

# MINERALS IN BLOOD SERUM OF LACTATING DONKEYS: EFFECT OF DIETARY TRACE ELEMENT SUPPLEMENTATION

**Fantuz F.<sup>1</sup>, Ferraro S.<sup>1</sup>, Todini L.<sup>1</sup>, Piloni R.<sup>1</sup>, Mariani P.<sup>1</sup>, Amadoro C.<sup>2</sup>, Salimei E.<sup>2</sup>**

<sup>1</sup>Dip. Scienze Ambientali, Università di Camerino, Camerino, Italy; <sup>2</sup>Dip. S.T.A.A.M., Università del Molise, Campobasso, Italy

## INTRODUCTION

- Donkey milk is indicated for sensitive consumers such as children with cow milk protein allergy or multiple food intolerance and elderly people.
- In milk from other species the concentration of some trace elements (i.e. Se and I) can be manipulated by dietary supplementation, making the milk more suitable for human consumption.

## OBJECTIVE

- to study the effect of dietary supplementation with trace elements on mineral profile of milk and blood serum of lactating donkeys.



## MATERIALS AND METHODS

**Animals, diets and sampling** -- 16 lactating donkeys (32-58 days from foaling) divided into 2 groups (CTL and TE) were used to provide milk samples: jennies in CTL group were fed a control diet (coarse hay ad libitum and 2.5 kg of mixed). The trace elements intake calculated for donkeys in control group would meet or exceed the trace elements requirements of lactating mares except for Se. Jennies in TE group were fed the control diet but mixed feed was added with 185 mg Fe, 36 mg Cu, 163 mg Zn, 216 mg Mn, 3.2 mg I, 2.78 mg Co, 0.67mg Se/kg.

-- The study lasted 3 months and individual blood and milk samples were collected at 2 weeks interval.

**Analyses and statistics** -- Macro mineral and trace element concentrations in feeds, **blood serum** and **milk** were measured by inductively coupled plasma-mass spectrometry. Data were elaborated by ANCOVA for repeated measures

### Blood serum mineral profile of lactating donkeys as affected by trace element supplementation

	Treatment <sup>1</sup>			P value <sup>3</sup>
	CTL	TE	SEM <sup>2</sup>	
<b>Macro minerals, mg/L</b>				
Ca	129.45	129.72	0.91	NS
P	104.97	102.81	3.28	NS
K	180.63	182.72	2.04	NS
Na	3153.50	3149.52	11.01	NS
Mg	25.03	26.64	0.45	<0.05
<b>Trace elements, µg/L</b>				
Zn	620.70	625.55	13.67	NS
Fe	1439.30	1495.46	120.52	NS
Cu	1083.83	1128.24	43.55	NS
Mn	0.62	0.58	0.12	NS
Se	185.36	213.34	11.83	NS
Co	0.69	1.34	0.09	<0.001
I	21.43	24.42	0.93	<0.05

### Donkey milk mineral profile as affected by trace element supplementation

	Treatment <sup>1</sup>			P value <sup>3</sup>
	CTL	TE	SEM <sup>2</sup>	
<b>Macro minerals, mg/L</b>				
Ca	806.5	807.6	25.8	NS
P	635.4	639.6	13.1	NS
K	732.8	751.6	18.8	NS
Na	141.8	139.9	2.1	NS
Mg	79.2	84.1	2.3	NS
<b>Trace elements, µg/L</b>				
Zn	2253.1	2240.4	57.9	NS
Fe	97.5	107.2	11.9	NS
Cu	101.3	93.7	5.6	NS
Mn	3.34	3.83	0.21	NS
Se	4.22	4.70	0.25	NS
Co	0.48	0.51	0.02	NS
I	65.8	82.1	8.3	NS

<sup>1</sup> Treatments: CTL = Control diet provided Zn 34.1 mg/kg, Fe 254.9 mg/kg, Cu 7.5 mg/kg, Mn 42.1 mg/kg, Se 0.05 mg/kg, Co 0.17 mg/kg, I 0.36 mg/kg; TE = Trace elements supplemented diet provided Zn 88.5 mg/kg, Fe 316.5 mg/kg, Cu 19.6 mg/kg, Mn 113.0 mg/kg, Se 0.27 mg/kg, Co 1.10 mg/kg, I 1.42 mg/kg; <sup>2</sup> Standard error of the mean; <sup>3</sup> NS = Not significant

## CONCLUSIONS

- The mineral profile in milk and blood serum of lactating donkeys is not dependent on dietary trace element intake, except serum Mg, Co, and I, of which concentrations can be increased through dietary trace element supplementation.
- Results from the current study may be useful both in human nutrition, in which donkey milk is used as a food for infants or elderly consumers, and in animal nutrition, to support the assessment of trace elements nutritional requirements of dams and newborns and as a basis to establish reference serum values for lactating donkeys.