# CHEMICAL COMPOSITION AND ENERGETIC VALUES OF SELECTED VEGETABLE SPECIES IN LITHUANIAN SUPERMARKETS

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**Abstract.** Fifty different vegetables included in daily schedule of diet and sold in the biggest supermarkets of Lithuania were analyzed for their nutritional values using standard techniques. In proximate analysis ash, fibre, proteins, fats and moisture were assayed and energetic values were calculated. The vegetable species showed variable results in proximate analysis, but all of investigated vegetables contributed to nutrition values. Moisture content was high ranging from 66.10% in garlic to 96.32% in celery. Crude protein, crude fibre, crude fats and ash were in range from 0.03 to 7.41%, 0.06 to 1.86%, 0.03 to 0.77% and 2.89 to 17.31% respectively. The results showed that almost all vegetables contain appreciable amount of essential nutrients.

**Keywords:** vegetable species, crude ashes, crude proteins, crude fibres, crude fats, gross energy.

# DARŽOVIŲ, PARDUODAMŲ DIDŽIUOSIUOSE PREKYBOS CENTRUOSE, CHEMINĖ SUDĖTIS IR ENERGINĖ VERTĖ

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**Santrauka.** Tirta didžiuosiuose prekybos centruose parduodamų lietuviškų ir atvežtų iš įvairių šalių daržovių (penkiasdešimt rūšių) kokybinė sudėtis (bendroji daržovių drėgmė, žalių pelenų kiekis, žali baltymai, žali riebalai, ląsteliena, neazotinės ekstraktyviosios medžiagos) ir energinė vertė. Visos tirtos daržovės pasižymėjo dideliu vandens kiekiu (nuo 84,24 proc. Briuselio kopūstuose iki 94,49 proc. salotose). Žalių baltymų, ląstelienos, riebalų ir pelenų kiekis įvairiose tirtose daržovėse įvairuoja: 0,03–7,41 proc.; 0,06–1,86 proc.; 0,03–0,77 proc. ir 2,89–17,31 proc. Tiek lietuviškų, tiek importuotų daržovių rūšys yra skirtingo maistinių medžiagų kiekio vertės, bet visų tirtų daržovių maistinė ir energinė vertė tenkina tos grupės daržovėms keliamus maistinius ir energinius poreikius.

**Raktažodžiai:** daržovių rūšys, drėgmė, žali pelenai, žali baltymai, riebalai, ląsteliena, energinė vertė.

**Introduction.** Health nutrition specialists recommend adding to every day diet as much as possible fruits and vegetables although the general public has a limited understanding of what the real benefits are, or how much should be eaten. Current recommendations are that adults should consume at least 400 g (or five servings a day) of fruits and vegetables (WHO, 1989).

Vegetables being a rich source of carbohydrates, which form the major portion of the human diet, are the cheaper source of energy. Vegetables are the excellent source of minerals and contribute to the RDA (recommended dietary allowance) of these essential nutrients (Robinson, 1990). Thus, the diet must be enriched with animal products, vegetable oils and corn products because most of vegetables are not rich in proteins and fats. The main vegetable carbohydrates, such as fructose, glucose, saccharose, starch and inuline are easily digestible. Chitin, cellulose, and hemicellulose are not easily digestible, but they are characterised by the ability to stimulate intestinal motility and development of intestinal micro organisms (Robinson, 1990). The importance of carbohydrates has been reported by various scientists (Chaturvedi, 1993; McDougall, 1999). Besides these bio compounds, the moisture, fibre and ash contents and the energy value of individual vegetable have been regarded (Chevaux et al., 2001; Aletor, 2002; Hanif, 2006; Hussain, 2010).

Some of the most exciting research in the last decade has been the discovery of a group of phytochemicals, which impart bright colour to fruits and vegetables and act as antioxidants in the body by scavenging harmful free radicals, which are implicated in most degenerative diseases (Kaur, 2009). Fresh vegetables are naturally rich in phytochemicals. The reviewed epidemiological research of recent decades strongly supports the protective effect of enhanced consumption of fresh vegetables against cancer and cardiovascular disease (Schreiner, 2005).

Although chemical composition and health benefit of vegetables are investigated and well known, it was of interest to investigate the energetic and nutritive values of vegetables sold in Lithuania. Lithuania has good traditions at growing traditional vegetables, but for a long time vegetables were understandable as the seasonal product for meal. Besides, the imported vegetables are regarded as of lower nutritional quality compared with the vegetables grown in Lithuania. In this study, determination of proximate composition of different vegetables consumed daily by the majority of people was carried out.

**The aim** of this trial was to compare the amounts of the main nutrient compounds and to estimate energetic values of Lithuanian and imported vegetables, sold in the biggest supermarkets of Lithuania.

**Materials and methods.** *Vegetable materials*

Fifty different vegetables sold in the biggest supermarkets of Lithuania were investigated. All vegetables were divided into three groups according to the part used as food: the first group – leaf vegetables; the second group – root vegetables; the third group – other vegetables. Eleven vegetables from the first group were investigated: four of them were of Lithuanian origin, three were grown in the Netherlands, and three examples were imported from Italy, Spain, and Poland. The second group of vegetables consisted of sixteen samples, three of them had Lithuanian origin, seven were from the Netherlands, and others were imported from Italy, China, Egypt, and Belgium. The third group was composed of vegetables from Lithuania (five samples), Netherlands (seven samples), Spain (eight samples) and El Salvador (one sample).

*Chemical analysis*

The proximate compositions (moisture, fibre, ash, crude fats, and nitrogen free extractives) of the samples were determined using methods described by Pearson (1976). The moisture and ash were determined using weight difference methods. Proteins were determined by the Kjeldahl method, described by AOAC (1990). The gross energy content of the different samples was computed from the proximate constituents by WEENDE method (accordingly energetic value of the nutritional compounds) as described by AOAC (1980).

*Data analysis*

Each experiment was repeated three times. The results are presented with their means, standard deviation and standard error (Sakalauskas, 1998).

**Results and discussion.** The results of proximate analysis showed variation in concentrations/proportions of bio compounds (fats, fibre and proteins) and other contents (ash and moisture).

The main values of the moisture, the dry matter and gross energy analysis of the investigated vegetables are shown in Table 1. The moisture contents of each species are different though the moisture content of all vegetables was very high. The values of moisture in the leafy vegetables ranged from 84.24% in Brussels sprout (the Netherlands) to 95.72% in lettuce (Lithuania). The amount of moisture of root vegetables varied from 66.10% in garlic (China) to 94.46% in red radish (the Netherlands). The values of moisture of the third group of vegetables did not vary from the results of the other two groups. The values ranged from 88.44% in red paprika (Netherlands) to 96.32% in celery (Spain).

The ash content, which is an index of mineral content in biota, in lettuce (Lithuania) was the lowest of this group, just 2.89%, and then the amount of minerals in other vegetables of this group ranged from 4.74% in Chinese lettuce (Poland) to 8.50% in leek (Lithuania). The big quantity of ashes is characteristic of vegetables from the second group. Some of the vegetables were found to be very rich in minerals. For example the value of minerals in garlic (the Netherlands) was found to be up to 13.22% and in potatoes (Lithuania) up to 17.31%. The quantity of ashes in the other vegetables of the second group ranged from 3.45% in onion (the Netherlands) to 12.83% in garlic (China). The quantity of aches in the vegetables of the third group varied from 2.09% in celery (Spain) to 7.92% in orange paprika (Spain). The amounts of minerals in sweet pepper were the biggest in this group and varied from 6.40% in red (Spain) to 7.92% in orange sweet pepper (Spain), except green sweet pepper, which was found to be not as rich in minerals. The content of ashes in paprika from Spain was 4.89% and in paprika from the Netherlands 5.14%. Generally, minerals from plant source are less bio available than those from animal source, but sometimes the minerals from plant source are essential for body functions (Osborne, 1978).

Gross energy values of the investigated vegetables were determined. The biggest gross energy value of 428.63 kJ is characteristic for garlic (China). The smallest value of 12.52 kJ was determined for spring onions (Lithuania). The gross energy value of the other vegetables ranged from 17.33 kJ in Chinese lettuce (Lithuania) to 204.2 kJ in white onion (Italy).

From the a nutritional point of view, vegetable proteins, except legumes, are less valuable then animal proteins, because the composition of proteins is penurious according to the essential amino acids and the quantity of proteins is rather low. The proximate chemical compositions of the selected vegetables are presented in Table 2. While analyzing the protein contents in the selected vegetable, the results showed that garlic had the highest concentrations of the protein as compared to other species. The vegetables of the second group were found to be rich in proteins, as the value of crude proteins varied from 0.66% in onion (the Netherlands) to 7.41% in garlic (China). The concentration of the crude protein in the vegetables of the first and third groups were found very similar and ranged from 0.03% in Chinese lettuce (Lithuania) to 1.15% in aubergine (the Netherlands).

Vegetables are good sources of fibres, which lower the body cholesterol level, consequently decrease the risk of cardiovascular diseases, and demonstrate the presumed protective effect on cancer risk. The crude fibre content, as shown in Table 2, in leek (Lithuania) was 1.86%, i.e. high as compared to other vegetables of the first group; the minimum amount was found in lettuce (Lithuania) – 0.06%. The value of crude fibre of the vegetables of the second group ranged from 0.16% in white radish (the Netherlands) to 1.60% in carrots (the Netherlands). The crude fibre content less than 1% is characteristic of the vegetables of the third group, except orange paprika (the Netherlands) which reached 1.18%.

Table 1. **Results of the non-organic content analysis of the various vegetables**

| Vegetables | Country of origin | Gross Energy, kJ | Moisture, % | Crude aches, % |
|---|---|---|---|---|
| I group Leaf vegetables | | | | |
| Cabbage, *Brassica oleracea* | Lithuania | 111.04 | 88.35± 0.02 | 6.21± 0.05 |
| Red cabbage, B*rassica capitata* | The Netherlands | 65.51 | 88.60± 0.02*** | 8.50± 0.02*** |
| Cauliflower, *Brassica oleracea* | France | 45.90 | 90.27±0.00*** | 7.84± 0.03*** |
| | The Netherlands | 52.70 | 89.92± 0.02*** | 7.98± 0.01*** |
| Leek, *Allium porrum* | Lithuania | 108.49 | 86.48± 0.01*** | 8.32± 0.04*** |
| Chinese lettuce, *Brassica pekinensis* | Lithuania | 17.33 | 94.13± 0.02*** | 5.04± 0.07*** |
| | Poland | 17.50 | 94.49± 0.00*** | 4.74± 0.01*** |
| Lettuce, *Lactuca sativa* | Lithuania | 36.73 | 95.72± 0.14*** | 2.82± 0.01*** |
| Broccoli, *Brassica oleracea* | Italy | 118.01 | 87.80± 0.04*** | 7.51± 0.04*** |
| | Spain | 125.30 | 87.01± 0.02*** | 7.95± 0.02*** |
| Brussels sprouts, *Brassica oleracea* | The Netherlands | 193.80 | 84.24± 0.02*** | 6.88± 0.02*** |
| II group Roof vegetables | | | | |
| Carrots, *Daucus carota* | Lithuania | 123.05 | 85.51± 0.02 | 8.32± 0.03 |
| Carrots (fresh), *Daucus carota* | Lithuania | 97.25 | 86.16± 0.03*** | 9.18± 0.02*** |
| | The Netherlands | 81.55 | 85.97± 0.03*** | 10.25± 0.02*** |
| Onions, *Allium cepa* | The Netherlands | 120.49 | 90.26± 0.03*** | 3.45± 0.05*** |
| Red onions, *Allium cepa* | The Netherlands | 120.15 | 88.59± 0.01*** | 5.32± 0.03*** |
| White onions, *Allium cepa* | The Netherlands | 204.2 | 82.41± 0.02*** | 7.31±0.02*** |
| | Italy | 131.85 | 89.11± 0.01*** | 4.02± 0.04*** |
| Garlic, *Allium savitum* | China | 428.63 | 66.15± 0.03*** | 12.83± 0.21*** |
| | The Netherlands | 405.22 | 66.10± 0.01*** | 13.22± 0.03*** |
| Potatoes, *Solanum tuberosum* | Lithuania | 88.06 | 78.83± 0.38*** | 17.13± 0.60*** |
| | Egypt | 177.94 | 81.16± 0.39*** | 9.70± 0.03*** |
| | Belgium | 96.56 | 85.06± 0.04*** | 10.31± 0.09*** |
| Red radish, *Raphanus sativus* | The Netherlands | 33.69 | 94.46± 0.03*** | 4.22± 0.01*** |
| | Spain | 47.7 | 93.93± 0.03*** | 3.95± 0.01*** |
| White radish, *Raphanus sativus* | The Netherlands | 53.78 | 93.98± 0.02*** | 3.38± 0.01*** |
| Beetroot, *Beta vulgaris rubra* | Lithuania | 60.61 | 86.46± 0.27* | 10.82± 0.02*** |
| III group Others vegetables | | | | |
| Courgette *Cucurbita pepo* | Lithuania | 36.91 | 93.64± 0.01* | 4.83± 0.03* |
| | Spain | 32.73 | 93.67± 0.01 | 4.97± 0.04 |
| Yellow courgette, *Cucurbita pepo* | Lithuania | 38.54 | 93.94± 0.01*** | 4.45± 0.03*** |
| Aubergine, *Solanum melongena* | The Netherlands | 52.71 | 92.99± 0.00*** | 4.66± 0.08* |
| | Spain | 57.64 | 93.34± 0.01*** | 4.03± 0.04*** |
| Sweet pepper, orange, *Capsicum annuum* | Spain | 46.81 | 90.19± 0.01*** | 7.92± 0.58** |
| | The Netherlands | 97.25 | 88.70± 0.01*** | 7.00± 0.06*** |
| Sweet pepper, green *Capsicum annuum* | Spain | 45.83 | 93.04± 0.01*** | 4.89± 0.04 |
| | The Netherlands | 40.73 | 93.16± 0.00*** | 5.14± 0.02** |
| Sweet pepper, yellow *Capsicum annuum* | Spain | 52.69 | 90.54± 0.01*** | 7.23± 1.17 |
| | The Netherlands | 56.18 | 90.54± 0.01* | 7.04± 0.02*** |
| Sweet pepper, red *Capsicum annuum* | Spain | 73.26 | 90.38± 0.01** | 6.40± 0.03*** |
| | The Netherlands | 66.47 | 88.44± 0.22 | 7.61± 0.20 |
| Celery, *Apium graveolens* | Spain | 37.08 | 96.32± 0.05 | 2.09± 0.01*** |
| | The Netherlands | 37.25 | 96.32± 0.04 | 2.11± 0.02*** |
| Spring onions, *Allium cepa* | Lithuania | 12.52 | 95.06± 0.04 | 4.40± 0.04 |
| Cucumber, *Cucumis sativus* | Spain | 47.98 | 93.34± 0.01** | 4.65± 0.20 |
| | Lithuania | 29.02 | 95.23± 0.02 | 3.52± 0.02** |
| Tomato, *Solanum lycopersicum* | Lithuania | 49.55 | 92.47± 0.09 | 5.21± 0.03* |
| | The Netherlands | 49.38 | 92.74± 0.05 | 5.02± 0.02*** |
| | Spain | 37.53 | 92.99± 0.08 | 5.51± 0.02 |
| Yellow tomato, *Solanum lycopersicum* | El Salvador | 46.36 | 92.75± 0.15 | 5.33± 0.02* |

*p<0.05; **p<0.01; ***p<0.001

Table 2. **Chemical composition of the selected vegetables**

| Vegetables | Origin country | Crude proteins, % | Crude fats, % | Crude fiber, % | NFE, % |
|---|---|---|---|---|---|
| I group. Leaf vegetables | | | | | |
| Cabbage, *Brassica oleracea* | Lithuania | 1.00± 0.15 | 0.26± 0.20 | 1.40± 0.00 | 2.78± 0.41 |
| Red cabbage, B*rassica capitata* | The Netherlands | 1.01± 0.02 | 0.22± 0.03 | 1.30± 0.01*** | 0.37± 0.05** |
| Cauliflower, *Brassica oleracea* | France | 1.30± 0.05 | 0.30± 0.04 | 0.36± 0.02*** | 0.14± 0.11** |
| | The Netherlands | 1.04± 0.12 | 0.23± 0.15 | 0.40± 0.02*** | 0.22± 0.17** |
| Broccoli, *Brassica oleracea* | Italy | 3.11± 0.02*** | 0.70± 0.01 | 0.16± 0.01*** | 0.72± 0.05** |
| | Spain | 3.05± 0.03*** | 0.77± 0.08 | 0.15± 0.02*** | 1.07± 0.11** |
| Brussels sprouts, *Brassica oleracea* | The Netherlands | 4.40± 0.05*** | 0.41± 0.04 | 0.42± 0.02*** | 3.65± 0.06 |
| Chinese lettuce, *Brassica pekinensis* | Lithuania | 0.03± 0.07*** | 0.07± 0.08 | 0.40± 0.01*** | 0.33± 0.15** |
| | Poland | 0.22± 0.04** | 0.08± 0.07 | 0.32± 0.02*** | 0.15± 0.03** |
| Lettuce, *Lactuca sativa* | Lithuania | 0.92± 0.03 | 0.23± 0.01 | 0.06± 0.01*** | 0.25± 0.19** |
| Leek, *Allium porrum* | Lithuania | 1.14± 0.02 | 0.24± 0.02 | 1.86± 0.02*** | 1.96± 0.03 |
| II group. Roof vegetables | | | | | |
| Carrots, *Daucus carota* | Lithuania | 0.89± 0.38 | 0.25± 0.04 | 1.46± 0.01 | 3.57± 0.35 |
| Carrots (fresh), *Daucus carota* | Lithuania | 1.03± 0.06 | 0.23± 0.06 | 1.53± 0.04 | 1.87± 0.11** |
| | The Netherlands | 0.92± 0.03 | 0.24± 0.03 | 1.60± 0.02*** | 1.02± 0.07*** |
| Onions, *Allium cepa* | The Netherlands | 0.66± 0.09 | 0.18± 0.08 | 0.84± 0.01*** | 4.61± 0.17 |
| Red onions, *Allium cepa* | The Netherlands | 0.96± 0.03 | 0.29± 0.07 | 0.37± 0.03*** | 4.47± 0.06* |
| White onions, *Allium cepa* | The Netherlands | 0.80± 0.06 | 0.74± 0.33 | 1.03± 0.03*** | 7.71± 0.24*** |
| | Italy | 0.85± 0.04 | 0.20± 0.11 | 0.66± 0.02*** | 5.16± 0.04** |
| Garlic, *Allium savitum* | China | 7.41± 0.16*** | 0.45± 0.03* | 1.28± 0.01*** | 11.88±0.35*** |
| | The Netherlands | 6.22± 0.03*** | 0.10± 0.03* | 0.49± 0.02*** | 13.87± 0.01*** |
| Potatoes, *Solanum tuberosum* | Lithuania | 2.00± 0.02* | 0.11± 0.01* | 0.81± 0.01*** | 1.12± 0.82* |
| | Egypt | 2.05± 0.06* | 0.12± 0.02 | 0.84± 0.01*** | 6.13± 0.47** |
| | Belgium | 1.58± 0.03 | 0.15± 0.03 | 0.80± 0.01*** | 2.10± 0.16* |
| Red radish, *Raphanus sativus* | The Netherlands | 0.81± 0.02 | 0.22± 0.02 | 0.19± 0.01*** | 0.10± 0.03*** |
| | Lithuania | 0.82± 0.02 | 0.22± 0.02 | 0.17± 0.02*** | 0.91± 0.04*** |
| White radish, *Raphanus sativus* | The Netherlands | 0.70± 0.02 | 0.12± 0.02* | 0.16± 0.01*** | 1.16± 0.01*** |
| Beetroot, *Beta vulgaris rubra* | Lithuania | 1.58± 0.15 | 0.10± 0.02* | 0.26± 0.01*** | 0.78± 0.34*** |
| III group. Others vegetables | | | | | |
| Courgette, *Cucurbita pepo* | Spain | 0.83± 0.24 | 0.12± 0.06 | 0.36± 0.03 | 0.05± 0.11 |
| | Lithuania | 0.80± 0.05 | 0.19± 0.01 | 0.30± 0.01*** | 0.24± 0.09** |
| Yellow Courgette, *Cucurbita pepo* | Lithuania | 0.97± 0.09 | 0.14± 0.02 | 0.40± 0.01*** | 0.10± 0.10** |
| Aubergine, *Solanum melongena* | The Netherlands | 1.15± 0.05 | 0.13± 0.07 | 0.51± 0.01 | 0.56± 0.16** |
| | Spain | 0.85± 0.04 | 0.20± 0.11 | 0.66± 0.02 | 0.92± 0.06 |
| Sweet pepper, orange *Capsicum annuum* | Spain | 0.89± 1.00 | 0.30± 0,01* | 0.52± 0.01*** | 0.18± 0.48* |
| | The Netherlands | 1.04± 0.02 | 0.55± 0.09* | 1.18± 0.01*** | 1.53± 0.13*** |
| Sweet pepper, green *Capsicum annuum* | Spain | 0.80± 0.30 | 0.15± 0.05 | 0.44± 0.01* | 0.68± 0.31 |
| | The Netherlands | 0.70± 0.07 | 0.23± 0.00 | 0.53± 0.02*** | 0.24± 0.06** |
| Sweet pepper, yellow *Capsicum annuum* | Spain | 1.08± 0.18 | 0.29± 0.04 | 0.11± 0.00*** | 0.75± 1.12 |
| | The Netherlands | 1.14± 0.13 | 0.26± 0.06 | 0.28± 0.02*** | 0.74± 0.21** |
| Sweet pepper, red *Capsicum annuum* | Spain | 1.15± 0.25 | 0.36± 0.02* | 0.58± 0.01 | 1.13± 0.23** |
| | The Netherlands | 0.94± 0.04 | 0.27± 0.03 | 0.67± 0.03* | 2.07± 0.23*** |
| Celery, *Apium graveolens* | Spain | 0.92± 0.03 | 0.11± 0.01 | 0.35± 0.01*** | 0.21± 0.07*** |
| | The Netherlands | 1.00± 0.02 | 0.11± 0.02 | 0.35± 0.01*** | 0.11± 0.04*** |
| Spring onions, *Allium cepa* | Lithuania | 0.29± 0.01 | 0.03± 0.01* | 0.21± 0.01*** | 0.01± 0.02 |
| Cucumber, *Cucumis sativus* | Spain | 1.27± 0.17 | 0.14± 0.03 | 0.60± 0.01* | 0.00± 0.15 |
| | Lithuania | 0.37± 0.03 | 0.11± 0.02 | 0.74± 0.03** | 0.03± 0.06*** |
| Tomato, *Solanum lycopersicum* | The Netherlands | 0.89± 0.05 | 0.18± 0.01 | 0.18± 0.01*** | 0.99± 0.05*** |
| | Spain | 1.03± 0.04 | 0.19± 0.01 | 0.17± 0.01*** | 0.11± 0.12*** |
| | Lithuania | 0.69± 0.01 | 0.18± 0.02 | 0.20± 0.01*** | 1.25± 0.10*** |
| Yellow tomato, *Solanum lycopersicum* | El Salvador | 1.08± 0.03 | 0.24± 0.03 | 0.19± 0.01*** | 0.41± 0.18** |

$*p<0.05$; $**p<0.01$; $***p<0.001$

Similarly, broccoli (Spain) had highest percentage of fat contents (0.77%) and spring onions were found having the lowest amount (0.03%). The fat contents of all species were found in the range from 0.07% in Chinese lettuce (Lithuania) to 0.55% in orange paprika (the Netherlands).

The values of nitrogen free extractives (NFE) of the vegetables of the root vegetables varied from 0.10% in red radish (the Netherlands) to 13.87% in garlic (the Netherlands). The vegetables of first group were found having almost the same chemical composition as the third group and the values of NFE varied from 0.05% in courgette (Spain) to 2.78% in cabbage (Lithuania).

**Conclusions**

It is concluded from this research that vegetables are nutritious food that provide sufficient amount of nutrient needed for normal body function, maintenance and reproduction. It was found that nutrient compositions in all the selected vegetables were different. Thus, some of the difference in the chemical composition is not unexpected. Some of the factors might be linked to species, climate, growing conditions, and nature of soil, application of natural or artificial manure and the period of analysis. It can be concluded that:

•the biggest amount of moisture was found in lettuce (Lithuania) 95.72%; the biggest amounts of crude proteins were found in broccoli 3.05-3.11% (Spain, Italy) and in Brussels sprout 4.40% (the Netherlands) of vegetables from the first group;

•the lowest amount of moisture is characteristic of garlic (66.15-66.10%) from the second group of vegetables and this kind of vegetables were found to be rich in minerals (12.83-13.22%), in proteins (7.41-6.22 %) and in nitrogen free extractives (11.88-13.87%);

•the red sweet pepper (the Netherlands) of the third group of vegetables has the lowest amount of moisture 88.44% ($p<0.001$) and a big amount of the crude ashes 7.61%, crude proteins 0.94 %, and crude fibre 0.67%.

The results obtained from this study showed that the vegetables grown in Lithuania and imported has similar chemical composition and contribute to nutritional value. It must be concluded, that the combination of the different vegetable species and origins is the most beneficial for health and provide the essential nutrient for normal body functions.

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