Ain Shams University
Faculty of Specific Education
Home Economy Department

Study the Effect of *Aloe Vera* Plant on Rats Infected by Liver Inflammatory

By

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Athesis Submitted for Partial Fulfilment of the Requirements of M.Sc. Degree in Home Economic Dept., (Nutrition & Food Science)

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ABSTRACT

The present study was carried out to investigate the protective role of *Aloe Vera* gel plant extract on carbon tetrachloride CCl_4 induced changes in liver enzymes of albino rats. *Aloe Vera* is a medicinal plant belonging to the family –Liliaceae, which has a wide range of therapeutic applications such as wound healing, diabetes, burns, for easing intestinal, curing ulcers and arthritic swellings.

Sixty-four male Albino rats weighing about 130±5 g was taken and divided into eight groups, each with eight rats. The first group is the control (-) and fed on normal diet for 6 weeks. The second group received subcutaneous injection with CCL_4 in paraffin oil (50% v/v 2 ml/kg) twice per week for 2 weeks to induce chronic damage in the liver tissue and fed on normal diet (control +). The third, fourth and fifth groups were injected with CCL_4 in paraffin oil twice per week for 2 weeks then fed on 0.3, 0.6 and 0.9ml *Aloe Vera* suspension gel (50 mg/mL), respectively by epi-gastric tube for remnant 4 weeks (injection groups). The sixth, seventh and eighth groups fed first on normal diet plus 0.3, 0.6 and 0.9ml *Aloe Vera* suspension gel, respectively by epi-gastric tube for first 4 weeks then they were injected with CCL_4 in paraffin oil twice per week for remnant 2 weeks with continued fed on the same concentrations of *Aloe Vera* suspension gel (protected groups).

The results indicated that *Aloe Vera* powder increased the nutritional value of all treatments (protein, fat, carbohydrate and crude fiber), vitamin E (6.54μg/ml) and phenols (0.39 mg/100mg). Also, body weight gain (BWG) in protected group with 0.9 ml *Aloe Vera* suspension gel (50 mg/mL) recorded the best result (58.90%) comparing with the control (-) (42.92%). Injected groups showed ratios of weight change or suffered a weight loss in liver comparing with control (+), ranged from -34.78 in 0.3ml to -11.37% in 0.9ml *Aloe Vera* suspension gel after 6 weeks. Feeding rats on different ratios of *Aloe Vera* gel decreased serum AST and ALT enzymes compared to the control (+) group. Also, decreased the mean values of uric acid, urea and creatinine in all tested groups was noticed compared to the control (+) group (2.43±0.17, 38.00±5.0 and 0.86±0.12, respectively). The best reduction in lipid profile was (89.60±12.41) for the triglycerides in high concentration of *Aloe Vera* gel (0.9 ml) and follow by 0.6ml (90.60±18.57) and 0.3ml (91.80±8.81) comparing with control (+) in protected group.

Aloe Vera improved liver and kidney histopathology in carbon tetrachloride induced hepatotoxicity in rats fed on different ratios of its extract (protective groups).

Key words: *Aloe Vera* gel (*Aloe Barbadensis miller)*, CCL_4, Albino rats, Liver enzymes, Kidney functions, Lipid Profile, Histopathology.

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A.O.A.C	Official Methods of Analysis
ALP	Serum Alkaline Phosphatase
ALT	Alanine aminotransferase
APHA	American Public Health Association
AST	Aspartate transaminase
ATP	Adenosine triphosphate
BWG	Body weight gain
CCl_4	Carbon tetrachloride
CVD	Cardiovascular Diseases
DEN	Diethylnitrosamine
DPPH	2,2-diphenyl-1- picrylhydrazyl
FBW	Final body weight
FDA	Code of Federal Regulation
FI	Food intake
Fig	Figure
FOSHU	Foods for Specific Health Use
FUFOSE	Functional Food Science in Europe
GGT	Serum gamma glutamyl transferase
GMPs	Glycomacropeptides
GSH	Cellulare glutathione
HCC	Hepatocellular carcinoma
Hr	Hour
HSCs	Hepatic Stellate Cells
IBW	Initial body weight
IgG	Immunoglobulin G
IgM	Immunoglobulin M
LAB	Lactic acid bacteria

LB	Lactobacillus
LDH	Lactate dehydrogenase
mg	Milligram
ml	Mel liter
mmol	Mill mol
MO	*Moringa oleifera*
MOE	*Moringa oleifera* extract
MOLP	*Moringa oleifera* leaves powder
NPN	non-protein nitrogen
pH	Hydrogen ion potential
ppm	Parts per million
PPP	pomegranate peel powder
PPWP	pomegranate peel whey powder
SD	Standard Deviation
ST	Streptococcus
SWB	sweet whey beverage
T1	5 g MOLP /100ml sweet whey beverage
T2	10 g MOLP /100ml sweet whey beverage
T3	15 g MOLP /100ml sweet whey beverage
TA	Titratable Acidity
TSS	Total Soluble Solids
WP	whey powder
BHA	Butylated Hydroxyanisol
TBHQ	Tert Butyl Hydroquinone

INTRODUCTION

Today the world appears to be increasingly interested in the health benefits of foods and has begun to look beyond the basic nutritional benefits of foodstuffs to disease prevention. It is generally accepted that the beneficial effects of herbal remedies can be obtained from active constituents present in the whole plant, parts of the plant (e.g., flowers, fruits, roots or leaves), or plant materials or combinations thereof, whether in crude or processed state**. (WHO, 1999)**

Plant extracts represent a continuous effort to find new compound against pathogens. Approximately 20% of the plants are found in the world have been submitted to pharmacological or biological test, and a substantial number of new antibiotics introduced on the market are obtained from natural or semi synthetic resources **(Pankaj *et al.*, 2013)**.

Herbal medicine is still the mainstay of about 75-80% of the world population, mainly in the developing countries, for primary health care because of better cultural acceptability, better compatibility with the human body and lesser side effects. One such popularly known and used plant is *Aloe Vera barbadensis* belonging to family lily (Liliacae). It is a semi-tropical plant and consists of about more than 250 species. *Aloe Vera* species has been used in folk medicine for Egyptian, Indian, Chinese and European cultures over 2000 years and has remained an important component in the traditional medicine of many countries **(Lang mead *et al.*, 2004)**. The ingredients responsible for the beneficial effects of this plant are present in leaves, **(Jeyasakthy *et al.*, 2017)**. It is commonly called "Guar patha" or Ghee-Kuar.

Aloe Vera gel is a mucilaginous substance in the central region of leaves. It is mainly composed of water (90%), sugars, amino acids, vitamins A, C, and E, minerals (Zinc, Selenium) as well as the enzymes glutathione peroxidase, superoxide dismutase **(Priyanka *et al*, 2016)** reported that *Aloe Vera* is a locally grown herbal plant it has historically been used to treat skin wounds it’s have antioxidant, anti-tumor and anti-inflammatory