ANTIFUNGAL ACTIVITIES OF CAMEL URINE AGAINST SELECTED HUMAN FUNGAL PATHOGENS

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Abstract

This study was aimed to evaluate the physico-chemical component and antifungal activity of camel urine against selected fungal pathogens. The chemical composition were determined using urinalysis while the antifungal activity were determined using mycelia growth inhibition method. The chemical composition of the male and female camel urine contains no amount of glucose, ketones, blood, bilirubin, nitrite and urobilinogen. The color of the male camel urine was amber while female urine was deep amber. The pH of the male and female camel urine sample was 9 and 8.5 respectively. A high content of protein, 30, was obtained for both male and female camel urine. Results showed that both male and female camel urine at high concentration had more significant inhibitory effect on fungal growth with 90.5 % and 90.0% inhibition for female and male camel urine respectively. The inhibitory effect of the conventional antifungal (fluconazole) recorded 95.5% for Aspergillus niger was similar to 100% camel urine. Camel urine is highly effective antifungal agent which might be an alternative for treating human fungal diseases.

Keywords: Antifungal, Camel urine, Pathogens, Physico-chemical and Fluconazole.

Introduction

As part of traditional healthcare and practice, complementary and alternative medicine is widely employed in Saudi Arabia and Africa, some cancer patients prefer to drink camel urine over chemotherapy and radiotherapy due to its perceived naturalness and safety. The camel represents a crucial livestock species, integral to pastoral existence by fulfilling essential livelihood requirements. Between 3,000 and 3,500 years ago, humans first domesticated camels (Ahmad *et al.*,2010). The camel's exceptional metabolic efficiency is one of its defining traits. Camel normally drink water only once during the winter and four times during the summer a feat very noteworthy. Camel can turn waste industrial plant resources into meat, milk, and fiber. This species is perfect for manipulation under dry and semi-arid terrestrial conditions (Iqbal *et al.*,2001). *Camelus dromedarius* and *Camelus bactrianus* are the two camel species that are primarily exploited economically in nature (Farah *et al.*,2020). The use of camel urine for health purposes is common in Nigeria, Somalia, Pakistan and some regions in Turkey.

Urine therapy is an alternative medicine movement that includes drinking camel urine. An age-old technique for treating a variety of human illnesses is urine therapy. Drinking camel milk and urine has a number of documented health advantages that have been supported by contemporary scientific studies from the early days of medical science (Al-Abdalall, 2010).

Hence, these present studies aims at evaluating the antifungal activities of camel urine against selected human fungal pathogens.

MATERIALS AND METHODS

Sample collection

The camel urine samples were collected from a male and female camel (*Camelus dromendarius*) in a neighborhood farm in Lagos State. The urine sample was kept in a sterile bottle and transported to the Microbiology laboratory of The Federal Polytechnic Ilaro for futher analysis.

A total of seven human fungal pathogens were investigated, *Aspergillus niger, Aspergillus flavus, Penicillum* sp., *Fusarium* sp., *Rhizopus* sp., *Alternaria* sp., and *Aspergillus fumigatus.*

These clinical isolates were obtained from specimens recovered from patients attending Sacred health hospital, Lantoro Abeokuta Ogun State. The fungal isolates were collected aseptically into sterile Potato dextrose agar slants.

Media Preparation

The media was prepared based on manufacturer's instruction, after dissolving in conical flask it was then sterilize in an autoclave for 15 minutes a 121ºC. Antibiotics (Streptomycin) were added along with the media to inhibit bacterial growth.

Urinalysis Test

The urinalysis of the male and female camel urine was tested by dipping a combi-9 urinalysis test strip into the urine sample for 60 seconds.

Antifungal Activity Test

The antifungal activities of camel urine on fungal pathogen were determined using a modified mycelia growth inhibition technique according to (Al-Hetar *et al.*, 010). Different concentration (100%, 75%, 50%, 25% and 0% as control) were prepared by incorporation of camel urine into sterilized distilled water.

The medium was autoclaved, then 5 mL of various camel urine concentrations were added to 15 mL of potato dextrose agar medium, stirred well, and then transferred onto a sterile petri dish to solidify.

Using a cork borer, fungal discs with a diameter of 6 mm were extracted from cultures that were actively growing and inoculated on potato dextrose agar plates seeded with camel urine. Plates were incubated at 28ºC temperature in incubator for 7 days. After 7 days plates were observed and the percentage growth inhibitions were calculated as described by (Oladipo *et al.*, 2021).

RESULTS AND DISCUSSION

Table 1: Cultural and Morphological Characterization of the Fungal Isolates

S/N	Cultural characteristics	Morphological characteristics	Organisms
1	They have a cottony appearance.	Conidia are globose, dark brown to black and rough-walled.	*Aspergillus niger*
2	They have powdery masses of yellowish-green spores on the upper surface and reddish-gold on the lower surface.	The globose conidia with varying sizes are slightly roughened and unbranched.	*Aspergillus flavus*
3	They are fast growing, yellowish green.	The conidia are globose with smooth walled.	*Penicillium* sp.
4	They are fast growing woolly to cottony lemon and yellow.	Multicellular distinctive sickle shaped macro conidia.	*Fusarium* sp.

5	They are fast growing, fades from white to dark. Dense cottony growth in texture	Sporangiospores are globose to ovoid.	*Rhizopus* sp.
6	It grows well in basic fungal medium.	Conidia surface is either smooth or spinose with small globose. The apex, they have a smooth surface.	*Aspergillus fumigatus*
7	They grow rapidly and produce flat, downy to woolly grayish green to black colonies.	Pale or dark brown conidiospore, straight or flexunous. Smooth surface.	*Alternaria* sp.

Table 2: Chemical components of the Male and Female camel urine

	Male Urine	**Female Urine**
Colour	-ve	+ve
Blood	-ve	-ve
Urobilinogen	-ve	-ve
Ketones	+ve	-ve
Protein	30	30
Nitrite	-ve	-ve
Glucose	-ve	-ve
pH	9	8.5
Specific gravity	1.005	1.005

Key:

-ve: Negative

+ve: Positive

Table 3: Percentage growth inhibition of camel urine against the isolates

Isolate	Male Camel Urine					Female Camel Urine				
	0%	**25%**	**50%**	**75%**	**100%**	**0%**	**25%**	**50%**	**75%**	**100%**
Aspergillus niger	1.5	27.5	35.0	45.0	52.5	0.5	42.0	65.5	71.5	86.0
Aspergillus flavus	1.0	15.0	30.0	45.0	50.0	0	38.5	67.0	69.5	81.5
Penicillium sp.	1.0	55.0	45.0	60.0	77.5	0	44.0	56.5	73.0	86.0
Fusarium sp.	0.5	60.0	70.0	80.0	90.0	0	42.5	69.0	75.0	90.5
Rhizopus sp.	0	47.5	60.0	77.5	82.5	0	36.0	47.0	65.0	88.5
Aspergillus fumigatus	1.5	40.0	50.0	60.0	67.5	0.5	31.5	46.0	60.5	71.0
Alternaria sp.	1.0	35.0	40.0	45.0	55.0	0.5	41.5	56.5	73.5	86.5

Table 4: Percentage Growth inhibition of fluconazole

S/N	Isolate	% Growth inhibition
1	*Aspergillus niger*	95.5
2	*Aspergillus flavus*	91.0
3	*Penicillium* sp.	93.0
4	*Fusarium* sp.	95.0

5	*Rhizopus* sp.	91.0
6	*Aspergillus fumigatus*	87.5
7	*Alternaria* sp.	89.0

DISCUSSION

Table **1:** shows the cultural and morphological characteristics based on their colony morphology (cell size, shape, pigmentation and arrangements) using lactophenol stain. The isolates were identified as *Aspergillus niger*, *Aspergillus flavus*, *Fusarium* sp., *Rhizopus* sp., *Aspergillus fumigatus*, *Penicillium* sp. and *Alternaria* sp.

Table 2: shows the urinalysis for the male and female camel urine. It showed that the urine contains no amount of glucose, ketones, blood, bilirubin, nitrite and urobilinogen. The colour of the male and female urine was amber which later changed to deep amber and the pH of the male and female camel urine sample was 9 and 8.5 respectively.

Percentage growth inhibition of camel urine as presented in **Table 3**: Results showed that the higher the camel urine concentration the greater the growth inhibitory effects on the isolates. Both male and female camel urine at high concentration had more significant inhibitory effect on fungal growth with the female camel urine displaying greater antifungal efficacy. At 100% concentration for both urine,

Fusarium sp. recorded the highest percentage growth inhibition of 90% and 90.5% for male and female camel urine respectively. The percentage growth inhibitions were not significant at 0% concentration.

Table 4 shows that the percentage growth inhibition of fluconazole on the isolates. The highest % growth inhibition was recorded on *Aspergillus niger* with 95.5% while *Aspergillus fumigatus* had the lowest % growth inhibition. Fluconazole showed significant inhibition of fungal growth.

Results from this study showed that both male and female camel urine at high concentration had more significant inhibitory effect on fungal growth with the female camel urine displaying greater antifungal efficacy. The effect is similar to the conventional antifungal which is the fluconazole when 100% camel urine was used. Maximum antifungal activity as observed against the mentioned fungi after 7 days of incubation and manifested by a larger diameter of growth inhibition.

Similarly, Al-Abdalall (2010) proved that camel urine at low concentration has no significant inhibitory effect on fungal growth, while inhibition can obviously revealed after using high concentrations.

CONCLUSION

In this study, the antifungal activity of camel urine was able to inhibit the growth of the selected fungal pathogens. Since the percentage growth inhibition of camel urine on the isolates were similar to that of the conventional antifungal agent, it can be concluded that camel urine can be used as an alternative antifungal agent.

REFRENCES

Ahmad, S., Yaqob, M., Hashmi, N., Ahmad, S., Zaman, M., & Tariq, M. (2010). Economic importance of camel: unique alternative under crisis. *Pakistan Veterinary Journal* 30: 191-197.

Al-Abdalall, A. (2010). The inhibitory effect of camel's urine on mycotoxins and fungal growth. *African Journal Agriculture Research*, 5, 1331-1337.

Al-Awadi, A., & Aljudaibi, A. (2014). Effects of Heating and Storage on the Antifungal Activity of Camel Urine. *Journal of Clinical Microbiology*, 3, 179.

Al-Hetar, M.Y., Zainal Abidin, M.A., Sariah, M., & Wong, M.Y. (2010). Antifungal Activity of Chitosan against *Fusarium oxysporium* f. sp. Cubense. *Journal of Applied Science* 10, 1002- 33455.

Iqbal, A, & Khan, B. B. (2001). Feeding behaviour of camel, Review. *Pakistan Journal of Agricultural Science*, 38, 58-63.

Hamzah, A.M., Khalaf, J.M., Al-Zubaidy, I.A., 2012. Isolation of *Salmonella* spp. from

human urine in Iraqi patients. *Int. J. Sci. Tech.*, 7(4), 71-75.

Mostafa, M. S., & Dwedar, R. A. (2016). Antimicrobial Activity of Camel's Urine and Its Effect on Multidrug Resistant Clinical Bacterial and Fungal Isolates. *British Journal of Pharmaceutical Research*. 13(4).

Newman, D., & Cragg, G. (2016). Natural products as source of new drug from 1981 to 2014. *Journal of Natural Products*, 79(3), 629-661.

Zaki, A., van Boheemen, S., Bestebroer, T., Osterhaus, A., & Fouchier, R. (2012). Isolation of a novel coronavirus from a man with pneumonia in Saudi Arabia. *New England Journal of Medicine* 367, 1814–1820.