العلاقة بين التسمم بالكرير والعناصر الموجودة بالمصل في الأعضاء والمناشر

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تم خلال هذه الدراسة فحص 162 حالة واثنتين وستين حالة من الماعز والأغنام التي تثبت تأثيرها بخلافات مصغرة في سهور مسحوق في مصغرة على أعداد مختلفة من المصابين وتم تحليل معدل الكاسهوم والعايضوم العضوي. كذلك، نشأت إنزيم الفوسفاتاز القلوي ودلت النتائج على وجود انخفاض معنوي في كل من العناصر سالفة الذكر.
CORRELATION BETWEEN OVINE SULPHUROSIS AND SERUM CALCIUM, MAGNESIUM, INORGANIC PHOSPHORUS AND ALKALINE PHOSPHATASE ACTIVITY  
(With One Table & Two Figures)  

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(Received at 16/12/1980)  

SUMMARY  
During this investigation, 162 sheep and goats were chosen from different areas at various distances far from the super-phosphate factory at Manquebad (Assiut province). Analysis of sheep and goats sera was carried out to determine calcium, inorganic phosphorus, magnesium and alkaline phosphatase activity. Results showed significant lowering in serum calcium, inorganic phosphorus, magnesium and alkaline phosphatase activity.  

INTRODUCTION  
Interrelationship between copper, sulphate and molybdenum have been demonstrated long ago, since DICK (1952) reported that the limiting effect of molybdenum in copper nutrition of sheep depended upon sulfate level of the ration. It had been reported also that sulphate lowers the availability of calcium in poultry (PENSACK et al., 1964) and lambs (GOODRICH and TILLMAN, 1966 a) through the formation of insoluble calcium sulphide in the gastrointestinal tract. GOODRICH and TILLMAN (1966 b) also reported that phosphorus retention was significantly reduced by sulphate in lambs fed on a ration containing sulphate ions.  
The study reported herein was conducted to study the interrelationship of industrial ovine sulphurosism and the level of calcium, magnesium, inorganic phosphorus and alkaline phosphatase enzyme in sheep and goats suffering from sulphate intoxication (SHAABAN et al., 1980) as a result of the emission of $SO_2$, $H_2S$ and $SO_3$ from super-phosphate factory at Manquebad (Assiut Province).  

MATERIALS AND METHODS  
Blood was obtained by jugular vein puncture from 162 animals, with (66 animals) - or without (95 animals) - clinical signs from different localities (Table 1) in the vicinity of super-phosphate factory. Control samples were obtained from 22 healthy sheep without any clinical symptoms, from an area 18 km. far from the factory. Serum calcium was determined by BETT and FRASER method (1959), magnesium by the method described by NEIL & NEELY (1956) and both inorganic phosphorus and alkaline phosphatase by KILCHLING and FREIBURG method (1951).  
Data obtained were statistically calculated according to KALTON (1967).  

RESULTS  
Analysis of serum calcium, inorganic phosphorus, magnesium and alkaline phosphatase activity revealed significant lowered levels (at $P_{> 0.01}$) in animals with or without clinical signs of intoxication at El-Gazira, and El-Tawabila comparative with high sulphur estimation. In Ilwan’s animals showing clinical signs, and Manquebad animals without clinical signs the same results were obtained. Results of these observation, are listed in (Fig.1 and 2).  

DISCUSSION  
A highly significant lowering in serum phosphorus level was observed in animals with high concentration (at $P_{> 0.01}$) of serum and wool sulphur accompanied by low levels of serum and wool copper (SHAABAN et al., 1980).  
In this respect copper is considered to be very essential for proper phosphorus metabolism (SHIRLEY et al., 1951). It is suggested that factors which lower copper levels indirectly produce hypo-phosphatemia. One of these 

factors is the increased level of sulphate intake specially when the diet contain normal or low level of copper and molybdenum. The obtained results appear, therefore, to agree with those of SHIRLEY et al. (1950, 1951) and GOODRICH and TILLMAN (1966 a).

The relationship between alkaline phosphatase activity and serum inorganic phosphorus is evidenced in this investigation which revealed that each one goes, nearly side by side with the other. Such relationship was previously discussed by DAVIS and HANNAN (1947) in cattle.

In exposed areas, at El-Gazira and El-Tamabila, the majority of animals had relatively lower levels of calcium which reached 7.85 mg%. The formation of calcium sulphide may explain such behaviour. Our results are in agreement with GOODRICH and TILLMAN (1966 b) that sulphate lowers the availability of calcium due to possible formation of calcium sulphide.

REFERENCES


TABLE (1)

Locality chosen, and number of animals used during investigating the effect of environmental sulphur pollution in sheep.

<table>
<thead>
<tr>
<th>Areas</th>
<th>Distance from factory (Km)</th>
<th>Serum sulphur (mg/100 ml.)</th>
<th>Number of Animals</th>
<th>Animals with a clinical signs</th>
<th>Animals Without clinical signs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1. El-Gazira</td>
<td>adjacent to the factory</td>
<td>1075.00±26.48</td>
<td>28</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>A) Gaziret El-Alkred</td>
<td></td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>B) Ezbat-Mohamed</td>
<td></td>
<td>1.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. El-Tamabila</td>
<td></td>
<td>1259.00±67.11</td>
<td>40</td>
<td>-</td>
<td>17</td>
</tr>
<tr>
<td>3. Mangabad</td>
<td></td>
<td>392.51±68.80</td>
<td>11</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. Ilman</td>
<td></td>
<td>851.65±87.74</td>
<td>47</td>
<td>-</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>162</td>
<td>6</td>
<td>60</td>
</tr>
</tbody>
</table>

Fig. (1): Sulphur, Calcium, Phosphorus, Alk. Phosphatase activity and Magnesium levels (mg %) in serum of tested animals showing clinical signs.

Fig. (2): Sulphur, Calcium, Phosphorus, Alk. Phosphatase activity and Magnesium levels (mg %) in serum of tested animals showing clinical signs observed.