrobial activity by disk diffusion method (NCLL 1993), no.1 whatmann paper of size 6mm was dipped in distilled water and later soaked in different lichen samples followed by placing them on Muller Hinton agar medium of different oral swabs of animals. Antimicrobial activity was determined by measuring the diameter of the zone of inhibition around the disk for understanding the positive control of growth inhibition, Streptomycin and Gentamycin were used.

III. RESULT

The antimicrobial activity of four lichen samples collected from southern region of Karnataka, India tested against the oral microorganisms of dog, cat, cow, hen and rabbit by estimating on the basis of the presence or absence of zone of inhibition with required diameter. The microorganisms used in the present study were analyzed for grams nature.

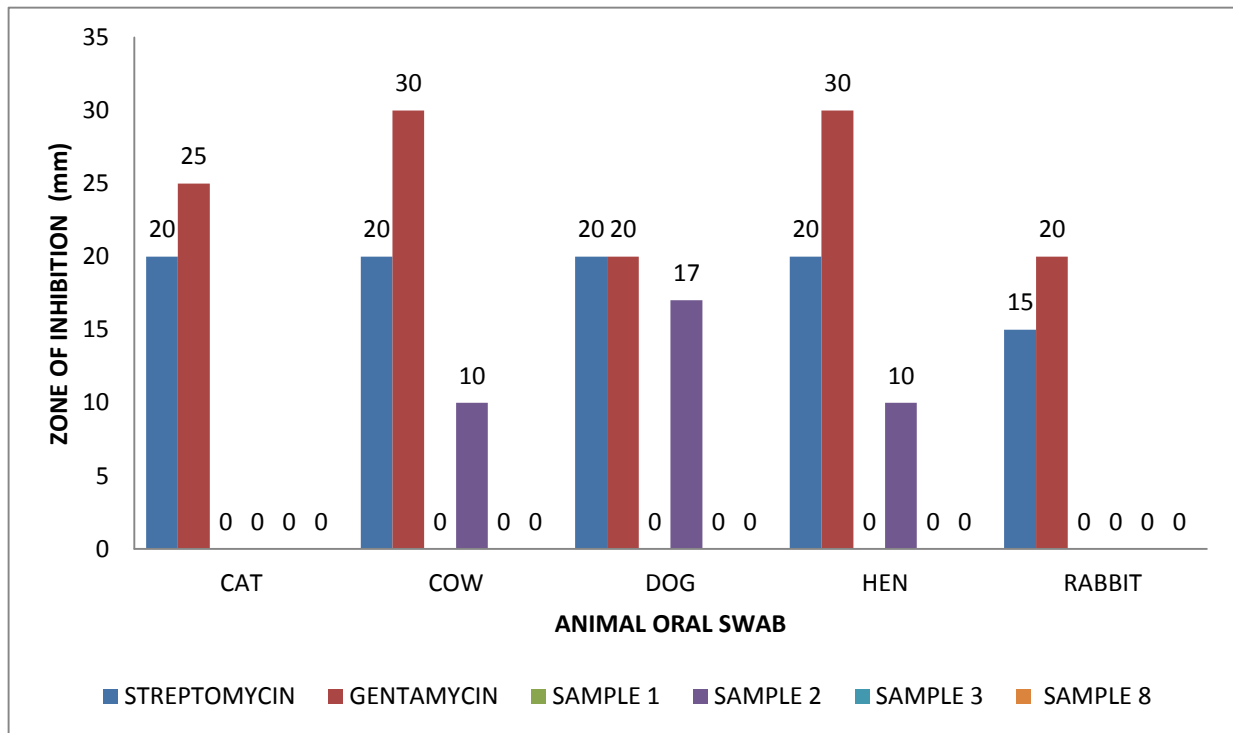
Parmotrema perlatum had strong antimicrobial activity inhibiting the bacteria of dog, cow and hen swab with inhibitory zone of 17mm, 10mm and 10mm and had nil effect on the oral swab of rabbit and cat (Table-1, Graph-1, Figure-1).

The zone of inhibition was zero with other lichen samples such as *Lepraria ecorticata*, *Hypogymnia physodes*, *Physcia americana* (Table-1, Graph-1, Figure-2).

The positive control used in the present study, streptomycin and gentamycin inhibited the growth of all the bacteria tested. The bacteria tested for grams nature showed gram positive bacilli for all the oral swab used in the present study (Figure-3).

TABLE-1: Antibacterial activity of different lichen species.

Animal Oral Swabs		Cat	Cow	Dog	Hen	Rabbit
Lichen Species	Sample Number	Diameter of Zone of Inhibition (mm)				
<i>Lepraria ecorticata</i>	1	nil	nil	nil	nil	nil
<i>Parmotrema perlatum</i>	2	nil	10	17	10	nil
<i>Hypogymnia physodes</i>	3	nil	nil	nil	nil	nil
<i>Physcia americana</i>	8	nil	nil	nil	nil	nil
Control-Gentamycin	-	25	30	20	30	20
Control - Streptomycin	-	20	20	20	20	15



GRAPH – 1: Antimicrobial activity of Lichen Species.

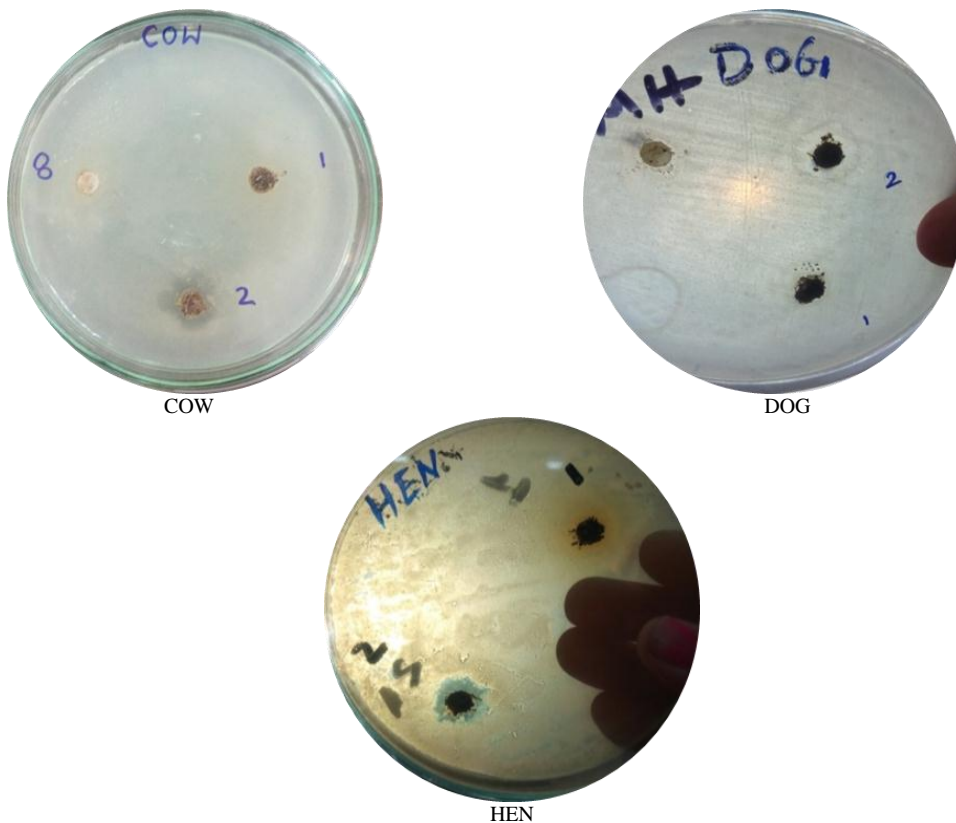


FIGURE – 1: Antimicrobial activity of *Parmotrema perlatum*.

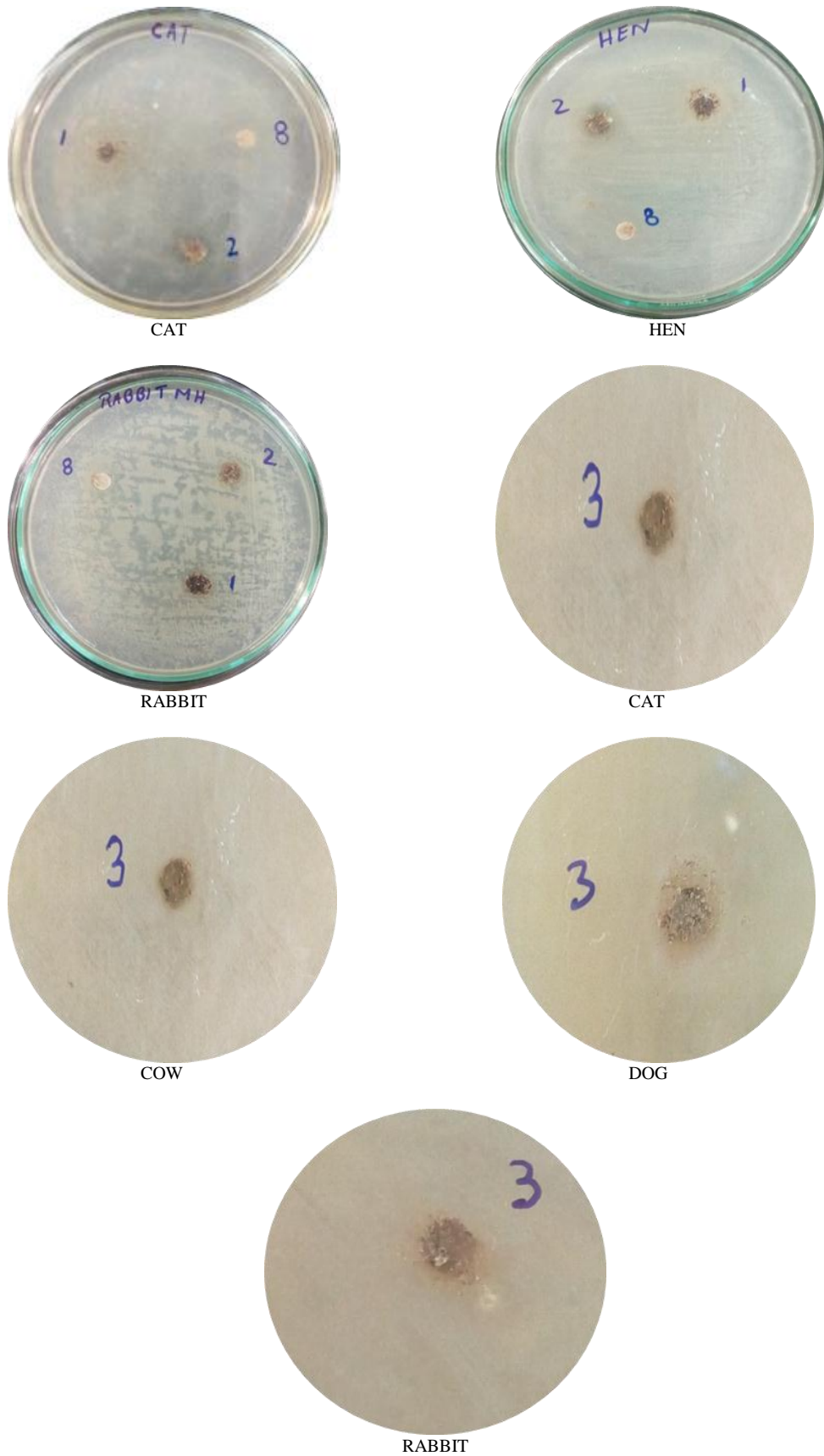
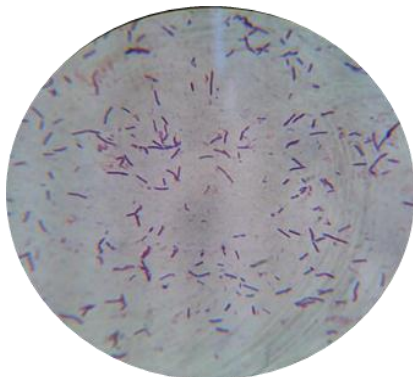
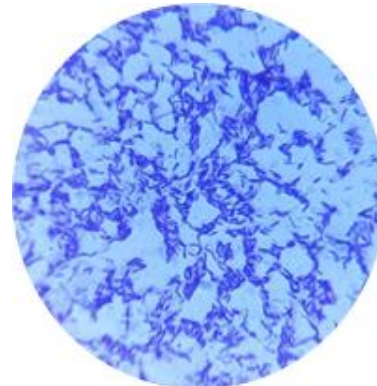


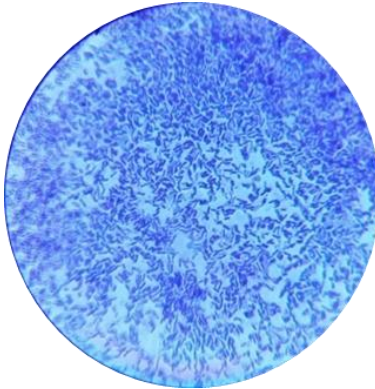
FIGURE – 2: Zone of inhibition was zero with other Lichen Species (*Leparia ecorticata*, *Hypogymnia physodes*, *Physcia americana*).



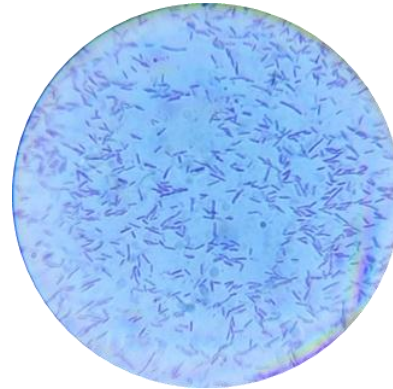
Cat - Gram +^{ve} bacilli



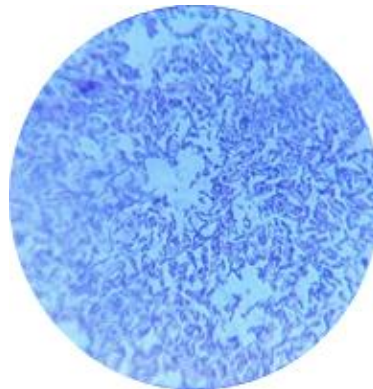
Cow - Gram +^{ve} bacilli



Dog - Gram +^{ve} bacilli



Hen - Gram +^{ve} bacilli



Rabbit - Gram +^{ve} bacilli

FIGURE – 3: Grams reaction of animal Oral Swabs.



Lepraria ecorticata



Parmotrema perlatuma



Hypogymnia physodes



Physcia americana

Images of lichens

IV. DISCUSSION

The present investigation showed marked results only in *Parmotirma perlatum* and not any other lichen sample .it may be due to poor solubility of insolubility of lichen substances present in the thalli of lichen.

Branislav *et al.*, 2009 has reported that the extract of lichens with acetone, methanol and aqueous showed large variation in their antimicrobial activity.

Thus, the similarity and differences with or without using extracts of different species of lichens are due to presence of different components with antimicrobial activity.

Investigators have reported that level of antimicrobial activity against gram negative and gram positive bacteria is different among different antibacterial agents. The experimental data of current study confirms some of lichens species can be used in manufacture of drug for treating many diseases caused by microorganisms.

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