



RESEARCH ARTICLE

Phytochemical Content of *Spondias mombin* And Its Effect on The Red Blood Cells of Monosodium Glutamate (MSG) Induced Fibroid on Experimental Animal

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Abstract

There has been a notable increase in the area of field of herbal medicine. The medicinal herbs and crops are gaining popularity in developing and developed countries because of their natural origin and fewer side effects. The current study investigated *Spondias mombin*'s phytochemical content and its effect on the Red Blood Cells of Monosodium Glutamate (MSG) induced fibroid on experimental rats. The animals were grouped into three groups of five rats each. The extract was orally administered at varying dosages for 28 days at the expiration of which the hematological parameter was carried out. The findings revealed a significant decrease in the red blood cell of the rat (7.24 ± 0.26^b) compared to the control group.

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Introduction: -

Over the years, plants' healing powers have been exploited, with most pharmaceutical drugs derived from them (Olaitan et al., 2013). There has been a notable increase in the area of the field of herbal medicine. The medicinal herbs and crops are gaining popularity in developing and developed countries because of their natural origin and fewer side effects (grower & Eche, 2002). In Nigeria, the choice of alternative medicine in the treatment of diseases is on the increase with *Spondias mombin* (Eze-Steven, Udedi, & Ude, 2019). Almost every part of Africa depends on the plant to treat ailments and diseases (Karou et al, 2007). *Spondias mombin* is a fructiferous tree with every part of it used traditionally for medicinal purposes. *Spondias mombin* is commonly found in the South West of Nigeria, Brazil, and several other tropical forests globally, and it is widely used in folk medicine. *Spondias mombin* (Hog plum), which belongs to the Anacardiaceae family, is a tropical fruit tree that grows to about 20 meters tall; the leaves are about 20-30 cm long and hairy underneath (Ibegbu, Ikekpeazu, Ezeagu, Onyekwelu, & Olusanya, 2018).

According to Moronkola et al., (2013), there are more than 54 component constituents of *Spondias mombin*'s essential oil with caryophyllene is the most abundant compound, delta cadinine, alpha-murolene, alpha-gurjunen, 5-isocedranol, and cadinine. Augusto et al., (2010) screened *Spondias mombin* to contain alcohols, esters, carbonyl compounds, and terpenoids. The beneficial effects of *Spondias mombin* cannot be overemphasized. All its parts are medicinally important within the traditional setting, and its fruit, known as a decoction, is taken as diuretic and febrifuge, while the decoction of the bark and the leaves serves as emetic anti-diarrhea and is used in treating dysentery, hemorrhoids, gonorrhoea, and leucorrhoea. The antimicrobial, antibacterial, antifungal, and antiviral properties of *Spondias mombin* have been reported (Ajao & Ashaolu, 2015). *Spondias mombin* is traditionally administered to women shortly after childbirth to increase their blood content.

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Red blood cells (erythrocytes) are the most common type of red blood cell. The level of red blood cell is said to be low in fibroid conditions than in none fibroid conditions (Maton et al., 2013). Fibroids are benign tumors that arise from the uterine muscular tissue (myometrium). Fibroids are found on the outer surface of the uterus (subserosal), embedded within the myometrium wall within the uterus' inner cavity, or in the combination of all in some cases.

The use of synthetic chemicals in cooking has become part of our everyday life with monosodium glutamate (MSG), used popularly in Nigeria as a food seasoning, a typical example(Sharma, Prasongwattana, & Cha'on, 2013). Monosodium Glutamate (MSG) is a sodium salt of glutamic acid that influences the appetite positively as a food additive and induces weight gain. Despite its taste stimulation and improved appetite enhancement, research has indicated that MSG is toxic to living organisms (Aviv & Gardner, 2009; Cemaluk, Madus, & Nnamdi, 2010). The current study aims to study *Spondias mombin* leaf extracts' phytochemical content and examine their effects on the red blood cell albino rats with monosodium glutamate-induced fibroid.

Methods: -

Healthy fresh leaves of *Spondias mombin* was obtained from the general market and was botanically identified and authenticated by plant taxonomist. At the same time, synthetic monosodium glutamate was also obtained from the local market. Harvested leaves of *Spondias mombin* were dried under shade for two weeks and then grounded into a coarse powder. 520g of the powdered leaves were boiled with 400ml of distilled water to make a decoction. The decoction was conveyed into a sterile bottle and allowed to stand for 24 hours, after which it was filtered using a muslin cloth. The decoction process was repeated severally to obtain enough water extract of the sample. The obtained filtrates were incubated in a hot water bath boiler for condensation until a semi-solid paste is obtained and refrigerated. The MSG stock solution was prepared by dissolving 500g of MSG granules in 600ml of distilled water. These stock solutions of MSG were administered to the experimental animals at 750mg/kg dosage depending on the body weights.

Experimental Animal

Fifteen (15) healthy Albino Wister rats of both sexes weighing 160-200g or 1.6-2.0kg were used for this study, and the rats were randomly distributed into (3) groups of (5) rats in each group. The experimental animals were housed in aluminum cages under standard laboratory conditions of 12 hours' light/dark cycle for 14 days before the experiment's commencement. A high lipoprotein food (cow brain) was prepared by dissolving 300g of fresh cow's brain in 500ml of distilled water, forming a semi-solid mixture. *Spondias mombin* leaves extract weighing 6.3g was dissolved in 17 ml of distilled water, creating a semi-solid drug extract.

Wister Albino rat weighing 160-200g were marked at ear, mouth, base tail, back, etc., and a picric acid was used to identify one from another. The body weight was obtained using Ohaus Beam Balance. Toxicity test was carried out using different doses of MSG ranging from 750mg-1050mg for 28 days. The experimental rats were randomly distributed into three groups of four rats each.

Group A: Animals in this group were treated with 350mg/kg of *Spondias mombin* water extract

Group B: This group will contain the control group and were treated with distilled water only.

Group C: This group contained the experimental animals that were fibroid induced and were treated with 750mg/kg body weight of MSG. At the end of the 28 days treatment, the experimental animals were subjected to hematology studies based on the desired parameters.

The red blood cell was assayed using an automated machine. Each of the samples collected was tested sequentially using the standard procedure for blood analysis. KX-21 Mindray hematological analyzer was used. The principle is that the blood sample is aspirated and measured to predetermine the volume, diluted at a specific ratio, and fed into each transducer. The transducer has 2mls holes called the aperture. The blood cells suspended in a diluted sample are passed through the aperture using a change in the current resist between electrodes. The size of the red blood cell is detected as electric pulses. The pulses calculate the number of blood cells.

The result of the Mindray hematological analyzer was obtained when the well-mixed cardiac puncture is analyzed. Each of the rats was reweighed, and its blood was collected by the ocular puncture method into an EDTA sample bottle using a capillary tube. The blood was divided into two bottles, one EDTA for 22 hematological assays and the other for hormonal assays. The blood for the hormonal assay was not to be contaminated with EDTA. The rats were

dissected using a surgical blade. Kidney, liver, heart, and uterus were collected and kept in a universal bottle with formalin

Result: -

The table below shows *Spondias mombin* leaf extract's effect on rats' hematological parameters at the interval of one week.

Group	RBC ¹	RBC ²	RBC ³	RBC ⁴
Group 1 (test animal)	7.98 ± 0.78 ^a	7.33 ± 0.55 ^b	7.05 ± 0.55 ^b	6.78 ± 0.43 ^a
Group 2 (negative control)	8.27 ± 0.76 ^a	8.36 ± 0.73 ^a	8.36 ± 0.32 ^b	7.24 ± 0.26 ^b
Group 3 (positive control)	7.97 ± 0.11 ^b	7.73 ± 0.43 ^a	7.60 ± 0.32 ^a	7.24 ± 0.26 ^b

Values represent the mean ± standard deviation of five animals

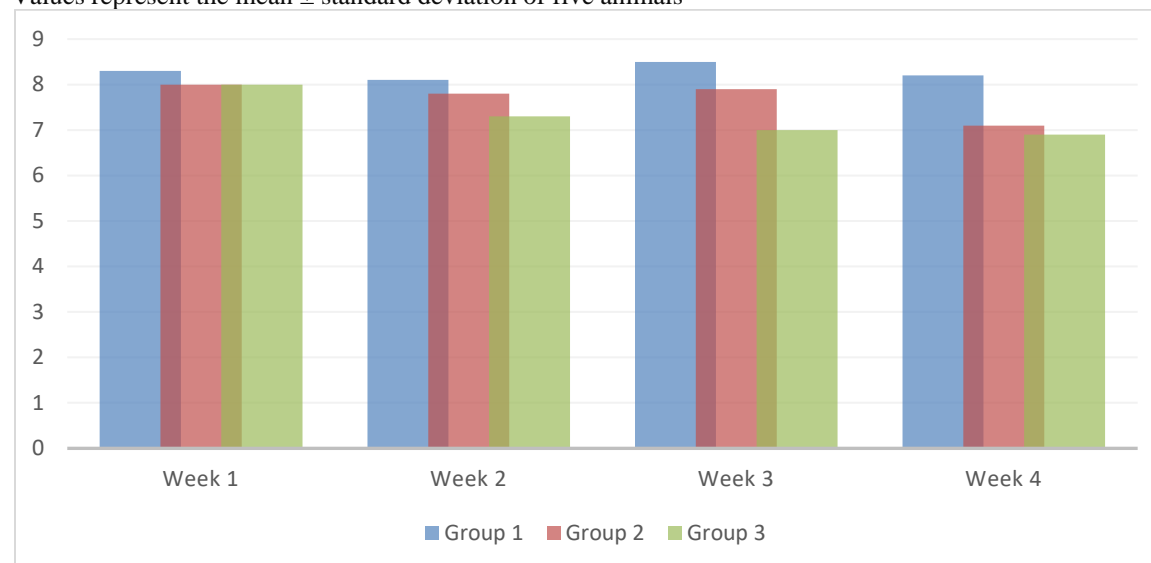


Fig 1 above represents a bar chart showing the concentration (mg/dl) of the red blood cell of rats in the groups in an ascending order against the respective weeks

Discussion: -

The current study aimed to ascertain *Spondias mombin*'s effect on the Red Blood Cells of Monosodium Glutamate (MSG) induced fibroid on experimental rats. The findings revealed a significant decrease in the red blood cell of the rat (7.24±0.26^b) compared to the control group. This indicates that MSG decreases the lifespan of the red blood cells, leading to direct toxicity mediated through the deleterious effect on the hemopoietic stem cells in the bone marrow. When the result was compared with the positive control group of rats using negative control as the intermediate, *Spondias mombin* has no significant effect on the red blood cell count depleted by monosodium glutamates. The extract was not able to mop up the red blood cell count. Instead, it continued decreasing. This implies that the phytochemical extract of *Spondias mombin* can be used to treat fibroid based on its insignificant effect on the red blood cell count. The finding is in agreement with the previous studies (e.g., Eweka, 2004;). For instance, Olaitan et al., (2013) reported that the non-significant increase of liver enzymes may imply that *Spondias mombin*'s extracts are safe non-toxic to the liver. The study concludes that alterations in the red blood cell counts were indicative of anemic conditions in the treated animals. Hence, this finding supports the literature that monosodium glutamate, despite its flavoring taste, is detrimental to human health. The study recommends avoidance of chemically manufactured additives.

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Ethical consideration

The author declares that all ethical standards concerning human and animal participation in the research were duly observed

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