



International Journal of Pharmacology & Toxicology

www.ijpt.org

NEPHROPROTECTIVE EFFECTS OF THE AQUEOUS EXTRACT OF *LOPHIRA LANCEOLATA*'S LEAVES (OCHNACEAE) IN ALBINO WISTAR RATS

DOUGNON Tossou Jacques¹, ADJAGBA Marius², AWEDE Bonaventure Lucien³,
LALEYE Anatole²

¹Laboratoire de Recherche en Biologie Appliquée (LARBA), Ecole Polytechnique d'Abomey-Calavi, Université d'Abomey-Calavi, 01 BP 2009 Abomey-Calavi (République du Bénin).

²Laboratoire de Cytogénétique, Unité de Biologie Humaine, Faculté des Sciences de la Santé Cotonou, Université d'Abomey-Calavi (République du Bénin).

³Laboratoire de Physiologie, Unité de Biologie Humaine, Faculté des Sciences de la Santé Cotonou, Université d'Abomey-Calavi (République du Bénin).

ABSTRACT

In spite of the efforts to improve the care of renal failure, its prevalence is still increasing. Regarding the cost of dialysis, populations have resort to numerous traditional medicine recipes whose efficiency and safety are not always clear. This study aims to assess the nephroprotective effects of the aqueous extract of *Lophira lanceolata*'s leaves in albino wistar rats poisoned with gentamicin. To achieve this, we first determine the major molecule families present in the extract followed by the demonstration of its safety through the evaluation of the toxicity up to the dose limit of 2000 mg/kg of body weight. Last but not the least; we assessed the biological activity of the extract on an acute renal failure provoked in Wistar rats. Thereby, 30 male rats of 200 g average weight were distributed in three (03) lots of ten (10) including one control group. Gentamicin (80 mg/kg/day) was then injected by intra-peritoneal route for 7 days to the rats of the second lot. In addition to gentamicin, the rats of the third lot received the aqueous extract (1000 mg/Kg/day) for 7 days. Blood, urine and organs (liver, kidney) samples were collected from the rats after treatment respectively for the dosage of urea and creatinine; the clearance of creatinine and the histological analysis. Gentamicin led to an elevation of the uremia (184.70 ± 28.77 mg/dl) and of the creatininemia (1.42 ± 0.06 mg/dl); a considerable reduction of the clearance of creatinine (19.60 ± 5.21 ml/hrs) and a necrosis of the epithelial cells of the proximal tubules ($P < 0.05$). It comes out of this study that the aqueous extract of *Lophira lanceolata*'s leaves reduced significantly the nephrotoxic effects of gentamicine.

Keywords: Nephroprotection, *Lophira lanceolata*, Gentamicin.

INTRODUCTION

Renal failure constitutes a serious public health threat in the world regarding the number of dialysis or transplanted patients and the cost of the replacement treatments as well as the excess of its associated cardiovascular risk since the early stages. In the general population, the global prevalence of renal failure is about

12.4% [1]. In less than 80 years old people, the annual risk of developing a renal failure each 5 years is 42 per 100.000 [2]. The mortality, whatever the aetiology remains remarkably steady at 50% [3]. Its real extent is still unknown in Africa. Nevertheless, in Ivory Coast, it is a common and serious affection representing the second

reason of mortality after cancers, in the Service of internal medicine of the Academic Hospital Centre of Treichville. In Benin, about 10 people consult every day for renal failure at the National Academic Hospital Centre of Cotonou and at least a person dies per day. In 1998, the mortality was 50.4% [4]. However, the dialysis remains the treatment of reference but with a very expensive cost [5]. For example, at the National Academic Hospital Centre of Cotonou, a session of haemodialysis costs about 50 000 F CFA (about 110 USD); multiply by 3 sessions per week gives 150 000 F CFA. Therefore, the African populations have resort to the traditional medicine for their health needs in 80% of the cases. Although their limited knowledge on the kidneys, the origin of urines and the symptoms of kidney failure, traditional therapist have some recipes based on medicinal plants. It would be then of a great interest to make the inventory of these medicinal plants as well as to assess their activities on the kidney and its diseases. Among these plants is found *Lophira lanceolata* whose nephroprotective activity is ignored because it is not clarified. Several studies previously conducted on this plant showed its implication in many diseases [6].

The overall objective of the current study is to assess the nephroprotective effect of the aqueous extract of *Lophira lanceolata*'s leaves in albino wistar rats poisoned with gentamicin. Specifically, it aims:

- to evaluate the toxicity of the aqueous extract of *Lophira lanceolata*'s leaves,
- to evaluate the effect of the aqueous extract on the renal lesions caused by gentamicin in the albino wistar rats.

MATERIAL AND METHODS

Animals

The study was conducted within the Institute of Applied Biomedical Sciences (ISBA). The plant material was the aqueous extract of *Lophira lanceolata*'s leaves. These leaves were harvested in Pahou (Department of Atlantic, Benin) and dried in the shelter of sun at lab temperature for 3 weeks. The dried leaves were pulverized and the powder was kept at ambient temperature. Male Wistar rats of 8 to 12 weeks old with average weight of 200 ± 20 g were used. Every lot required three animals. The initial dose of the aqueous extract used was 300 mg/Kg of body weight. These rats were raised at the animal house of the Unit of Human Biology of the Institute of Applied Biomedical Sciences (ISBA).

Methods

The works were achieved in five steps:

- aqueous extraction of the leaves of *Lophira lanceolata*,
- phytochemical screening of the aqueous extract of the leaves of *Lophira lanceolata*,
- study of the toxicity of the aqueous extract,

- experimental step of induction of the nephrotoxicity with gentamicin and research of the nephroprotective effects of the aqueous extract,
- Statistical data analysis.

Aqueous extraction of the leaves of *Lophira lanceolata*

After grinding, 75g of the leaves' powder was boiled in 500 ml of distilled water on a hotplate for 30 min; the mixture was cooled and filtered. The residue may be boiled in 500 ml of distilled water and be filtered again. The filtrate was filtered again and then evaporated with vacuum in a beaker under reduced pressure at 70°C using the Stuart RE300 rotavapor. The solid residue was scraped from the beaker with a spatula, weighed and kept in Flask tube. In order to get the necessary amount of extract for the study, this operation was repeated four times.

The yield of the extraction related to a given amount of the plant powder was calculated using to the following formula:

$$R = \frac{\text{Mass of plant powder (g)}}{\text{Mass of obtained aqueous extract (g)}} \times 100 (\%)$$

The phytochemical screening of the aqueous extract

The phytochemical screening of the aqueous extract of the leaves of *Lophira lanceolata* was conducted in the Laboratory of Biochemistry and Molecular Biology at ISBA by the method of chromatography on thin layer (CTL). The detection of the characteristic colorations was made with specific reagents after the determination of the adequate migration solvent, the concentration of the migrating extract and the actual migration of the aqueous extract on a silica plate according to the method of CTL.

Study of the toxicity of the aqueous extract

The test of toxicity was realized according to the recommendations and guidelines of the Organization of Cooperation and Economic Development (OECD) for chemicals' tests.

Principle of the test

The principle of this test is that with a sequential process, using three Wistar rats by lot, sufficient information for classification purpose might be gotten on the acute toxicity of aqueous extract. The absence or the demonstration of mortality due to the aqueous extract in a group receiving a certain dose from the protocol, at any stage, determines the following actions: cessation of the test, administration of the same dose to three supplementary animals, administration of the dose immediately higher or lower to three supplementary animals. The doses vary generally between four values: 5; 50; 300; 2000 and unusually 5000 mg/Kg of body weight (Figure 1).

Protocol of the test

The extract was administrated orally with a forced-feeding probe, to two (2) lots of rats of 3 males each. The rats were watched individually at least once every 30 minutes during the first 4 hours, then two to three times during the first 24 hours and finally daily during 14 days after the administration of the aqueous extract. The weight of the rats was also measured the 7th and the 14th day after treatment. However, the length of observation was not set in a strict manner. It was function of the speed of apparition of toxicity reactions and the length of the recuperation period.

Sample collection and histological study of the organs

Organs as liver and kidneys were sampled. After the dissection of the ribcage, we removed the liver located right under the diaphragm. The dissection of the abdomen permitted to remove the kidneys flattened on both sides of the backbone. Thereafter, these organs were immediately put in a 10% formalin Buffer for the fixation and then they served for the histological study.

The experimental stage

*Study of the nephroprotective effect of the aqueous extract of *Lophira lanceolata*'s leaves*

Male rats were distributed in three (03) lots of ten (10). All rats of the same lot were handled in the same conditions with free access to water and feed. The nephroprotective activity of the aqueous extract of the leaves of *Lophira lanceolata* was assessed by the treatment of the nephrotoxicity produced by gentamicin in the Wistar rats. The duration of the test was 07 days.

Lot 1: control rats neither poisoned nor treated with the aqueous extract

Lot 2: rats poisoned with gentamicin (80 mg/kg/day) injected by intra peritonea during 7 successive days;

Lot 3: rats poisoned during 7 successive days with gentamicin (80 mg/kg/j) and treated orally with the aqueous extract (1000 mg/kg/day) during 7 days.

Biochemical parameters: dosage of the blood urea and creatinine

Blood sample of the rats was collected the 8th day for the dosage of the urea and the creatinine.

Calculation of the clearance of creatinine

In order to calculate the clearance of creatinine; the rats were placed individually in metallic cages at the end of the experiment (7th day), to collect their urines for 24 hours and for the dosage of the urinary creatinine. The following formula was used:

$$C \text{ (ml/h)} = \frac{U \text{ (umol/L)}}{P \text{ (umol/L)}} \times V \text{ (ml/h)}$$

Where C = Clearance of creatinine, U = Urinary concentration of creatinine, P= plasmatic concentration of creatinine and V = Urinary debit (diuresis).

Histological section of the kidney and the liver

After collecting the blood sample for biochemical analyses the 8th day, the kidney and the liver were removed after killing rats. These organs were then kept in a 10% formalin solution for the histological section and study.

Statistical analysis

The statistical analyses were conducted using Microsoft Excel (2007 version) and SPSS (version 17) softwares.

Results

The results obtained concerned mainly the yield of the aqueous extraction, the phytochemical screening of the aqueous extract of *Lophira lanceolata*'s leaves, the assessment of the toxicity of the aqueous extract, the provocation of the nephrotoxicity and the research of the nephroprotective effects of the extract.

Yield of the extraction

The Table 1 displays the masses of extract and the yield obtained from the two lots of extraction. It can be concluded that the yield didn't vary from one lot to the other with an average value of $14.61 \pm 0.08\%$

Phytochemical Screening of the aqueous extract of the leaves of *Lophira lanceolata*

The results of the phytochemical analysis are summarized in the Table 2 bellow that presents the major phytochemical groups found in the leaves of *Lophira lanceolata* (Ochnaceae).

Assessment of the toxicity of the aqueous extract

A limit toxicity test by oral route was achieved. No undesirable obvious effect or death was registered during the 14 days of regular clinical observation of the two lots of sequential dose of 300 mg/Kg and the two lots of sequential dose of 2000 mg/Kg of body weight. Therefore, the absence of undesirable effects in the rats at the sequential dose of 2000 mg/Kg of body weight led to the end of the test.

Evolution of the body weight of the rats during the test of toxicity

The table 3 displays the weight of rats with which the toxicity test was done at the dose of 300 mg/kg of body weight. No significant difference ($P > 0.05$) was observed between the average of the initial weights (203.83 ± 5.21) and the ones of the seventh day of the treatment (205 ± 5.36). Otherwise, a significant difference was observed between the average of the initial weights and the ones recorded two weeks after treatment (210 ± 4.12) ($P < 0.05$).

The Table 4 shows the weight of the rats that underwent the toxicity test at the limit dose of 2000 mg/kg

of body weight. A significant difference is observed ($P < 0.05$) in the evolution of the averages weights of the rats.

Histological aspects of the kidneys and the liver of the rats that underwent the toxicity test

At the end of the histological study, the kidney and the liver of the rats that underwent the toxicity test were compared with those of the control group.

The figure 2 displays the structure of a normal kidney. It is a partial view of the renal cortex showing a glomerulus with renal tubes.

The figure 3 shows the kidney of a rat that underwent a toxicity test at the dose of 2000mg/kg of body weight with the aqueous extract of the leaves of *Lophira lanceolata*. No structural abnormality is observed compared to the normal kidney.

The figure 4 shows the structure of a normal liver. It is a general view of a normal hepatic lobule showing the hepatocytes displayed radially around a centrolobular vein.

The figure 5 shows the liver of a rat that underwent a toxicity test at the dose of 2000mg/kg of body weight with the aqueous extract of the leaves of *Lophira lanceolata*. No structural modification is observed compared to the normal liver.

Plasmatic rate of the urea in Wistar rats poisoned with gentamicin (80 mg/kg) and treated with the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg) during 7 days

The injection of gentamicin during 7 days to the rats of the 2nd lot led to a significant increase of the uraemia (184.70 ± 28.77 mg/dl) compared to the one recorded in the control rats (63.50 ± 4.70 mg/dl) ($P < 0.05$). Nevertheless, this rise of uraemia is reduced in the rats of the lot 3 by the aqueous extract of the leaves of *Lophira lanceolata* at the dose of 1000mg/kg (101.70 ± 20.81 mg/dl) ($P < 0.05$) (Figure 6).

Plasmatic Rate of creatinine in the Wistar rats poisoned with gentamicin (80 mg/kg) and treated with the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg) during 7 days

The figure 7 shows an increase of the creatininemia in the rats poisoned with gentamicin (1.42 ± 0.06 mg/dl) during 7 days compared to the control (0.51 ± 0.05 mg/dl). The treatment of the poisoned rats with the aqueous extract of the leaves of *Lophira lanceolata* (0.58 ± 0.06 mg/dl) during 7 days decreased considerably the creatininemia ($P < 0.05$).

Clearance of creatinine in the Wistar rats poisoned with gentamicin (80 mg/kg) and treated with the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg) during 7 days.

The figure 8 shows a significant reduction of the clearance of creatinine in the rats poisoned with gentamicin (3.77 ± 0.41 ml/h) during 7 days compared to the controls (29.20 ± 2.14 ml/h). The treatment of the rats of the 3rd lot with the aqueous extract of the leaves of *Lophira lanceolata* ($19,60 \pm 5,21$ ml/h) during 7 days increased considerably the clearance of creatinine ($P < 0.05$).

Compared histological aspects of the kidneys and the liver of the various lots

The kidney of the rat poisoned for 7 days with gentamicin (80 mg/kg) showed a necrosis of the proximal epithelial cells towards a total disappearance of the glomerulus (Figure 9).

The figure 10 shows the structure of the kidney of the rat poisoned during 7 days with gentamicin (80 mg/kg) and treated with the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg). The general architecture of the kidney is kept and don't present any major structural abnormality.

The figure 11 presents the structure of the liver of the rat poisoned during 7 days with gentamicin (80 mg/kg). The normal architecture of the liver is kept although the nucleus of many hepatocytes is in pycnosis.

The figure 12 shows the structure of the liver of the rat poisoned during 7 days with gentamicin (80 mg/kg) and treated with the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg). The normal architecture of the liver is kept.

Table 1. Yield of the aqueous extraction of the leaves of *Lophira lanceolata* (Ochnaceae)

Lots	Mass of obtained extract (g)	Yield (%)
1	21.9	14.53
2	22.04	14.69
Average	-	14.61

Table 2. Phytochemical Screening of the aqueous extract of the leaves of *Lophira lanceolata* (Ochnaceae)

Phytochemical Groups	Results
Alkaloids	-
Glycosiled Coumarin	+
Glycosiled Flavonoids	++

Naphtoquinonsaglycone	-
Anthocyanic Pigments	-
Anthracenic derivatives	++
Bitter Principles	++
Tannins	++
GlycosiledTerpenes	-
Triterpenes	++

(-): negative test; (+): positive test; (++): highly positive test

Table 3. Evolution of the body weight of the rats subjected to a toxicity test at the dose of 300 mg/kg of body weight

	W0 (g)	W7 (g)	W14 (g)
Lot 1	218	218	220
	199	200	202
	211	214	216
Lot 2	186	167	195
	215	217	219
	194	194	208
Means	203.83±5.21	205±5.36	210±4.12

W0: Weight on the first day; W7: Weight on the 7th day; W14: Weight on the 14th day.

Table 4. Evolution of the body weight of the rats subjected to a toxicity test at the dose of 2000 mg/kg of body weight

	W0 (g)	W7 (g)	W14 (g)
Lot 1	215	217	219
	204	216	218
	197	194	209
Lot 2	216	211	219
	181	193	192
	189	188	193
Means	200.33±5.73	203.16±5.27	208.33±5.23

W0: Weight on the first day; W7: Weight on the 7th day; W14: Weight on the 14th day.

Fig 1. Testing protocol for the research of acute toxicity for an initial dose of 300 mg/Kg of body weight in Wistar rats

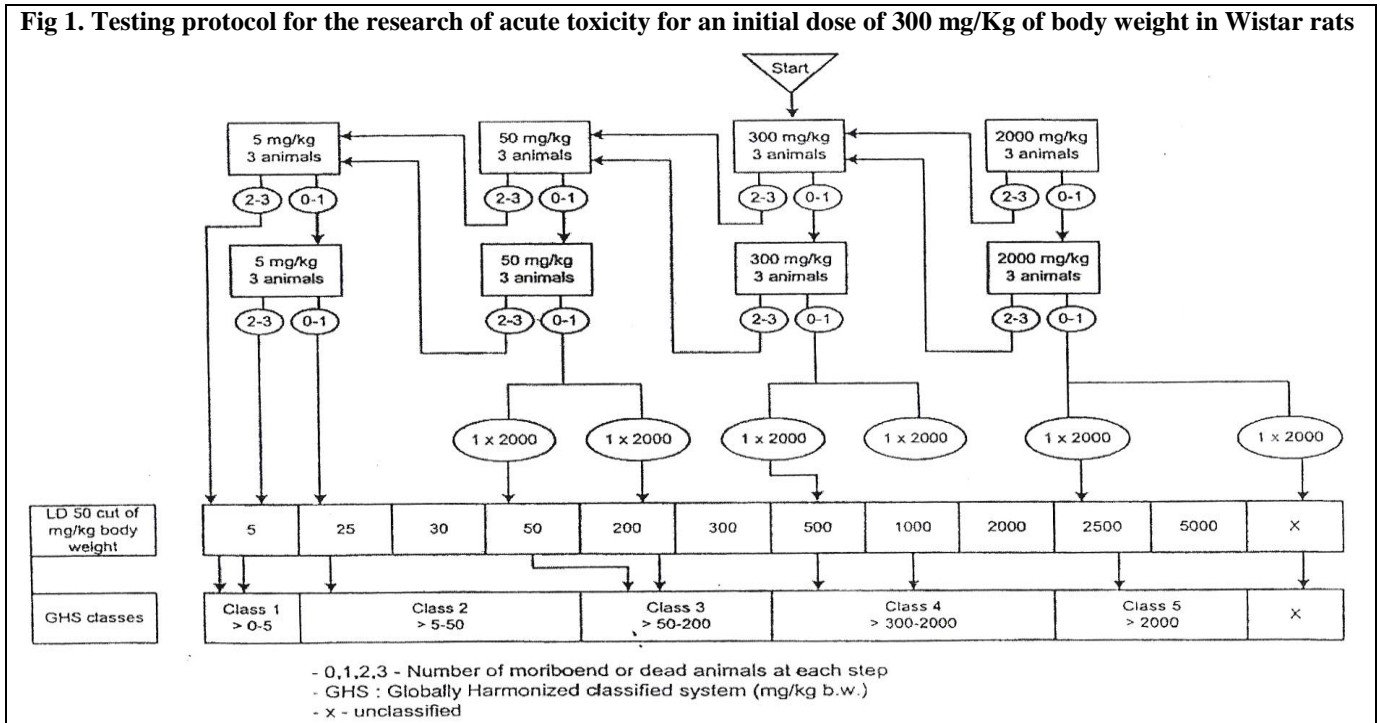


Fig 2. Normal Kidney (HE X10)

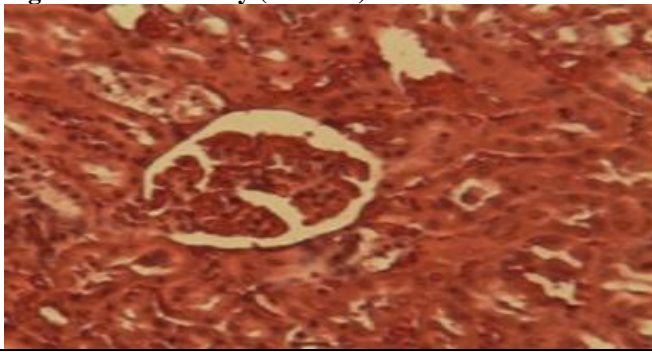


Fig 3. Kidney of a rat subjected to a toxicity test with the aqueous extract of the leaves of *Lophira lanceolata* at the limits dose of 2000 mg/kg of body weight (HE X10)

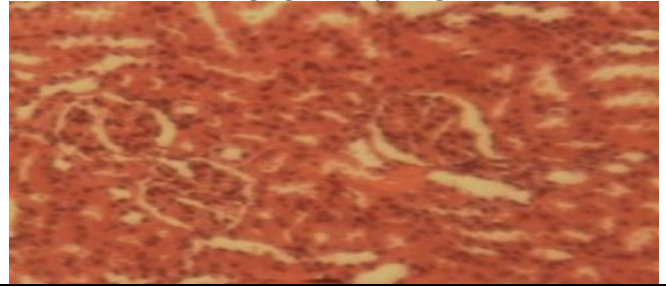


Fig 4. Normal Liver (HE X 10)

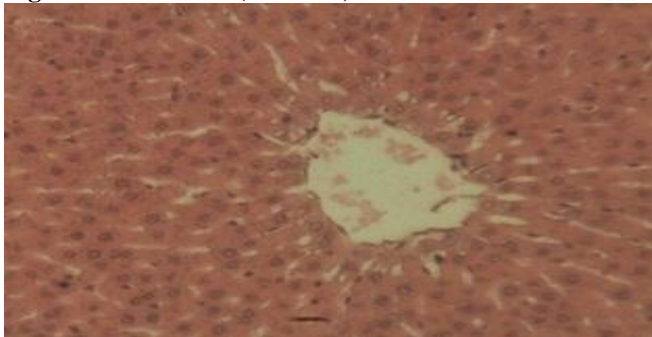


Fig 5. Liver of a rat subjected to a toxicity test with the aqueous extract of the leaves of *Lophira lanceolata* at the limits dose of 2000 mg/kg of body weight (HE X10)

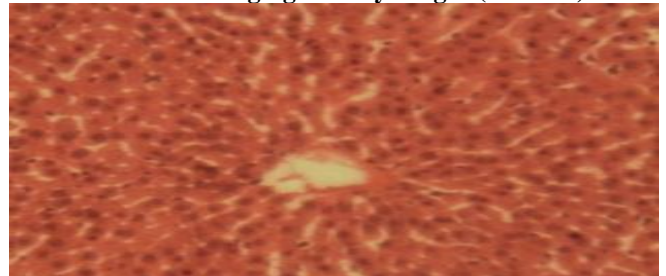
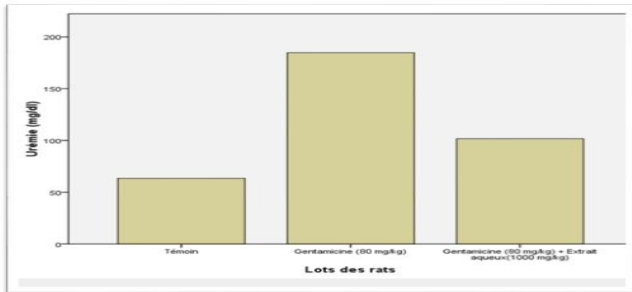
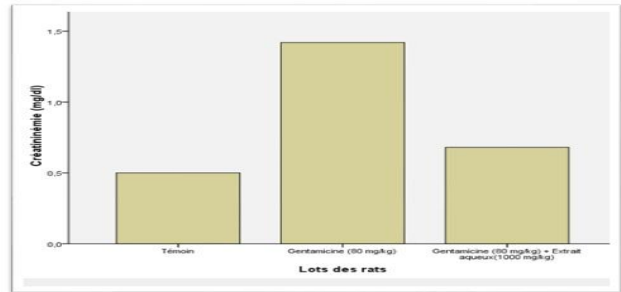


Fig 6. Plasmatic Rate of the urea in Wistar rats poisoned with gentamicin (80 mg/kg) and treated with the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg) during 7 days



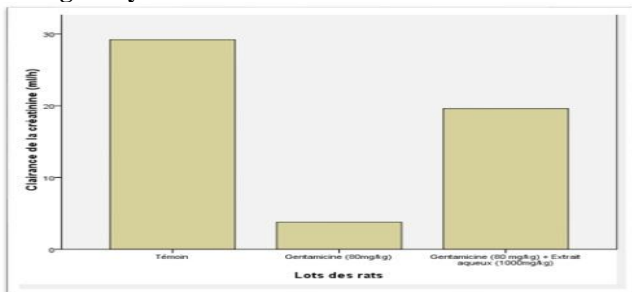
Lot 1: Control; Lot 2: Gentamicin (80 mg/kg); Lot 3: Gentamicin (80 mg/kg) + aqueous extract (1000 mg/kg).

Fig 7. Plasmatic level of creatinine in the Wistar rats poisoned with gentamicin (80 mg/kg) and treated with the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg) during 7 days.



Lot 1: control; Lot 2: Gentamicin (80 mg/kg); Lot 3: Gentamicin (80 mg/kg) + aqueous Excerpt (1000 mg/kg).

Fig 8. Clearance of creatinine in the Wistar rats poisoned with gentamicin (80 mg/kg) and treated with the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg) during 7 days



Lot 1: Control; Lot 2: Gentamicin (80 mg/kg); Lot 3: Gentamicin (80 mg/kg) + aqueous extract (1000 mg/kg)

Fig 9. Kidney of a poisoned rat with gentamicin (80 mg/kg) during 7 days (HE X10)

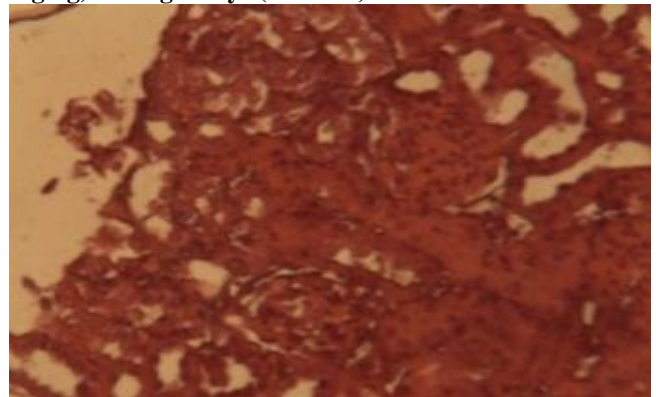


Fig 10. Kidney of rat poisoned with gentamicin (80 mg/kg) during 7 days (HE X10) and treated with the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg)

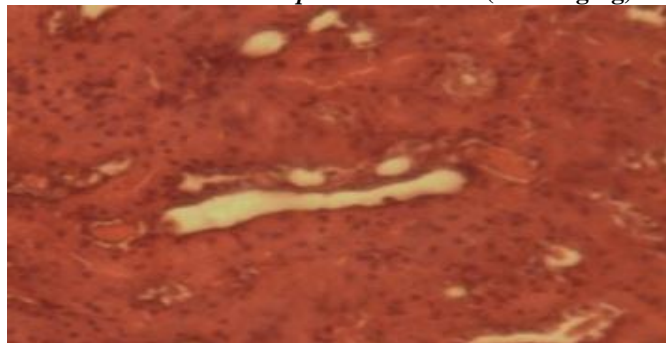


Fig 11. Liver of rat poisoned with gentamicin (80 mg/kg) during 7 days (HE X10)

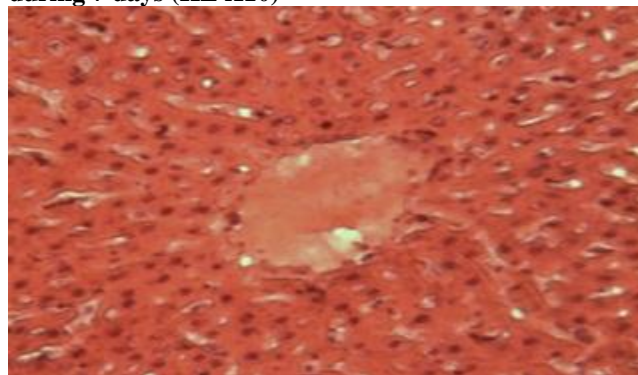
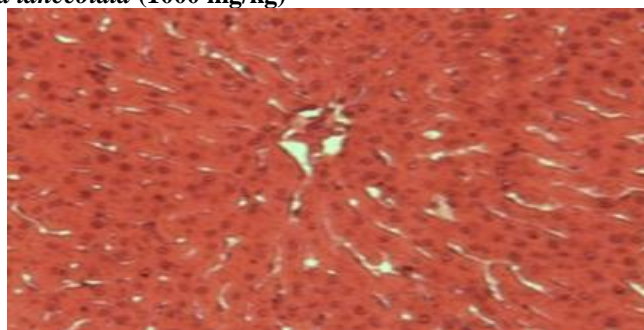


Fig 12. Liver of rat poisoned with gentamicin (80 mg/kg) during 7 days (HE X10) and treated with the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg)



DISCUSSION

Yield of extraction and phytochemical Screening

The aqueous extract gave a yield of $14.61 \pm 0.08\%$. The phytochemical screening revealed the presence of coumarins; flavonoids; anthracenic derivatives; bitter principles; tannins and triterpens. These results confirm those of Haruna *et al.*, (2011) from Nigeria [7]. These authors notified the presence of tannins, anthraquinones (anthracenic derivative), flavonoids and bitter principles with other chemical groups such as carbohydrates, steroids and saponines. Tannins are polyphenolic compounds having some antiviral, antibacterial, anti-inflammatory and antioxidant properties [8]. Coumarins are biologically active molecules, that show various activities: anti aggregation of platelet, anti-inflammatory, anticoagulant, anti-timorous, diuretic, anti-microbial, antiviral and analgesic. In addition to their antioxidant properties, flavonoids possess some anti-inflammatory, anti-allergic and anti-ulcerogenic properties. Triterpens and the steroids have some cytostatic, anti-viral, analgesic and anti-inflammatory properties. Saponines are compounds often bitter, amphiphiles with expectorant properties [9].

Nephroprotective effects of the aqueous extract of the leaves of *Lophira lanceolata*

In the current study, the nephrotoxicity produced with gentamicin is characterized by the elevation of the

uraemia and the creatininemia in the rats of the 2nd lot compared to those of the control group. Likewise, the clearance of creatinine decreased considerably and there was a necrosis of the proximal tubular cells towards a disappearance of the glomerulus in the histological view of the kidney. These results confirmed therefore the nephrotoxicity of gentamicin at the dose of 80 mg/kg of body weight. The specificity of gentamicin in the renal toxicity is related to its accumulation in the contorted proximal tubules and its effects in the biologic membranes. It produces a renal phospholipidosis through inhibition of the lysosomal hydrolases such as sphingomyelinase and phospholipase [10].

Nevertheless, this renal functional and histological modification was attenuated in the addicted rats of the lot 3 with gentamicin (80 mg/kg) and treated with the aqueous extract of the leaves of *Lophira lanceolata* at the dose of 1000 mg/kg/day during 7 days. The extract reduces therefore the blood concentrations of urea and creatinine compared to the rate gotten in the addicted and untreated rats. Also the clearance of creatinine increased in the rats of the 3rd lot thanks to the aqueous extract. An improvement of the renal tubular necrosis was also noticed. Therefore, the aqueous extract of the leaves of *Lophira lanceolata* reduced considerably the nephrotoxic effects of gentamicin and improved the functional status of the kidney in the rats poisoned with gentamicin, hence the improvement of the rates of the

biochemical parameters. A lot of animal experiments demonstrated a strong relationship between the nephrotoxicity and the oxidative stress [11-12]. The oxydative stress is the result of an unbalance in favour of the pro-oxidant species in relation to the system of the body defence that often has as consequence the apparition of irreversible damages in the cells [12]. Gentamicin increases the production of hydrogen peroxide in the renal mitochondria. The oxygen reactive species associated with the oxydative stress are the important mediators of the renal cellular damages caused by gentamicin. Various chemicals were used in the experimental models to prevent the nephrotoxicity of gentamicin. The results of the current study are in agreement with those of Anwar (2000), Hamidreza (2010) and Biyani (2011) who evaluated respectively the nephroprotective effects of probucol, saffron and the aqueous extract of the leaves of *Momordica charantia* on the nephrotoxicity induced with gentamicin. According to their respective findings, the various agents protected the rats against the nephrotoxicity thanks to their antioxidant property.

Antioxidant properties of the chemical compounds of the aqueous extract of the leaves of *Lophira lanceolata*

The anti-radicalar activity of plants is often assigned to the phenolic compounds which are flavonoids, coumarines and tannins [13]. The nephroprotective effect of the aqueous extract of *Lophira lanceolata*'s leaves observed in the current investigation might be due to these compounds. Coumarins are molecules able to prevent the peroxydation of the lipid membrane and to capture the radical hydroxyls, superoxide and peroxy radicals [10]. Barrier (1998) showed through his study on tannins that they can

be reserved like medicine in the prevention of pathologies in which the free radicals are involved [14]. Numerous studies sustain that the antioxidant activity of flavonoids is essentially related to their capacity to trap the oxygen reactive species [10]. In fact, flavonoids are able to deactivate and to consolidate the free radicals thanks to their hydroxyl group highly reactive. They are capable to capture directly the radicalar compounds, and so interrupt the propagation of the reaction in radicalar chain. The flavonoids contained in the aqueous extract of the leaves of *Lophira lanceolata* are capable to generate vitamin E, one of the essential antioxidants in the protection of the cellular membranes as notified by Mamadou (2002). In agreement with other previously described studies (Biyani, 2011); the nephroprotective effect of the aqueous extract could be associated to the antioxidant potential of tannins; flavonoids and coumarins. The co-administration of the aqueous extract of the leaves of *Lophira lanceolata* (1000 mg/kg) and gentamicin (80 mg/kg) during 7 days in the current study suggests a new therapeutic strategy but the precise mechanism of the renal protection requires some more thorough studies.

CONCLUSION

The results of this study showed that the aqueous extract of the leaves of *Lophira lanceolata* (Ochnaceae) at the dose of 1000 mg/kg/day during 7 days protected the kidney against the toxic effect of gentamicin. These preliminary results, obtained based on the animal experimentation, cannot straightaway be extrapolated to human but constitute a pharmacological argument in favour of the traditional use of plant in the treatment of some nephropathies.

REFERENCES

1. Bonventre JV, Pascual M, Tadhani R. Acute renal failure. *Engl J Med*, 322, 1996, 1448-1460.
2. Landais P. Epidémiologie des maladies rénales. Université Paris-Descartes, Faculté de Médecine, UPRES EA 4067, AP-HP, Hôpital Necker, Service de Biostatistique et d'Informatique Médicale, Paris, 2009, 58-59.
3. Jacob L, Leblanc I. Protection Rénale. Département d'Anesthésie-Réanimation, Hôpital Saint-Louis, 75010 Paris, MAPAR 1997, 416-421.
4. Aguemon AR, Atchade D, Attolou V, Kohossi L, Monteiro B. Contribution à l'étude de l'insuffisance rénale au CNHU de Cotonou. *Le Bénin Médical Spécial Urologie N° 9 Ande*, 1998, 106-108.
5. Ambe GA, Malaisse F. Les plantes utilisées dans la médecine et la pharmacopée traditionnelles d'une population malinké en Côte d'Ivoire. *Revue Méd. Pharm. Afr.* 2000, 121-130.
6. Mapongmetsem PM. *Lophira lanceolata* Tiegh.exKeay, Vegetable oils/Oléagineux. PROTA, Wageningen, Protobase Netherlands, 2007, 14.
7. Haruna AK, Ilyas M, Sani A. Phytochemical screening of the leaves of *Lophira lanceolata* (Ochnaceae). *Life Science Journal*, 4(4), 2007, 79.
8. Biaye M. Actions pharmacologiques des tannins. Thèse de doctorat d'Etat en pharmacie. Faculté de médecine, de pharmacie et d'odontostomatologie de l'Université CHEIKH ANTA DIOP de Dakar 2002, 15-24.
9. Abdul KH, Abdulkareem SS, Ibrahim MS, Mohammed I, Ojuolape RA and Sani A.A. Acute toxicity studies of *Lophira lanceolata* leaf extract. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, 2(1), 633.
10. Biyani KR, Chaudhary BP, Chaware VJ, Vaishnav MK. Protective Effect of the Aqueous Extract of *Momordica charantia* Leaves on Gentamicin Induced Nephrotoxicity in Rats. *International Journal of PharmTech Research CODEN (USA)*, 3(1), 2011, 553-555.

11. Anwar AS, Naidu MUR, Ratnakar KS, Vijay KK. ProbucoI protects against gentamicin-induced nephrotoxicity in rats. *Indian Journal of Pharmacology*, 32, 2000, 108-113.
12. Hamidreza PT, Marjan A, Rouhollah H, Shahriar E, Soltan AE. Effect of *crocus sativus* on gentamicin induced nephrotoxicity. *Biol Res*, 43, 2010, 83-90.
13. Kumpulainen JT, Salonen JT. Natural Antioxidants and Anticarcinogens in Nutrition, Health and Disease. *Royal Society of Chemis*, 1997, 178- 187.
14. Barrier L, Bouchet N, Fauconneau B. Radical scavenging activity and antioxydant proprieties of tannins from *Guiera senegalensis* (Combretaceae). *Phytotherapy research*, 12(3), 1998, 159-162.