CONTENT OF NONESSENTIAL ELEMENTS AND CHIMICAL COMPOSITION OF MAIN COMMUNITY of GRASSLAND in ECOLOGICAL ZONES

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ABSTRACT

Result of studying a nutrition value of main communities in grasslands is depending on ecological zones and growth stage. Contamination of non essential elements, macro-micro element is non-significant difference between forest steppe and steppe while a significant difference came out in semi desert area.

INTRODUCTION

The chemical composition of pasture grasses is different, with substances presented in various amounts. The plants are considered valuable in nutrition if contains protein, fat, minerals and have less crude fiber. The chemical composition depends on many facts like the geographic location, weather condition, type of pasture and development stages, and varies consequently. It is important to achieve the information about contents of macro micro elements and chemical composition of the common represented pasture grasses and most preferred plant species for every type of zones. This is decisive for solving the problems related to feeding animals and to establish a knowledge about the process of development of those zones.

Objective: The main objectives of the research work was to determine the nutrition value, amount of macro-micro element and contamination of non-essential elements in needle grass-forbs types of ecological zones.

Samples and methodology: Representing for forest steppe zone that is Dadal sum, Hentii aimag, steppe zone is Hustai National Park, Tuv aimag and semi dessert zone is Eredenedalai sum, Dundgovi aimag. All of the research samples were taken from main pasture type of these zones in the autumn. The samples are include three mixed pasture and five dominant individual plants that are Stipa Krylovii *Roshev*., Cleistogenes squarrosa (Trin) *Keng.,* Agropyron cristatum (L) P.B., Carex duriuscula C.A. *Mey*., Artemisia Frigida *willd* ., from semi dessert zone's Cleistogenes soongorica *Ohwi*., Stipa gobica *Roshev*.. The sample were collected in August when the plants reached their maximum yield.

All samples were analyzed at the University of Saskatchewan and RIAH. Analyses was performed in duplicate on all samples, including the mixed samples, individual, and the mineral samples. Dry matter (DM) was determined according to the methods of AOAC (1990d) for 3h at 105^0C and then ashed (Ash) (AOAC, 1995a) at 550^0C. Crude protein (CP) was determined using the kjeldahl method

(Kjeltec titration) (AOAC, 1995), acid detergent fiber (ADF) using Ankom®fiber analyzer (AOAC, 1990a). Neutral detergent fiber (NDF) determined using Ankom ®fiber analyzer as described by Van Soest et al.(1991). Lignin (ADL) was determined by first performing ADF and then ADL (AOAC, 1990c) and either extract through diethyl ether extraction (AOAC,1990b).

Mineral and toxic metal analysis was conducted at the Western College of Veterinary Medicine Mineral Diagnostics Lab using ICP Mass Spectrometry (Thermo Electron corp., X series ICP-MS, serial #1263). Samples were digested in 5mL concentrated nitric acid, and heated in Mars Xpress (CEM corp.) pressurized microwave for 50 min with gradual temperature increase to 180^0C. Duplicate samples were diluted to 100 ppb and 50 ppb to increase accuracy.

RESULTS AND DISCUSSION

The chemical composition of pasture grasses is the main characteristic in determination of the nutrition value of the pasture and it is quality. By comparing of the chemical composition of the same type of pasture grass-forbs in different ecological zones, one could determine that the pasture in the steppe forest region contained less protein (8.75%), has more fiber and was less nutrition value than in the other regions.(see table 1). This result depend on vegetation period and growing stage. Same time we are collected samples but growing stage was late in forest steppe area.

Table1

Nutrition value of mixed sample of three different ecological zones

№	Content of Nutrition value	Forest steppe zone	Steppe zone	Semi dessert zone
1	Moisture, %	5.4	5.48	4.52
2	Crude protein , % /CP/	8.75	13.48	10.29
3	Fat, % /DF/	3.45	3.93	4.9
4	Crude fiber, % /CF/	29.4	28.3	27.2
5	Ash, %	7.5	6.4	10.06
7	Neutral detergent fiber, % /NDF/	53.7	51.7	49.1
8	Acid detergent fiber, % /ADF/	34.9	33.8	32.4
9	Metabolitic Energy, MJ/Kg	8.1	9.0	8.3

The higher NDF content of forest and steppe zones which is indicated decrease to intake. It is concluded that the higher ash content in the steppe regions with semi desert area can be linked to the higher content of macro-micro elements in those regions.

The comparison of the ME of the dominant species of grass-forbs pasture shows no significant differences in quality between steppe and steppe-forest pasture species even though there are some differences in chemical composition which was influenced by the geography, climate and growing stage.

The Content of Macro- and Microelements of pasturelands

Mongolian grasslands macro-microelements was determined by some researchers. These three ecological zones' plants have more concentration of potassium then other macroelements and lower concentration of phosphorus. That result is according to Tserendulam.R [28,29] and other researchers analysis. (see figure 1)

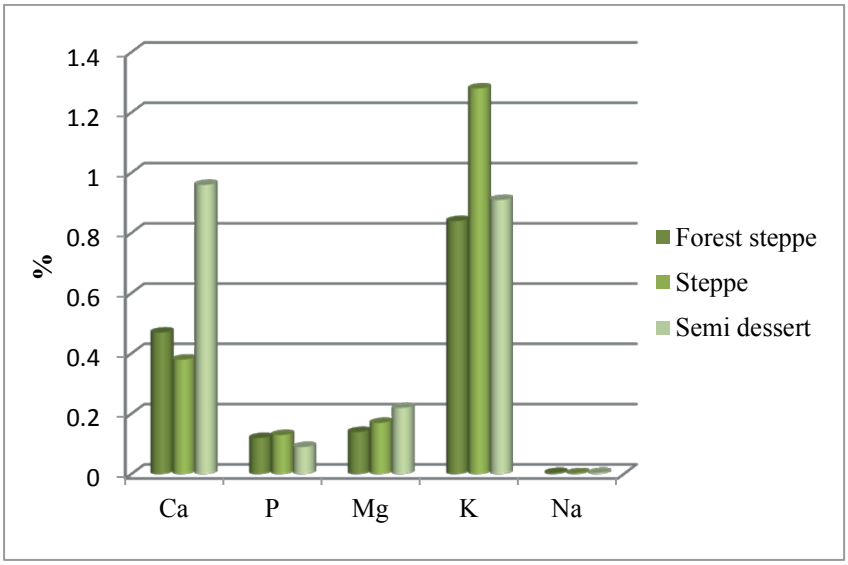

Figure 1. Content of Macroelements in three different zones

The needle grass-forbs pasture type and species by choice have proved enough potassium content in all regions, but not sufficient content of sodium (Na) in steppe-forest zones and also not enough phosphorus was found in the semi desert area for the animal requirements. All other elements were presented in sufficient amounts.

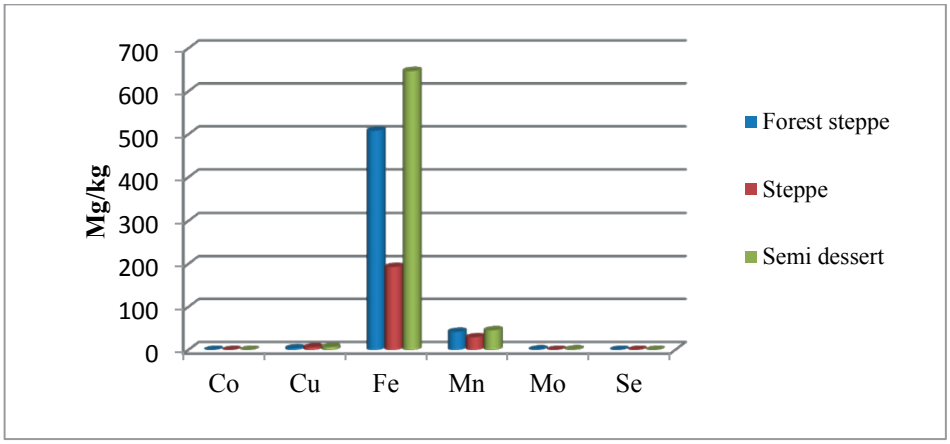

Figure 2. Content of Microelements in three different zones

The iron content in the samples from desert region was 547.3 ppm which is by 70% more than of steppe regions and by 21% more than of forest-steppe zones. The iron as microelement was presented more than any other elements in all regions (Figure 2). The selenium was also found not sufficient, but cobalt has met with its 0.09-0.23 ppm the required amount for the animals.

The chemical composition and nutrition value of grass-forbs pasture and dominant species were analyzed and compared to each other in different ecological zones. In steppe and forest steppe zones there were no significant differences in regards to quality and nutrition value, when the content in macro, micro elements differed slightly. But there was a significant difference in above characteristics of desert steppe compared to the other two zones.

This study shows that the concentration of macro, microelements is related directly to the soil where the plants growing. The chemical composition of those plants was compared to the result of previous studies Tserendulam.R [5,6] and Yunatov.A.A [7].

Table 2

Content of Microelements in the three different Ecological zone, mg/kg

Microelements	Forest steppe zone	Steppe zone	Semi dessert zone
Cobalt (Co)	0.23	0.09	0.27
Copper (Cu)	3.82	6	6.61
Iron (Fe)	508.4	193.1	647.3
Manganese (Mn)	42.2	29.4	45.7
Molybdenum (Mo)	1.23	0.35	1.2
Selenium (Se)	0.27	0.44	0.2

The contents of molybdenum, manganese, cobalt and copper in soil increase if the location gets closer from forest-steppe to desert steppe .

Nonessential elements

Our result that is the concentration of toxic and heavy metal in the grasslands normally to equalized with NRC [8]. Furthermore semi dessert zone's grassland includes more amount of nonessential elements.*(See table 3)*. Also more amount of heavy metal strontium 40-115 mg/kg, barium 35.8-89.0 mg/kg than other nonessential elements (see figure 4).

Table 3

Content of nonessential elements in the three different Ecological zones, mg/kg

№	Toxic and Heavy metal	Forest steppe zone	Steppe zone	Semi dessert zone
1	Antinomy (Sib)	9.57	7.0	9.57
2	Arsenic (As)	0.24	0.27	0.46
3	Barium (Ba)	58.8	35.8	89.0
4	Berylium (Be)	0.00883	0.00604	0.0156
5	Bismuth (Bi)	0.00803	0.00252	0.00514
6	Cadmium (Cd)	0.0271	0.0113	0.0264
7	Chromium (Cr)	3.54	1.63	2.31
8	Lead (Pb)	0.56	0.32	0.66
9	Nickel (Ni)	1.54	2.07	3.54
10	Strontium (Sr)	40.0	36.0	115.5
11	Thallium (Tl)	0.0065	0.0035	0.0064
12	Tin (Ti)	0.031	0.014	0.0167
13	Uranium (U)	0.0227	0.00565	0.0243
14	Vanadium (V)	0.86	0.34	0.85

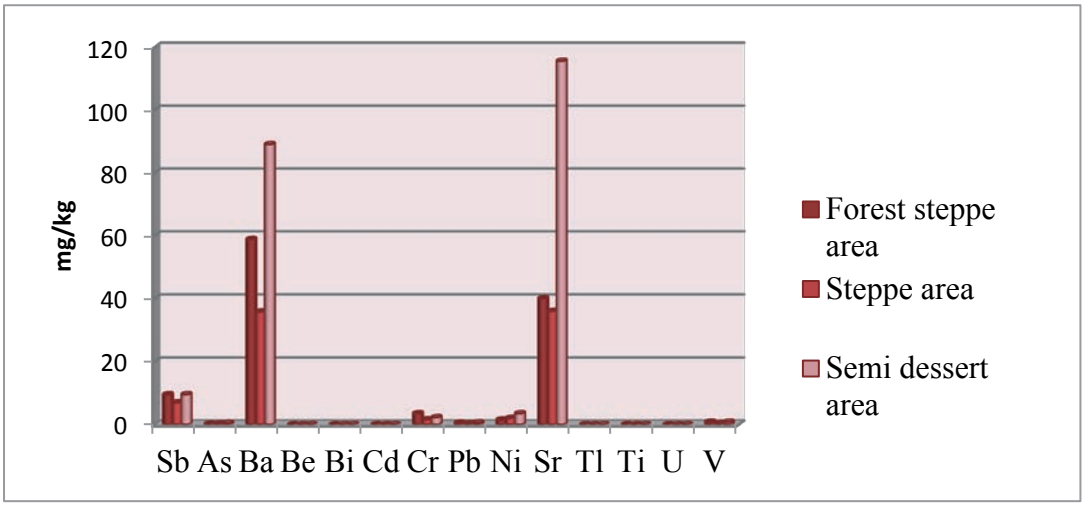

Figure 3. Content of nonessential elements in the three different Ecological zones

CONCLUSION

This research work would be the first of this kind because there was not yet done such complex studies to determine the various characteristics for one type of pasture in different regions and establishing the chemical composition of common type of plants and their contents in macro, micro elements and nonessential elements.

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