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RESEARCH AND EVALUATION OF THE MAIN QUALITATIVE INDICATORS OF MEDICINAL ROSEMARY SPREAD IN ADJARA-GURIA REGION

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Abstract. *Analysis of the main qualitative indicators of rosemary (Salvia Rosmarinus) leaves spread in western Georgia is carried out. For the evaluation of the medicinal properties of rosemary of this species, a number of qualitative indicators and elemental composition of plant leaves are carried out.The research objects were rosemary green biomass taken from the Black Sea areas of Batumi, Kobuleti and Ureki. According to the analysis, the titer acidity is low in all three locations, the overall acidity increases simultaneously with the decrease in altitude and increase in humidity. The amount of dry matter in the leaves correlates with relative air humidity.The amount of essential oils, vitamin C and polyphenols is maximum in the raw material taken at Kobuleti location. The content of K, Ca, Mg and P is maximum, while the content of Na is minimal in rosemary leaves taken at Kobuleti location. From micro – and ultramicroelements in rosemary leaves were not observed: Cd, Co, V, as, Li, Ba, Ti, Be, Hg, Sb. Rosemary leaves taken in Kobuleti contain more trace elements-Fe, B, Zn.*

Key words: *Rosemary; Qualitative indicators; Analysis; Morphology; Elements.*

Actuality

Rosemary-a fragrant plant and evergreen shrub, decorated with delicate lilac flowers during the flowering period. "Sea health" – this is how rosmarinus is translated, which is found in the Wild on the Mediterranean coast. The plant is still known from ancient Rome, in the Empire it was called Sea dew. It was believed that it is the sea waves that give rosemary flowers such a beautiful color [1, 13]. The healing properties of rosemary are due to the content in its chemical composition of a number of valuable compounds: rosmarinic acid (it has antioxidant properties that protect cells from damage); carnosic acid, which is also an antioxidant and has an anti-inflammatory effect; ursolic acid, which has antimicrobial and anti-inflammatory effects; Essential oils (cineol, camphor, limonene), flavonoids, Phytoncides, which provide the aroma characteristic of rosemary and a number of therapeutic effects. The complex of the above compounds conditions the healing and other therapeutic effects of rosemary (calming effect, memory improvement) [11, 14]. Studies are underway on the potential of rosemary to treat severe diseases such as Alzheimer's, cancer and diabetes. Essential oil obtained from rosemary leaves and twigs is used in perfumery and medicine. Medicinal Rosemary (Salvia rosmarinus) is an ornamental, fragrant and medicinal plant, has a calming effect, and helps to improve memory. All of the above determined the relevance of the research [3, 11].

Methods Used: Gravimetric [6, 7]; Titrimetric [4, 5]; Plasma Atomic Emission Spectrometry [11, 12].

Research Results

I. Botanical-morphological characterization of rosemary

The Latin name for Rosemary is Rosmarinus L., Kingdom: plants; division: scaly seeds (Angiospermae); class: dicotyledonous; family:Lamiaceae; genus: rosemary [1]. The homeland of the plant is the coastal regions of the Mediterranean Sea. Salvia Rosmarinus is an evergreen shrub 0.5 to 2 meters high with frequent branching, which is due to its ability to make numerous root sprouts. The bushes are grouped, the branches are not branched, they are linear and crowded with sessile abundant leaves, which have a very small stalk.Rosemary is characterized by abundant shearing. The Leaf is elongated, lanceolate-shaped , with a short stalk, the tip is

slightly taper, the edges on the underside of the Leaf seem to be cocked. The upper side of the leaf plate is dark bright green, and the underside is grayish and slightly pubescent. The upper part of the leaf plate is smooth. The grayish-bluish flowers of rosemary are characteristic ortucha of the typical Lamiaceae family, which are collected in a sagebrush inflorescence and are located at the ends of short shoots [2]. The upper lip of the flower is much larger than the lower lip, they sit almost at the ends of the stems in groups, have long stamens and small nut-shaped fruits. Rosemary thrives well in sunny, well-drained soil and is drought tolerant. The evergreen low shrub loves dry and hot places, but if necessary, it can also withstand severe frosts: Mediterranean varieties with frost up to -20°C cannot do anything with it [3].

II. Study of Physico-Chemical indicators of rosemary.

The pH of the aqueous extract of rosemary leaves was: 5.8 in Kobuleti sample; 5.46 in Ureki sample; 5.6 in Batumi sample. The reaction of the aqueous extract of rosemary leaves at all three locations was weak acid. Titer acidity was low in all three locations: 0.040%-Kobuleti; 0.028%-Ureki; 0.02% – Batumi. The overall acidity in the rosemary leaves increased, along with a decrease in height and an increase in tannin. Dry matter content was maximum in Batumi location, minimum – in Kobuleti (Table 1). This indicator was correlated with relative humidity in the study locations. In particular: in Kobuleti, where Leaf humidity was 49.75%, the amount of dry matter was 50.25%; in Batumi, relative humidity was 53.87% and dry matter was 46.13%; in Ureki, leaf humidity was 56.66% and dry matter was 43.34%. The ash content was highest in rosemary leaves taken from Kobuleti location and less-in Ureki and Batumi locations.

Table 1. Dry matter, moisture and ash content in the leaves

№	*Location*	*Dry Matter (%)*	*Humidity, %*	*Ash content*
1	Kobuleti	50,25	49,75	12,85
2	Ureki	43,34	56,66	12,68
3	Batumi	46,13	53,87	11,47

Determination of essential oils in rosemary leaves [8] revealed that their amount was maximum in green biomass taken at Kobuleti location (0.41%). The content of essential oils decreased simultaneously with the decrease in humidity: in Ureki town, their content was 0.37%; in Batumi-0.37%. The content of polyphenols in the raw mass of leaves taken at Kobuleti location was 2.42% [9]. The content of tannins in Ureki and Batumi locations was approximately the same (in Ureki-2.34%; in Batumi-2.32%). The content of vitamin C [10] was high in all three locations, but rosemary leaves taken from Kobuleti location were distinguished in this regard (Table 2).

Table 2. The content of the main qualitative indicators in rosemary leaves

№	**Location**	**Essential Oil Content (%)**		**Polyphenolic Compounds (%)**		**Vitamin C Content, mg%**	
		raw	***in terms of dry matter***	***raw***	***in terms of dry matter***	***raw***	***in terms of dry matter***
1	Kobuleti	0,41	0,82	2,42	5,58	87,47	201,82
2	Ureki	0,37	0,85	2,34	5,07	85,53	185,41
3	Batumi	0,35	0,76	2,32	4,62	86,71	172,56

III. Multi-Element Analysis.

The dominant macroelements in the rosemary leaves were potassium (K) and calcium (Ca)**.** The richest in these elements were the leaves of plants taken from the Kobuleti location, in which the content of the sodium (Na) was minimal (Table 3). They were also distinguished by magnesium (Mg) and phosphorus (P) content, unlike Batumi and Ureki locations. Micro – and ultramicroelements in rosemary leaves were not observed: cadmium (Cd), cobalt (Co), vanadium (V), arsenic (As), lithium (Li), barium (Ba), titanium (Ti), beryllium (Be), mercury (Hg), and antimony (Sb)**.** At all three locations, plant leaves contained negligible

amounts of selenium (Se), chromium (Cr), and nickel (Ni). Rosemary leaves in Kobuleti contain such important microelements as iron (Fe), boron (B), and zinc (Zn).

Table 3. Concentration of Micro- and Ultra-Microelements in Rosemary Leaves

Location	*Fe*	*Si*	*B*	*Al*	*Cu*	*Mn*	*Mo*	*Zn*	*Se*	*Cr*	*Ni*
Batumi	19.7	59.2	1.67	51.4	2.87	5.29	<0.025	5.48	<0.102	<0.279	0.073
Ureki	12.1	51.8	2.46	45.2	2.24	4.05	<0.066	4.21	<0.120	<0.266	<0.058
Kobuleti	30.5	47.0	2.83	28.4	2.42	3.9	0.089	10.2	<0.063	<0.121	0.024

Conclusion

Studies have established that the green biomass of rosemary taken at Kobuleti location was the best in the content of dry matter, essential oils, polyphenols, vitamin C. The dominant macronutrients in rosemary leaves are K, Ca. The leaves of the plant taken at Kobuleti location were distinguished by more Mg and P content, unlike Batumi and Ureki locations, they are also rich in Fe, B, Zn. The green biomass of rosemary taken from Kobuleti seaside was distinguished by the content of dry matter, moisture, essential oils, polyphenols, vitamin C, macro-and microelements. The obtained results show that Rosemary Green biomass inhabiting the Black Sea coast of Adjara-Guria can be successfully used in Pharmacognosy as an excellent antimicrobial, antibacterial, antioxidant, cognitive, anti-inflammatory, digestive system, and perfumery. It can be used as a spice, as well as a decoction and ready-made tea.

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