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RESEARCH ARTICLE

Phenolic compounds and Pectin consist of *Vaccinium Corymbosum* of Blueberry.**Tamar Kacharava¹, Liana Koiava² and Aleqsandre Kalandia².**

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Blueberry (*Vaccinium Uliginosum*), pectins, anthocyanins, phenolics, HPLC. CV.

Corresponding Author*Tamar Kacharava.****Abstract**

Blueberry (*Vaccinium Corymbosum*) is a good source of natural antioxidants. Blueberry also had the highest total phenolic content. A preliminary analysis using high performance liquid chromatography (HPLC) showed that the blueberry samples tested contained of flavonols: rutin, anthocyanidins: malvidin-3-galactoside, malvidin-3-glucoside, and cyanidin). In particular, the blueberries had high levels of anthocyanidins and flavonols, which might be responsible for their strong antioxidant activities. These results indicate a potential market role for berries as a functional food ingredient or nutraceutical.

The article describes the research results of *Vaccinium Uliginosum* phenolic compounds and pectins contents in fruits It is ascertained that qualitative characteristics of *Vaccinium Uliginosum* in fruits are much more than qualitative characteristics of berry.

*Copy Right, IJAR, 2013., All rights reserved.***Introduction**

The richest and most unique phylogenetic of Georgia represents natural - historical riches. It is constantly in need of the monitoring, conservation - restoration and protection, because of its changing by anthropological or natural impacts. The problem is topical for our country which represents a provenance of many cultural plants and their wild ancestors conditioned by climatic and edaphic diversity, vertical and horizontal zonation, mutational variability, distant hybridization, natural selections, the proper exploitation of gene pool by our ancestors, national and scientific selection..

In Georgia those unique medicinal, aromatic, spicy and poisonous plants are spread which can not be found any where in the world.

Recent years, interest in medicinal, aromatic, spicy and poisonous plants have been increased and the potential of their use has progress, though, in modern medicine, cosmetology or cookery there are a lot of synthetic-chemical means.

It is natural because the use of the latter is often followed by side effects, like allergosis, while medications produced from medicinal, aromatic, spicy and poisonous plants have no harmful effects. The process mentioned above has great importance as in metabolic processes taking place in ontogenesis period of plants there are formed very important and precious compounds, like essential oils, alkaloids, glycosides, tanning matters, vitamins or pharmaceutically active substances that have soft and long-term effects on the human organism and stable results. They also have positive physiologic effect on the organism. It should be noted that pharmacologically active substances in medical, aromatic and spicy plants are balanced. This balance is formed in the evolution process of plants and in their relation with the ecosystem.

After the ban of antibiotics in several countries Georgia has a chance to become one of the main manufacturer of

biologically active natural human and animal food and take significant part in the world market with stable income because of its unique ecologically clean endemic-aboriginal phyto-genetic resource.

One such a wide consumption it is of blueberry -*Vaccinium*. *Vaccinium* is a genus of shrubs or dwarf shrubs in the plant Family *Ericaceae*. The fruit of many species are eaten by humans and some are of commercial importance. blueberry fruit in great demand in many countries. Development of infrastructure of *Vaccinium* genus plants and establishment of production plantations have many-sided effect for Georgia. For example: Ecological, Pharmacological, Economical and e t. blueberry demand on the world market is growing every year, which is due to the fact that its consumption is more than production.. The 4 species of the genus *Vaccinium* are widespread in Georgia. *Vaccinium Myrtilus*, - *Vaccinium Corymbosum*, - *Vaccinium Vitis-idaeeae* and *Vaccinium Arctostaphylos*.

Particular interest of the blueberry due to that is rich of the phenolic compounds, Blueberries are phytonutrient superstars. These fruits contain significant amounts of anthocyanadins, antioxidant compounds that give blue, purple and red colors to fruits and vegetables. Included in blueberry anthocyanins are malvidins, delphinidins, pelargonidins, cyanidins, and peonidins. In addition to their anthocyanins, blueberries also contain hydroxycinnamic acids (including caffeic, ferulic, and coumaric acid), hydroxybenzoic acids (including gallic and procatechuic acid), and flavonols (including kaempferol, quercetin and myricetin). Blueberries also contain the unique, phenol-like antioxidants pterostilbene and resveratrol. Blueberries are a very good source of vitamin K, vitamin C, and manganese. Blueberries are also a good source of fiber and copper.

We studied and unifying model of differentiation of quality indicators of productions and some raw materials, also a model of protection of biodiversity-conservation-monitoring, cultivation-production of medicinal, aromatic, honey, spice and poisonous plants have been developed by us, including, on the one hand, the research and monitoring of genetic resources of the priority plants in our country for their further protection - conservation and improvement and on the other hand, their public - economic importance and necessity of economic rehabilitation under the edaphic - climatic conditions of Georgia for the location – development

The Goals of research was to study of quantitative and qualitative of blueberry fruit biologically active substances pectin and phenolic compounds, (Antocianins, Flavonols) in the western part of Georgia, in particular, Kobuleti, Ozurgeti and Zugdidi regions.

Studies have shown that blueberry fruit contains more nutrients than any other fruit or vegetables.

Samples were taken maturity stage. Were prepared The extracts and were conducted qualitative and quantitative research of Some phenolic compounds. We used performance liquid chromatography (HPLC) methods.

Material And Methods:-

Samples of study were taken in Georgia, in particular, Kobuleti, Ozurgeti and Zugdidi regions. The raw materials were used in the fruits of *Vaccinium Corymbosum*.

We conducted a series of experiments blueberry fruit biologically active substances in the chemical composition of the qualitative and quantitative determination. The biologically active substance of pectins in the chemical composition of the qualitative and quantitative determination was established. Extraction of pectin from blueberry was chosen on the basis of various studies (Buchholt et al., 2004 and Mesbahi et al., 2005) which suggested that acid hydrolysis is the most used method for pectin extraction. new proteins substrates were extracted from the press residues of fruit blueberry by boiling water. Pectin was extracted with conventional (CV) heating in water bath. For extraction pectins from blueberry, 10 g of AIS was suspended in distilled water using a solid/liquid ratio 1:50 (w/v). The aqueous solution was adjusted to pH 1.2 with a solution of 1 M H₂SO₄. The mixture was then heated to 80 ± 2 °C and extraction was carried out with continuous stirring for 90 min. For CV heating, extraction was performed in a conical flask placed in a water bath under continuous stirring.. The experiment showed that the pectin significantly higher in blueberry fruit.

Pectin yield was calculated as follows:

$$\text{Pectin yield(\%)} = \frac{\text{weight(g) of dried pectin}}{\text{weight(g) of dried peel taken for extraction}} \times 100$$

Table N1:- Blueberry fruit pectin substances(% The crude mass balance)

Option	Soluble pectin	Insoluble or protopektin	Pectic substances Sum
Blueberry	0,0810	0,0754	0,1564

Pectins compounds is important , they promote food digestion, eject toxins in from a living organism, including radionuclide.

HPLC analysis of flavonoids:-

Frozen fruits were blended to a puree using commercial blender. Subsamples (5g) of puree were then homogenized for 1 min in 20 ml of extraction solution containing ethanol/water/HCl (40:57:3 v/v/v)((-15)–(-18)⁰C) to the smallest particle size using a laboratory homogenizer. Homogenates were filtered and the filtrates were centrifuged for 5 min at 5000 rpm. Aliquots (4ml) of supernatant were evaporated to dryness using a concentrator (RVO 400 SD) with no radiant heat and resuspended in 1 ml of aqueous 5 % formic acid solution. All samples were passed through 0,45 µm filters (Acrodist LC PVDF Syringe Filters Waters) prior to HPLC analysis.

Samples (20 µL) were analyzed using a Waters HPLC system equipped with a model 525 pump, UV/Vis detector. Separation was carried out using a 4,6x150 Symmetry C 18 column (Waters Corp, Milford, MA, USA) with a 3,9 mmx20mm C 18 guard column. The mobile phase was a linear gradient of 5 % formic acid (A)and methanol (B) from 2 % B to 60 % B for 60 min at 1 ml min⁻¹. The system was equilibrated for 20 min at the initial gradient prior to each injection.

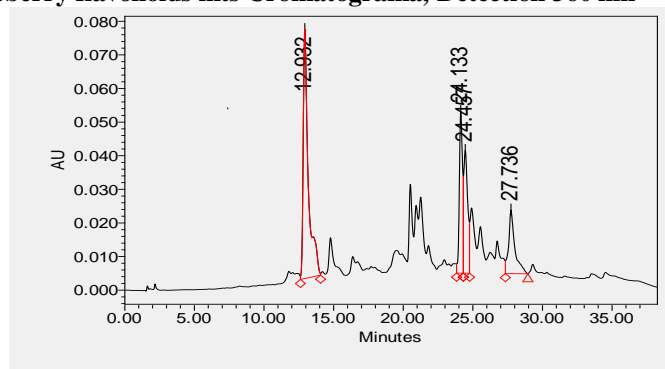
Detection wavelengths used were 524-370 nm for anthocyanins and 274 da 360 nm for flavonols. Total anthocyanin derivatives were calculated as the sum of individual anthocyanin. Flavonols were quantified as rutin equivalents

Statistical analysis:-

Analysis of variance was used to determine significant differences (P < 0,05) in total anthocyanin and flavonoid contents and antioxidant capacity among genotypes of each fruit analysis.

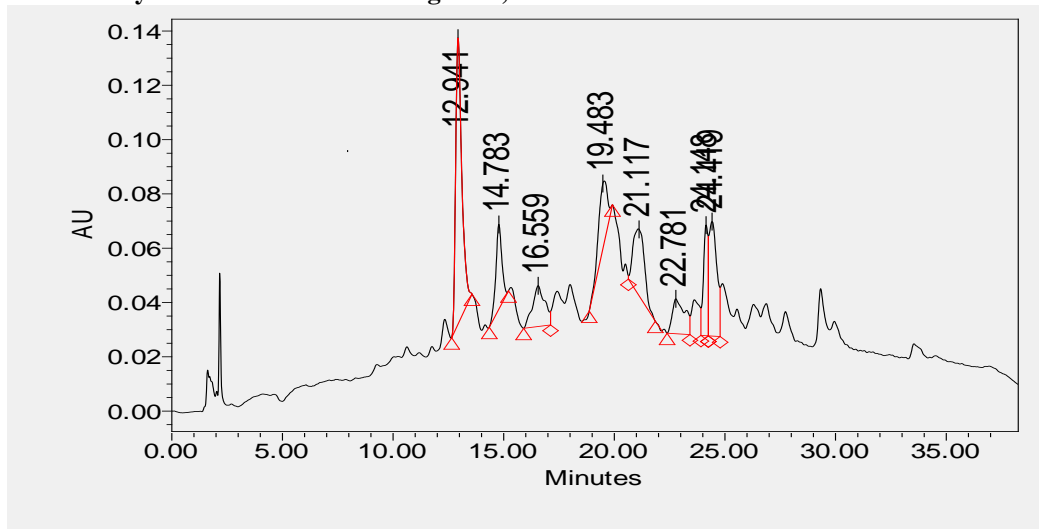
The phenolic high content in blueberry are evaluated berries . It also increases the healing effect.

blueberry flavonoids mts Cromatograma, Detection 360 nm



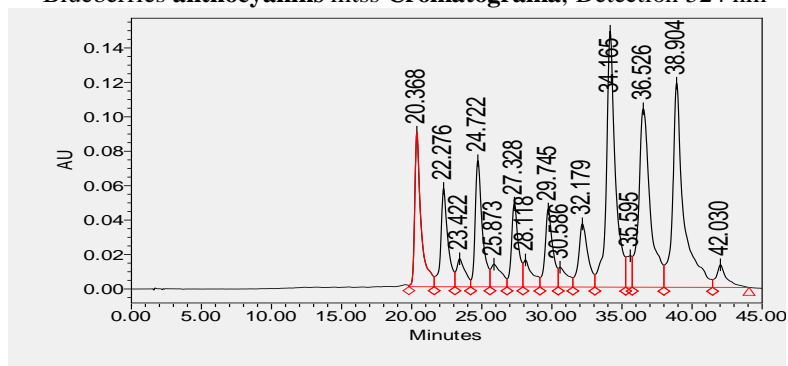
Sample Name	Acq Method Set	Injection Volume	Channel Description	Column Type
Blueberry	Flavonoide	20.00	W2489ChB 360nm	Atlantis d C 18 5 µm
Name	Retention Time	Area	% Area	
1	12.932	1883546	47.53	
2	24.133	760887	19.20	
3	24.457	729135	18.40	
4	27.736	589067	14.87	

blueberry flavonoids mts Cromatograma, Detection 274nm



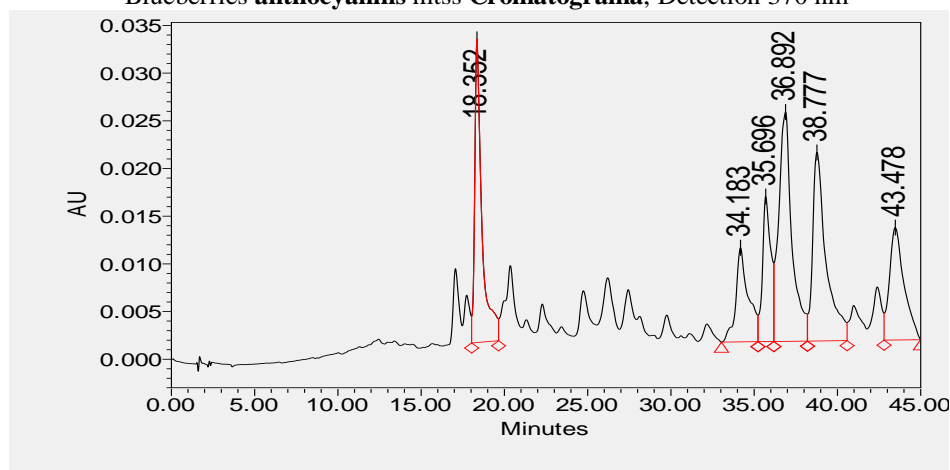
Sample Name	Acq Method Set	Injection Volume	Channel Description	Column Type
Blueberry	Flavonoide	20.00	W2489 ChB 360nm	Atlantis d C 18 5 µm
Name	Retention Time	Area	% Area	
	12.941	203345	29.72	
	14.783	582771	8.52	
	16.559	579925	8.48	
	19.483	652263	9.54	
	21.117	866773	12.67	
	22.781	503028	7.35	
	24.148	576947	8.43	
	24.419	1045394	15.28	

Blueberries anthocyanins mtss Cromatograma, Detection 524 nm



SampleName	Acq Method Set	Injection Volume	Channel Description	ColumnType
Blueberry	Anthociane CH3CN	20.00	W2489ChB 524nm	Atlantis d C 18 5 µm

Name	Retention Time	Area	% Area
	20.368	2812435	7.91
	22.276	2031641	5.72
	23.422	693317	1.95
	24.722	2600071	7.32
	25.873	695508	1.96
	27.328	167333	4.71
	28.118	700618	1.97
	29.745	1732191	4.87
	30.586	517770	1.46
	32.179	1718057	4.83
	34.165	6632918	18.67
	35.595	501573	1.41
	36.526	5980318	16.83
	38.904	6566299	18.48
	42.030	678046	1.91

Blueberries anthocyanins mtss **Cromatograma**, Detection 370 nm

Sample Name	Acq Method Set	Injection Volume	Channel Description	Column Type
Blueberry	Anthociane CH3CN	20.00	W2489ChB 524nm	Atlantis d C 18 5 µm

Name	Retention Time	Area	% Area
	18.352	955976	18.42
	34.183	520373	10.02
	35.696	532035	10.25
	36.892	1348855	25.99
	38.777	1110958	21.40
	43.478	722696	13.92

Results and Discussion:-

Demand for blueberry is increasing every year due to the fact that its consumption is considerably greater than its production. Consequently, the relevant studies have been conducted to compare the quality indicators of alien cultivated forms of blueberry. It was determined from the quantitative point of view, based on our research, that blueberry fruits have more phenolic compounds than other berries.

Thus, the commercial production of blueberry will diversify the national agricultural products and will benefit the economy of Georgia. There is high demand for Blueberry fruit in many countries. That is why its cultivation is the paramount importance for the country and the regional authorities

The use of medicinal plants in modern medical practice obtains the large scale. This can be explained by the complex, velvety influence of biologically active substances of plants on the human body without the toxic effects. The expansion of herbal-treatment nomenclature presents the topical task for the modern pharmaceutical technology, pharmacology and medicine. A lot of species of medicinal, aromatic, spices, honey, poisonous plants are included in the Pharmacopoeia of Georgia and the world's countries, but they are often studied incompletely. The genus *Vaccinium* having the unique tasty and medicinal features belongs to them.

Consumption of the berries can provide a good source of antioxidants and nutrients, and therefore they may have potential for use in the development of nutraceuticals or as functional food ingredients of benefit to human health.

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