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Effect of sandfish (*Scincus scincus*) in serum biochemical parameters evolution in the wistar rats

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Abstract

The uncontrolled diet certainly contributes to the epidemic of metabolic syndrome. The high incidence of adverse drug effects means that the population relies on natural medicine for treatment. In the region of Oued Souf (south-east of Algeria), sand fish is widely recognized as a traditional remedy against various metabolic diseases. Several ethno pharmacological studies have been devoted to the effect of certain plants on biochemical parameters. However, no study has been done on the therapeutic effect of certain animals, especially on sandfish. The objective of this study is to evaluate the effect of sandfish (*Scincus scincus*) on the evolution of certain serum biochemical parameters and to look for possible toxic effect in experimental rats. Fifteen (15) male Wistar rats are grouped into three groups (5 rats each): control, fed by 12% of the body of the sand fish, and fed by 12% of the head of the sandfish. The effect of skink on these parameters was evaluated after 6 weeks of treatment. The results reveal that both parts of the skink have a positive effect on the regulation of serum parameters. Administration of the skink showed a very highly significant increase in iron (3.21 mg / l); a very highly significant decrease in total cholesterol (0.71 g / l), triglycerides (0.48 g / l) and TGO (248 u / l), with no significance for blood glucose (0.77 mg / dl) and TGP (45.1 u / l) compared to control. The results obtained also show an increase in urea (0.5 g / l) and a decrease in serum creatinine (6.08 g /l). this study we found that the sandfish has a cholesterol-lowering and hypotriglyceridemia effect

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Introduction

Since ancient times, humans have relied on nature to meet their basic needs of food and clothing (Selles *et al.*, 2012). Food is essential to life its main role is to nourish the body that it must first transform into small parts called "nutrients" (Landry, 2012). Indeed, the effect of dietary risk factors in the development of chronic diseases is now well recognized (Azzati et Riboli, 2013), the transition from a traditional food to a more industrialized rich energy (fast food) has led to global epidemics of obesity and type 2 diabetes.

The origin of chronic diseases related to poor nutrition can result from deregulation of different metabolic parameters, including deregulation of carbohydrate, lipid metabolism, and liver function. Scientific literature shows that low-refined or low-fat diets rich in micronutrients and fiber and low in saturated fat are protective against risk factors for many chronic diseases, including cardiovascular diseases, anemia, obesity and type 2 diabetes (Sofi *et al.*, 2010 Willcox *et al.*,2009).

The failure of conventional pharmaceutical treatments, the high incidence of adverse effects associated with them, and the inadequacy of health infrastructures in developing countries mean that a large portion of the world's population depends mainly on complementary natural medicine. or parallel to heal.

In the region of Oued Souf (southeastern Algeria) the use of animal remedies is very widespread (opotherapy), especially by the famous sandfish (*Scincus scincus*). Because of their high nutritional value (high in tocopherol and zinc (Toumi *et al.,* 2017a), sandfish has been used as a food for male infertility (mixed with honey after drying and milling). It is consumed to fight against iron deficiency (contains 27mg / 100g of iron (Toumi *et al.,*2017a) and given to anemic people and pregnant women for preventive purposes.

The aim of our study is to evaluate the effect of sandfish on different biochemical parameters in wistar rats, and to look for any toxic effect through these parameters.

Materials and methods

Biologic material

Our experimental study was carried out on 15 male rats (Albinos wistar) from the Pasteur institute (Algiers), aged eight and ten weeks with a weight of 200 ± 10 g. The animals were kept under favorable breeding conditions; temperature (25 to 30 °C), humidity (60 and 70%) and a photoperiod of 12 hours.

The rats were raised in polyethylene cages lined with litter made of wood chips. Animals have free access to water and food. They were fed an energy balanced concentrate consisting of 32.6% corn, 16.8% protein, 32.6% sacharose, 4% cellulose, 2% minerals, 2% vitamins, 4% oil.

Animal treatment

After a period of 15 days of adaptation, the rats were randomly divided into three groups of five rats each, they were treated for six weeks as follows:

Lot 01: control rats received the standard diet with water ad libitum.

Lot 02: rats fed the standard diet containing 12% of the grinds sandfish (body part) with water ad libitum.

Lot 03: rats fed by the standard diet containing 12% of the grinds of the sandfish (head part) with water ad libitum.

Blood collection is done using a Pasteur pipette through the retro-orbital sinus at the eye, before and 6 weeks after treatment. The whole blood recovered is then centrifuged at 3000 rpm for 15 minutes.

Serum is collected in tubes and stored at -20 °C for analysis of biochemical parameters. Blood glucose, urea, creatinine, total cholesterol, serum triglycerides, alanine aminotransferase (ALT) activity, aspartate aminotransferase (AST) activity, and serum iron were determined. by a colorimetric enzymatic technique using an auto-analyzer of the type (BIOLIS24j) by a

specific kit for each parameter.

Statistical analysis

The data were analyzed using primarily descriptive statistics indices, including mean and standard deviation. Second, the tests of the inferential statistics were used. This was the student's T test for verifying the significance of perceived differences between means and standard deviations. For all tests, the statistical significance level was set at 5%. The data collected was processed using the MINITAB version 16 software.

Results and discussion

Glycaemia evolution and serum iron

The results obtained are shown in Table 1. After 6 weeks of treatment by both sides of the sand fish.

The results show a no significant decrease in the order of 9.6% in rats treated with groundfish and 9.9% in rats treated with sandfish heads. But these values remain in the normal range of blood glucose levels in rats, without having a hypoglycemic effect for these doses. The normal value of blood glucose can be explained by the low sugar content of sandfish.

Table 1. Variation in blood glucose levels in control rats and sandfish treated rats.

Parameters evolution		Groups		
		Control	01	02
Glycaemia (mg/dl)	Day 0	0.74 ± 0.1	0.74 ± 0.6	0.76 ± 1.06
	Day 42	0.78 ± 0.9	0.75±0.1	0.77±0.19
serum iron (mg/l)	Day 0	2.59±0.29	2.53±0.2	2.52±1.32
	Day 42	2.52±1.04	3.09±1.2***	3.21±0.84***

Studies on the effect of a few plants on biochemical parameters (absence of animal effect studies) have shown that the ethanolic and chloroformic extract of *Citrullus colocynthis* seeds do not have a hypoglycemic effect in normal rats treated with intraperitoneal injection of 20mg / kg extracts (Azzi, 2007). Thus a study by Bellahcen *et al.*, (2012) indicates that Administration of virgin argan oil to rats has no effect on the fasting blood glucose level.

Table 2. Hepatic enzyme variation (TGO, TGP) in control rats and sandfish-treated rats.

Parameters evolution		Groups		
		Control	01	02
TGP (U/L)	Day 0	43.8±18.4	44.9±12.3	39,54±2,55
	Day 42	44.02±0.8	45.1±7.69	39.4±6.82
TGO (U/L)	Day 0	301±69.9	302±86.9	303 ±42.5
	Day 42	302±69.9	268±30.6 ***	248 ±49.2 ***

In this study serum iron concentration showed a very highly significant increase in rats treated with sandfish. Serum iron refers to the level of iron that is not bound to red blood cells but is circulating in the blood serum. An increase in serum iron results in the dietary intake of hem iron in meat, poultry, fish and offal (Pen,2010). The composition of Common Skink is rich in mineral matter where iron represents a rate of 27mg / 100g. A change in meat consumption appears to be a determining factor in improving the status martial (Hambraeus, 1999).

Transaminases evolution

With respect to transaminase levels, we observed a highly significant decrease in serum TGO activity in both treatment groups compared with the control group (Table 2). These results can be explained by the integrity of the myocyte membranes (Fleurentin,

1990). The decrease in transaminases, under the effect of a treatment, has no pathological significance in itself.

Our results are similar to the study of Pascal *et al.,* (2011) who demonstrated that the use of *Carpolobia alba* (Polygalaceae) in rats decreased the level of TGO. The results obtained show no significant difference in the serum activity of TGP in groups treated with sandfish compared to the control, so Derouiche *et al.*, (2017) showed that the aqueous extract of Portulaca oleracea decreased serum activity of transaminases TGP and TGO.

The increase in TGP indicates a sign of predominantly hepatic cytolysis (Groth and Gränzer 1975) and the no significant change in ALT indicates hepatocyte membrane integrity (Nelson, 1995).

Table 3. Lipid parameters evolution in control rats and sandfish treated rats.

Parameters evolution		Groups		
		Control	01	02
Cholesterol total (g/l)	Day 0	1,07±0,63	0.99 ± 0.1	1.01 ±0,55
	Day 42	1,12±0,09	0.71± 0.2 ***	0.77 ±0.11***
Triglycerides (g/l)	Day 0	0.64 ± 0.05	0.69 ± 0.06	0.65±0.45
	Day 42	0,65±0,08	0.53± 0.14**	0.48±0.13***

Lipid parameters evolution

From Table 3, we found that the introduction of sandfish into the diet of the rats caused a very highly significant decrease in cholesterol and triglyceride (0.77g/l and 0.48g/l) respectively compared to the control rat. This decrease can be explained either by the low fat content of the sandfish. Several authors have established that an increase in the lipid content of the food causes an increase in the concentration of plasma cholesterol. Either through the richness of sandfish in zinc, it has been established that zinc can play an important role in the activation of enzymes involved in the metabolism of lipids and proteins (Ashima *et al.*,2012). This also improves lipid parameters and reduces the risk of cardiovascular complications.

Table 4. Kindly parameters variation in control rats and rats treated with sandfish.

Parameters evolution		Groups		
		Control	01	02
Creatinine (mg/l)	Day 0	6.44±1.46	6.45 ± 0.09	6.43 ±0,55
	Day 42	6.48 ± 0.25	6.18±0.44***	6.08±1.29***
Urea (g/l)	Day 0	0.41±0.06	0.43±0.9	0.41±1.6
	Day 42	0.43±0.04	0.51±0.06***	0.5±0.03***

A study evaluating the effect of *Citrullus colocynthis* seeds on the lipid profile of rabbits shows a significant decrease in triglyceride and total cholesterol levels (Zamani *et al.*, 2007). A significant reduction was also observed after the consumption of argan oil for 4 weeks in obese rats (Adlouni *et al.*, 2009).

The biological compounds of our organism containing the cyclopentanoperhydrophen-antrenic nucleus are synthesized from cholesterol; this is the case of bile acids and sex steroid hormones (André, 2010). Indeed, the sandfish is consumed in the Souf region not only for its taste properties but also for its aphrodisiac power (Toumi *et al.*,2017 b).

Kidney parameters evolution

From Table 4 shows a highly significant decrease in creatinine relative to the control. A high serum creatinine level inversely related to the glomerular filtration rate, a decrease of more than 50% indicates

that the renal function is also dependent on the muscular production of creatinine (Moulin and Peraldi, 2016). A decrease in creatinine concentration and uric acid protects the kidney against harmful effects and increases cellular defense processes against the cytotoxic effects of oxidative stress and reduces the production of free radicals (Deepmala *et al.,* 2013).

The urea level depends on kidney function, dietary protein intake and hydration status. Also the concentration of blood urea is dependent not only on glomerular filtration but also protein catabolism of the body, the capacity of production of the liver and the renal perfusion. Creatinine is a more specific indicator of glomerular function than urea (Whelton *et al.*,1994).

Analysis of the results showed a significant increase in urea in both batches treated with sandfish compared to the control.

This increase can be explained either by the accelerated degradation of proteins (Brunner and Suddarth, 2006), or by the high-protein diet that rats experience (the richness of sandfish in protein ;46.3mg / 100g Toumi *et al.*,2017a). In the case of increased protein intake in normal subjects, excess amino acids are de-aminated and urea excretion increases, nitrogen losses exceed dietary intake and the nitrogen balance is negative, which maintains the nitrogen balance (ASBH, 2015).

Conclusion

Traditional medicine is widespread and holds a major place in the treatment of various metabolic diseases. The number of studies on the search for new molecules capable of preventing these diseases remains very limited. This work was oriented to evaluate the influence of sandfish on some biochemical parameters.

In conclusion we found that the sandfish has a cholesterol-lowering and hypotriglyceridemic effect that can reduce the cardiovascular risk by improving the distribution of fat. These results indicate the influence and effectiveness of the skink on iron deficiency by improving the contribution of this element to cover the daily needs. Our results also showed that sandfish does not influence renal and hepatic function. It would be interesting to clarify this study by isolating and identifying the active principles contained in sandfish. As well as the study of the healing effect of sandfish by induction of obesity or type 2 diabetes in experimental rats

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