The Effect of Hyphaene Thebaica and Nelumbo Nucifera Ethanolic Extract on the Hyperlipimic and

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Abstract:
Dyslipidemia is a disorder marked by abnormal levels in any or all of the blood's lipids (e.g. triglycerides and cholesterol) or lipoproteins profile (e.g. LDL and HDL). Elevated LDL is risky and the best indicator of atherosclerosis risk. Low levels of HDL raise the risk of hypertension. Medicinal plants are thought to be a major source of novel chemical compounds with therapeutic promise. In oriental medicine, Hyphaene Thebaica (Doum) and Nillumbik Nucifera (Lotus) extract contains important active compounds, such as phenolic and flavonoids that work as an antioxidant, antihypertensive, hypolipidemic, antidiabetic, and antimicrobial agents. However, this study aimed to find out the effects of doum and lotus methanolic extracts on hyperlipidemic markers like lipid profile as well as hypertension parameters like; aldosterone and, angiotensin-converting enzyme and aldosterone. Methods: This experimental study was carried out in the Research Center of Experimental Animal Faculty of Veterinary Medicine, Banha University, in the period from March to May 2021. Forty male Wistar albino rats were categorized into four groups. The first one was the control group, whereas the hyperlipidemic and hypertensive rats were included in the last three groups. Feeding hyperlipidemic and hypertensive rats with extract of doum in the third group and lotus extract in the fourth group. Blood samples were collected from the orbital plexus and intracardiac of the rats. Blood glucose test and Lipid profiles test including TC, TGs, LDL, and HDL was determined in all groups. Also, hypertensive parameters, including aldosterone hormone and angiotensin-converting enzyme were measured. The data was analyzed using SPSS program version 23. Results: The findings reported that the effect of both extracts on lipid profile parameters, Angiotensin converting enzyme, and aldosterone were parallel in significantly lowering them (P<0.05). Doum had a strong effect on body weight but lotus had a strong effect on fasting blood glucose levels. Conclusion: Doum and Lotus methanolic extracts contain flavonoids and phenols which cause a lowering in lipid and lipoprotein profiles, angiotensin-converting enzyme, aldosterone, and body weight.

Keywords: Hyperlipidemia, Hyphaene Thebaica, Nelumbo Nucifera, Angiotensin converting enzyme, BMI, Biochemical parameters
I. Introduction

Dyslipidemia, also known as hyperlipidemia is a medical condition characterized by elevation of plasma cholesterol (TC), triglycerides (TGs), or both, or a high low-density lipoprotein cholesterol (LDL) or a low high-density lipoprotein cholesterol (HDL) level that contributes to the development of atherosclerosis, cardiovascular diseases and DM (Al-Taher et al., 2017). It is also called hypercholesterolemia or hyper-lipoproteinemia. An Egypt study reported that that 37% of the Egyptian population have elevated blood total cholesterol (TC) levels (Taha et al., 2021). The main predictor of atherosclerosis risk is high LDL blood levels (Altaher, Alewaity, & Abu-Touima, 2016). Hypertension (HTN) is among the most common disorders linked with dyslipidemia, with higher serum levels of TG, LDL, and TC linked to a higher risk for high blood pressure (Altaher & Zabut, 2013). For HDL, the risk of hypertension was increased at low levels (Bayad, 2016). Hypertension and dyslipidemia are important risk factors for cardiovascular disease (Elmahdy & Adris, 2021). Population-based epidemiological research reported that the Gradual increases in the prevalence of hypertension (HTN) have also been linked to dyslipidemia (Herrington, Lacey, Sherliker, Armitage, & Lewington, 2016). Unfortunately, available synthetic chemically drugs for dyslipidemia and hypertension have been linked with numerous side effects such as: nausea, diarrhea, hyperuricemia, myositis and abnormal liver function (Thirumalai, Tamilselvan, & David, 2014). Medicinal plants are employed in a variety of studies. More than 80% of the population of poor nations relies on traditional folk medicine methods to heal their maladies, and medical plants are thought to be a key source of novel chemical compounds with potential therapeutic benefits (Subasini et al., 2014). The doum palm (*Hyphaene thebaica*) is a species of palm tree with edible oval fruits and a woody texture that is native to Upper Egypt (El-Beltagi, Mohamed, Yousef, & Fawzi, 2018). Doum water extract contains important active compounds, such as phenolic and flavonoids that work as an antioxidant that helps to control hyperlipidemia. Doum has pharmacological and nutritional properties (Aboshora et al., 2014). It contains a high amount of amino acids valine, leucine, and some non-essential amino acids e.g. aspartic acid, alanine, glycine, glutamic acid, proline and serine. Also, it was very rich in minerals such as potassium and phosphorous (Abdel-Rahman, Ismail, & Elshafe’a, 2015). The Lotus (*Nelumbo Nucifera*) is a perennial water plant with yellow flowers (Durairaj & Dorai, 2010). It is used as a food staple as well as for a number of therapeutic uses. In oriental medicine, all parts of the Lotus are employed for diverse therapeutic applications. These herbs have significant hypolipidemic, antioxidant, antiplatelet, hypoglycemic and antipyretic abilities (Deepa, Usha, Nair, & Prasannakumari, 2009). However, this study aimed to find out the effects of doum and lotus methanolic extracts on hyperlipidemic markers like lipid profile as well as hypertension parameters like; aldosterone and, angiotensin-converting enzyme and aldosterone.
Materials and Methods:

**Ethical Approval:**

This study was carried out in the Research Center of Experimental Animal Faculty of Veterinary Medicine– Banha University after the approval of all steps of the experiment with serial number: (000031).

**Study Period:**

The study was carried out in the period from March to May 2021.

**Plant Materials extraction:**

Hyphaene Thebaica and Nelumbo Nucifera seeds are obtained from Botanical Market and authorized by plant taxonomists who used them for preparation. Preparation of plants Extracts: The *H. Thebaica* decoction and *N. Nucifera* seeds powder (500 gm) were presented under reflux of 75% methanol in a glass jar at 70°C. The extracts were filtrated by the Whatman apparatus, its filter paper 0.45 micron under pressure. Then at rotatory evaporator at 60°C. Then they were put in methanol 5% with glycerin 0.5% in purified water. The final concentration was each 1 ml containing 750mg of each extract.

**Animals:**

Forty male Wistar Albino rats with an average weight between 190-200g means (219.10±15.20) were used in this study. They were kept in cages each had 5 with mesh bottom galvanized metal wall boxes under controlled environmental and nutritional conditions amount 25-28 C° and humidity of about 55-60% in the lab of the research center. They were fed standard rat diets and supplied with fresh tap water ad libitum, with a 12-h dark and light cycle. The animals were acclimatized for 2 weeks before the beginning of the experiment.

**Treatment protocol:**

The animals were divided into 4 groups. a control and 3 experimental groups G1,G2 and G3: As fed by high-fat diet and injected weekly with Hydrocortisone and Nandrolone for 4 weeks at doses of Hydrocortisone (succinate sodium 100mg) 1.8mg/kg body weight subcutaneously and Nandurabolin (Nondrolone decarbonate 50mg/ml) 10 mg/kg body weight intramuscular in the gluteal region. The control group ate a standard diet with an energy less than 1830kcal/kg diet and the G2, G3 and G4 ate high-fat diets with an energy of 3014 kcal/kg. All animals were sacrificed after the end of the treatment protocol, then blood samples were taken immediately.

**Blood Samples Collection:**

Blood samples were collected from the orbital plexus and intra-cardiac of the rats two times; the first time at the end of the first month and the second was at the end of the second month.
**Biochemical Measurements:**

Lipid profile was determined in all groups according to the methods reported by (Altaher et al., 2016) including total cholesterol, triglycerides, LDL, and HDL. Also, hypertensive parameters, including aldosterone hormone and angiotensin-converting enzyme.

**Statistical Analysis:**

The data was analyzed using SPSS windows program version 23. The record values were expressed as mean and standard deviation (Mean± SD). The one-way analysis of variance (ANOVA) was used to determine the most significant effect of feeding *Hyphaene Thebacia* and *Nelumbo Nucifera*. A P-value less than 0.05 (P<0.05) was considered to be signific.

**Results and Discussion:**

Various disorders, such as diabetes, hypertension, and hyperlipidemia, have been treated with medicinal plants. Medicinal plants are one of the most common sources of treatment for primary health care for more than 65 % of the world's population, particularly in developing nations (Salihu et al., 2019). Doum is a traditional Egyptian beverage that is frequently consumed. It's commonly used as a health tonic and a hypertension treatment because many polyphenolic chemicals abound in it (Eldahshan, Ayoub, Singab, & Al-Azizi, 2008). Blue lotus was distributed along the Nile river valley. Our results reported that *H. Thebacia* and *N. Nucifera* have a significant lowering effect on lipid and lipoproteins profiles including TC, TGs, and LDL. The lowering effect of *Thebacia* was in agreement with (Bayad, 2016) who proved that regular administration of aqueous extract of *H. Thebacia* for 1 or 2 months with 0.5 and 2gm/kkg lowering the levels of TC, TGs. but the aqueous extracts of doum fruits lower it significantly (P<0.05), this agreement with our results that TGs lowered with doum administration in a significant manner (Bayad, 2016). The results proved a significant increase in the level of HDL in the group treated with doum and a significant decrease in LDL level in the same group which agreement with (El-Gendy et al., 2008) who proved that supplementation with doum was parallel to the reduction of lipoproteins level in the form of decrease LDL and increase in HDL. The results agreement with (Kamis, Modu, Zanna, & Oniyangi, 2003) reported a hypolipidemic effect of doum. Abdulazeez et al., 2017 proved that decreased levels of serum TG, LDL, and TC and increased HDL were observed in rats treated with a flavonoid-rich fraction of *H. Thebaica* (Abdulazeez, Abubakar, & Mu'aazzam, 2017). Our results showed the significant lowering effect of *N. Nucifera* on lipid profile including TC, TG, and LDL while a significant increase in HDL. These results agree with (Bhardwaj, A., 2017) who proved that *N. Nucifera* has improved the lowering effect of lipids in induced diabetic hyperlipidemic rats. Our results showed significant lowering of aldosterone hormone in groups III and IV, but no significant difference between both groups. Group IV(Lotus) showed a lower level than group III (Doum) this agree with the role of Doum and Lotus in lowering blood pressure, these present results are explained with (Abdel Malak & Amin, 2018) study who proved that Nitric Oxid (NO) has a good role in protection and stimulation of suprarenal glands from changes occur with stress, so NO
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has a stimulation role for secretion of aldosterone hormone (Bhardwaj, A., 2017) proved that *N. Nucifera* has a scavenger effect on Nitric oxide and it will cause lowering in aldosterone level and following regulation of blood pressure.

Table(1) : Changes in serum concentrations of lipid profiles in mg/dl.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Controls Mean ±SD (n=10)</th>
<th>Experimental group</th>
<th>p. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>G I Mean ±SD (n=10)</td>
<td>G II Mean ±SD (n=10)</td>
</tr>
<tr>
<td>Cholesterol (mg/dL)</td>
<td>82.29 ± 3.85</td>
<td>141.09 ± 24.64</td>
<td>80.24 ± 2.55</td>
</tr>
<tr>
<td>TGs (mg/dL)</td>
<td>102.78 ± 8.44</td>
<td>143.55 ± 15.09</td>
<td>110.83 ± 10.31</td>
</tr>
<tr>
<td>HDL (mg/dL)</td>
<td>50.02 ± 2.78</td>
<td>41.41 ± 6.25</td>
<td>45.39 ± 5.93</td>
</tr>
<tr>
<td>LDL (mg/dL)</td>
<td>21.50 ± 2.37</td>
<td>48.21 ± 13.86</td>
<td>20.63 ± 2.75</td>
</tr>
</tbody>
</table>

Table (2): Changes in serum concentrations of Aldosterone Hormone in pg/ml and Angiotensin converting enzyme U/L

<table>
<thead>
<tr>
<th>Hormones</th>
<th>Controls Mean ±SD (n=10)</th>
<th>Experimental group</th>
<th>p. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>G I Mean ±SD (n=10)</td>
<td>G II Mean ±SD (n=10)</td>
</tr>
<tr>
<td>Aldosterone (pg/ml)</td>
<td>169.00 ± 86.88</td>
<td>394.50 ± 139.75</td>
<td>182.91 ± 115.97</td>
</tr>
<tr>
<td>Angiotensin converting enzyme (U/L)</td>
<td>101.50 ± 73.33</td>
<td>190.80 ± 36.08</td>
<td>141.10 ± 33.55</td>
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Conclusion:

Both plants act as hypolipidemic, hypotensive factors. A side effect of the plants was related to the dose, high doses may give adverse effects, while the small dose for long period gives acceptable therapeutic effects.

Acknowledgment:

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References:


