

Original Research Article

Phytochemical Screening and Toxic Effects of *Ambrosia maritima* L Ethanolic Extract in Albino Rats

Manal A Ibrahim^{1*}, Safia A Ahmed¹¹Department of Botany, Faculty of Science and Technology, Omdurman Islamic University, Sudan***Corresponding Author:** Manal A Ibrahim

Department of Botany, Faculty of Science and Technology, Omdurman Islamic University, Sudan

Article History**Received:** 03.04.2022**Accepted:** 08.05.2022**Published:** 12.05.2022

Abstract: *Ambrosia maritima* was traditionally used in folkloric medicine to treatment of rheumatic pains, asthma, and bilharziasis. In this study the plant tested for their secondary metabolites and toxicological effects. *Ambrosia maritima* showed high presence of alkaloids, steroids and triterpens, moderate presence of flavonoids and tannins, and trace presence of saponins and cumarins. Biochemical and histological examination were done. Rats treated with *Ambrosia maritima* showed no significant change from the control, except in the ALT, significant decrease was observed. The histological examination of the plant extract showed normal appearance of most sections therefor plants seemed to be safe for oral consumption.

Keywords: Phytochemical screening, Biochemical Parameters, Histopathological Changes, *Ambrosia maritima*.

INTRODUCTION

Plants provide a variety of resources that contribute to the fundamental needs of food, clothing and shelter. Among plants of economic importance are medicinal plants. Medicinal plants are groups of plants with vital roles in alleviating human suffering (Baquar, 2001).

Plants have been utilized as therapeutic agents since time immemorial in both organized and unorganized forms (Girach *et al.* 2003).

Information about medicinal plants has been transmitted gradually from generation to generation; a human knowledge has gradually become complete with the formation of civilizations and the provision of more facilities. Medicinal plants used as a medical resource in almost all cultures. Ensuring the safety, quality and effectiveness of medicinal plants and herbal drugs very recently became a key issue in industrialized and developing countries. By standardizing and evaluating the health of active plant-derived compounds, herbal drugs can help the emergence of a new era of the healthcare system to treat human diseases in the future. Awareness of traditional knowledge and medicinal plants can play a key role in the exploitation and discovery of natural plant resources (Jamshidi *et al.* 2018). The traditional system of treatment, differing in concept and protocol, exemplifies well-developed systems such as allopathic, homeopathic, Ayurvedic, and Chinese systems of treatment. Most of the civilized nations have developed their own Materia Medica, compiling details about various plants used for therapeutic purposes (Khan, 2014).

Safety is the major criterion for indication herbal medicines to use in therapeutic purposes. Toxic potentials closely associated with screening of plants extracts for their activities against microorganism (Bulus *et al.* 2011). Potential Chemicals that are used in commerce, the home, the environment, and medical practice may present various types of harmful effects. The nature of these effects is determined by the physicochemical characteristics of the agent, its ability to interact with biological systems (hazard), and its potential to come into contact with biological systems (exposure). (Dekant, and Vamvakas, 2000).

Copyright © 2022 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

Citation: Manal A Ibrahim & Safia A Ahmed (2022). Phytochemical Screening and Toxic Effects of *Ambrosia maritima* L Ethanolic Extract in Albino Rats. *South Asian Res J App Med Sci*, 4(3), 10-13. 10

Some medicinal plants have unpleasant side effects which may be attributed to over doses or other factors. This may lead to acute toxicity and death, however, when these problems are well treated, the therapeutic potentials of medicinal and aromatic plants will harness for further drug development in the future. (Okigbo *et al.* 2009). Modern medicines have little to offer for alleviation of hepatic diseases and it is chiefly the plant based preparations which are employed for their treatment of liver disorders. However, there is not much drugs available for the treatment of liver disorders Therefore, many folk remedies from plant origin are tested for its potential activities in experimental animal model (Chacko *et al.* 2012).

Ambrosia maritima family Asteraceae. annual or short-lived perennial plant (Hammouda, *et al.* 2009). Is known locally as "Damsissa" (Fig. 1). It is a widely distributed weed especially near water catchment. The species was found in Sudan in Nile bank, on muddy canal banks, and Egypt, it grows in Nile delta, south Sinia (Makkawi *et al.* 2015). And Oases and Mediterranean region (Hammouda, *et al.* 2009). It is a common folk medicine used in the treatment of rheumatic pains, asthma, and bilharziasis. (Helal *et al.* 2014) Plants extracts should not only be efficacious but safe for consumption, therefore this study aimed to evaluate the toxic effects of the plant under investigation in order to confirm the safe for oral dose.



Fig-1: Ambrosia maritima

MATERIAL AND METHODS

Plant Materials and extraction

Ambrosia maritima (Damsissa) was obtained from Khartoum state, the plant was identified at the Herbarium, Institute of medical and aromatic plants. Extraction was carried out according to method described by (Sukhdev *et al.* 2008). The plant sample was coarsely powdered using mortar and pestle. Then extracted by soaking in 80 % ethanol for about five days with daily filtration and evaporation. Solvent was evaporated to dryness by using rotary evaporator and the extract of each part combined together.

Phytochemical screening

Phytochemical screening for the active constituents was carried out for ethanolic extract using the methods described by (Martinez *et al.*, 2003), Sofowora (1993), Harborne (1984) and Wall *et al.* (1952) with many few modifications.

Experimental design

Twenty four white male albino rats were obtained from the Institute of medical and aromatic plants _ Sudan; the animals were divided to (2) groups. Group 1 the control contain 6 rats which orally dosed with distilled water, group 2 contain 18 rats divided into 3 sub-groups which orally dosed with extract of plant (450, 800, and 1400mg/kg) for 14 days.

Blood Sampling and Processing

At the end of the experiment (14 days) the rats were decapitated and blood samples were obtained from each rat, the samples were collected in plain tube to obtain serum; blood was left for one hour to clot and the tube was centrifuged at 3000 rpm for 15 minutes and the harvested serum was used for biochemical analysis. The rats were quickly dissected and the whole liver was excised, preserved in a formalin solution. Tissues sectioning were made, stained and histopathological examination was done.

Biochemical Parameters

Serum samples were analyzed for the activities of aspartate aminotransferase (AST), alanine aminotransferase (ALT) and for the concentrations of total protein, albumin, total bilirubin, alkaline phosphate and urea by the Roche Diagnostic Hitachi 902 Analyzer. Assay kits (Bio Systems S. A. Costa Brava, 30, 08030 Barcelona Spain) were employed for the analyses, the parameters were determined in the serum following the procedure described in the kits.

STATISTICAL ANALYSIS

Analysis of variance (ANOVA) for completely randomized design with six replicates was used followed by Duncan multiple range test (DMRT) to detect significant differences in all the parameters, Values were considered statistically significant at $p < 0.05$ (Gomez and Gomez 1984).

RESULTS AND DISCUSSION

Phytochemical screening

The plant under investigation (*Ambrosia maritima*, *Damsissa*) tested for secondary metabolites as described by Harborne (1984). The results indicated high presence of alkaloids, steroids and triterpens, moderate presence of flavonoids and tannins, trace presence of saponins and Cumarins, the result agreement with what was found by EL-Kamali *et al.* (2010). Also Helal *et al.* (2014) reported presence of all secondary metabolites.

Table-1: Results of phytochemical screening of the secondary metabolites

Compounds	Saponin	Cumarins	Alkaloids	flavonoids	Tannins	Triterpenes	Steroids
Presence	+	+	+++	++	++	+++	+++

Keys: +++ = High presence. ++ = Moderate presence. + = Weak presence. - = Absent

Biochemical Finding

The present study highlight the effect of toxicity of (*Ambrosia maritima*) extract on liver function (LF) parameters (ALT, AST, ALP, protein, albumin, globulin and bilirubin) of albino rats which were investigated. The administrated levels were 450 mg /kg (low dose), 800mg/kg (medium dose) and 1400mg/kg (high dose), in addition to the control. Six randomly albino rats were assigned for each group (treatment). Table2 showed that the level of Alanine Amino Transferase (ALT) in rats was not significantly different between the studied extract doses of (*Ambrosia maritima*) species (450, 800, and 1400mg/kg) and control as well as between the doses themselves and it was ranged between 18.97 U/L for control and 17.89 U/L for the high dose (1400mg/kg). Also (AST) was not significantly affected by admitted levels of *Ambrosia maritima* extract the values were (71.97, 64.87 and 72.60 U/L for low, medium and high doses, respectively) than in control (85.82 U/L) by about 16.1%, 24.4% and 15.4%, respectively.

Table-2: Effect of administration of different doses of *Ambrosiamaritima* on biochemical parameters

ALT (U/L)	18.91±5.65 ^a	18.25±5.63 ^a	18.62±4.55 ^a	17.89±3.68 ^a	0.764	Ns
AST (U/L)	85.82±23.08 ^a	71.97±19.70 ^a	64.87±12.95 ^a	72.60±27.49 ^a	0.246	Ns
ALP (U/L)	88.87±31.64 ^a	69.44±25.08 ^a	62.29±18.65 ^a	81.23±9.74 ^a	0.000	**
Protein (g/L)	6.76±1.25 ^a	6.80±0.45 ^a	7.25±0.71 ^a	6.77±0.30 ^a	0.639	Ns
Albumin (g/L)	2.31±0.13 ^b	2.42±0.23 ^b	2.97±0.62 ^a	1.74±0.34 ^c	0.214	Ns
Globulin (g/L)	4.52±1.06 ^a	4.38±0.42 ^a	4.31±0.65 ^a	5.06±0.35 ^a	0.419	Ns
Bilirubin (mg/dl)	0.065±0.047 ^a	0.062±0.062 ^a	0.067±0.067 ^a	0.045±0.045 ^a	0.985	Ns

Means within rows which having similar letters are not significantly different at 0.05 level of probability according to DMR

NS: Not significant

:** Significant at 0.01 level of probability

While (ALP) showed significant decrease (69.44, 62.29 and 81.23 U/L, resp.) than in control (88.87 U/L) by about 21.9%, 29.9% and 8.6%, respectively. These finding disagree with what was reported from previous literature, EL muoiz *et al.*, (2020) presented significant reduction on AST level and no change on ALT and ALP. Also they reported that *A. maritima* has many compounds that lead to improvement the hepatocytes and preserve the structural of hepatic-cellular membranes.

Moreover the values of protein, albumin, globulin and bilirubin were not significantly different from the control. The results for ALT,AST and ALP in this study were agreement with Ahmed *et al.*, (2001) who indicated hepatoprotective result when they used methanolic extract of *A. maritima* against acetaminophen (paracetamol,4hydroxy acetalline). Also *A.maritima* has not got toxic signs could be detected after oral administration of methanolic extract, during four weeks (Alard, 1991).

The histological examination showed normal appearance of most sections therefor the plant seemed to be safe.

CONCLUSION

These finding of the plant under investigation beside the available information from previous literature indicate that the *M. maritime* extract is completely safe for oral remedies.

ACKNOWLEDGEMENTS

The authors are grateful to the management and staff of the Department of Histopathology, Faculty of Veterinary, University of Khartoum, Pharmacology laboratory, Medicinal and Aromatic Plants Research Institute (MAPRI) for technical supports and service of animal facilities.

REFERENCES

- Ahmed, M. B., & Khater, M. R. (2001). Evaluation of the protective potential of *Ambrosia maritima* extract on acetaminophen-induced liver damage. *Journal of ethnopharmacology*, 75(2-3), 169-174.
- Alard, F., Stievenart, C., Vanparys, P., Thilemans, L. and Geerts, S., 1991. Toxicity and mutagenicity of the molluscicidal plant *Ambrosia maritima* L. *Drug and chemical toxicology*, 14(4), pp.353-373.
- Baquar, S. R. (2001). *Textbook of Economic Botany (1st Edition)* Published in Pakistan by Ferozsons (Pvt) Ltd.
- Bulus, T., Atawodi, S. E., & Mamman, M. (2011). Acute toxicity effect of the aqueous extract of *Terminalia avicennioides* on white albino rats. *Science World Journal*, 6(2), 1-4.
- Chacko, N. I. M. M. Y., Thomas, A., Shastry, C. S., & Shetty, P. (2012). Hepatoprotective activity of (*Elettaria cardamomum*) against paracetamol induced hepatotoxicity. *Int. J. Pharm & Pharm. Sci*, 4(3), 611-613.
- Dekant, W., & Vamvakas, S. (2000). *Toxicology, I. Fundamentals*. Ullmann's Encyclopedia of Industrial Chemistry. 56.
- EL-Kamali, H. H., & EL-Amir, M. Y. (2010). Antibacterial activity and phytochemical screening of ethanolic extracts obtained from selected Sudanese medicinal plants. *Current Research Journal of Biological Sciences*, 2(2), 575-581.
- El muoiz, G., EL kamali, H., Abbadi, O.S. (2020). Biological Effects of *Ambrosia maritima* L on *Rats* *International journal of research and review*, 7(12),2454-2237
- Girach, R. D., Khan, H., & Ahmad, M. (2003). Botanical identification of *Thuhar* seldom used as Unani medicine. *Hamdard Medicus (Pakistan)*.
- Gomez, K.A., & Gomez, A.A. (1984). *Statistical procedures for agricultural research* 2nd Ed. John Wiley and Sons, Inc., New York.
- Hammouda, F., Ismail, S., Abel-Azim, N. and Shams, K. (2009). *Ambrosia maritima* L. A Guide to Medicinal Plants in North America, 1-2.77
- Harborne, J. B. 1984. *Phytochemical methods*. 2nd edition. Chapman and Hall.
- Helal, E. G., Abou-Aouf, N., Khattab, S. M., Meselhy, A. E., & Abu-Amara, T. M. (2014). The effects of *Ambrosia maritima*, L.(Damsissa) on some biochemical and histological parameters of diabetic albino rats. *The Egyptian Journal of Hospital Medicine*, 57(1), 612-629.
- Jamshidi-Kia, F., Lorigooini, Z., & Amini-Khoei, H. (2018). Medicinal plants: Past history and future perspective. *Journal of herbmed pharmacology*, 7(1).
- Khan, H. (2014). Medicinal plants in light of history: recognized therapeutic modality. *Journal of evidence-based complementary & alternative medicine*, 19(3), 216-219.
- Makkawi, A. J., Keshk, E. M., Elshamy, M. M., & Abdel-Mogib, M. (2015). Phytochemical and biological evaluation of *Ambrosia maritima*. *Research journal of pharmaceutical biological and chemical sciences*, 6(4), 1678-1688.
- Martinez, A., & Valencia, G. (1999). In *Manual de prácticas de Farmacognosia y Fitoquímica. St edition. Medellin: Universidad de Antioquia*, 1999-2003.
- Okigbo, R. N., & Mmekwa, E. C. (2009). An appraisal of phytomedicine in Africa. *Current applied science and technology*, 6(2), 83-94.
- Sofowora, A. (1993). *Medicinal Plants and Traditional Medicines in Africa*. Chichester John, Willey & Sons New York 256.
- Sukhdev. S. H., Suman. P. S. K., Gennaro. L., & Dev. D. R (2008). *Extraction technologies for medicinal and aromatic plants*. United Nation Industrial Development Organization and the International Center for Science and High Technology, sss116.
- Wall, M. E., Eddy, C. R., McClenna, M. L., & Klump, M. E. (1952). Detection and estimation of steroid and sapogenins in plant tissue. *Analytical Chemistry*, 24; 1337-1342.