Orally Administration Effect of Sumac on Blood Sugar in Rat

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ABSTRACT

Sumac is an Iranian traditional spice which is widely used in the Iran. In general, sumac can grow in non-agriculturally viable regions, and has a long history of use by indigenous people for medicinal and other purposes. Therefore, the objective of this study was to investigate the effect of orally administration of Sumac on Blood sugar in Rat. 40 Adult Wistar male albino rats weighing between 250 and 300 g were used for the study. Animals were divided randomly into four groups, consisting of ten animals each. All the groups were treated for 28 consecutive days with dosages of 0.25, 0.5 and 1 g/kg for treatment groups, respectively. Blood samples were collected in days of 0, 7, 14 and 28 from retro-orbital plexus. The blood sugar was assayed using standard kits. According to results of present study a significance increase in levels of blood sugar after administration of sumac were observed. The findings demonstrate that sumac can be increased the blood sugar therefore in diabetic patient be considered.

Key word: Sumac, Blood sugar, orally administration, Rat.

Introduction

Diabetes is a metabolism disorder that its characteristic is rising blood sugar more than normal range and it happens because of dysfunction of Insulin which regulates blood sugar. According to International federation of Diabetes assessment in year 2003, 194 million diabetic people live in the world and its estimated people live in the world and it's estimated in year 2025 this number achieves 333 million. One out of every 20 people in Iran is diabetic and half of these numbers even don’t know about their illness. In every 10 seconds, one person in the world passes a way because of ignorance about Diabetes and ways to control it. As regards in our country (Iran) Diabetes and its related diseases are prevalent, researching about it seems to be necessary. Nowadays in addition to treatment with drugs, fiber supplements and other natural antioxidant compounds are used in this procedure because of having essential elements for diabetic people. It's shown that some fruits and vegetables can stimulate insulin secretion. Researchers have found out that eating some of natural different foods in diabetic patients reduces serum Blood sugar. So diabetes treatment and finding new ways to prevent and cure it is one of challenges of researchers [21,16,17,20]. It is determined that using antioxidants and some foods can reduce incidence of Diabetes in man and laboratory animals [7,15]. Rhus coriaria L. (known as sumagh in Persian and sumach in Turkish) is a wild plant grown in Iran, Turkey and Mediterranean coastline. Sumac has a sour and acidic taste and is traditionally used as a table spice in the region but is prepared divergently in Iran and Turkey. What are called sumagh in Iran are in fact pure ground fruit epicarps of the plant while in Turkey the whole fruit is ground with salt crystals. Sumac has an acidic sour taste due to its indigenouslyorganic acids and is mainly sprinkled on various kinds of kebabs. In
traditional medicine sumac is used as astringent agent [22]. Sumac and saffron are contains flavonoid compounds [10,9] and the extracts of the plant have been shown to have antioxidant [2], free radical scavenging [4], antimicrobial [13] and hypoglycemic [8] biological activities. Previous phytochemical studies of this plant reported that its leaves contained flavones, tannins, anthocyanins, and organic acids [11,12]. However, it is the fruit of the plant that is typically consumed as spice after drying and grinding. Other reports indicated that sumac has antimicrobial activity with limited information on its antioxidant activity and potential as a new source of antioxidative substances [3,4,18,19,23,24]. Therefore the aim of present study was to determine the orally administration effect of Sumac on Blood sugar in Rat.

Material and method

40 Adult Wistar male albino rats weighing between 250 and 300 g were used for the study. They were kept under standard laboratory conditions and were fed with commercial rat pellets and drinking water ad libitum. The animals were housed in polypropylene cages. Ethical committee in accordance with animal experimentation and care has approved all animal procedures. Animals were divided randomly into four groups, consisting of ten animals each.

<table>
<thead>
<tr>
<th>Group</th>
<th>Control (Normal saline 10 ml/kg, orally) (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group II</td>
<td>Sumac (0.25 g/kg, orally) (n=10)</td>
</tr>
<tr>
<td>Group III</td>
<td>Sumac (0.5 g/kg, orally) (n=10)</td>
</tr>
<tr>
<td>Group IV</td>
<td>Sumac (1 g/kg, orally) (n=10)</td>
</tr>
</tbody>
</table>

All the groups were treated for 28 consecutive days. Blood samples were collected in days of 0, 7, 14 and 28 from retro-orbital plexus under ether anesthesia and the serum was used for the assay of blood sugar measurement. The blood sugar was assayed using standard kits. Values were represented as mean±SEM. Data were analyzed by one-way analysis of variance (ANOVA) followed by Dunnett's test using statistical package for social sciences (SPSS) version 10. P<0.05 was considered significant.

Table 1: Blood sugar levels (mg/dl) of 4 groups in days of 0, 7, 14 and 28

<table>
<thead>
<tr>
<th>Group</th>
<th>Days</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>101.73±1.64</td>
<td>102.28±1.23</td>
<td>102.91±1.53</td>
<td>101.57±1.72</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>102.28±1.33</td>
<td>*122.45±1.87</td>
<td>*121.39±1.97</td>
<td>*121.33±1.69</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>103.62±1.67</td>
<td>*128.34±2.03</td>
<td>*126.44±1.88</td>
<td>*127.27±1.77</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>104.75±1.45</td>
<td>***130.58±2.34</td>
<td>***139.12±2.24</td>
<td>***141.86±2.56</td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01 and ***p<0.001 compared with 0 day.

Results and discussion

The results of present study in following table have been shown.

According to this results sumac causes significance increase in levels of blood sugar, of course other effects of sumac have need to more studies. In other hands, the antifungal and antibacterial activity exhibited by the extracts and essential oils of medicinal plants has been demonstrated by several researchers [1,5,14,19,6]. According to the findings of other study, Sumac extracts showed relatively high activity against all the tested bacteria and fungi and in fact so fare most study on antimicrobial effect of Sumac has been reported but study on effect of sumac on serumic levels of blood sugar has been not reported. The present study suggests that the essential oil of this plant is a potential source of natural agents. After this screening experiment, further work should be performed to describe the antimicrobial activities in more detail as well as their activity in vivo. Also phytochemical studies will be necessary to isolate the active constituents and evaluate the antibacterial activities against a wide range of bacteria population. Researcher showed that R. coriaria leaves which are rich in flavones, tannins, anthocyanins, and organic acids [11] would be a good source for traditional medicine. But our result showed that a significance increase in levels of blood sugar after administration of sumac was observed. The findings demonstrate that sumac can be increased the blood sugar therefore in diabetic patient be considered.

References


