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Study of the acute and subacute toxicity of the total aqueous extract of *Ipomea mauritiana* Jacq. (Convolvulaceae) leaves on Wistar rats

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Abstract

Ipomea mauritiana Jacq is a plant commonly used in traditional medicine for its therapeutic properties against certain diseases. When using products made from this plant repeatedly to treat a specific condition, it is therefore essential to allow for a safety margin in order to avoid any risk of poisoning. This work is part of a toxicological study of the total aqueous extract of *Ipomea mauritiana* leaves (ETAIm), the form most commonly used by local populations. To achieve this, an acute toxicity study was first conducted with fifteen (15) rats divided into two test groups and one control group of five (5) rats each. The test groups received doses of 2000 and 5000 mg/kg bw of ETAIm, respectively, and the control group received distilled water orally in a single dose. In a second step for the subacute toxicity study, twenty-four (24) male and female rats are divided into three test groups and one control group (three male and three female rats) for each group. The control group received distilled water, and the test groups received doses of 200, 400, and 800 mg/kg bw of ETAIm via daily gavage for 28 days. During the experimental period, weight measurements were taken and a blood sample was collected at the end of the experiment. The rats were then anesthetized and sacrificed in order to remove the target organs for toxicity testing. The results showed that in the acute toxicity study, no mortality was detected during the entire experimental period for the doses evaluated. The lethal dose 50% (LD_{50}) is greater than 5000 mg/kg bw. With regard to subacute toxicity, changes were observed in body weight, hematological parameters, and the organs most affected by toxicity in rats exposed to different doses of ETAIm. In short, the use of ETAIm to alleviate certain conditions in the population does not present any significant danger and therefore justifies its widespread use in traditional medicine.

Keywords: *Ipomea Mauritiana*; Aqueous Extract; Toxicity; Hematological Parameter; Rat

1. Introduction

Medicinal plants have always been used in the treatment of various diseases around the world, particularly in Africa. Indeed, these plants are found in various environments and contain bioactive molecules responsible for their therapeutic activity. Today, the practice of medicine based on the use of medicinal plants is experiencing rapid growth despite the development and availability of synthetic molecules (Kroa *et al*., 2014). In most developing countries, and particularly in Côte d'Ivoire, people are very interested in plants used in primary healthcare and food (Yao, 2010; Soro

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et al., 2014). The reasons given are varied: socio-cultural heritage, availability, accessibility, and the low cost of these plants. In light of this interest, several studies have been conducted to compile an inventory of medicinal plants used in the treatment of diseases in various regions of Côte d'Ivoire (N'guessan *et al*., 2009, 2009; Droh *et al*., 2013; Kouakou *et al*., 2024). Among the plants used by the population to diagnose, prevent, or treat all kinds of ailments are *Ipomea mauritiana* Jacq. This plant, commonly known as giant potato, is used to treat several conditions. Its tubers are used as tonics, alteratives, aphrodisiacs, galactagogues, demulcents, lactagogues, and purgatives. These leaves are also used in the treatment of kidney pain, liver and spleen enlargement, female infertility, and ensure healthy pregnancies. Phytochemical analyses have revealed that this plant contains bioactive molecules such as alkaloids, flavonoids, tannins, gums, phenols, and glycosides (Istiak *et al*., 2020). Pharmacological and biological analyses show that this plant has antioxidant and antimicrobial properties (Istiak *et al*., 2020), antidiabetic properties (Ranjith and Viswanath, 2019), and anti-anxiety properties (Jaiswal *et al*., 2021). Thus, the data provided by these studies demonstrate the therapeutic effect of *Ipomea mauritiana*. However, like many other medicinal plants, the use of *Ipomea mauritiana* as a medicine may pose risks to consumers. This work aims to remove any concerns regarding the use of *Ipomea mauritiana* in medicinal practice. Thus, assessing the acute and subacute toxicity of the total aqueous extract of this plant's leaves will help us to better use it in its usual therapeutic applications.

2. Materials

2.1. Plant materials and collection

The leaves of *Ipomea mauritiana* Jacq. were collected at the Jean Lorougnon GUEDE University (Daloa, Côte d'Ivoire) then identified and authenticated by the laboratory's teaching staff. These leaves are then dried in the laboratory at room temperature for two weeks and then ground into a fine powder using a RETSH SM 100 grinder.

2.2. Animals

The animal material consisted of male and female rats of the species *Rattus norvegicus* (Muridae). The animals were between 8 and 9 weeks old and weighed between 100 and 110 g. All animals came from the animal facility at Jean Lorougnon GUEDE University (Daloa, Côte d'Ivoire), where the ambient temperature was 25°C with a photoperiod of 12 hours per 24 hours. These animals were fed Ivograin® pellets and had free access to water. The biological tests were conducted in accordance with the principles and good laboratory practices (OCDE, 1998).

3. Methods

3.1. Preparation of the total aqueous extract from the leaves of *Ipomea mauritiana* Jacq.

The total aqueous extract of *Ipomea mauritiana* leaves was prepared according to the method described by (Zirihi *et al*., 2003). One hundred (100) grams of fine powder from the leaves of *Ipomea mauritiana* are dissolved in one liter of distilled water by maceration under a magnetic stirrer for 24 hours. The resulting macerate is filtered first through cotton wool and then through Whatman paper. The various filtrates obtained were combined and then freeze-dried. The total aqueous extract obtained from the leaves of *Ipomea mauritiana* (ETAIm) was weighed to determine the yield, then stored in a freezer at -5°C and subsequently used to perform various tests.

3.2. Phytochemical screening of the total aqueous extract of *Ipomea mauritiana* Jacq. leaves.

Phytochemical screening was performed to identify the secondary metabolites present in the total aqueous extract of *Ipomea mauritiana* Jacq. leaves (ETAIm). The standard reactions for characterizing major chemical groups such as polyterpenes, alkaloids, tannins, polyphenols, flavonoids, quinones, and saponins were performed according to the methods described by (Békro *et al*., 2007).

3.3. Study of acute oral toxicity

The acute toxicity study was conducted using the dose adjustment method described in OECD Guideline 423 (2001). The experiment was conducted on nulliparous, non-pregnant female rats. A total of fifteen (15) rats were used and divided into three groups of five. The control group received 2 mL/100 g of distilled water via gavage, while the test groups received 2 mL/100 g of 2000 and 5000 mg/kg body weight of ETAIm via gavage. After a single administration of the various products, all animals were kept under continuous observation and deprived of food for 4 hours. Then, the fast was lifted and observations continued for 14 days, during which clinical signs of toxicity were noted.

3.4. Study of subacute toxicity by oral administration

The subacute oral toxicity of ETAIm was evaluated according to OECD Guideline 407 (2008). The test was conducted on twenty-four (24) rats, including twelve (12) male rats and twelve (12) female rats. These animals were divided into four groups of six, each consisting of three males and three females. Group 1 (control) received distilled water daily by mouth at a rate of 2 mL/100 g of body weight. Groups (tests) 2, 3, and 4 received ETAIm solutions at doses of 200, 400, and 800 mg/kg body weight, respectively, at a rate of 2 mL/100 g via gavage each day. The treatment of the animals lasted for 28 days. During this period, all animals were fed an adequate diet and had free access to water, and were weighed every 4 days. At the end of the 28 days, all animals were fasted for 24 hours, then a blood sample was taken from the orbital sinus into collection tubes, followed by dissection after anesthesia with ether. Blood samples were collected in EDTA tubes for hematological parameter analysis. Certain organs such as the kidneys and liver were removed, rinsed, and then weighed to determine their relative weight using the following formula:

$$Relative\ weight\ of\ the\ organ\ =\ Organ\ weight\ (g)/body\ weight\ of\ rat\ (g)\ x\ 100$$

3.5. Statistical analyses

The different values obtained are presented as averages followed by the standard error (M ± esm). The statistical analysis of these data and the graphical representations were performed using GraphPad Prism version 8.0 software (Microsoft, San Diego, California, USA). The comparison of data between the test and control groups was assessed using the DUNNETT test combined with one-way analysis of variance (ANOVA 1) at a 5 % significance level.

4. Results

4.1. Phytochemical screening of ETAIm

The total aqueous extract of *Ipomea mauritiana* Jacq leaves obtained by maceration using distilled water is a blackish powder with a yield of 20.1 ± 0.5%. The phytochemical characterization of ETAIm revealed the presence of certain compounds such as polyphenols, alkaloids, tannins, and flavonoids. However, there is an absence of other compounds, notably saponins, polyterpenes, and quinones (Table 1).

Table 1 Chemical compounds present in the total aqueous extract of *Ipomea mauritiana* Jacq. leaves.

Metabolites	***Ipomea mauritiana***
Polyphenols	+
Alkaloids	+
Flavonoids	+
Tannins	+
Saponins	-
Quinones	-
Polyterpenes	-

(+): Present, (-): Absent

4.2. Effect of ETAIm on acute toxicity

A single oral administration of ETAIm at doses of 2000 and 5000 mg/kg body weight to rats did not cause any deaths after 14 days of observation. Therefore, the lethal dose 50% (LD_{50}) is greater than 5000 mg/kg of body weight (Table 2). However, some clinical signs such as decreased mobility and drowsiness were observed immediately after administration of ETAIm to rats for 45 minutes. Subsequently, no other signs were detected in the animals.

Table 2 Mortality rate of female rats according to the dose of ETAIm administered orally

Solutions	Doses (mg/kg bw)	Number of rats	Mortality				Number of deaths	Percentage of Mortality (%)
			24H	48H	72H	14D		
Distilled water	00	05	00	00	00	00	00	00
ETAIm	2000	05	00	00	00	00	00	00
ETAIm	5000	05	00	00	00	00	00	00

ETAIm: Total aqueous extract of *Ipomea mauritiana* Jacq leaves, BW: body weight

4.3. Effect of ETAIm on subacute toxicity

4.3.1. Effect of ETAIm on weight change in male and female rats

Daily oral administration of ETAIm for 28 days caused a change in the body weight of rats. This change in body weight varies according to the sex of the animals, but it is comparatively insignificant ($p>0.05$) between the treated groups and the control groups. In the control group, the respective variations in body weight increased from 103.11 ± 2.5 to 120.30 ± 3.2 g and from 104.4 ± 2.1 to 115.31 ± 3.01 g, representing a weight gain of 16.67% in males and 10.45% in females. For rats in group 2 that received ETAIm at a dose of 200 mg/kg bw, body weights increased from 104.22 ± 2.8 to 118.2 ± 3.1 g in males, with a weight gain of 13.41 %, and from 104.10 ± 2.2 to 113.42 ± 2.5 g, representing a weight gain of 8.95 %. At a dose of 400 mg/kg bw, weight gain in males was 12.46% with a variation in body weight ranging from 104.21 ± 1.8 to 117.20 ± 2.2 g, and 8.83% in females, where body weight ranged from 103.92 ± 2 to 113.10 ± 2.2 g. Finally, male rats that got ETAIm at 800 mg/kg bw had a weight gain of 12.23% with a range from 103.44 ± 2.2 g to 116.10 ± 2.02 g. In females, the weight variation ranged from 104.20 ± 1.7 to 112.20 ± 2 g, representing a weight gain of 7.67% (Figures 1 and 2).

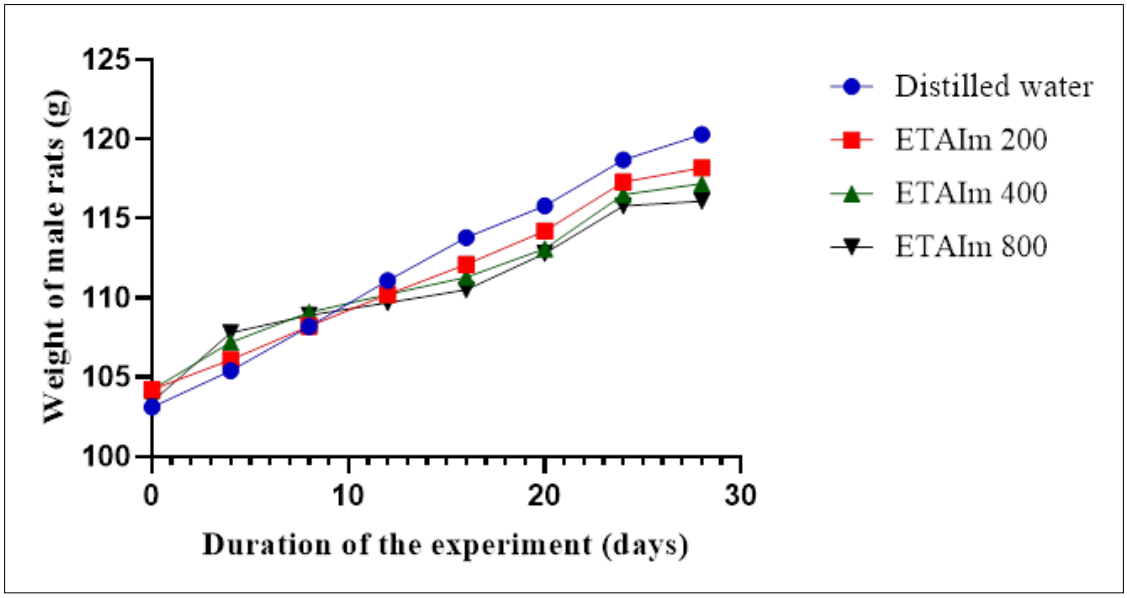

Figure 1 Change in body weight of male rats

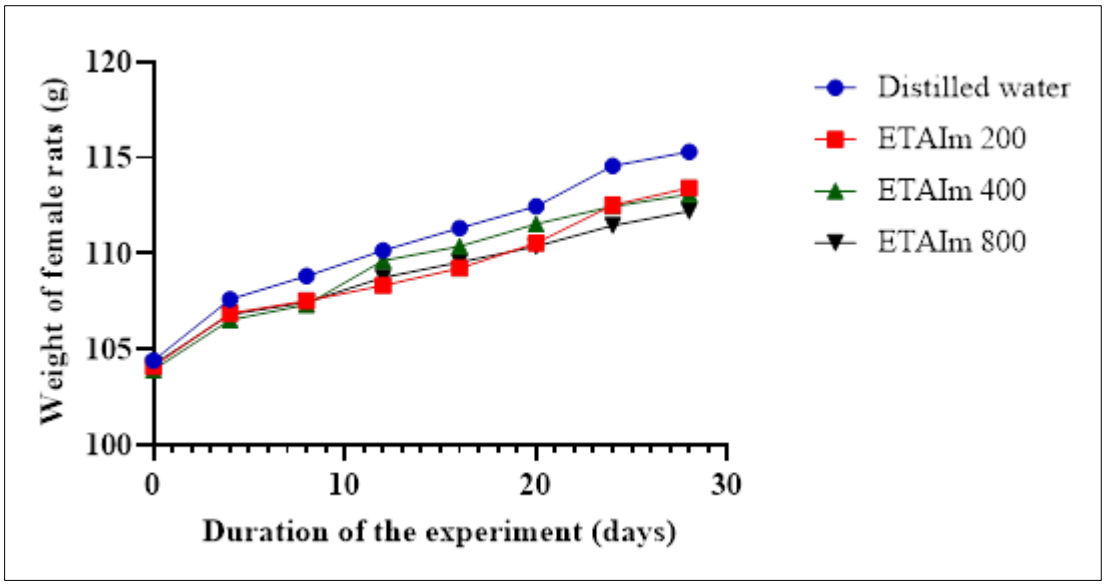

Figure 2 Change in body weight of female rats

4.3.2. Effect of ETAIm on the amount of food and water consumed by rats

Figure 3 shows the amount of food consumed by the rats during the experimental period. In the control group, the amount of food consumed remained virtually constant and was higher than in the groups treated with different doses of ETAIm. In terms of the treated groups, ETAIm caused a slight decrease in the animals' food intake, with a sharp drop during the last week of the experimental period. In terms of water intake, the animals' water consumption remains high and varies slightly between the control group and the treated groups (Figure 4).

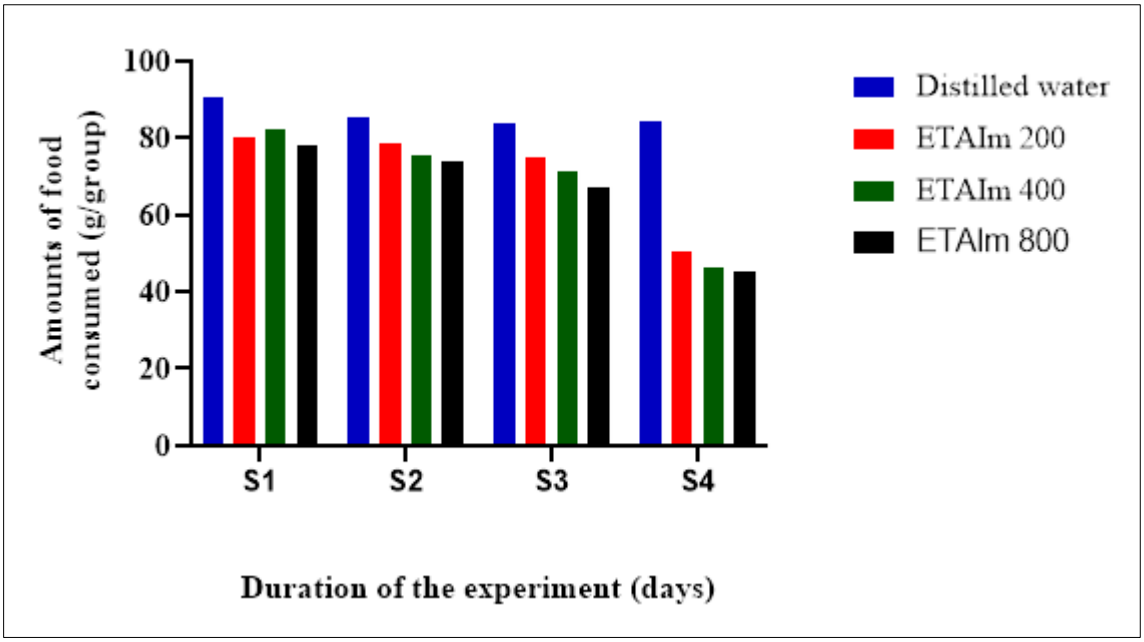

Figure 3 Amount of food consumed by control and treated rats

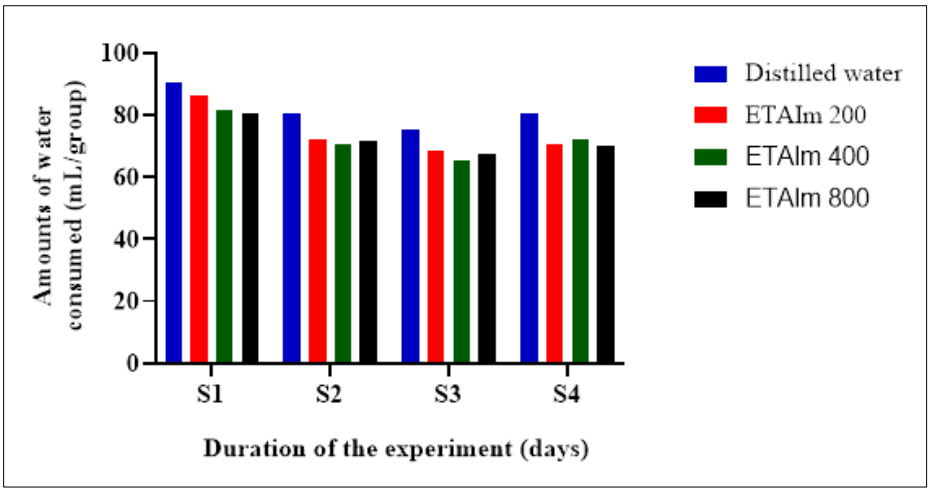

Figure 4 Amount of water consumed by control and treated rats

4.3.3. Effect of ETAIm on hematological parameters in male and female rats

Table 3 Hematological parameter values in male rats treated and untreated with different doses of ETAIm

Hematological parameter	Distilled water	Total aqueous extract of *Ipomea mauritiana*			Value of P
		200 (mg/kg bw)	400 (mg/kg bw)	800 (mg/kg bw)	
RBC (10^6/L)	7.32 ± 0.02	7.52 ± 0.09	7.70 ± 0.05	7.48 ± 0.04	<0.001
Hemo. (g/dL)	14.30 ± 0.1	15.02 ± 0.06	15.18 ± 0.03	14.40 ± 0.05	<0.01
Hema. (%)	40.15 ± 0.06	44.25 ± 0.06	42.02 ± 0.04	43.10 ± 0.06	<0.01
MCV (fL)	56.27 ± 0.05	55.01 ± 0.06	55.10 ± 0.06	54.15 ± 0.06	<0.01
MCHC (g/dL)	33.60 ± 0.24	34.80 ± 0.17	35.40 ± 0.08	34.07 ± 0.10	<0.05
MCH (pg)	18.45 ± 0,15	18.82 ± 0,08	18.70 ± 0,08	18.20 ± 0.10	<0.05
WBC (10^6/L)	15.62 ± 0.08	17.12 ±0.06	19.52 ± 0.09	17.03 ± 0.06	<0.01
Mono. (10^3/µL)	1.50 ± 0.12	1.70 ± 0.10	1.60 ± 0,13	1.66 ± 0.15	>0.05
Granulo. (10^3/µL)	4.02 ± 0.11	3.70 ± 0.25	3.58 ± 0.15	3.46 ± 0.05	<0.05
Lympho. (10^3/µL)	11.58 ± 0.10	13.61 ± 0.21	14.85 ± 0.15	14.75 ± 0.11	<0.01
Neutro. (10^9/µL)	2.53 ± 0.13	2.79 ± 0.24	2.75 ± 0.06	2,68 ± 0,06	>0.05
Eosin. (10^9/µL)	0.20 ± 0.01	0.21 ± 0.07	0.22 ± 0.06	0.21 ± 0.04	>0.05
Baso. (10^9/µL)	0.072 ± 0.001	0.081 ±0.001	0.082 ±0.001	0.080 ±0.001	<0.05
Platelets (10^3/µL)	792.72 ± 9.69	837.28 ± 5.90	885.37 ± 7.44	900.12 ± 34.24	>0.05

The values are means ± standard errors, with each group comprising six animals (n=6/group). The comparison was performed using one-way analysis of variance (ANOVA 1) followed by the DUNNETT test. The difference between the means is considered statistically significant at the 5% threshold (p<0.05). RBC: red blood cells;Hemo.: Hemoglobin; Hema.: Hematocrit; MCV: Mean Corpuscular Volume; MCHC: Mean Corpuscular Hemoglobin Concentration; MCH: Mean Corpuscular Hemoglobin Concentration; WBC: white blood cells; Mono.: Monocyte; Granulo.: Granulocyte; Lympho. Lymphocyte; Neutro. Neutrophils; Eosino.: Eosinophils; Baso.: Basophils. Bw: body weight

The results of hematological analyses of blood samples from rats treated daily with ETAIm for 28 days are shown in Tables 3 and 4. These results indicate that statistically significant changes (p<0.05) were observed in the hematological parameters red blood cells (RBC), hemoglobin, hematocrit, mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC), mean corpuscular hemoglobin (MCH), white blood cells (WBC), granulocytes, lymphocytes, and basophils in both males and females. For the other blood parameters taking into account neutrophils, eosinophils, and platelets, no significant variation (p>0.05) was recorded between the treated rat groups and the control groups in both males and females.

Table 4 Hematological parameter values in female rats treated and untreated with different doses of ETAIm

Hematological parameter	Distilled water	Total aqueous extract of *Ipomea mauritiana*			Value of P
		200 (mg/kg bw)	400 (mg/kg bw)	800 (mg/kg bw)	
RBC (10^6/L)	7.20 ± 0.03	7.16 ± 0.01	7.12 ± 0.02	7.28 ±0.02	<0.01
Hemo. (g/dL)	14.23 ± 0.01	14.78 ± 0.01	15.01 ± 0.01	14.51 ± 0.01	<0.01
Hema. (%)	40.30 ± 0.23	38.20 ± 0.07	38.38 ± 0.13	37.53 ± 0.09	<0.01
MCV (fL)	54.43 ± 0.04	54.22 ± 0.03	52.42 ± 0.03	50.51 ± 0.05	<0.001
MCHC: (g/dL)	34.25 ± 0.04	34.85 ± 0.04	36.30 ± 0.07	36.78 ± 0.02	<0.01
MCH (pg)	18.35 ± 0.05	18.63 ± 0.04	18.72 ± 0.05	18.80 ± 0.05	<0.001
WBC (10^6/L)	12.16 ± 0.03	11.42 ± 0.03	11.20 ± 0.02	12.52 ± 0.05	<0.01
Mono. (10^3/µL)	1.41 ± 0.02	1.82 ± 0.03	1.52 ± 0.05	1.65 ± 0.04	<0.05
Granulo. (10^3/µL)	4.00 ± 0,02	4.42 ± 0,05	3.52 ± 0.04	3.73 ± 0.03	<0.05
Lympho. (10^3/µL)	10.20 ± 0.03	10.55 ± 0.04	10.18 ± 0.03	11.24 ± 0.03	<0.05
Neutro. (10^9/µL)	1.62 ± 0.02	1.75 ± 0.02	1.78 ± 0.02	1.81 ±0,02	<0.05
Eosin. (10^9/µL)	0.20 ± 0.001	0.20 ± 0.001	0.21 ± 0.001	0.21 ±0.001	>0.05
Baso. (10^9/µL)	0.051 ± 0.007	0.055 ± 0.007	0.060 ± 0.007	0.060 ±0.007	<0.05
Platelets (10^3/µL)	977.25 ± 3.77	985.38 ± 4.57	990.20 ± 5.25	998.23 ± 1.92	<0.05

The values are means ± standard errors, with each group comprising six animals (n=6/group). The comparison was performed using one-way analysis of variance (ANOVA 1) followed by the DUNNETT test. The difference between the means is considered statistically significant at the 5% threshold (p<0.05). RBC: red blood cells; Hemo: Hemoglobin; Hema.: Hematocrit; MCV: Mean Corpuscular Volume; MCHC: Mean Corpuscular Hemoglobin Concentration; MCH: Mean Corpuscular Hemoglobin Concentration; WBC: white blood cells; Mono.: Monocyte; Granulo.: Granulocyte; Lympho. Lymphocyte; Neutro. Neutrophils; Eosino.: Eosinophils; Baso.: Basophils. Bw: body weight

4.4. Effect of ETAIm on target organs of toxicity

Table 4 shows the effect of ETAIm on the relative weight of the regulatory organs of the groups of rats exposed to different doses compared to the control group. These results show that no significant difference (p>0.05) was observed in the weight gain of these organs in rats treated with ETAIm doses compared to the organ weights of the control group.

Table 5 Variation in the relative weights of target organs of toxicity in the absence and presence of ETAIm doses in male and female rats

Target organs	Sexes	Distilled water	Total aqueous extract of *Ipomea mauritiana*			Valeur de P
			200 (mg/kg bw)	400 (mg/kg bw)	800 (mg/kg bw)	
Liver (%)	M	3.70± 0.1	3.68± 0.08	3.68±0.08	3.68±0,08	>0.05
	F	3.25± 0.01	3.24± 0,01	3.23± 0.007	3.23± 0.007	>0.05
Heart (%)	M	0.34± 0.007	0.33± 0,01	0.32± 0.007	0.32±0.007	>0.05
	F	0.33± 0.01	0.34± 0,007	0.33± 0.01	0.33± 0.01	>0.05
Spleen (%)	M	0.22± 0.002	0.21± 0.002	0.21± 0.002	0.20± 0.001	>0.05
	F	0.21± 0.002	0.20± 0.001	0.19± 0.001	0.19± 0.001	>0.05
Right kidney (%)	M	0.29± 0.01	0.30± 0.01	0.31± 0.007	0.29± 0.01	>0.05
	F	0.28± 0.007	0.29± 0.01	0.30± 0.01	0.30± 0.01	>0.05
Left kidney (%)	M	0.27± 0.007	0.28± 0.007	0.3± 0.01	0.29± 0.01	>0.05
	F	0.26± 0.01	0.28± 0.007	0.29± 0.01	0.29± 0.01	>0.05

The values are averages ± standard errors, with each group comprising six animals (n=6/group). The comparison was performed using one-way analysis of variance (ANOVA 1) followed by the DUNNETT test. The difference between the averages is considered statistically significant at the 5% threshold. Bw : Body weight

5. Discussion

The toxicological study was conducted on the total aqueous extract of *Ipomea mauritiana* leaves (ETAIm), which is actually the form most commonly used in traditional medicine to treat diseases. The phytochemical characterization of this extract revealed the presence of several bioactive chemical compounds such as polyphenols, alkaloids, flavonoids, and tannins. Most of these compounds are responsible for biological activities in *Ipomea mauritiana*. The acute toxicity study of ETAIm did not alter general behavior or cause any mortality in the treated animal groups up to a dose of 5000 mg/kg body weight. These results show that this extract is well tolerated by rats and is therefore non-toxic. The lethal dose 50 % (LD_{50}) of this extract is therefore greater than 5000 mg/kg body weight and, according to the Globally Harmonized System of Classification (OCDE, 2001), ETAIm can be classified in category 5 of substances with very low acute toxicity. These results corroborate those obtained with aqueous extracts from other medicinal plants (Mba Akue *et al*., 2017; Mikolo *et al*., 2020). Since no toxic effects were detected in the short term during the acute toxicity study, a medium-term study was conducted to assess its subacute toxicity over an experimental period of 28 days, which would indicate a wide margin of safety for its therapeutic use. After 28 days of treatment, normal morphological parameters were observed in the animals from the different groups. These parameters resulted in a gain in body weight that was similar in almost all of the different groups of animals, as no significant differences ($p>0.05$) were observed. However, this gradual increase in the animals' body weight would reflect their good physiological condition and would be due to the fact that the extract did not induce anorexia but rather stimulated their consumption of the food provided to them. Given that no notable or significant changes were observed in the different groups of animals following daily treatment for 28 days, this shows that oral administration of ETAIm did not have a negative impact on the normal growth of these animals. These results corroborate those of (Ehoussou *et al*., 2020; Nnanga *et al*., 2020), who made similar observations during their studies on the subacute toxicity of aqueous extracts of *Cassia sieberiana* and *Psychotria calceata*. In addition, other blood-related parameters were also evaluated in the groups of animals that underwent treatment and those that did not. The various blood components, such as red blood cells, hemoglobin, hematocrit, mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC), and mean corpuscular hemoglobin (MCH), show significant changes between the treated animal groups and the control groups. These results are consistent with those obtained by (Atsamo *et al*., 2011; Mikolo *et al*., 2020) in their studies of the subacute toxicity of *Erythrina senegalensis* and *Tetracera potataria*. These different blood components are particularly important in a toxicological study because their disruption below normal levels leads to a diagnosis of anemia (Ajagbonna *et al*., 1999). The hematopoietic system, which enables the synthesis of blood cells, is one of the main targets of toxicity (Gandhare *et al*., 2013). Therefore, any damage to this system after administration of a therapeutic substance is characterized by anemia following the destruction of blood cells by molecules of said therapeutic substance. ETAIm has not had a negative impact on this system and is therefore non-toxic. However, in terms of white blood cells, ETAIm caused a significant increase between the treated rat groups and the control groups. Mikolo *et al*., (2020) obtained similar results in their work with the aqueous extract of *Tetracera potatoria* leaves. In fact, in a toxicological study, any increase in white blood cell count would be due either to stimulation of the immune system by the bioactive molecules in the extract, which would promote the production of immune cells (Fahim *et al*., 2012), or to inflammation or a malignant infection (Mohamed and Azab, 2014). This increase in white blood cell count in this study suggests that ETAIm is non-toxic to these blood cells. As for blood platelets, their number also increased, but not significantly ($p>0.05$) between the treated and untreated rat groups. Similar effects have been obtained with other plant extracts such as *Chrisophyllum perpulchrum* (Bidié *et al*., 2016) and *Cassia sieberiana* (Ehoussou *et al*., 2022). However, blood platelets are thought to be involved in blood clotting and to protect the vascular endothelium from damage caused by free radicals (Kebir *et al*., 2007). ETAIm was also evaluated on the target organs of toxic substances. Once damaged, these organs release their enzymatic or protein contents, thereby affecting their relative weight. In this study, the relative weights of the liver, kidneys, spleen, and heart of both male and female animals are virtually identical. These different doses administered orally had no effect on these organs. These results corroborate those of (Ouahchia *et al*., 2017), who showed that methanolic extracts of *Inula viscoa* had no direct impact on these organs during their work. In view of the various results obtained, ETAIm does not appear to contain any toxic bioactive molecules, which would therefore justify its traditional and recurrent use in the treatment of certain pathologies.

6. Conclusion

The toxicological study conducted with the total aqueous extract of *Ipomea mauritiana* leaves (ETAIm) did not cause any mortality in rats up to a dose of 5000 mg/kg body weight in a single oral administration. This extract is therefore non-toxic with an LD_{50} greater than 5000 mg/kg of body weight. Furthermore, repeated administration of ETAIm to rats over the medium term did not alter the animals' weight gain or hematological parameters and had no adverse effects on target organs of toxicity. Therefore, the use of *Ipomea mauritiana* in traditional medicine could be safe in the treatment of debilitating diseases.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no competing interests

Statement of ethical approval

The equipment handing and sacrificing of the animals were in accordance with the European Council Legislation 87/609/EEC for the protection of experimental animals.

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