

Evaluating the Effect of Oral Administration of *Artemisia herbaalba* Extract Compared to Artesunate on the Mortality Rate of Ehrlich Solid Carcinoma Bearing Mice

Hanan R. H. Mohamed¹, Mahmoud Amer², Ahmad S.A El Faky³

^{1,2}Zoology Department, Faculty of Science, Cairo University, Giza Egypt

³Faculty of Biotechnology, MSA University

Abstract: Increasing the cancer incidence in the last years, increasing the need for developing new cancer therapy with no toxic effects on human health. Therefore, this study was undertaken to evaluate the effect of *Artemisia herbaalba* extract on the mortality rate of mice bearing solid tumor. Oral administration of *Artemisia herba alba* extract or Artesunate at the dose level 300 mg/kg decreased the % mortality to 0% and 30% compared with control values 10% and 77% after five and ten days, of their administration respectively. This effect was better than Cisplatin that reduced mortality rate to only 60% after ten days of its administration. Conclusion: *Artemisia herbaalba* exhibited promising antitumor efficacy with less toxic effects compared with cisplatin.

Keywords: *Artemisia herbaalba*; mortality, cancer and mice

1. Introduction

Cancer is a diseases characterized by uncontrolled growth of cells that can invade and spread to other parts of the body and/or other organs. It affects people of all ages and sex; increases with age and can affect almost any part of the body. (American Cancer Society, 2007; World Health Organization, 2017). There are several ways for cancer treatment. However, many side effects resulting from cancer treatment with surgery, radiotherapy, hormonal therapy and even chemotherapy that threaten human life (Gibson and Keefe, 2006; Cramp and Byron-Daniel, 2012; Shaikh and Shih, 2012).

As a result scientists focused in their research on finding new cancer therapy safer to human than the ordinary used cancer therapies. Several natural products and their derivatives exhibited potential anticancer efficacy with no toxic effects on human health, thus there is increasing interest on using natural products to treat cancer (Greenwell and Rahman, 2015).

Artemisia Herba Alba is one of the natural products that heavily used in folk medicine for the treatment of several diseases including hair loss, diabetes, fever, vomiting, diarrhea, gastrointestinal tract disturbances, bronchitis, and muscular pains (Iriadam et al. 2006; Tahraoui et al., 2007; Boudjelal et al., 2013). Further more, it has exhibited strong antifungal, antibacterial and vasorelaxant effects as a result of its chemical constituents (Kim et al. 2004; Abou El-Hamd et al. 2010; Skiker et al. 2010). Therefore, this study was designed to estimate the effect of *Artemisia Herba Alba* extract on the survival of Ehrlich Solid Carcinoma bearing mice.

2. Materials and methods

Chemicals

Artemisia herbaalba dried plant was purchased from the local market, Cairo, Egypt. Soaked 200 gm of dried *Artemisia* in 70% ethanol with agitation for 2 days at room temperature, then filtered the mixture to discard any solid material concentrated the filtrate in a water bath at 70 °C. Cool down the crude extract, collected and saved for later treatment at -4 °C temp.

Animals

In our study female BALB/c mice were used and purchased from the National Cancer Institute (NCI) animal house Unit. They were left one week for adaptation under standard dark/light cycle and supplied normal diets and water *ad libitum*. All experimentations carried out in the present study were approved by the Institutional Animal Care and Use Committee at Faculty of Science, Cairo University (CU-IACUC) Egypt with approval number CUIS/11/16.

Ehrlich Solid Carcinoma induction and experimental design

To induce solid tumor, forty female mice were injected intramuscularly with 2.5×10^6 viable Ehrlich Ascites Carcinoma (EAC) cells obtained from the NCI (Cairo, Egypt) (Perry and Michael, 2008). As the tumor formed, mice were divided randomly into four groups: control group (administered deionized water, cisplatin group (injected intraperitoneally with 5 mg/kg of cisplatin), Artesunate group (orally administered 300 mg/kg. b.w of the semisynthetic drug Artesunate) and *Artemisia herbaalba* group (orally administered 300 mg/kg b.w of the *Artemisia herba-alba* crude extract daily). Mice were administered the tested substances for ten consecutive days.

Mortality rate

To determine the effect of *Artemisiaherba alba* extract and *Artesunate* on the mortality of mice bearing solid tumor, mice were noticed and recorded the number of dead mice (mortality) after 5 and 10 days of the first administration of cisplatin, Artesunate or *Artemisia herba alba* extract. Results were expressed as mortality percentage.

3. Results

Effect of Artesunate on mice Mortality

Oral administration of *Artesunate* resulted in a significant reduction the mortality of mice bearing solid tumor as revealed from decreasing mortality from 10% in control group to 0% in *Artesunate* group after 5 days of its oral administration and from 77% in control group to 30% in *Artesunate* group after 10 days of *Artesunate* oral administration better than *Cisplatin* that reduced mortality to 60% (Fig. 1).

Effect of *Artemisiaherbaalba* on mice Mortality

As shown in Fig. 1 oral administration of *Artemisia herba alba* at the dose level of 300 mg/kg caused significant reduction in the mortality rate of mice bearing solid tumor as shown from decreasing the mortality percentage from 10% in control group to 0% in *Artemisia herba alba* group and from 77% in the control group to 30% in *Artemisia herba alba* group after 5 and 10 days, respectively, of *Artemisia herba alba* oral administration. on the other hand, cisplatin treatment decreased the percentage of mortality to 60% compared with the control level as shown in Fig. 1.

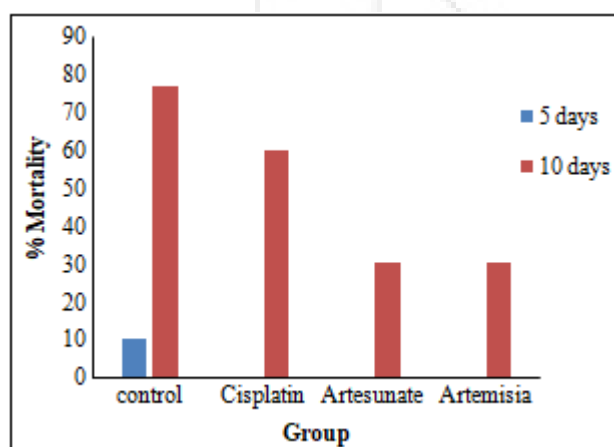


Figure 1: Percentage of mice mortality in the control and the three treated groups

4. Discussion

Artemisia herbaalba has exhibited potential anticancer effects against human laryngeal carcinoma, human colon cancer cell, bladder carcinoma and myelogenous leukemia with no evidence of toxicity to the normal human cell line (Lupidi et al., 2011; Daradka and Alshibly, 2012; Khlifi et al. 2013). Likewise, our finding of significant reduction in the mortality rate of mice bearing solid tumor after oral administration of *Artemisia herbaalba* evidenced its safety in vivo.

In consistence, several studies evidenced the safety of *Artemisia Herba Alba extract* in vivo (Nagwa et al., 2012; Ali et al., 2015). Abdallah and his colleageaus (2015) demonstrated that administration of *Artemisia Herba Alba* ethanol (100, 200 or 400 mg/kg b.w) has no injuries effects on the liver and kidney architectures.

Likewise, administration of *Artemisia Herba Alba* aqueous extract at the dose level of 500 mg/kg protected the Kidney from stress induced by STZ stimulates diabetes by reducing the degenerative changes caused by hyperglycemia and showed that the glomerulus-size was close to normal (Ali et al., 2015). Therefore, our results are similar to those of previous studies showing that *Artemisia Herba Alba* extract safe at doses less than 350 mg/kg

In conclusion, *Artemisia Herba Alba* extract is a potent safe antitumor agent as revealed by decreasing the mortality rate of mice bearing solid tumor.

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