Basic information on arsenical poisoning in cattle and small ruminants are meager (Tapan Kumar et al. 2014). Arsenic exposure affects all body systems viz. cardiovascular, nervous, hepatobiliary, gastrointestinal, renal, dermatologic and respiratory system (Gulin 2016). This arsenic accumulation tendency in the body of animals is a threatening problem for livestock and human (Chimoy et al. 2016). The dominant basis of arsenic poisoning is from groundwater that naturally contains high concentration of arsenic (Verma et al. 2016). About 21 countries around the world are facing groundwater arsenic contamination, but in aquifers of Asian countries the most drastic occurrences were found (Al-forkan et al. 2016). This study aimed to examine and measure the presence of arsenic in blood and sheep’s tissues of Ghorveh area, city of Kurdistan provinces of Iran, which can be samples of ecosystem and environment population of the area.

This study was done in 3 villages of Kurdistan, Iran, which researchers identified as risky areas with severe pollution in terms of arsenic presence in geological studies in the past. The blood and wool samples were randomly taken from 55 sheep, including both sexes in the age groups less than 1 year, 1–3 years, and above 3 years from 3 villages. In addition to these samples, liver of 10 sheep were also chosen from the slaughterhouse of the area for study. Arsenic concentrations of the blood, wool, and liver were measured according to atomic absorption instruction (Chinmoy et al. 2016). Initially data were entered in Microsoft Excel and then imported to GraphPad prism version 3.0 where descriptive statistics (mean, standard deviation of the mean) of the blood, wool and liver analytical variables were determined. The SPSS (version 14) statistical tool was used for one-way analysis of variance (ANOVA) computation to compare the groups and P<0.05 was considered significant.

In this research, levels of arsenic concentration in blood and wool of sheep at Ghorveh area were studied (Table 1). Lopez Alonso et al. (2000) in which maximum level of arsenic in the wool was specified as 100 ppb, there is no significant difference of arsenic concentration in sheep’s wool under study compared with normal levels (P≥0.05). In the study done on arsenic concentration in sheep and some blood parameters on Tekab’s sheep around gold mines, the level of arsenic concentration in all sheep’s wool under study was higher than the normal range (Rezazadeh et al. 2014). Chinomy et al. (2016) also reported that arsenic concentration in wool in exposed Garole sheep in India, showed significant increase.

Generally, the hair contains metabolic dead substances, which are around the hair, between the hair, and in the active substances which are in the hair root. Active root hair cells are able to concentrate or accumulate different elements; this accumulation depends on the type and concentration of elements in the environment, nutrition, exposure duration,
There is no significant difference (P > 0.05) in the level of arsenic in age groups.

Table 3. The level of arsenic in blood and wool in male and female (ppb)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Num.</th>
<th>Blood Mean± SD</th>
<th>Wool Mean± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>21</td>
<td>14.741 ± 10.105</td>
<td>32.09 ± 15.488</td>
</tr>
<tr>
<td>Female</td>
<td>24</td>
<td>16.935 ± 10.566</td>
<td>30.445 ± 13.497</td>
</tr>
</tbody>
</table>

*There is no significant difference (P > 0.05) in the level of arsenic in both sexes.

Table 2. The amount of arsenic in blood and wool in age groups (ppb)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Num.</th>
<th>Blood Min.</th>
<th>Blood Max.</th>
<th>Mean± SD</th>
<th>Wool Min.</th>
<th>Wool Max.</th>
<th>Mean± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 years</td>
<td>15</td>
<td>6.855</td>
<td>13.854</td>
<td>10.855± 2.07</td>
<td>30.455</td>
<td>17.340± 8.35a</td>
<td></td>
</tr>
<tr>
<td>≥3 years</td>
<td>15</td>
<td>3.568</td>
<td>16.659</td>
<td>11.288± 5.3</td>
<td>26.531</td>
<td>17.44± 10.25a</td>
<td></td>
</tr>
</tbody>
</table>

*There is no significant difference (P > 0.05) in the level of arsenic in age groups.

The aim of this study is to determine level of arsenic in sheep’s blood, wool and liver in Ghorveh area, city of Kurdistan provinces in Iran. The samples of blood and wool of 55 sheep, including both sexes in different age groups (<1, 1–3 and ≥3 years) were collected, sampling of liver also carried out from the slaughterhouse of the mentioned area. The mean concentration of arsenic in the blood, wool and liver of sheep were 10.024±7.105, 13.699±10.205 and 7.684±3.75 ppb, respectively, which blood concentration shown significant difference statistically in comparison to the normal value (P < 0.05) whereas wool and liver do not show significant difference statistically (P > 0.05). There is no significant correlation between arsenic concentration with age and sex (P > 0.05). Arsenic concentration revealed the high level of arsenic in the environment and food in Kurdistan, which can be a serious threat to public health and other creatures.

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REFERENCES


