

# THE USE OF *CYMBOPOGON CITRATUS* (LEMONGRASS) EXTRACTS AS ANTILEISHMANIAL ACTIVITY

Husain F. Hassan and Sahar A. Taha\*

Department of Biology, College of Science, University of Kirkuk, Iraq.

\*e-mail: tokmachy@gmail.com

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**ABSTRACT :** The results of the current study indicated the apparent inhibitory effect of the aqueous and alcoholic extracts of *Cymbopogon citratus* on the growth of *L. tropica* and *L. donovani* promastigotes. The inhibitory concentration ( $IC_{50}$ ), which cause the loss of 50% of the promastigotes of *L. tropica* and *L. donovani* at the logarithmic growth phase 96 hours was shown to be 0.008 and 0.016 mg/cm<sup>3</sup> respectively, whereas the  $IC_{50}$  of alcoholic extract was 0.007 mg/cm<sup>3</sup> in both parasite forms. The results revealed decrease in total protein amount, total nucleic acid amount, RNA, and DNA concentrations, upon treating the leishmanial promastigotes with *C. citratus* extracts. High-pressure liquid chromatography (HPLC) analysis of the plant extracts proved to contain such phenolic active compounds which in turn may responsible for the antileishmanial activity.

**Key words :** *Cymbopogon* extract, antileishmanial, promastigote, *Leishmania*.

## INTRODUCTION

Leishmaniasis is a protozoal disease caused by various species of the genus *Leishmania* which is transmitted by the bite of the female of sand flies (*Chimyaem et al*, 2019).

Different species of *Leishmania* causes different clinical manifestation ranging from self healing, cutaneous lesions to disfiguring mucocutaneous ulceration and the visceral infection which can be fatal if untreated (Postigo, 2010).

Pentavalent antimonials is the drug of choice for the treatment of cutaneous and visceral leishmaniasis, but frequently is failed to eradicate the parasite due to resistance, toxicity, and lower efficacy (Pujol and Riera, 2014). Consequently, it is generally accepted that there is an argent need for new alternative therapies for the treatment of these disease (Silva, 2015) and must be more effective, and less toxic and can be taken orally.

Medicinal plant and their natural products are constitute best sources of chemical compounds for functions including defence against parasites (Chan and Pena, 2001). The present study was unde taken to use the effect of the aqueous and alcoholic extracts of *Cymbopogon citratus* on the growth of promastigotes of *Leishmania tropica* and *L. donovani*.

## MATERIALS AND METHODS

### Parasite growth

The promastigote forms of *Leishmania tropica* and *L. donovani* were grown at 26 C in NNN medium as

described by (Chang and Bray, 1985) and in PY medium as described by (Hassan and Abdulla, 2017).

### Preparation of plant extracts

The aerial parts of *Cymbopogon citratus* were collected from Baghdad. The plant parts were cleaned with water to remove dust particle then were dried at room temperature and kept in free of moisture conditions (Mahmoud *et al*, 2014). The aqueous extraction of each plant parts were prepared as described by Riöse *et al* (1987). Whereas the alcoholic extracts were prepared as described by Ladd *et al* (1987).

Astock solution (1gm/ml) from aqueous and alcoholic extraction of each plant was used to prepare the final concentration (0.01, 0.1, 1) mg/cm<sup>3</sup> in the growth medium. The solution of extracts were sterilized using filtration through (0.45) µm membrane filter.

### Estimation of total protein and nucleic acid

The determination of protein content was carried out using Lowery method (Lowery *et al*, 1951) while the method of (Giles and Mayer, 1965) were used for estimation of nucleic acid DNA and RNA.

### HPLC

The (High performance liquid Chromatography) HPLC analysis was carried out for determination of 6 phenolic compound namely (Catechin, Epigin, Keamferol, Luteoline, Quercetine, Rutin) in each of aqueous and alcoholic extraction of Lemon grass, the method of analysis was done by Mardu *et al* (2012) using device SYKAM liquid high performance the phase has been