Study the *Eucalyptus microtheca* effect in dysentery treatment

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Abstract

The current study was intended to exhibited phenolic compounds activity against dysentery that caused by E. histolytica. The work utilized 20 rats (male) and distributed to following group groups; control group. Second group rat infected with (103 cyst/ml) E. histolytica. Third group infected rat were treated with (100mg/ml) aqueous extract for four weeks. Fourth group infected rat were treated with (250mg/ml) aqueous extract for four weeks. The findings demonstrated significant elevate ($P < 0.05$) in MDA with significant ($P < 0.05$) reduce in levels of catalase in an infected rats compared with control group. The results of treated rats show non-significant ($P < 0.05$) changes in all parameters compare with control group when using phenolic compounds. About the histological changes, In second group, duodenum sections show fibroblasts and lymphocyts infiltration. In treated groups (100mg & 250mg) show semi normal crypts of goblet cells, absorptive cells and muscular layer. So, aqueous extract show a high efficacy role against the E. histolytica and in treatment of dysentery.

Keywords: Dysentery, Eucalyptus microtheca; oxidative stress; Colon.

Introduction

Since the announcement of SARS-CoV-2 as global pandemic and the scientific community has been heavily involved in efforts to

Eucalyptus plant (Family: Myrtaceae) is a genus that classified under flowering trees (evergreen aromatic), that possess more than 600 types [1-2]. Oils of Eucalyptus leaves and blossom composed of 101 compounds including α-phellandrene, the α-pinene, β-pinene, O-cymen, aromadendrene and globulol. Some of the chemicals isolated are used in pharmacological products and other types are used as insecticide agents [1]. Several types of Eucalyptus plant are utilized as an antiseptic against different microorganisms and against the the upper respiratory tract infections, like influenza and congestion of sinus [3]. Amoebic dysentery is due to the parasite called Entamoeba histolytica [4]. About 4 to 10% of the carrier persons of this infection develop signs and symptoms within a period close to year and dysentery is considered as the third disease leading cause of death worldwide after infection of Malaria and infection of Schistosomiasis [5-6]. Transmission of *E. histolytica* generally happens by the ingestion of the infected water or food with cysts of *E. histolytica* and even fecal-oral transmission within household [7-9]. Infection by *E. histolytica* may be asymptomatic in most of the infected cases; however, fulminating disease may happen after period of incubation (7–28 days) from exposure step to parasite infection. In mild parasite signs and symptoms may be including abdominal cramps, diarrhea or stool passing with mucus.

There may be fatigue, immoderate gasses with weight loss. In the heavy parasite infection with this parasite, the patient suffering from fever, vomiting, pain of abdominal and bloody diarrhea condition of about 10–20 motions/day [10-11].

Materials and Methods

Animal model

20 rats (male) were used, (wt 200-250 gm with age 4-6 month) obtain from Science College / Tikrit University.

Culturing the parasite

The parasite isolates were got from patients of Kirkuk General Hospital. The feces samples were identified and diagnosed by the method used by [12], and then E. histolytica was isolated according to the method of [13]. The number of cysts was calculated and dose of injection was determined.

Eucalyptus aqueous crude extracts

Aqueous crude extracts of leaves of eucalyptus were prepared to test against Amoebic dysentery. The method of [14] was used to process aqueous extract. Stock solutions of aqueous extract of eucalyptus were prepared by dissolving 1 g of dried aqueous extract in 10 ml of sterilized distilled water and no further concentrations were made.

Experimental design

Twenty rats were used in this work and after that divided as follow:

A. Control group received standard diet.

B. Second group rat administrated with (dose 10 3 cell/ ml.) E. histolytica

C. Infected rat were treated with 100mg of aqueous crude extracts for four weeks.

D. Infected rat were treated with 250mg of aqueous crude extracts for four weeks.

Oxidative agents

Serum MDA (malonedialdehyied), was measured in this study according to colorimetric reaction by using thiobarbituric acid (TBA) [15]. S. Catalase was determined by using the Biovision-USA kits procedure.

Processing of histology

Liver species were removed and fixed with 10% formalin, processed by paraffin method, cut at six micrometers in thickness by microtome device and stain step done by using Hematoxylin and Eosin (H&E) [16]. Sections were diagnosed by using Olumpis microscope.

Statistical analysis

Current data were analyzed by using program known as Minitab (statistical program). A statistical change between the groups means were analyzed using one-way analysis of variance.

Results

Oxidative stress

MDA levels show significant ($P<0.05$) increase in second group compare with control group. Where, catalase levels show significant ($P<0.05$) decrease in same group. After treatment with phenolic compounds, MDA and catalase levels show non-significant ($P<0.05$) changes in third and fourth groups compare with control group.

Histological study

Sections of control group show normal form of villa of duodenum and sub-mucosa, muscular layer (fig. 1). In second group, duodenum sections show fibroblasts and lymphocyrs infiltration (fig. 2). In treated groups (100mg & 250mg) show semi normal crypts of goblet cells, absorptive cells and muscular layer (fig. 3-4).

Figure (1): colon of control group show normal structure of crypts (CY), goblet cells (GC), absorptive cells (SC) and stromal cells (SC) H&E X400.

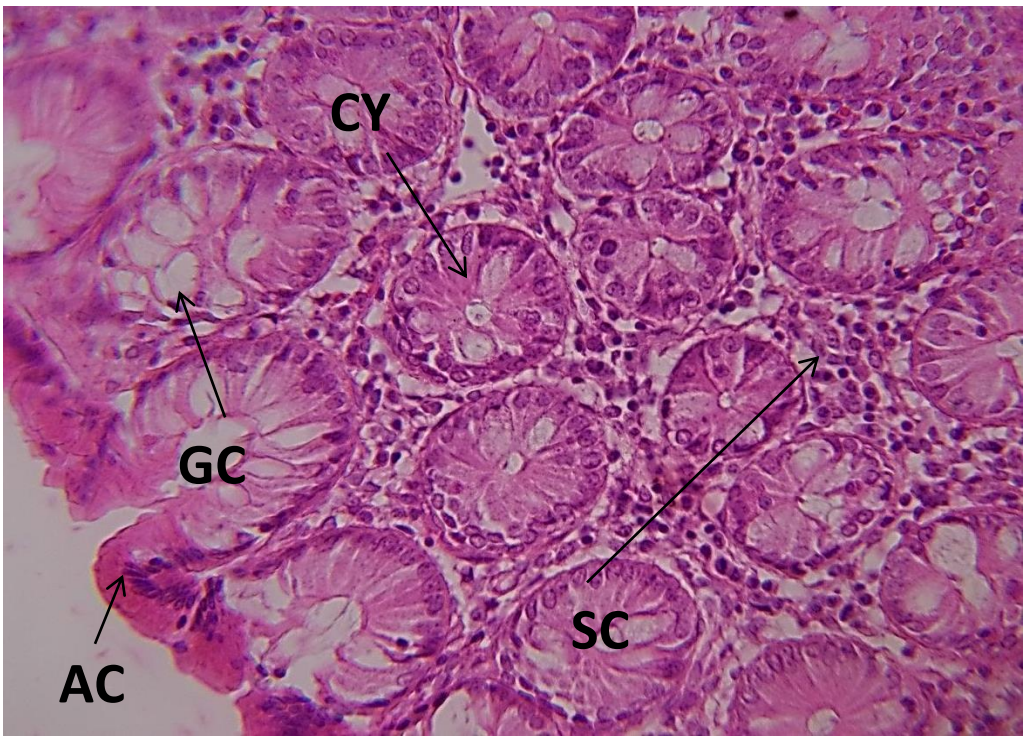


Figure (2): colon of infected group show fibroblasts (FB) and lymphocyrs infiltration (LI) H&E X400.

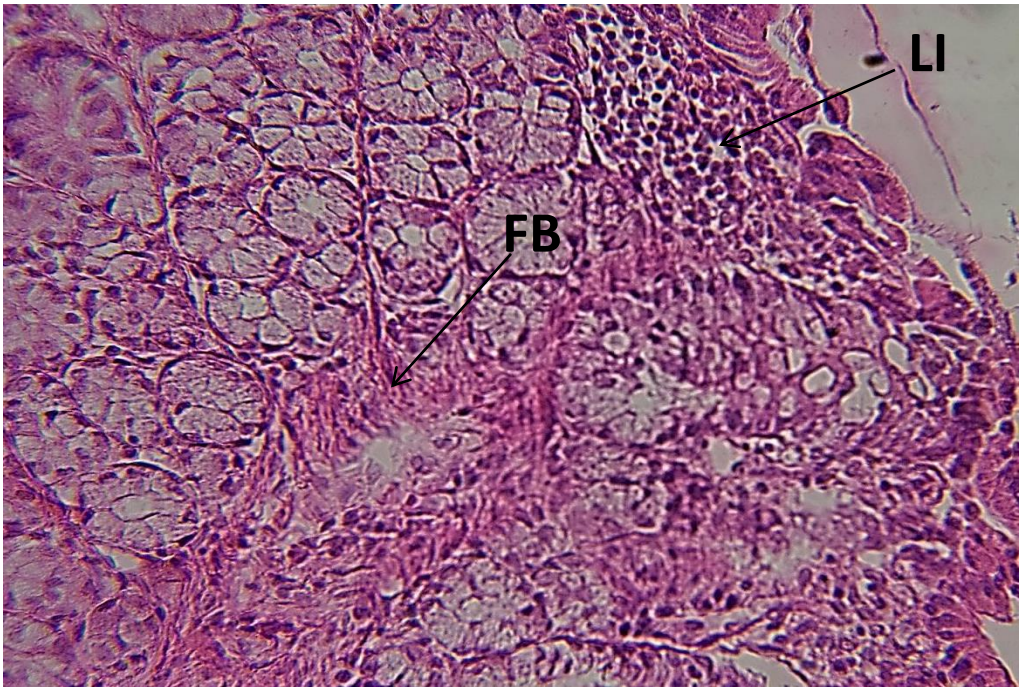


Figure (3): colon of treated group (100mg) show normal structure of goblet cells (GC), absorptive cells (SC) and muscular layer (SC) H&E X400.

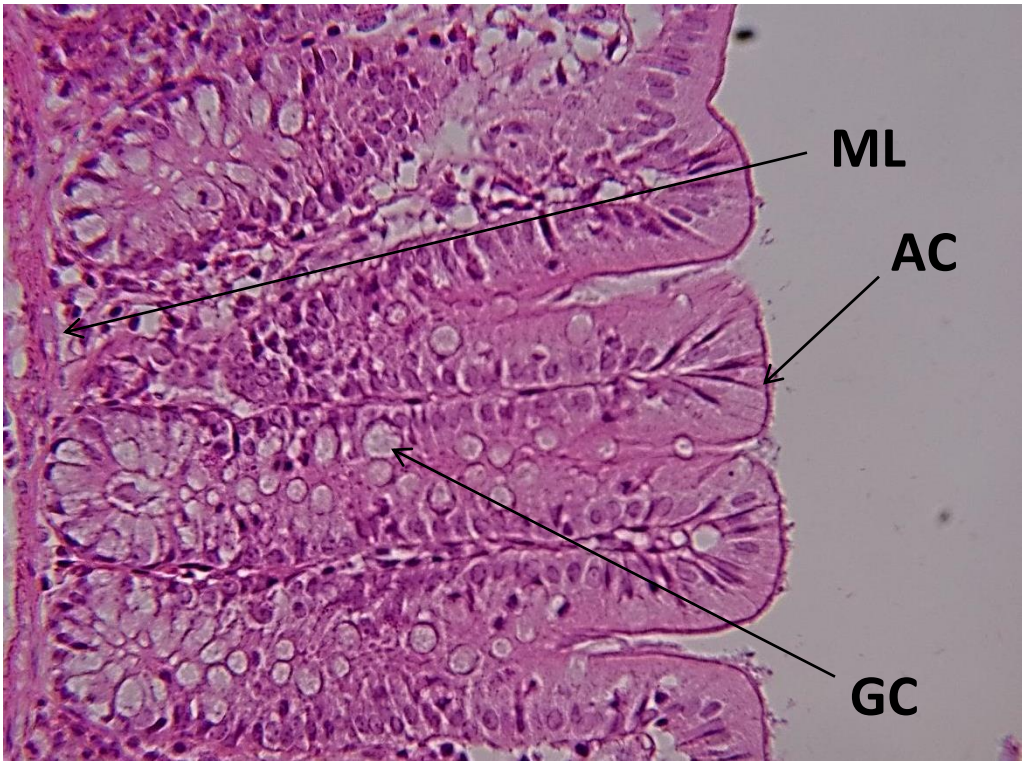
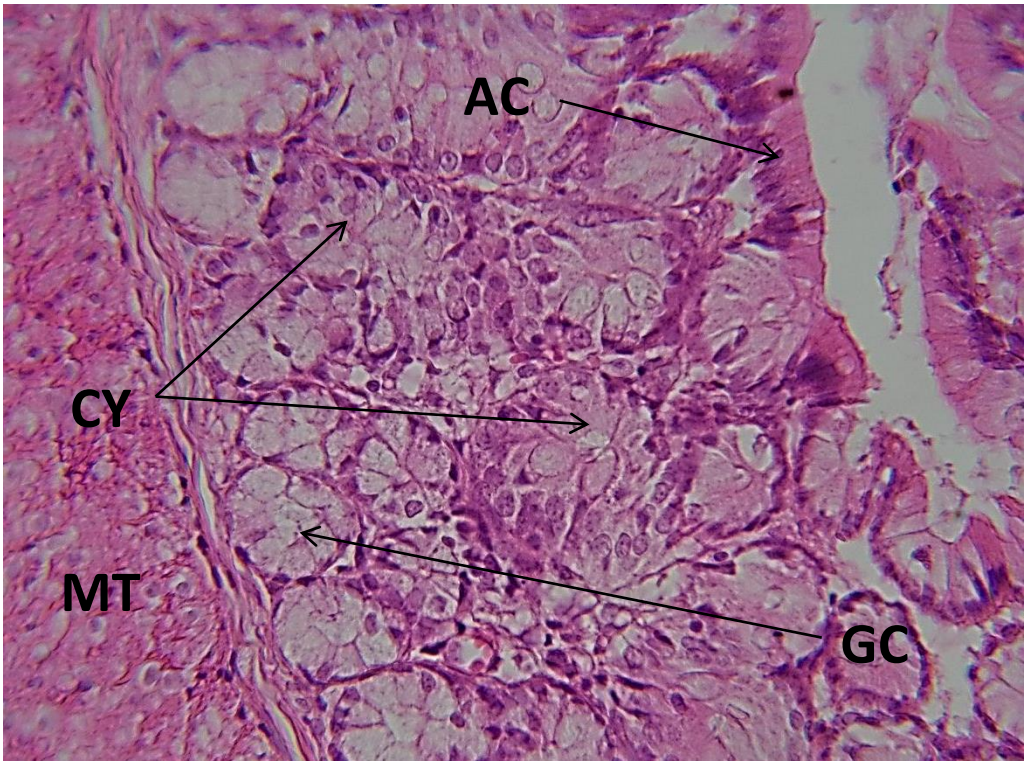


Figure (4): colon of treated group (250mg) show crypts (CY) of goblet cells (GC), absorptive cells (SC) and muscular layer (SC) H&E X400.



Discussion

The results show different histological changes in colon include lymphocytes infiltration, fibrocytes and degeneration changes with significant change in MDA and catalase levels. The results of current study is in agreement with Al-Kennany et al. [17] who referred that E. histolytica lead to different lesions in mice colon include lymphocytes infiltration and degeneration changes. Pineda [18] indicated that E. histolytica induced an elevated ROS level in cells that explains the results of current study, that explain elevate the MDA levels in present study. Otherwise, the treatment of infected rats with aqueous extracts, results show improved of colon tissues and oxidative stats, eucalyptus is rich in essential oils. Several researchers attributed the presence of essential oil and its various constituents in eucalyptus extracts for the inhibition of a wide range of microorganisms including fungi and bacteria [19-20]. Among the various constituents of eucalyptus essential oil is 1,8-cineole which is a characteristic compound of the genus Eucalyptus and found by some researchers that this compound was largely responsible for a variety of its antimicrobial and pestcidal effect [21-22].

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