

## The Clinical Efficiency of Minerasol® a New Trace Element Combination on Sheep

<sup>1</sup>M. Erman Or, <sup>1</sup>Abdullah Kayar, <sup>1</sup>Remzi Gonul, <sup>1</sup>Banu Dokuzeylul, <sup>2</sup>Ali Riza Kiziler,  
<sup>3</sup>Birsen Aydemir, <sup>4</sup>Abdullah Aksu, <sup>1</sup>Cagla Parkan, <sup>5</sup>Tamercan Morkoc and <sup>3</sup>Bora Barutcu

<sup>1</sup>Department of Internal Medicine, Faculty of Veterinary Medicine,  
Istanbul University, 34320 Avcilar, Istanbul, Turkey

<sup>2</sup>Department of Biophysics, Faculty of Medical, Namik Kemal University, Tekirdag, Turkey

<sup>3</sup>Department of Biophysics, Faculty of Cerrahpaşa Medicine,  
Istanbul University, Cerrahpaşa, Istanbul, Turkey

<sup>4</sup>Department of Chemical Oceanography, University of Istanbul,  
Institute of Marine Science and Management Vefa-Istanbul, Turkey

<sup>5</sup>Interhas Limited Company, Ankara, Turkey

**Abstract:** In this study, the effects of Minerasol® application, is a new mineral combination, on blood serum parameters, its efficiency on sheep breeding and its safety on the treatments of diseases (caused by macro and micro element deficiencies) were examined. When the serum mineral level before and after the application of Minerasol® were examined on 40 sheep, it was determined that, there were increases in serum Fe, Cu, Zn, Mg and Ca levels. The increase in serum Zn, Mg and Ca were significant ( $p < 0.001$ ). Consequently, it was concluded that with the inclusion of Minerasol® into the routine care and nourishment program, the problems related to the deficiency of trace elements would be eliminated in a short time and predisposition in terms of bacterial, viral and parasitic diseases would be prevented.

**Key words:** Sheep, trace element, mineral combination, minerasol, mineral deficiencies, copper

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### INTRODUCTION

The importance of many inorganic elements classified as macro and micro elements in nourishing and growing of animals is accepted (Altintas *et al.*, 1990; Sahin, 1999). Trace elements have an important role on growth, reproduction and productivity of domestic animals. Mineral deficiency or imbalance observed in nearly everywhere in the world causes significant losses in terms of both production and economy (Jones *et al.*, 1990; Graham, 1991; Dakka and Abdel-All, 1992; Sahin, 1999). It is reported that the losses caused by trace elements are as important as the losses caused by infectious and parasitic diseases (Sahin, 1999). Although, trace elements are very important for increasing resistance to diseases in living organisms (Camas *et al.*, 1994; Sahin, 1999).

Minerasol® used in this study, is a hypertonic infusion solution that includes calcium, phosphate, potassium, magnesium and sodium salts and iodine, iron, cobalt and zinc trace elements. Mineral substances and trace elements are critical co-enzymes necessary for the activation of the effects of biologically important substances like hormone, enzyme, vitamins and

other functional proteins (Interhas.com). Any deficiency causes specific or non-specific disorders in cells' metabolism.

In this study planned under the light of all these information, the effects of Minerasol® application which is a new mineral combination, on blood serum parameters were examined, its efficiency on sheep breeding and its safety on the treatments of diseases caused by macro and micro element deficiencies.

### MATERIALS AND METHODS

This study was carried out in Istanbul University Veterinary Faculty Farm. Forty sheep that proved healthy after the clinical examination were included to the study. About 10 mL of blood without anticoagulant was drawn from the animals before drug administration and serum element levels were determined. Then, each animal were administered IV 6cc Minerasol® that includes calcium phosphonate 65.00 mg, potassium chloride 4.282 mg, calcium gluconate 300.00 mg, potassium iodide 50.00 mg, sodium iodide 50.00 mg, magnesium chloride 6 H<sub>2</sub>O 19.64 mg, iron (II) chloride 4 H<sub>2</sub>O 12.96 mg, cobalt (II)

chloride 6 H<sub>2</sub>O 0.164 mg, zinc chloride 0,1355 mg in 1 mL, blood was drawn 1 week later and the variations were determined. Then 6 mL of Minerasol® was again applied intravenously. After 1 week, without applying IV injection of Minerasol®, blood was drawn and serum element levels were determined. All the element levels were measured in AA-680 Shimadzu atomic absorption spectrophotometry in Biophysics Department of Istanbul University Cerrahpaşa Faculty of Medicine, hemogram parameters were measured in Istanbul University Veterinary Faculty Central Analysis Laboratory and the data were statistically assessed.

## RESULTS AND DISCUSSION

When the serum mineral level before and after the application of Minerasol®, it was determined that there was no statistically significant change in hemogram levels but there were increases in Fe, Cu, Zn, Mg and Ca levels and that the increases of Zn, Mg and Ca were significant in  $p < 0.001$  level (Table 1).

Compared to other countries, while the country is one of the leading countries in terms of economically valuable animal count, its place is much worse than expected in terms of products like meat, milk and skin obtained from these animals (Agaoglu, 1991; Camas *et al.*, 1994). Deficiency of trace elements plays as much role as infectious and parasitic diseases in the formation of this table (Underwood, 1997; Sahin, 1999). A similar appearance was observed in Northwest Turkey and after discussions with breeders and veterinary physicians it was reported that there were many diseases caused by parasites and trace element deficiencies. Particularly, complaints like walking disorders in calves, fertility related problems, loss of weight, diarrhea, predisposition to infections, decrease in fleece quality were compatible with symptoms reported in literature (Altintas *et al.*, 1990; Ruls, 1990).

Calcium is present in the structure of tissue and bones and is necessary for healthy bone, muscle and nerve function. It is essentially responsible for blood clotting. It enables the interaction of reticuloendothelial system and suprarenal gland (Interhas.com). It has a regulatory effect on acute and chronic metabolic abnormalities and reproduction activities due to its effect on phosphate interim metabolism. It is necessary for healthy bone and dental growth and its maintenance (Dakka and Abdel-All, 1992). It is also known that calcium and phosphate deficiencies cause many metabolic diseases (Shupe *et al.*, 1988; Jones *et al.*, 1990; Dakka and Abdel-All, 1992). In the study, when the changes in calcium level of blood serum was observed, it was a

Table 1: The changes in blood serum levels in sheep before and 1 and 2 weeks after Minerasol® administration (n = 40)

Parameter and units	Before injection	1 week after injection	2 weeks after injection	p-value
	-----X±Sx-----			
Fe (µg dL <sup>-1</sup> )	120.815±9.30	122.19±5.60	110.944±5.45	NS
Cu (µg dL <sup>-1</sup> )	61.91±3.77	61.34±2.01	70.13±2.70	NS
Zn (µg dL <sup>-1</sup> )	92.44±4.77	76.44±1.81	79.06±2.29	***
Mg (mEq L <sup>-1</sup> )	3.64±0.057	3.52±0.064	3.30±0.07	***
Ca (mg dL <sup>-1</sup> )	8.02±0.13	7.76±0.16	7.12±0.20	***

NS =  $p > 0.05$ , \*\*\* $p < 0.001$

significant increase seen in calcium quantity, statistically. It was decided that injections of calcium with phosphate could decrease the risk of metabolic diseases.

Copper has an important role in hemoglobin shaping and body growth, symptoms like failure in metabolic functions like immune function, increase in mortality rate, debility, depigmentation, walking disorders, demyelination in nerve tissues, low osteoblastic activity and loss of weight caused by the failure of oxidation in tissue and diarrhea are reported (Sharma *et al.*, 2005; Sahin, 1999). Copper and zinc are the most important essential minerals necessary for the normal functioning of animals' reproduction functions (Kendall *et al.*, 2000; Yildiz and Balikci, 2004). Zinc is an essential mineral for healthy skin, hair and nail situation, reproduction, bone and cartilage growth, carbohydrate, lipid and protein metabolism, enzyme and immune system. It has a vital role in DNA synthesis. Decrease in consumption, decrease in growth rate, growth retardation, abnormal estrus behaviour, decrease in testicle magnitude, spermatogenesis malfunction, decrease in the development of secondary sex organs and fertility, decreases in resistance to infections, significant compression on immune response, pathological changes in skin and hair, parakeratosis are observed in the animals with zinc deficiency (Sahin, 1999; Interhas.com).

Magnesium is necessary for bone and tooth formation and the maintenance of normal muscle functions. It was reported that the inclusion of Zn, Cu and Mg to the ration in sufficient rates plays an important role for fertilization and increasing the life chance of embryo (Yildiz and Balikci, 2004). In this study we observed that serum Cu, Zn and Mg levels increased after injection and it might be efficient on preventing the diseases related to these minerals. Although, half of the researchers reported that the risk of enzootic ataxia increased with the blood copper levels under 50 µg dL<sup>-1</sup>, it was observed that no such risk was present in the animals in our farm and Minerasol® administration completely eliminated this risk by increasing the serum copper level more.

Fe deficiency along with the Cu deficiency is known to cause violent anemias and predisposition to parasitic diseases. Iron enters the structure of hemoglobin

necessary for moving oxygen from lungs to body cells. In case of insufficiency, decrease in immune response, cell mediated immune abnormalities may be seen and the killing ability of neutrophilia can be significantly reduced (Interhas.com). Pirkle *et al.* (1985) and Agaoglu (1991) reported that high amount of cobalt, zinc, cadmium, manganese and copper found in ration decreased the absorption of iron. In the study, it was observed that the blood erythrocyte count, haematocrit level and hemoglobin level before and after the injection did not change and all the parameters were reported as normal (Smith, 2002) in sheep and all that this was compatible with the presence of blood serum Fe and Cu levels within normal limits before injection.

Potassium administered to the animals with Minerasol® administration are necessary for the maintenance of cellular integrity and for healthy nerve and muscle function (Interhas.com). Sodium and Chlorine are necessary for the maintenance of healthy nerve and muscle function (Imren and Sahal, 1990). Iodine is the structural component of thyroid hormones called Thyroxine (T<sub>4</sub>) and Triiodothyronine (T<sub>3</sub>) and has a regulatory and activating effect on metabolism. The normal growth and proper functioning of reproduction organs depend on the thyroid situation. Since, blind and hairless calves, abortus in cows can be seen in its deficiency, iodine supplementation in various concentrations has a positive effect on reproduction performance (Agaoglu, 1991). Cobalt is necessary for Vitamin B<sub>12</sub> synthesis in the large intestine of pigs and horses and the rumen of cattle. The field experiences indicate that the population performance in sheep and cattle is deteriorated and ovarium function is deteriorated in cattle, the rate of getting pregnant, deliveries and milk and wool production decreased (Interhas.com; Camas *et al.*, 1994). However, although we did not have the chance to examine the changes in K, Na, Cl, I and Co levels in blood serum after the injection, it was decided that these were increased similarly to the others and this may be effective on preventing diseases due to mineral deficiencies.

Minerasol® is used for treating, preventing specific or non-specific diseases and disorders caused by deficiency, lack or imbalance of the components (Zinc, Cobalt, Iodine, Iron, Sodium, Potassium, Phosphor, Calcium and Magnesium) in its constitution and supporting the animal (Interhas.com).

It's specific areas of use are grass tetany, milk fever, bone disorders, disorders in hair and skin related to zinc, anemia related to iron and cobalt deficiency (Vitamin B<sub>12</sub>), hairless calves due to iodine deficiency and it is used for removing the negative situations caused by the

deficiency of substances in its constitution mentioned in pharmacological properties section (Imren and Sahal, 1990).

It can be used for prophylaxis during pregnancy and lactation for the prevention of diseases, which are likely to develop since the need of animals for substances within Minerasol® is increased during these periods (Interhas.com).

## CONCLUSION

Consequently, it was decided that with the inclusion of Minerasol® which is a new trace element combination into the routine care and nourishment program, the problems related to the deficiency of trace elements would be eliminated in a short time and predisposition in terms of bacterial, viral and parasitic diseases would be prevented.

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