Some Physiological and Biochemical Effects of Oshar Extract and Abamectin Biocide on Male Albino Rats

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Abstract: The impact of the two natural products; extract of oshar leaves (Calotropis procera) and Vertimic biocide (abamectin) were studied on some physiological and biochemical parameters of mature male albino rats (Rattus norvegicus). The LD₅₀ was determined for both compounds and its values were 95.52 and 8.7 mg/kg b.w. for oshar and abamectin, respectively. Animals were treated orally with (1/4 LD₅₀) of each compound as a single dose. Blood and semen samples were collected after 1, 2, 3 and 7 days of treatment. Plasma was separated and stored at -20 °C until biochemical and hormonal analysis. The results revealed that total count of red blood corpuscles (RBCs) and white blood corpuscles (WBCs) were non significantly decreased in animal group treated with oshar extract compared to control group. Total count of RBCs was significantly decreased, while that of the WBCs was significantly increased post abamectin treatment compared to control ones. Haemoglobin content was significantly decreased, while haematocrit value was significantly increased post extract and abamectin treatments compared to control group. Plasma levels of amino transferase enzymes (ALT & AST), urea, uric acid and creatinine were significantly increased, while that of total protein, glutathione-s-transferase (GST), catalase (CAT) and testosterone were significantly decreased post extract and abamectin treatments compared to control group. Sperm count was non significantly decreased post extract treatment, while the decrease was significant post abamectin treatment compared to control group. Sperm motility was significantly decreased in animal groups treated with oshar and abamectin compared to control group. In conclusion, abamectin was found to be more effective than oshar on the measured parameters so, abamectin was more toxic for rat.


Key words: Oshar, abamectin, RBCs, WBCs, Hb, Hct, GST, CAT, testosterone, sperm count

1. Introduction

Rodent pests are controlled by chemical compounds that cause health hazards and environmental pollution in addition to the toxic effect to non-target organisms. These problems provided an impetus to get poisonous natural materials for using as rodenticides. Some natural products as oshar leaves extract and Vertimic biocide (abamectin) proved promising efficiency for control of rodent species (Gabr, 2005). The widespread loss of livestock and low animal production were attributed to the existence of Calotropis procera in the arid Northern regions of Nigeria (Burkill, 1985). Administration of Calotropis procera leaves to sheep causes tachycardia and transitory cardiac arrhythmia at auscultation 30 min after dosage (Jmaia et al., 2011).

Al-Robai et al. (1993) and Hussein et al. (1994) reported the presence of alkaloids, flavonoids, cardiac glycosides as well as sterols and uscharin in the entire plant, Calotropis procera. A significant decrease of Hb, RBCs, WBCs, and Hct value post ethanolic Calotropis procera extract was reported by Ali (2006). Mourad (2007) studied the effect of 1/4 LD₅₀ of ethanolic leaves extract Calotropis procera on rats and reported significant increases of AST, ALT enzyme activities and serum protein level.

Abamectin is highly toxic to insects and may be highly toxic to mammals (Lankas and Gordon, 1989). Vertimec caused reduction of RBCs, WBCs and Hb concentration. These effects were significantly more pronounced in Vertimec treated rats at the high dose (Eissa and Zedan, 2010). Abamectin revealed significant increases in the liver function parameters (i.e. ALT, AST activities, acid phosphatase activity, serum albumin, glucose and total protein levels). Also, kidney function parameters (urate acid and creatinine concentration) were severely affected Eissa and Zedan (2010). The activities of the antioxidant enzymes like superoxide dismutase (SOD), glutathione peroxidase (GSH-Px) and glutathione-S-transferase (GST) were decreased by fenitrothion incubation more than endosulfan and abamectin (El-Shenawy, 2010). Decreased catalase levels in rat were reported with oshar leaves extract...
and abamectin treatments by El-Deeb et al. (2002)
and Khider et al. (2006).

Intramuscular administration of aqueous and
ethanolic flower extracts of Calotropis procera at
doses of 10.0 or 5.0 mg/mouse/alternate day for a
period of 20 days to sexually mature male albino
mice induced functional sterility and has a potent
antispermagenic activity Nidhi et al. (2001).

Abamectin caused a significant increase in the
level of plasma testosterone. Sperm counts and sperm
motility were significantly decreased in exposed
males Eissa et al. (2003).

The present work aims to study the effects of
the two natural compounds on male albino rat, Rattus
norvegicus to clarify the physiological and
biochemical responses.

2. Materials and Methods
I- Pesticides:

Leaves of oshar plant, Calotropis procera
(family: Asetipiadaceae) were collected from El-kilo
4 ½ Cairo- Suez Road. Oshar leaves were extracted
by ethanol according to Freedman et al. (1979).

Abamectin is a natural product produced by the soil
microorganism Strptomyces avermitillis. The
common name: Vertimic (1.8% EC), it was obtained
from Syngenta Agro. Co. Switzerland.

- Determination of Half Lethal Dose (LD50):

Mortality percentages were recorded up to 28
days after treated rats with oshar extract and
abamectin biocide and LD50 was calculated
according to Weill (1952).

II- Animal groups:

The present experiment was carried out on 100
mature male rats Rattus norvegicus (200-220gm)
obtained from animal farm (Ministry of Health). Rats
were kept at a constant environmental conditions
throughout the period of the experiment, water and
food were supplied ad libitum. The rats were divided
into 3 groups. The first group acted as control. The
second and third groups administrated 1/4LD50 of
oshar leaves extract and abamectin, respectively as a
single dose.

III- Blood sampling and analysis:

Blood samples were collected by heparinized
syringes from the orbital vein of rats after 1, 2, 3 and
7 days of oshar and abamectin treatments.

Plasma was separated after centrifugation (3000
rpm for 15 min.) and stored at -20 °C until used for
biochemical and hormonal determinations.

The total count of red blood cells (RBCs) and
white blood cells (WBCs) were estimated as
described by Schalm et al. (1975), haemoglobin
content was determined according to the method of
Wintrobe (1967) and haematocrit value (Hct %) was
determined according to Britton (1963).

Plasma AST and ALT, urea, uric acid, creatinine
and total protein were determined calorimetrically by
spectrophotometer according to the method of
Reitman and Frankel (1957), Fawcett and Soctt
(1960), Barham and Trinder (1972), Schirmeister
(1964) and Barawill and David (1949), respectively
using El-Gamhoria kits. Glutathion-S-transferase and
Catalase activity were determined by Habig et al.
(1974) and Aebi (1984), respectively using
Biodiagnostic kits. Testosterone level was measured
by Radioimmunoassay kit from Monobind Inc. USA
according to Horton and Tait (1966).

VI- Sperm count and sperm motility:

Sperm count was estimated according to the
method described by Robb et al. (1978) and sperm
motility was determined according to Bearden and
Fuquay (1980).

VII- Statistical analysis:

The obtained results were statistically analyzed by
one way ANOVA and Least Significant
Difference (LSD) at (p< 0.05) using Costat program
(Cohort, 2005).

3. Results

1- Acute oral toxicity:

The LD50 of oshar extract and abamectin
biocide of male albino rat is shown in Table (1)
which revealed that mortality percentages through 28
days increased gradually with increasing dose for the
two tested compounds. Also, the LD50 values were
95.52 and 8.70 mg/kg b.w. for oshar and abamectin,
respectively. It was cleared that abamectin exhibited
high toxicity to male albino rat than oshar extract. In
addition, abamectin toxicity was about 10 times more
than that of oshar.

2-Effect of pesticides on haematological
parameters:

As shown in Table (2) total count of red blood
corpuscles (RBCs) and white blood corpuscles
(WBCs) were non significantly decreased in animal
groups treated with oshar extract compared to
control group. Total count of RBCs was significantly
decreased (p< 0.05), while that of the WBCs was
significantly increased (p< 0.05) post abamectin
treatment compared to control ones. Haemoglobin
content was significantly decreased (p< 0.05), while
haematocrit value was significantly increased (p<
0.05) post extract and abamectin treatments
compared to control group.

Data in Table (3) revealed that oshar and
abamectin treatments induced significant (p< 0.05)
elevations of plasma ALT and AST activities compared to control values at all tested times. Oshar and abamectin treatments induced significant (p<0.05) decreases of plasma protein with prolongation of the period post treatment. Abamectin showed more toxic effect than oshar on ALT, AST activities and protein.

4- Effect of pesticides on kidney function:
Table (4) showed that plasma urea, uric acid and creatinine levels were significantly increased (p<0.05) with prolongation of treatment period with oshar and abamectin. Abamectin showed more toxic effect than oshar on urea, uric acid and creatinine.

5- Effect of pesticides on glutathione-s-transferase and catalase:
Data in Table (6) showed that the plasma level of glutathione-s-transferase was significantly decreased (p<0.05) in animal groups treated with oshar leaves extract after 1 and 7 days, and the decrease was non-significant after 2 and 3 days compared to control group. The level was significantly decreased (p<0.05) in animal group treated with abamectin compared to control group. Abamectin was more effective than oshar on G-S-T activity. Catalase level of animal groups treated with oshar leaves extract and abamectin was significantly (p<0.05) decreased compared to the control group.

6- Effect of pesticides on sperm count, sperm motility and testosterone:
The sperm count in animal groups treated with oshar leaves extract was non significantly decreased after 1, 2, 3 and 7 days compared to that of the control group and the decrease was significant (p<0.05) in animal group treated with abamectin after all tested times. Abamectin was more effective than oshar on sperm count.

Sperm motility was significantly decreased (p<0.05) in animal groups treated with oshar leaves extract and abamectin after 1, 2, 3 and 7 days compared to that of the control groups.

Testosterone level was non significantly decreased at all tested times with oshar extract and the decrease was significant (p<0.05) at all tested times with abamectin biocide (Table 7).

Table (1): Acute oral toxicity (LD<sub>50</sub>) of oshar leaves extract and abamectin biocide on the male albino rats through 28 days.

<table>
<thead>
<tr>
<th>compound</th>
<th>Dose (mg/kg)</th>
<th>Mortality (%)</th>
<th>LD&lt;sub&gt;50&lt;/sub&gt; (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oshar leaves extract</td>
<td>31.25</td>
<td>0</td>
<td>95.52</td>
</tr>
<tr>
<td></td>
<td>62.50</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>125.00</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250.00</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Abamectin biocide</td>
<td>2.50</td>
<td>0</td>
<td>8.70</td>
</tr>
<tr>
<td></td>
<td>5.00</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.00</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20.00</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Table (2): Effect of oral administration of a single sublethal dose (1/4 LD<sub>50</sub>) of oshar leaves extract (23.88 mg/kg) and abamectin biocide (2.18 mg/kg) on blood parameters of male albino rats.

<table>
<thead>
<tr>
<th>Days of sampling</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RBCs (Million/mm³)</td>
</tr>
<tr>
<td></td>
<td>Oshar</td>
</tr>
<tr>
<td>0 (control)</td>
<td>4.33±0.46</td>
</tr>
<tr>
<td>1</td>
<td>4.25±0.29</td>
</tr>
<tr>
<td>2</td>
<td>4.21±0.27</td>
</tr>
<tr>
<td>3</td>
<td>4.07±0.04</td>
</tr>
<tr>
<td>7</td>
<td>3.67±0.21</td>
</tr>
</tbody>
</table>

Values are expressed as means (5 rats) ± standard errors

abcd values in column with different letters are significantly different at (P ≤ 0.05).

AB values in row with different letters are significantly different at (P ≤ 0.05).
Table (3): Effect of oral administration of a single sublethal dose (1/4 LD₅₀) of oshar leaves extract (23.88 mg/kg) and abamectin biocide (2.18 mg/kg) on plasma (ALT), (AST) and total protein of male albino rats.

<table>
<thead>
<tr>
<th>Days of sampling</th>
<th>Parameters</th>
<th>ALT (U/L)</th>
<th>AST (U/L)</th>
<th>Protein (g/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oshar</td>
<td>Abamectin</td>
<td>Oshar</td>
<td>Abamectin</td>
</tr>
<tr>
<td>0 (control)</td>
<td>39.00d ±0.59</td>
<td>39.00e ±0.59</td>
<td>36.00f ±5.85</td>
<td>36.00f ±5.85</td>
</tr>
<tr>
<td>1</td>
<td>48.00A ±0.53</td>
<td>43.00B ±0.44</td>
<td>41.00d² ±2.50</td>
<td>41.00d² ±2.31</td>
</tr>
<tr>
<td>2</td>
<td>48.00A ±1.03</td>
<td>52.00A² ±0.10</td>
<td>42.00d² ±3.77</td>
<td>44.67A² ±2.89</td>
</tr>
<tr>
<td>3</td>
<td>52.00A² ±0.06</td>
<td>57.00B² ±0.28</td>
<td>47.00d² ±0.00</td>
<td>44.67cA ±2.31</td>
</tr>
<tr>
<td>7</td>
<td>57.00A² ±0.19</td>
<td>62.00A² ±2.00</td>
<td>48.00d² ±0.00</td>
<td>44.67cA ±2.31</td>
</tr>
</tbody>
</table>

Values are expressed as means (5 rats) ± standard errors

Abcde values in column with different letters are significantly different at (P ≤ 0.05).

AB values in row with different letters are significantly different at (P ≤ 0.05).

Table (4): Effect of oral administration of a single sublethal dose (1/4 LD₅₀) of oshar leaves extract (23.88 mg/kg) and abamectin biocide (2.18 mg/kg) on plasma kidney function parameters (urea, uric acid and creatinine) of male albino rats.

<table>
<thead>
<tr>
<th>Days of sampling</th>
<th>Parameters</th>
<th>Urea (mg/dl)</th>
<th>Uric acid (mg/dl)</th>
<th>Creatinine (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oshar</td>
<td>Abamectin</td>
<td>Oshar</td>
<td>Abamectin</td>
</tr>
<tr>
<td>0 (control)</td>
<td>32.83d ±0.44</td>
<td>32.83d±0.44</td>
<td>0.92d ±1.45</td>
<td>0.92d ±1.45</td>
</tr>
<tr>
<td>1</td>
<td>35.17A ±0.33</td>
<td>35.17B² ±0.21</td>
<td>1.89A² ±0.96</td>
<td>1.75A² ±0.00</td>
</tr>
<tr>
<td>2</td>
<td>38.32A² ±1.11</td>
<td>39.02B² ±3.01</td>
<td>2.28d² ±0.65</td>
<td>1.93A² ±0.22</td>
</tr>
<tr>
<td>3</td>
<td>40.56A² ±1.69</td>
<td>39.12B² ±2.25</td>
<td>2.75B² ±0.94</td>
<td>7.01A² ±0.87</td>
</tr>
<tr>
<td>7</td>
<td>42.81A² ±2.00</td>
<td>50.82B² ±4.00</td>
<td>3.22B² ±0.38</td>
<td>8.56A² ±0.53</td>
</tr>
</tbody>
</table>

Values are expressed as means (5 rats) ± standard errors

Abcd values in column with different letters are significantly different at (P ≤ 0.05).

AB values in row with different letters are significantly different at (P ≤ 0.05).

Table (5): Effect of oral administration of a single sublethal dose (1/4 LD₅₀) of oshar leaves extract (23.88 mg/kg) and abamectin biocide (2.18 mg/kg) on plasma antioxidant enzymes of male albino rats.

<table>
<thead>
<tr>
<th>Days of Sampling</th>
<th>Parameters</th>
<th>G-S-T (µmol/min/mg protein)</th>
<th>Catalase (µmol/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oshar</td>
<td>Abamectin</td>
<td>Oshar</td>
</tr>
<tr>
<td>0 (control)</td>
<td>0.46 ±0.12</td>
<td>0.46 ±0.12</td>
<td>53.92A ±1.39</td>
</tr>
<tr>
<td>1</td>
<td>0.34B ±0.40</td>
<td>0.34B ±0.40</td>
<td>47.50B² ±0.89</td>
</tr>
<tr>
<td>2</td>
<td>0.43A² ±0.44</td>
<td>0.31B² ±4.62</td>
<td>48.00A² ±2.92</td>
</tr>
<tr>
<td>3</td>
<td>0.45B² ±1.41</td>
<td>0.35B² ±0.53</td>
<td>45.21A² ±3.62</td>
</tr>
<tr>
<td>7</td>
<td>0.29A² ±0.06</td>
<td>0.30A² ±0.06</td>
<td>46.29B² ±1.93</td>
</tr>
</tbody>
</table>

Values are expressed as means (5 rats) ± standard error

Ab values in column with different letters are significantly different at (P ≤ 0.05).

AB values in row with different letters are significantly different at (P ≤ 0.05).
Tables (6): Effect of oral administration of a single sublethal dose (1/4 LD₅₀) of oshar leaves extract (23.88 mg/kg) and abamectin biocide (2.18 mg/kg) on sperm count, motility and plasma testosterone of adult male albino rats.

<table>
<thead>
<tr>
<th>Days of sampling</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sperm count/ ml X 125 X 104</td>
</tr>
<tr>
<td></td>
<td>Oshar</td>
</tr>
<tr>
<td>0 (control)</td>
<td>29.23</td>
</tr>
<tr>
<td></td>
<td>±1.51</td>
</tr>
<tr>
<td>1</td>
<td>28.25a</td>
</tr>
<tr>
<td></td>
<td>±0.98</td>
</tr>
<tr>
<td>2</td>
<td>25.33a</td>
</tr>
<tr>
<td></td>
<td>±1.00</td>
</tr>
<tr>
<td>3</td>
<td>25.25</td>
</tr>
<tr>
<td></td>
<td>±2.16</td>
</tr>
<tr>
<td>7</td>
<td>25.25a</td>
</tr>
<tr>
<td></td>
<td>±3.01</td>
</tr>
</tbody>
</table>

Values are expressed as means (5 rats) ± standard errors

A and B values in column with different letters are significantly different at (P ≤ 0.05).

Numbers in row with different letters are significantly different at (P ≤ 0.05).

4. Discussion

The LD₅₀ values through 28 days were 95.52 and 8.70 mg/kg b.w. for oshar and abamectin, respectively which are closely agreed with those obtained by Mourad (2007) who found LD₅₀ of oshar plant extract to rat was 82.0 mg/kg b.w. and 92.6 mg/kg by Ali (2006). On the other side, the value ranged between 8.7 to 12.8 mg/kg for abamectin (Lankas & Gordon, 1989 and Converge, 2010). Toxic effects of whole latex were reported for Calotropis procera following its oral and parenteral administrations (El Badwi et al., 1998). The whole latex is rich in rubber like poly-isoprene fraction and predominantly exhibits proinflammatory effects that may account for its toxicity (Singhal and Kumar, 2009). The presence of cardiac glycosides, alkaloids, saponins, tannins and flavonoids was also reported by Mossa et al. (1991).

The obtained non significant decreases of RBCs and WBCs count post oshar extract treatment were in line with those of Guy et al. (2011) in rabbits. Abamectin caused reduction in RBCs count and hemoglobin content. Similar results were also reported in rats by El-Abd (2001) who mentioned that this reduction may be attributed to more than one factor i.e. the failure to supply the blood circulation with cells from haemopoietic tissue, since the liver has an important role in the regeneration of erythrocyte and the possible destructive effect on erythrocyte by the toxicants. The obtained results are in agreement with those reported by El-Abd (2001) who found that abamectin significantly decreased the total number of RBCs, haemoglobin and hematocrit, while increased total number of WBCs due to the bone marrow stimulation. The decrease in hemoglobin content of the extract treated animals, suggested that administration of the extract may cause anemia as previously reported by Mahmoud et al. (1979) or due to the presence of some toxic principles in the extract as saponins (Jato et al., 2009).

Obtained results revealed significant (p<0.05) increase of ALT and AST levels which may be due to damage of liver cells under the effect of extract or biocide (Tilkian, et al., 1983). In addition, the increases of plasma AST and ALT activities may be referred to diffusion of these enzymes from the intracellular sites due to the damage caused by the pesticides on the sub cellular level (Amer et al., 1994). In addition, ALT activity in the blood increased in conditions in which cells are damaged or dead (Jimoh and Odutuga, 2001). Elevation in the activities of serum ALT and AST treated with ivermectin may have been due to leakage from the organs into extracellular fluids due to change in endothelial permeability (Arise and Malomo, 2009).

On the other hand, Ali (2006) recorded decreases in ALT and AST after 15 days of treatment with 1/3 LD₅₀ of oshar.

In the present study oshar and abamectin treatments revealed significant decreases of plasma total protein, which is in accordance with the previously recorded findings of Al-Robai et al. (1993) The rate of protein synthesis and/or catabolism in the muscles altering the activities of transaminases and the enzymes concerned with gluconeogenesis. Since liver is a major organ of protein synthesis, any diseases in liver can be seen as damage of hepatocytes with alteration of its
production capacity or, in case of kidney damage and increase loss of protein or muscle wasting via catabolism (Wallace, 2007). In addition, the administrated pesticides may containing compounds could cause bloat, thereby reducing appetite in animals (Trease and Evans, 1989).

Significant increases of plasma urea, uric acid and creatinine post oshar and abamectin treatments in the present study may be due to damage of the kidney cells and/or failure of kidney under the toxic effect of oshar and abamectin biocide (Elissa and Zidan, 2010). This damage could be due to accumulation of active principles of the plant extract into the kidney, accumulation of hazards can be toxic to the tubular epithelial cells (Park, 1982). Elevation of serum uric acid and creatinine concentrations of treated male albino rats may be attributed to reductions in glomerular filtration in kidney and reflect dysfunction of the kidney tubules (Walmsley and White, 1994). Reduced renal blood flow associated with higher serum urea concentration may impair the secretory function of the kidney (Wheaton et al., 1994).

Present work revealed occurrence of oxidative stress induced by oshar leaves extract and abamectin. Pesticides may induce oxidative stress (Kale et al., 1999) and disturb membrane structure (Michelangeli et al., 1990). This in turn can impair cellular structure and function (Bergamini et al., 2004). Decreased plasma GST levels in the present study are in consistent with the finding of (El-Shenawy, 2010) who reported decreased GST activities in rat liver following exposure to insecticides fenitrothion, endosulfan and abamectin. He also added that organophosphorus insecticides consume GSH through a detoxification reaction and/or that GST catalyzes this reaction between GSH and xenobiotic regulating possible harm (Mulder et al., 1990). The decrease in GST level in the present study may be due to that GST involved in detoxification of the oshar leaves extract and abamectin to non-toxic products or by rapidly binding and very slowly turning over the insecticide.

The activity of H$_2$O$_2$ scavenging enzyme CAT decreased significantly post oshar and abamectin treatments. The present results are coincident with El-Demerdash (2011) who reported that significant decreases in the antioxidant enzyme activities (GST and CAT) in liver proved the failure of antioxidant defense system to overcome the influx of reactive oxygen species generated. However, the inhibition of enzymes involved in free radical removal led to the accumulation of H$_2$O$_2$, which promoted lipid peroxidation of DNA, altered gene expression and cell death (Halliwell and Gutteridge, 1999). The decline in the enzyme levels may be due to an excessive formation of superoxide anions, thus resulting in an inactivation of H$_2$O$_2$ scavenging enzyme.

Obtained results revealed a non significant decrease in both sperm count and plasma testosterone post oshar treatment. However, the decrease was significant for sperm motility. These decreases may be due to the effect of pesticides on sex gland. In support to this view, Akinloye et al. (2002) observed that rat treated with extract of Calotropis procera showed varying degrees of testicular lesions, significant reduction in the seminiferous tubular diameter of the testis, which may affect sperm volume negatively and has probably affected testesterone production. These observations may partially explain why Calotropis procera was reported being used as anti-fertility agent (Malhi and Trivedi, 1972). Nidhi et al. (2001) reported that the antifertility effect of Calotropis procera on mice can be attributed to the highly reduced sperm concentration and altered biochemistry of the genital organs.

Abamectin administration during this investigation was associated with decreased both sperm count and motility. These results are in consistent with those previously obtained by Celik-Ozenci et al. (2011) who reported that abamectin exposure for 6 weeks induces testicular damage and effects sperm dynamics in rats. The reduction in sperm concentration may be attributed to reduction in meiotic index of the testicular cells as a result of the passage of the insecticides, across the blood testis barrier and gain access to the germ cells in seminiferous tubules (Dixon and Lee, 1973).

The level of testosterone was significantly decreased post abamectin treatment. These results are in accordance with the results reported by El-betieha and Daas (2003) in rat treated with abamectin which could be explained by the fact that the pesticide acted directly on the testis and effected the androgen biosynthesis pathway. In addition, an agent acting directly on the brain, hypothalamus, or anterior gland will indirectly affect the testis and will possibly affect sexual activity (Amman, 1982).

On the other hand, serum testosterone concentration did not show any significant change after abamectin exposure in rat (Celik-Ozenci et al., 2011).

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References


Barham, D. and Trinder, P. (1972): Total lipid was determined spectrophotometrically. Analyst, 97: 142.


Weil, C.S. (1952): Tables for convenient calculation of median-effective dose (LD₅₀ or ED₅₀) and instructions in their use. Biometrics, 8:249-263.