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AN OUTLINE OF THE METABOLIC PROFILE TEST (MPT) IN SMALL RUMINANTS

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Abstract

The health of a flock is to a great extent dependent on the producer because he plays an important role in the prevention program by providing the appropriate feeding and reproductive regimen and a practical deworming program. MPT in small ruminants was carried out to test the insufficiency, resp. imbalance in feed intake and to help detect the subclinically occurring metabolic diseases.

Of great use would be a basic MPT for each monitored flock based on the statistical processing of data and hematological results (RBC, Hb, PCV, MCV, WBC, diff. WBC) and biochemical examinations (Ca, iP, Mg, K, Na, urea, cholesterol, GOT, TSP) of blood samples taken from selected animals during different physiological stages of production (at least 30 days before partum and within 2 months of lactation). The deficiency of the ration would be determined by the MPT screening before the animals are turned out to pasture and during the confinement. The roughage content would be analyzed by chemical analyses supported by macro- and microelements. Such basic MPT would reflect the actual state in a flock with regard to the breed, age, type, production, feeding regimen and environmental factors.

Introduction

Good production can be expected only from healthy animals. Metabolic, deficiency and parasitic diseases occurring either subclinically or as minor infections with inapparent clinical signs account for very large economic losses: fall in milk yields and in reproductive efficiency of the affected animals. When the disease becomes clinically recognizable the treatment may often be uneconomic therefore preventive measures must be maintained. By adequate feeding, hygiene, uninfected pastures, avoidance of stressfull events and eradication of metabolic, deficiency, parasitic and some other innfectious diseases economic damage can be considerably prevented.

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Rearing of animals intensively may adversely affect their health. Under stressful conditions they are more sensitive to various inadequacies in nutrional and breeding management. Particular attention need to be focused on pastures to reduce excessive contamination by worm populations (worm in abomasum, small intestine, lugworm) and agricultural areas (appropriate fertilization).

Regular srategic treatment and direction recommended by the veterinarian should be strictly followed by the owner of the flock. The flock health is thus to a great extent dependent on the owner who can carry out a considerable part of disease prevention especially with regard to the feeding regime. Thus, the MPT has been elaborated to detect possible deficiencies, resp. imbalance in the feed ration and for early recognition of subclinical diseases.

The metabolic profile test (MPT)

The most important objective of the metabolic profile test is maintaining a continuous high level of metabolic processes which assures optimum productivity of sheep/goat flocks. A basic metabolic profile test for each monitored flock is the ideal at which to aim. It would be the result of statistically processed data and the results of hematological and biochemical examinations of blood samples collected at different stages if production. Such basic MPT would ireflect the actual situation in the flock regarding breed, age, type, production, selection program, reproduction, feeding regime and environmental factor. Results of the follow-up examinations would thus be compared to threshold values of the basic MPT.

The pattern of animals for basic MPT determination

1. With regard to the size of the flock and physiological stage of the animals 20 % randomly selected animals are separated: 10 % of animals during the dry period, approx. 30 d before parturition and 10 % animals in the second month of lactation.

2. With regard to the feed intake, blood samples are obtained from 10 % of animals in the spring before they are turned out to pasture and in the autumn immediately after the animals are housed. Thus, possible nutritional deficiency would be established and the diet alternated to the needs of the flock.

The pattern consists of clinically normal animals only. For the actual assessment of the health status of the flock samples form animals that have aborted or that showed milk production below flock average should not be obtained.

Deviations from obtained threshold values are usually expressed in low reproduction indexes and metabolic diseases due to metabolic imbalance resulting in extensive economic damage.

The metabolic profile test program

1. Collection of animal health data

It is very important to become knowledgeable about zootehnical and veterinary-medicine related issues in small ruminants. We are interested in the flock composition. In newborn animals we are interested in birth weight, vigour of animals, mortality/stillborn rate and reasons for death. Reduced vigor and health problems in newborn animals are often resulting from poor nutririon, metabolic and systemic disturbances of mothers. Very significant are data on possible difficulties in reproduction which are often the first indicator of sublinically occurring pathology in a flock.

2. General inspection of animals

Focus is placed on defining the general health status of animals: appetite, body condition, hair coat, quality of feces, getting up and lying down and reaction to different stimuli. It is important to know the hygienic conditions in housisng facilities. Organolleptic examination of roughage qualitiy, resp. pasture is carried out as well as an investigation of feed supplements.

3. Clinical examination of selected animals

In a large flock 10 % of animals that were ranked highest according to the basic MPT validation are seperated. The clinical examination includes obtaining of health data, examination of lymph nodes, gastrointestinal tract, liver, leg structure, a general examination of the udder and urogenital tract.

4. Blood examination

In principle, blood samples for morphological and biochemical examination are taken before noon. Blood for morphological examination is drawn into glass tubes with an anticougulant (e.g. EDTA II). For the majority of biochemical examinations blood serum is collected.

Table 1 - PRESENTATION OF PHYSIOLOGICAL VALUES USED AT THE CLINIC FOR RUMINANTS FOR THE INTERPRWETATION OF THE METABOLIC PROFILE TEST FOR SHEEP AND GOATS

Parameter	Symbol	Unit	Sheep	Goat
Erythrocytes	RBC	X 10^{12}/L	9,0 - 15,0	8,0-18,0
Hemoglobin	Hb	g/L	90 - 150	80 - 120
Hematocrit	PCV	1/L	0,27-0,45	0,22-0,38
MCV	MCV	fL	28-40	16-25
MCH	MCH	pg	8,0-12,0	5,2-8,0
MCHC	MCHC	g/L	310-340	300-360
Leukocytes	WBC	X 10^{9}/L	4,0-12,0	4,0-13,0
Lymphocytes	L	%	50-75	47-65
Neutrophils	N	%	10-50	30-48
Eosinophils	E	%	1-10	2-8
Basophils	B	%	0-2	0-1
Monocytes	M	%	0-6	1-4
Sodium	Na	mmol/L	140-160	137-152
Potassium	K	mmol/L	4,8-5,9	3,7-5,9
Calcium	Ca	mmol/L	2,40-3,05	2,28-2,85
Phosphorus	iP	mmol/L	1,30-2,25	1,52-2,80
Magnesium	MG	mmol/L	0,85-1,20	0,95-1,30
Urea	Urea	mmol/L	3,0-7,0	3,0-6,7
Cholesterol	Chol	mmol/L	1,42-2,33	2,07-3,36
AST(SGOT)	AST	U/L	to 60	to 30
Total serum protein	TSP	g/L	70,0-80,0	63,0-77,0

The morphological examination includes determination of the erythrocyte and luekocyte counts, hemoglobin concentration and hematocrit value. When WBC is increased the differential leukocyte count is determined as well.

Biochemical parameters are determined in blood serum or pllasma. Biochemical examinations within basic MPT include the following parameters: serum Ca, inorganic P, Mg, Na, K, total serum proteins, urea, cholesterol, and the activity enzyme glutamat-oxalacetat transaminase. In highly problematic flocks the examination may include also other biochemical parameters.

5. Feces examination

An important part of the metabolic profile test is the coprological examination which includes sedimentation, flotation and the method acc. to

Vajda. Particular attention is paid to invasion of animals with species of nematodes (Trichostrongylidae, Rhadbitidae, Strongylidae, Ancylostomatidae and Trichuridae), tape worm (Anoplocephalide) and stomack flukes (Paramphistomidae).

6. Chemical analysis of roughage

The said clinical and paraclinical examinations are as a rule supported by the chemical analysis of roughage and if necessaary the concentrates. Employed is the Weend's analysis and the silage analysis acc. to Fliege. Additionally, the Weend's analysis is supported by the determination of macro- and somme other microelements concentrations. The chemical analysis of roughage ensures immediate adjustment of the ration, stimulates the appropriate fertilization of the grounds and high quality roughage production.

If the MPT results display negative situation in a flock, preventive measures - a group preventive therapy - is reguired. For example, we try eliminate any deficiency in the feeding regimen by inclussion in the diet minerals, vitamines, concentrates, etc. In the long run adequate feed supplies must be ensured which can be achieved by changing the structure of feed legumes, appropriate fertilization, rotation of pastures and improved technology for roughage preparation and conservation.

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KRATAK PREGLED TESTA METABOLIČKOG PROFILA (MPT) U MALIH PREŽIVAČA

Sažetak

Zdravlje stada uvelike ovisi o proizvođaču jer on igra važnu ulogu u programu prevencije odgovarajućim režimom prehrane i reprodukcije te praktičnim programom suzbijanja glista.

MPT je proveden na malim preživačima radi testiranja manjkavosti, odnosno neuravnoteženosti u uzimanju hrane te radi otkrivanja subkliničke pojave metaboličkih oboljenja.

Osnovni MPT bio bi vrlo koristan za svako praćeno stado što se temelji na statističkoj obradi podataka i hematološkim rezultatimas (RBC, Hb, PCV, MCV, WBC, razl. WBC), te biomehaničkom ispitivanju (Ca, iP, MG, K, Na, urea, kolesterol, GOT, TSP) uzoraka krvi odabranihg životinja za vrijeme raznih faza proizvodnje (najmanje 20 dana prije partusa i u dva mjeseca laktacije). Nedostatak obroka odredio bi se pomoću MPT-a prije izlaska životinja na pašu i za vrijeme bređosti. Sadržaj grube krme analizirao bi se kemijskim analizama pomoću makro- i mikroelemenata. Takav osnovni MPT pokazao bi stvarno stanje u stadu u odnosu na pasminu, dob, tip, proizvodnju, režim hranidbe i čimbenike okoline.

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