

The effectiveness of red palm oil in patients with gastrointestinal diseases.

NIZOM ERMATOV¹, SHAYKHOVA GULI², SALOMOVA FERUZA³, AZIZOVA FERUZA⁴, RUSTAMOV BAKHTIYOR⁵

¹Doctor of Medical Sciences, Associate Professor, Head of the Department of Hygiene of Children, Adolescents and Nutrition at the Tashkent Medical Academy

²Doctor of Medical Sciences, Professor at Department of Hygiene of Children, Adolescents and Nutrition, Tashkent Medical Academy

³Doctor of Medicine, Associate Professor, Head of the Department of Environmental Hygiene at the Tashkent Medical Academy

⁴Doctor of Medical Sciences, Associate Professor at Department of Hygiene of Children, Adolescents and Nutrition at Tashkent Medical Academy

⁵Ph.D., Independent researcher at Department of Hygiene of Children, Adolescents and Nutrition at the Tashkent Medical Academy

Email ID: nizom.ermatov@tma.uz, guli.shayhova@tma.uz, feruza.salomova@tma.uz, f.azizova@tma.uz, d-r.bakhtiyor@mail.ru

Received: 17.06.19, Revised: 29.08.19, Accepted: 24.09.19

ABSTRACT

The article presents the results of a study of the chemical composition, nutritional and biological value, natural and health-improving properties of refined red palm oil from fruit pulp, a toxicological assessment of the biomedical safety of refined red palm oil in an experiment on laboratory animals, and the role of red palm oil in the treatment of patients with iron deficiency anemia and patients with a disease of the gastrointestinal tract. The organoleptic properties of refined red palm oil prepared from the pulp of fruits were also determined, and the physicochemical and toxicological parameters of refined red palm oil were evaluated.

Keywords: red palm oil, iron deficiency anemia, gastrointestinal disease

INTRODUCTION

Red palm oil 100% natural vegetable refined and deodorized oil. A feature of this edible oil is that it does not have taxes on the content of natural carotenoids (provitamin A), tocopherols and tocotrienols (vitamin E), and a high content of mono- and polyunsaturated fatty acids. The oil is rich in natural coenzyme Q 10 (Ubiquinone). It has a high iodine number (64 by Wijs), does not contain cholesterol, fatty acid transisomers, genetically unchanged.

In addition, natural vitamins are present in sufficient quantities in red palm oil: D, group B, C, F, amino acids (including essential ones); iodine, zinc, iron, copper, selenium and other minerals and trace elements necessary for the body.

The spectrum of positive effects of oil is very wide. Red palm oil strengthens the immune and cardiovascular systems, is effective for skin diseases, varicose veins, gastritis, peptic ulcer, duodenal ulcer, an indispensable product for

diabetes, obesity, reduces the risk of cancer (including breast cancer), normalizes pressure, indicated for diseases of the joints and spine, restores vision and protects against cataracts, improves memory, promotes the normal course of pregnancy, protects against premature aging.

Currently, the consumption of palm oil as a food oil has significantly increased in the production of spreads, margarines and cooking fats. As ingredients, this oil and its fractions are part of fatty mixtures used in the production of various food products and in home cooking. Palm oil, like other oils and fats, is easily absorbed and processed in the normal metabolic process. It plays an important role as a supplier of energy and essential fatty acids to the human body, and in cosmetics it is an excellent emollient.

The **purpose** of the study is to develop improved measures for the use of red palm oil to improve patient nutrition.

MATERIAL AND METHODS

The main object of research was red palm oil. As a subject of research, the chemical composition, nutritional and biological value of red palm oil was studied, a toxicological assessment of biomedical safety in laboratory animals was given, and the effectiveness of using red palm oil in the prevention and treatment of iron deficiency anemia in patients as well as in patients with acid-dependent diseases of the gastrointestinal tract was evaluated. When studying the chemical composition of the oil, gas-liquid chromatography methods were used. Toxicological safety assessment of red palm oil was carried out on laboratory animals. Three series of chronic experiments were performed on outbred white rats (males) with an initial weight of 140-160 g. The duration of the experiment was 45 days, since the studied oil is a widely used edible vegetable oil.

The completion of a set of studies on the nutritional and biological value of red palm oil was carried out in a clinical setting. At the first stage, antianemic efficacy was studied in the treatment of patients suffering from IDA with various severity of the disease. Under the supervision there were 90 patients suffering from iron deficiency anemia, which are divided into 3 groups (30 each) depending on the severity of anemia: the first group is mild, the second is moderate and the third is severe. The course of treatment was 20-28 days.

At the second stage of the research, the effectiveness of red palm oil in individuals suffering from acid-dependent diseases of the gastrointestinal tract was studied. Together with diet No. 1, patients (main group) received 1 tablespoon of oil daily. Under the supervision were 35 patients suffering from gastrointestinal diseases. The course of treatment was 28 days. Esophagogastroduodenoscopy, ultrasound of the liver, gall bladder, endoscopic examination were performed for all patients. As a result of examinations in patients, edema and hyperemia of the mucosa, erosion or ulcer of the esophagus, erosion or ulcer of the stomach, erosion or ulcer of the bulb of the duodenum were revealed. In addition, a gastroesophageal reflex was examined, as well as a blood test.

Oil tolerance was evaluated on the basis of subjective symptoms and sensations reported by the patient, and objective data obtained by the

researcher during treatment, as well as the frequency of occurrence and nature of adverse reactions.

RESULTS

It was revealed that the acid number, (mg, KOH) in red palm oil is 0.68 mg. Considering that red palm oil is used as a dietary supplement, and not as a food substance, the acid value is within the acceptable range. The iodine content in the oil was 72.2 ± 7.8 mg%, which indicates the enrichment of the oil with monoenic fatty acids. The studied butyric acids were determined by gas-liquid chromatography. Unsaponifiable substances make up 1.45%. The mass fraction of carotenoids was 45.0 mg /% (450 mg / kg). When studying the main indicators of red palm oil, it was found that the content of carotenoids in the oil is 525 mg / kg (slightly less than what is indicated in the literature - 550 mg / kg). Other oils do not contain carotenoids. Some of the carotenoids in red palm oil are converted in the body into vitamin A. Provitamin A - carotenoids are concentrated near the bone of the fetus and have good antioxidant properties. The content of tocopherols (vitamin E) in red palm oil is 325 ± 31.5 (in soybean oil - 89 ± 14.3 , corn - 780 ± 42.1 , half-sun - 550 ± 61.7 and in olive - 50 ± 10 , 5). The composition of red palm oil contains tocotrienols 675 ± 72.1 mg%, in other oils they are not detected. Tocotrienols are members of the vitamin E family. When comparing red palm oil with sunflower oil, it was found that red palm oil differs in the composition of fatty acids from the studied sample of sunflower oil. The main fatty acid of the oil is oleic acid, which is 56% of the total mass of acids. The palmitic acid content is higher; it is 24% saturated and monounsaturated fatty acids in red palm oil; it is 2-3.5 times higher compared to sunflower oil. The low proportion of essential fatty acids in red palm oil is leveled due to the high content of carotenoids and vitamin E.

During the experiment, the amount of food, water and excreted excreted daily was recorded to study the possible toxic properties of red palm oil. When observing animals, throughout the experiment, it was found that the general condition and behavior, both in the control and experimental groups were satisfactory. All animals were active and eager to eat. The coat and visible mucous membranes are unchanged.

During the experiment, there were no changes in the behavioral and somatic status observed in the animal experiment. The simplest and most sensitive indicator of the adverse effect of the test product on the body is the dynamics of the animal's body weight. During the entire experiment in the experimental group, the body weight of the animals was slightly higher than in the control. Along with the determination of body weight, weights of internal organs were evaluated. The mass of internal organs in the experimental group of animals did not differ much from the indices of the intact group.

The local irritating effect of red palm oil was studied on white rats weighing 160-200 grams and guinea pigs weighing 350-500 g. The oil was applied to pre-trimmed 2x2 cm animal skin in the abdomen as a native preparation. Animals were fixed for 4 hours. During the observation period, the death of animals was not observed, no symptoms of intoxication were noted. Under conditions of such a 4-hour contact with red palm oil samples in white rats and guinea pigs, clinical manifestations of intoxication and functional and structural disorders of the skin were not observed. It follows that red palm oil does not have a skin irritant effect.

A study of the local action on the mucous membranes of the eyes was carried out on rabbits. When 0.05 g of red palm oil was introduced into the conjunctival sac of the rabbit's eyes, mild conjunctival hyperemia and mild lacrimation were observed for 20 minutes, and corneal sensitivity was not impaired. After 1 hour, the eyeball was unchanged, all the phenomena of irritation passed without a trace. Therefore, the obtained research data showed that the studied red palm oil does not irritate the mucous membrane of the eyes.

The allergenic effect of red palm oil samples was investigated by a single intradermal sensitization of guinea pigs. The test animals injected 0.02 ml of the sample solution into the skin of the ear, while the control animals received the same amount of physiological saline. 11 days after a single sensitization, a course of epicutaneous applications was performed. The severity of the allergic reaction was evaluated using blood cell reactions - specific lysis and agglomeration of leukocytes (RSL and RSAL) and provocative skin samples. Testing carried out after a single sensitization and a course of epicutaneous

applications revealed the absence of sensitizing properties in red palm oil.

Peripheral blood is a mobile system that quickly responds to changes in the body's homeostasis in case of adverse toxic effects. A study of the morphological composition of the blood in our experiments showed that there were no statistically significant differences between the content of red blood cells, white blood cells and hemoglobin in the experimental and control groups of animals. The content of sulfhydryl groups, the activity of cholinesterase and catalase in whole blood in animals of the experimental group did not statistically significantly differ from the indicators in the control group throughout the experiment.

At autopsy of animals, pathological changes were not detected. The data on the increase in body weight correspond to the results of morphological and biochemical blood tests, from which it is seen that under the influence of the studied red palm oil, the main metabolic parameters in the organism of white rats were within physiological fluctuations.

To study the clinical efficacy of red palm oil in the treatment of patients with iron deficiency anemia (IDA) and mixed anemia, 45 patients with moderate and severe iron deficiency and mixed anemia were included. The subjects were conditionally divided into two groups: groups - the main and control. Both groups of patients complained of general weakness, fatigue, headaches, dizziness, tinnitus, flashing flies in front of the eyes, palpitations, shortness of breath, drowsiness, poor appetite, numbness of the limbs.

During the use of oil in patients with IDA, there were no complaints from patients. This indicates that the oil has good tolerance. No side effects were observed during the oil test.

A comparative analysis of the results of treatment of patients with standard therapy and the inclusion of palm oil in the treatment showed that an improvement in hematological parameters was noted in both groups, but mainly in the group of patients receiving red palm oil, a more pronounced improvement in peripheral blood parameters was observed, which manifests itself as an increase daily hemoglobin and red blood cell counts. This, in turn, indicates that red palm oil contributes to a more intense saturation of the body with iron and vitamin B12, stimulates

the processes of their effective inclusion in hemoglobin and activates bone marrow functions. Studies have shown that in the group of patients taking antianemic drugs and oil, there was a more significant decrease in the severity of the clinical symptoms of anemia than in the control group. Patients with moderate anemia showed an improvement in appetite, mood, patients became physically more active. Half of patients with severe anemia also showed improvement in well-being, which was manifested by a decrease in dizziness, flickering flies in front of the eyes, drowsiness and pallor of the skin. Complaints such as tinnitus, palpitations, headaches disappeared in 25% of patients.

Also under the supervision were 35 patients suffering from gastrointestinal diseases. Red palm oil was well tolerated by patients; no side effects were detected during the study period. The examined patients showed swelling of the mucous membranes, which decreased in the main group by 56.1%, and in the control group by 51.8%; mucosal hyperemia, respectively, by 60.3 and 55.5%; esophagus erosion in the main group - by 50%, in the control - 27.3%; erosion of the stomach - by 40% and 27.2%, erosion or ulcer of the bulb of the duodenum - 63.6 and 58.3%.

The dynamics of clinical symptoms in the examined patients showed that pain in the pyloroduodenal zone in the main group decreased by 2.42 points, and in the control group by 2.4 points; heartburn by 2.25 and 2.2 points, respectively; nausea - by 2.0 and 1.9 points. In other words, when using red palm oil, the improvement of all the studied indicators is more pronounced than in the control group. Therefore, palm oil has an anti-inflammatory, regenerative improving effect in the treatment complex, red palm oil is quite clinically effective, has no side effects and is well tolerated by patients.

Clinical testing of palm oil in patients with mixed anemia has shown that the drug has the ability to enhance the anti-anemic effect of basic therapy for all degrees of mixed anemia.

This is a result of improved absorption of iron and vitamin B12 from the composition of drugs, the stimulating effect of red palm oil on hemoglobin synthesis processes, as well as the involvement of tissue iron in the processes of hematopoiesis and stimulation of bone marrow

functions. As can be seen from the table, by the end of treatment there was a significant decrease in all indicators.

A general blood test showed that the hemoglobin in the main group from 110.6 ± 9.0 rose to 114.5 ± 9.3 g / l i.e. by 14.6%; and in the control - from 112 ± 6.8 to 115 ± 9.0 i.e. 2.8%.

CONCLUSION

Red palm oil is characterized by a high content of carotenoids, tocopherols and tocotrienols. The total content of saturated and monounsaturated fatty acids in red palm oil is correspondingly higher than in sunflower oil. The low proportion of essential fatty acids in red palm oil is leveled due to the high content of carotenoids and vitamin E. According to the results of the toxicological assessment of biomedical safety red palm oil can be classified as non-toxic plant products. A study of the clinical efficacy of red palm oil suggests that it is advisable to use red palm oil in wide hematological practice as a means with a definite therapeutic effect in case of iron deficiency anemia and mixed anemia of varying severity. The product can be recommended as a prophylactic to prevent the occurrence of anemia. Red palm oil can also be recommended for inclusion in the complex treatment of patients with erosive and ulcerative lesions of the gastroduodenal zone, as it has an anti-inflammatory, regeneration-improving effect in the treatment complex and is well tolerated by patients.

REFERENCES

1. Catanzaro, R., Zerbinati, N., Solimene, U., Marcellino, M., Mohania, D., Italia, A., Ayala, A. and Marotta, F., 2016. Beneficial effect of refined red palm oil on lipid peroxidation and monocyte tissue factor in HCV-related liver disease: a randomizer controller study. *Hepatobiliary & Pancreatic Diseases International*, 15(2), pp.165-172.
2. Mutalib, M.S.A., Wahle, K.W.J., Duthie, G.G., Whiting, P., Peace, H. and Jenkinson, A., 1999. The effect of dietary palm oil, hydrogenated rape and soya oil on indices of coronary heart disease risk in healthy Scottish volunteers. *Nutrition Research*, 19(3), pp.335-348.
3. Sathasivam, T., Muniyandy, S., Chuah, L.H. and Janarthanan, P., 2018. Encapsulation of red palm oil in carboxymethyl sago cellulose beads by emulsification and vibration technology: Physicochemical characterization and in vitro

- digestion. *Journal of food engineering*, 231, pp.10-21.
4. Zhu, C., Cai, Y., Gertz, E.R., La Frano, M.R., Burnett, D.J. and Burri, B.J., 2015. Red palm oil-supplemented and biofortified cassava gari increase the carotenoid and retinyl palmitate concentrations of triacylglycerol-rich plasma in women. *Nutrition research*, 35(11), pp.965-974.
 5. Burri, B.J., 2012. Evaluating global barriers to the use of red palm oil as an intervention food to prevent vitamin A deficiency. *Comprehensive Reviews in Food Science and Food Safety*, 11(2), pp.221-232.
 6. May, C.Y. and Nesaretnam, K., 2014. Research advancements in palm oil nutrition. *European journal of lipid science and technology*, 116(10), pp.1301-1315.
 7. Lamia medouni-haroune, farid zaidi, sonia medouni-adrar, mouloud kecha (2018) olive pomace: from an olive mill waste to a resource, an overview of the new treatments. *Journal of Critical Reviews*, 5 (6), 1-6. doi:10.22159/jcr.2018v5i5.28840
 8. Zhu, C., Cai, Y., Gertz, E.R., La Frano, M.R., Burnett, D.J. and Burri, B.J., 2015. Red palm oil-supplemented and biofortified cassava gari increase the carotenoid and retinyl palmitate concentrations of triacylglycerol-rich plasma in women. *Nutrition research*, 35(11), pp.965-974.
 9. Angham G. Hadi , Khudheir Jawad , Dina S. Ahmed , Emad Yousif. "Synthesis and Biological Activities of Organotin (IV) Carboxylates: A Review." *Systematic Reviews in Pharmacy* 10.1 (2019), 26-31. Print. doi:10.5530/srp.2019.1.5
 10. Imdad, A., Mayo-Wilson, E., Herzer, K. and Bhutta, Z.A., 2017. Vitamin A supplementation for preventing morbidity and mortality in children from six months to five years of age. *Cochrane Database of Systematic Reviews*, (3).