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CYTOTOXIC, ANTI-PROLIFERATIVE AND ANTI-MICROBIAL ACTIVITIES OF EXTRACT FROM *CLADONIA POCILLUM*

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INTRODUCTION

Lichens produce a wide variety of seconder metabolites which have a potential use as anti-microbial, cytotoxic, fungitoxic, anti-feedant, anti-oxidant, anti-inflammatory [1-3]. Many studies report that, the efficacy of lichen metabolites in the treatment of cancers [4, 5]. The aim of the study is to explore the anti-proliferative, cytotoxic and anti-microbial properties of extract from *Cladonia pocillum*.

MATERIAL AND METHOD

The human breast cancer cells (MCF-7) were treated with the extract from *C. pocillum* for 24 h. MTT assay was used for cytotoxicity. The effect of proliferation inhibitor was examined using immunocytochemistry assay using the proliferating cell nuclear antigen (PCNA) antibody. The methanolic and chloroform extracts of the lichen were tested for anti-microbial activity against *Staphylococcus aureus, Enterococcus faecalis, Escherichia coli*, *Pseudomonas aeruginosa* and *Candida albicans* using disc diffusion and minimal inhibitory concentration methods.

RESULTS

A significant decrease was observed the percentage of PCNA immunoreactive cells among groups (Fig.1). The half maximal inhibitory concentration (IC_{50}) was found to be 0.802 mg/mL using MTT assay (Fig.2). The more effective anti-microbial activity of *C. pocillum* was recorded for the chloroform extract. However, a higher anti-fungal activity was noted in the methanol extract. Besides, the results indicate that *C. pocillum* had the highest anti-microbial activity against gram-negative bacteria.

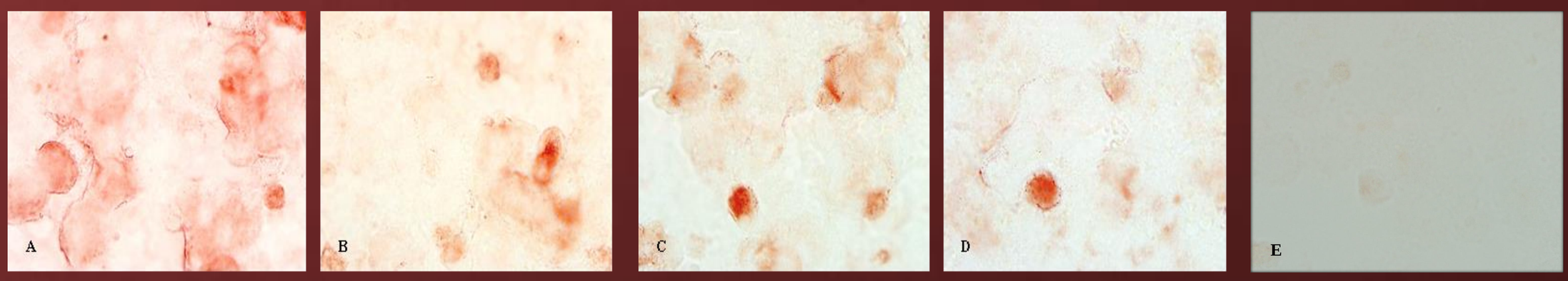

Fig.1. Immunreactive cells labeled for PCNA . A: Control; B: treated with the methanolic extracts of 0.2 mg/ml ; C: 0.4 mg/ml ; D:0.6 mg/ml ; E: 0.8 mg/ml

Table 1. Anti-microbial activities of the extracts of *C. pocillum* in the disc diffusion assay.

Lichen species[a]		*E. coli*	*P. aeruginosa*	*E. faecealis*	*S. aureus*	*C. albicans*
C. pocillum	M	-	-	-	-	30 ±0.50
	C	32 ±0.58	31 ±0.58	-	10 ±1.00	23 ±0.00
Antibiotics[b]						
	C				26 ±0.58	
	FLU					25 ±0.58
	TZP	26 ±1.53	26 ±1.52			
	Va			17 ±1.15		

Values are mean inhibition zone (mm) ± S.D of three replicates; "-" No inhibition observed
[a]C, chloroform extract (20 µg/disc); M, methanol extract (134 µg/disc). [b]Antibiotics used as positive reference standards;
C, chloramphenicol (30 µg/disc); FLU, fluconazole (25 µg/disc); TZP, piperacillin/tazobactam (110 µg/disc); Va, vancomycin (30 µg/disc).

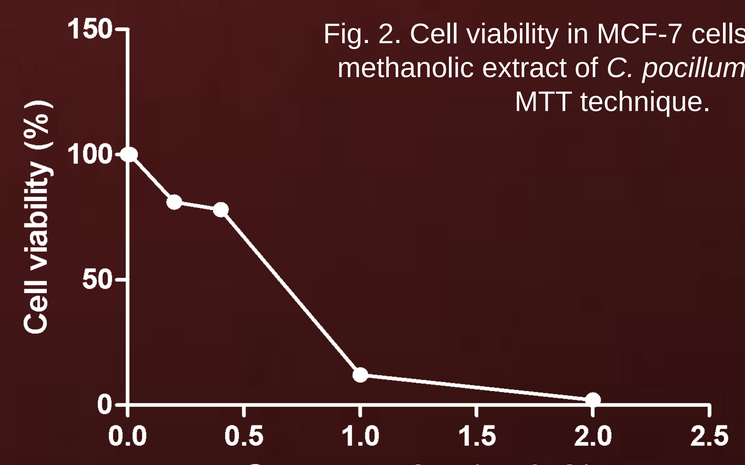

Fig. 2. Cell viability in MCF-7 cells treated with methanolic extract of *C. pocillum* for 24 h by MTT technique.

Table 2. Minimum inhibitory concentration (MIC) of the extracts of *C. pocillum* against the test organisms.

		E. coli	*P. aeruginosa*	*E. faecealis*	*S. aureus*	*C. albicans*
C. pocillum	M	-	-	-	-	26,8 ±0.00
	C	2 ±0.58	4 ±0.00	-	8 ±1.00	6 ±1.00

± S.D of three replicates; "-" Non-affective on the bacteria
C, chloroform extract (µg/ml); M, methanol extract (µg/ml).

CONCLUSION

The present study indicates that lichen extracts from *Cladonia pocillum* was demonstrated strong anti-microbial and anti-cancer effects. It is suggested that lichens may be used as a natural anti-microbial and anti-cancer agents.

REFERENCES

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