Specialty Journal of Pharmacognosy, Phytochemistry, and Biotechnology
ISSN: 3062-441X
2022, Volume 2, Page No: 27-31

Available online at: www.galaxypub.co/page/journals

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Exploring the Efficacy of a Novel Lake Salt-Based Supplement for Primary Dysmenorrhea

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Received: 14 February 2022; **Revised:** 18 April 2022; **Accepted:** 24 April 2022

ABSTRACT

Historically, minerals and plants have been used to treat dysmenorrhea symptoms, alleviate pain, replenish nutrients, and enhance overall well-being. In this study, we tested a novel plant-based dietary supplement consisting of cranberry extract, burdock root, both underground and above-ground parts of marsh cinquefoil, and natural mineral salt from Siberian lakes. The participants, all pubescent girls, did not have any diagnosed health issues or previous allergic reactions. Cardiovascular assessments were performed before and after the treatment to assess any changes. The autonomic nervous system was examined through tests targeting the sympathetic nervous system (e.g., handgrip tests) and the parasympathetic nervous system (including deep breathing and the Valsalva maneuver). The supplement was administered three times daily, in addition to cyclic vitamin therapy and electrotherapy. Our findings suggest that the dietary supplement positively influenced the treatment outcomes.

Keywords: Dysmenorrhea, Dietary supplement, Neurohumoral regulation, Cardiovascular tests

How to Cite This Article: Sergun V, Gorbushina I, Valentina B, PoznyakovskyV, Tokhiriyon B, Lapina V. Exploring the Efficacy of a Novel Lake Salt-Based Supplement for Primary Dysmenorrhea. Spec J Pharmacogn Phytochem Biotechnol. 2022;2:27-31. https://doi.org/10.51847/LKDf0jzmER

Introduction

Dietary supplements are widely regarded as one of the most convenient and effective means of enhancing nutrition and promoting overall health [1-13]. The combination of dietary supplements with conventional medical treatments is becoming increasingly recognized as a valuable approach for managing common health conditions, including dysmenorrhea. Typically, the management of dysmenorrhea involves both pharmacological interventions and nutritional support [14, 15].

This study aimed to assess the effectiveness of a new dietary supplement in managing menstrual disorders in adolescent girls (15 ± 0.5 years old).

Materials and Methods

The plant-based supplement includes the following ingredients per 120 grams: 10 g of *Arctium lappa* (burdock root), 6 g of *Vaccinium macrocarpon* (cranberry) extract, 2.4 g of both underground and above-ground parts of *Comarum palustre* (marsh cinquefoil), 6g of Isobel (a natural mineral salt from Siberian lakes), and 104.4 g of sorbitol.

The dietary supplement meets the following functional food requirements: lipid content (0.05%), polyphenolic compounds (tannin equivalent) (0.7%), organic acids (malic acid equivalent) (1.5%), and magnesium (0.3%).

Patients took one teaspoon of the supplement three times daily, dissolved in 100 cm^3 of water. In addition to the supplement, they were given 1 tablet of Pentovit three times daily for the first phase of the treatment, followed by 1 capsule of Aevit 3 times a day in the second phase. These vitamin supplements are typically used as part of cyclic therapy for dysmenorrhea in adolescent girls. Patients also underwent 10 sessions of electrotherapy, during which electrode pads soaked in a 1% solution of the supplement were applied to the pelvic area.

This study was conducted under the guidance of N.M. Usynina, an obstetrician-gynecologist at Tomsk Antenatal Clinic No. 4. The participants, who were suffering from cramping, dizziness, fatigue, and malaise during menstruation, were selected for the trial.

Results and Discussion

The patients had menarche between the ages of 11 and 12, with regular menstrual cycles occurring every 28 to 31 days and lasting 3 to 5 days. No allergies, gynecological conditions, or venereal diseases were reported.

Upon examination, the shape and mobility of the uterus were found to be normal, with no pain during palpation. The uterine appendages also showed no abnormalities and were painless. Leucorrhoea was moderate, white, odorless, and of normal consistency, ruling out reproductive system disorders.

Further pelvic examination with ultrasound revealed normal follicle sizes (2-3 mm, 2-5 mm), a normal uterine shape (48 ± 5; 36 ± 0.8; 48 ± 0.4), and a homogeneous myometrium. Additional data, including smear test results and immune status, are presented in **Tables 1 and 2**.

Table 1. Bacterioscopic examination data

Variables	The cervical canal	The vaginal vault	The urethra
Leukocytes	8-12	15-25	0-3
Epithelium	columnar	squamous	columnar
Döderlein bacillus	no reaction	no reaction	no reaction
Aerobic flora	8-16	20-24	0-1
Anaerobic flora	20-28	36-40	0-3
Candidae albicans	no reaction	+0	0
Neisseria gonorrhoeae	no reaction	no reaction	no reaction
Trichomonas vaginalis	no reaction	no reaction	no reaction

Table 2. The immune status

Variables	Fact	Norm
Leukocytes	8.9	(4.5-8.0x10 g/l)
Basophils	20 (0-1%)	(20-100)
Eosinophils	2 (2-5%)	(100-300)
Stab	2 (2-4%)	178 (100-300)
Segmented	78 (40-60%)	1798 (1080-4080)
Monocytes	2 (4-8)	178 (200-600)
Lymphocytes	18 (25-45%)	1404 (1200-2800)
CD 3	64	(65-79%)
CD 4	28	(34-44%)
CD 8	28	(19-27%)
CD 16	1	(6-18%)
CD 72	15	(3-15%)
CD 25	4	-
CD 95	7	-
Ig M	1.04	(0.8-2.5)
Ig G	10.13	(8.0-16.0)
Ig A	0.55	(0.7-3.0)

CICs	0.2	(0.040-0.100)

All patients exhibited heightened anxiety. To analyze neurohumoral regulation and determine the nervous system's impact on essential physiological processes, we evaluated data from spectrum analysis and spectrogram readings to calculate Total Power.

Based on the results of the tests, examinations, and patient complaints, a diagnosis of primary dysmenorrhea was confirmed. No additional medical conditions were identified.

The prescribed treatment included:

1. One teaspoon of the dietary supplement, taken three times daily. The supplement was dissolved in 100 cm^3 of water before consumption, starting from the first day of the menstrual cycle, with a total treatment duration of one month.
2. Ten sessions of electrotherapy, during which electrode pads soaked in a 1% solution of the supplement were applied to the pelvic area.

By the 14th day of treatment, patients reported no complaints. The subsequent menstrual cycle was notably less painful, and overall well-being showed improvement.

To evaluate treatment efficacy, follow-up assessments were conducted one and three months after initiation. The findings related to immune status are outlined in **Table 3**.

Table 3. The immune status before and after the treatment

Variables	Before treatment	After treatment	Normal values
Leukocytes	6.23	6.15	4.5-8.0%
Stab	1	-	2-4%
Segmented	46	53	40-60%
Lymphocytes	52	35	25-45%
Monocytes	1	7	4-8%
CD 3	76	68	65-79%
CD 4	31	39	34-44%
CD 8	46	30	19-27%
CD 16	1	8	6-18%
CD 72	15	15	3-15%
CD 25	4	1	
CD 95	7	8	
Ig M	1.04	1.73	0.8-2.5%
Ig G	10.13	15.64	8.0-16.0%
Ig A	0.55	2.22	0.7-3.0%
CICs	0.12	0.120	0.040-0.100

The data obtained from the cardiovascular tests are presented in **Table 4**.

Table 4. Cardiovascular tests data

Test	Normal values	Borderline values	Pathology	Before taking dietary supplement	After taking dietary supplement
Deep breathing ratio	> 1.4	1.2-1.4	< 1.2	1.0	1.04
Active orthostatic ratio	> 1.35	1.2-1.35	< 1.2	1.1	1.07
Valsalva maneuver ratio	> 1.7	1.3-1.7	< 1.3	1.2	2.89
Active orthostatic	< 11	11-25	> 25	-4	-4
Isometric handgrip	> 15	10-15	< 10	0	-1

The sympathetic branch of the autonomic nervous system facilitates the rapid activation of bodily organs and systems to manage physiological functions, whereas the parasympathetic branch oversees routine bodily operations. Before treatment, there was evident dysfunction in the regulation of physiological processes, accompanied by only a moderate activation of defense mechanisms. **Tables 5 and 6** present the spectrum analysis data on neurohumoral regulation after and before treatment.

Table 5. The data on the spectrum analysis of the neurohumoral regulation before treatment

Test	TP	VLF	LF	HF	LF/HF	% VLF	% LF	% HF	RR min	RR max	RRNN	SDNN
Baseline	2457	789	287	1503	0.43	32	14	62	689	1093	843	52
Deep breathing	3206	223	1315	1596	0.87	8	39	51	714	933	815	53
Valsalva maneuver	2788	254	355	2179	0.16	9	13	78	708	928	814	49
Orthostatic	1035	604	254	178	1.4	58	25	17	669	823	745	30
Isometric handgrip	9270	1629	3820	3821	1	18	41	41	263	843	736	87

The neurohumoral modulation exhibited moderate overall power, with comparable findings for vagal and humoral-metabolic (cerebral ergotropic) modulation. The sympathetic division exerted minimal influence, whereas parasympathetic activity was predominant. Functional capacity was rated as satisfactory (8).
Orthostatic test results highlighted diminished responsiveness of the parasympathetic division, while the sympathetic system maintained appropriate activity. However, the coping capacity was significantly low (-8).

Table 6. The data on the spectrum analysis of the neurohumoral regulation after treatment

Test	TP	VLF	LF	HF	LF/HF	% VLF	% LF	% HF	RR min	RR max	RRNN	SDNN
Baseline	2181	823	295	1073	0.27	39	13	50	683	936	799	42
Deep breathing	1530	1166	249	116	2.1	76	16	8	635	812	710	38
Valsalva maneuver	13708	938	5421	7349	0.74	7	40	54	293	1622	813	119
Orthostatic	3120	627	1099	1394	0.79	20	35	45	193	1432	701	60
Isometric handgrip	1077	661	312	104	3	61	29	10	651	795	711	28

Following treatment, neurohumoral regulation was characterized by a moderate spectrum of total neurohumoral modulation power, with comparable vagal and humoral-metabolic (cerebral ergotropic) influences. The parasympathetic division exerted a low impact on heart rate activation but remained more active overall. Functional capacity was assessed as satisfactory (5).
The orthostatic test results indicated reduced parasympathetic reactivity, while sympathetic activity in the autonomic nervous system remained adequate. Coping capacity improved to a satisfactory level, demonstrating the proper functioning of physiological systems.

Conclusion

The findings suggest that incorporating the dietary supplement in the treatment of primary dysmenorrhea enhances therapeutic outcomes by reducing treatment duration, ensuring long-lasting effects, positively influencing neurohumoral regulation, and alleviating pain.

Acknowledgments: None

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

References

1. Gerasimenko NF, Poznyakovsky VM, Chelnakova NG. Healthy food and its role in ensuring the quality of life. Technologies of the food and processing industry of the agro-industrial complex - healthy food products. 2016;4(12):52-7.
2. Poznyakovsky VM, Chugunova OV, Tamova MYu. Food ingredients and biologically active additives: Textbook. Moscow: INFRA-M; 2017. 143 p.
3. Nikita P, Yuliya S, Varuzhan S, Yuliya F, Alla K, Vladimir M. Complex of polyphenols sorbed on buckwheat flour as a functional food ingredient. Foods Raw Mater. 2018;6(2):334-41.
4. Pineda Ospina DL. Bibliometric analysis for the identification of factors of innovation in the food industry. AD-minister. 2015;27:75-126.
5. Pistol GC, Marin DE, Rotar MC, Ropota M, Taranu I. Bioactive compounds from dietary whole grape seed meal improved colonic inflammation via inhibition of MAPKs and NF-kB signaling in pigs with DSS induced colitis. J Funct Foods. 2020;66:103708.
6. Porter AL, Garner J, Newman NC, Carley SF, Youtie J, Kwon S, et al. National nanotechnology research prominence. Technol Anal Strateg Manag. 2019;31(1):25-39.
7. Qi M, Wang J, Li J, Liao S, Liu Y, Yin Y. Dietary glutamine, glutamate, and aspartate supplementation improves hepatic lipid metabolism in post-weaning piglets. Anim Nutr. 2020;6(2):124-9.
8. Tokhiriyon B, Poznyakovsky VM, Beliaev NM. Biologically active complex for functional support of connective tissue: Scientific substantiation, clinical evidence. Int J Pharm Res Allied Sci. 2019;8(10):115-22.
9. Tokhiriyon B, Poznyakovsky VM, Andrievskikh S. Biologically active complex for multifactorial support of the central nervous system: new composition, efficacy. Carpathia J Food Sci Technol. 2020;12(1):52-60.
10. Tokhiriyon B, Poznyakovsky VM. Full-scale testing of the functional product in patients with vegetative-vascular dysfunction and chronic cerebrovascular disorder. Int J Pharm Res Allied Sci. 2019;8(3):91-7.
11. Sergun V, Valentina B, Poznyakovsky V, Tokhiriyon B. Siberian Plants and Natural Mineral Salts for Dietary Supplements. Int J Pharm Res Allied Sci. 2021;10(2):108-15.
12. Alshali R, Alrafiah A, Al-Ofi E, Hanafy A, Hasan A, Bawaked N, et al. Nigella sativa protects Kidneys against Metabolic disorders induced by high-fat diet in Rats. J Adv Pharm Edu Res. 2019;9(1):125-33.
13. Almaiman A, Al Wutayd O. Assessment of the side effects of random weight-loss diet programs (protein-based) on health in a Saudi community. Int J Pharm Psychopharmacol Res. 2019;9(6):39-46.
14. Tutelyana VA, Nikityuk DB. Nutrition and clinical dietetics: national guidelines. M.: GeoTAR-Media; 2020. 656 p.
15. Khoroshilov I. Clinical nutrition and nutritional support. SPb.: ELBI – SPb; 2018. 192 p.