VEGETABLE SUPPLEMENT TO BEEF: MINERALS

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INTRODUCTION

There is an extensive body of literature implicating dietary excess and nutrition imbalance in the aetiology of several major chronic diseases. The need for fat reduction in the diet has been further emphasized by the recommendations of different governmental and independent nutritional and scientific organizations [1 - 3]. Dietary recommendations noted necessary of increased consumption of foods high in fibres, vitamins, minerals also. The fibre has different physiological properties and their intake should be an average of 20 to 30g a day [4]. Vegetables as a source of fibre may be considered as well as minerals' sources. There are numerous disorders associated with inappropriate intakes of essential minerals. Supplement of products with fibre and mineral - rich ingredients is believe to have more effect than adding separate minerals.

The beef continues to command of total meat consumption. Unfortunately meat products made traditionally generally contain among 20 and 30% fat and are high in cholesterol also. Therefore it is important that the red meat industry needs the improvement of meat products according the increased demand of low - fat and biological valuable items. The vegetable as well as protein additives may be used as meat supplements.

OBJECTS AND METHODS

Parsley *(Petroselinum crispum Nym.)*, parsnip *(Pastinaca sativa L.)*, leek *(Allium porum L.)*, celery *(Apium graveoleus L.)* and topinambur *(Helianthus tuberosium L.)* were collected from Lithuanian Institute of Horticulture. The roots were cleaned. washed, ground and dried at ambient temperature with an activated ventilation. Dried material was milled till the particle size 1 mm and stored in bags until use.

Content of Ca, Mg, Fe, Zn, Cu, Mn, P was established with atomic absorption spectrophotometer (model Perkin - Elmer), and Na, K - after mineralization with spectrophotometer PFM.

The influence of vegetable supplement to ground beef product may be predict according the differences of mineral content The calculation of comparable level of separate minerals was done by following formula on base that mineral content of beef is equal 1,0:

$$x = (v - b)/b$$

x - the ratio between mineral content of beef and vegetables
v - mineral content of dried vegetable, mg/ 100g
b -mineral content of dried beef, mg/ 100g

RESULTS AND DISCUSSION

The vegetables contain till 8% of minerals. The analyses of mineral composition of dried vegetables showed that content of K, Ca, Mg, Mn are higher than in animal origin. The big variations in content of Ca of vegetable were established (89,3 - 472,7 mg/100g) as well Parsnip has especially low content of Na and may be good supplement of low sodium diet. Concerning Fe the analyzed vegetables have 1,6 -3,2 times lower content of this mineral than in beef.

Table 1. Mineral composition of dried beef and vegetables supplements (mg / 100 g)

	K	P	Ca	Mg	Na	Fe	Cu	Mn	Zn
beef	1296,8 ±172,89	730,3 ±105,77	40,0 ±15,73	85,5±17,75	355,0±52,33	14,06±4,08	0,54±0,19	0,22 ±0,10	12,50 ±5
celery	3212,0 ±408,30	549,0 ±98,39	296,6 ±31,59	198,6±38,05	380,0±28,30	5,80±2,25	0,60 ±0,14	1,34 ±0,26	2,09 ±0,4
leek	2084,0 ±144,12	418,3 ±98,96	472,7 ±34,22	151,4±33,69	205,0±63,60	8,54±2,02	0,81 ±0,36	1,06 ±0,37	2,5 ±0,
parsnip	2895,5 ±291,30	508,8 ±115,30	223,8 ±20,57	216,5±66,29	40,0 ±7,10	4,33±1,04	0,60 ±0,05	0,95 ±0,20	2,12 ±0,
topinambur	2795,0 ±128,0	371,3 ±69,90	89,3 ±26,60	110,0±22,82	-	8,96±5,20	0,75 ±0,06	0,36 ±0,12	1,23 ±0,
parsley	2407,5 ±153,40	341,6 ±75,52	316,1 ±18,23	205,0 ±40,3	277,5±15,12	7,33±2,23	0,61 ±15,00	1,73 ±0,22	2,2 ±0,

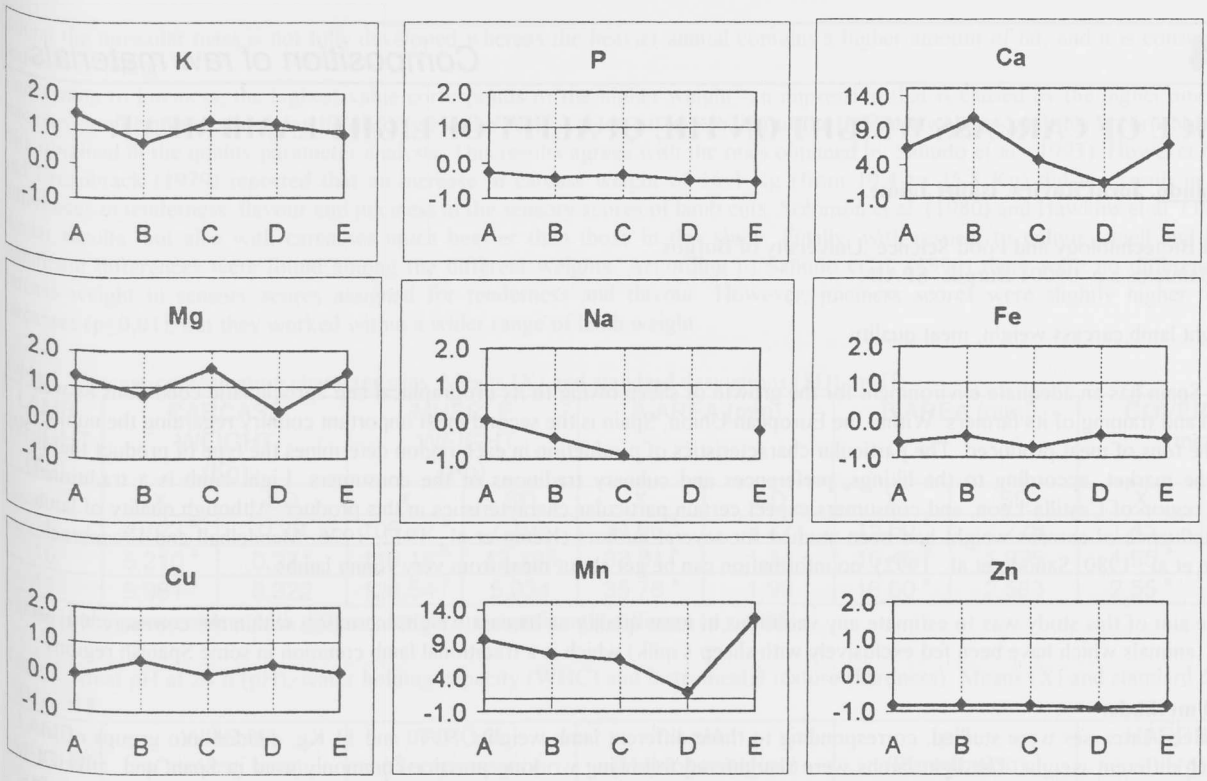

Figure 1. The comparison between beef and vegetable's mineral compositions, on base that mineral content of beef is equal 1,0: A- celery, B - leek, C - parsnip, D - topinambur, E - parsley

Potassium lessens risk of cardiovascular diseases, and the highest content of this element was found in celery, parsnip and topinambur - 3.2, 2.9 and 2.8 g/100g dried vegetables respectively. The high content of minerals of analyzed vegetables appeared will not reduce the mineral level of vegetable - meat product.

Figure 1 indicates the differences of mineral composition more clear. It seems that beef - vegetable compositions may increase level of essential minerals in more attractive for consumer forms.

CONCLUSIONS

The analyze of vegetable indicate that vegetable will have high nutritional benefit as sources of K, Ca, Mg and Mn. Formulation of beef - vegetable composition on base of nutritional recommendation may extend assortment of dietetic meat products.

LITERATURE

1. J.M. McGinnis, M. Nestle, 'The Surgeon General's report on nutrition and health: policy implications and implementation strategies'. Am.J.Clin.Nutr., 1989. **49**, 23.
2. Keeton, J.T. 1991. Fat Substitutes and Fat Modification in processing. Proceedings 44 -th Annual reciprocal meat conference. June 9 - 12, 1991, Kansas State University Manhattan, KS.AMSA, p.79.
3. D.L.Huffman, W.Russell Egbert, Chiao - min Chen, D.P.Dylewski. Technology for Low - Fat Ground Beef. Proceedings 44 -th Annual reciprocal meat conference. June 9 -12, 1991, Kansas State University Manhattan, KS.AMSA, p.73.
4. J.I.Harland. The addition of dietary fiber to foods and beverages. Food Technology international Europe, 1992, 219.