УДК: 613.23:535.343:665.3:006.354

Oltiboeva Mavsuma G’ulom qizi
Assistant of the Department of Organization of Pharmaceutical Work,
Samarkand State Medical University

Evaluation of changes in the digestive organs and morphofunctional changes and biochemical analyses occurring in the stomach under the influence of food dyes (E-171, E-173).

ABSTRACT

According to the data, among the diseases with the highest mortality rate in the Republic of Uzbekistan, digestive system diseases occupy the 4th place. The hot climate of Uzbekistan, the peculiarities of the nutrition of our people, and the deterioration of the ecological situation in some regions are contributing to the increase in diseases of the gastrointestinal system among the population of our republic. In addition, the increase in the use of various synthetic foods and food additives, the increase in drug treatment, dietary disorders, various infections, bacteria, parasites, and stress factors disrupt the digestive function. Assessing the structure and function of the stomach, which is the central organ of the digestive system, and its changes in various pathologies will greatly help in analyzing the results of future studies.

Keywords: E-173 - aluminum, E-171 - titanium dioxide, albumin, cholesterol, pyloric part, cardial part, antral part, metaplasia, gastropanel.

Oltiboeva Mavsuma G’ulom qizi
Samarqand Davlat tibbiyot universiteti
Farmatsevtika ishini tashkil qilish kafedrasi assistenti,Samarqand.

Hazm qilish a’zolaridagi o’zgarishlarni baholash va ozuqa bo'yoqlari(E- 171, E- 173) ta'sirida oshqozonda yuzaga keladigan morfofunksional o'zgarishlar va biokimyoviy tahlillar.

ANNOTATSIYA

Sog’liqni saqlash vazirligining 2016-yilgi ma’lumotlarga qaraganda O’zbekiston Respublikasida eng ko’p o’lim ko’rsatgichiga ega bo’lgan kasalliklar orasida ovqat hazm qilish a’olari kasalliklari 4-o’rinni egallar ekan. O’zbekistonning issiq iqlimi, xalqimizning ovqatlanishdagi o’ziga xos xususiyatlari, ayrim hududlarda ekologik vaziyatning yomonlashishi respublikamiz aholisi orasida oshqozon-ichak tizimi kasalliklari ko’payishiga sabab bo’lmoqda. Bundan tashqari

har xil sintetik oziq-ovqatlar va oziq-ovqat qo’shimchalarining ko’payishi, dori vositalari bilan davolanishning ko’payishi, ovqatlanish tartibining buzilishi, har xil infektsiyalar, bakteriyalar, parazitlar, stress omillari ovqat hazm qilish faoliyatini buzadi. Hazm qilish a’zolarining markaziy organi bo’lgan oshqozonning tuzilishi va funktsiyasini, turli patologiyalardagi o’zgarishlarini baholash, kelgusidagi tadqiqotlar natijalarini tahlil qilishda katta yordam beradi.

Kalit so’zlar: E-173 – alyuminiy, E-171 - titan dioksidi, albumin, xolestirin, pilorik qism, kardial qism, antral qism, metaplaziya, gastropanel.

Олтибоева Мавсума Гулямовна
Самаркандский государственный медицинский университет
Ассистент, Отдел организации фармацевтической работы, Самарканд.

Оценка изменений в органах пищеварения, морфофункциональных изменений и биохимических анализов, происходящих в желудке под воздействием пищевых красителей (Е-171, Е-173).

АННОТАЦИЯ

По данным Министерства здравоохранения за 2016 год, заболевания пищеварительной системы занимают 4-е место среди заболеваний с самым высоким уровнем смертности в Республике Узбекистан. Жаркий климат Узбекистана, особенности питания населения, ухудшение экологической ситуации в некоторых регионах приводят к увеличению заболеваемости желудочно-кишечным трактом среди населения нашей республики. Кроме того, увеличение использования различных синтетических продуктов питания и пищевых добавок, рост применения лекарственных препаратов, нарушения питания, различные инфекции, бактерии, паразиты, стрессовые факторы нарушают функцию пищеварения. Оценка структуры и функции желудка, являющегося центральным органом пищеварительной системы, и его изменений при различных патологиях значительно поможет в анализе результатов будущих исследований.

Ключевые слова: Е-173 - алюминий, Е-171 - диоксид титана, альбумин, холестерин, пилорическая часть, кардиальная часть, антральная часть, метаплазия, гастропанель

Introduction. Currently, some components of food products and most drugs can turn into xenobiotics and produce harmful substances in the body. They can have an allergenic, mutagenic, carcinogenic or cytotoxic effect. Pollution of water and air on Earth, depletion of natural resources, disruption of natural processes directly or indirectly affect the human body. Therefore, it is important to analyze the

components of food, drugs and the means we use for our needs, and to study their effect on the body.

Literature review. Several biochemical blood tests are also used to assess changes in the digestive system.

Hematological tests (clinical and biochemical blood tests). At this stage of the examination, metabolic disorders not associated with gastrointestinal disorders (for example, liver or kidney failure) can be detected, which helps to make a diagnosis at the initial stages of the patient's examination. Various indicators (such as erythrocytes, leukocytes, hemoglobin, etc.) allow us to detect infections and inflammations, signs of bleeding and neoplasms. By evaluating the indicators of biochemical blood tests (bilirubin, cholesterol, proteins, sugar, trace elements, etc.), pathological changes in the gastrointestinal tract, digestive dysfunction, infections, bleeding or tumor processes can be detected. When analyzing tumor markers, the presence of tumor processes in the organs of the gastrointestinal tract can be indicated by special blood tests - CA-19-9, CEA, CA-72-4, CA-242, M2-PK. Both venous and capillary blood are suitable for testing.

Despite the availability of several tests and examinations for the detection of gastric cancer, it remains a problem to identify the changes necessary for the early diagnosis of this disease. In patients with chronic atrophic gastritis, the assessment of the composition of gastric juice and salivary fluid with morphological changes has helped to analyze the signs of gastric cancer. Finding signs of the disease and early detection of the disease are very important for the patient's health [15].

Gastropanel is a set of studies designed to assess the structure and functions of the gastric mucosa. It allows predicting the risk of developing ulcerative, atrophic, oncological diseases in the gastrointestinal tract, identifying diseases such as atrophic gastritis, gastric ulcer, gastric cancer. It is also important for determining the exact localization of pathological processes and their degree of danger, as well as the presence of pathogenic bacteria in the body. The gastric panel includes tests for four biomarkers:

Gastrin 17 (a hormone responsible for the recovery processes of the gastric mucosa);

Helicobacter pylori;

Pepsinogens I and II (proteins, the amount of which indicates the condition of the stomach and its mucous membrane);

Oncomarkers (indicate the presence or absence of tumor processes).

The advantages of the Gastropanel complex are that it allows for reliable diagnosis of gastrointestinal diseases and can be used to monitor the course of the disease [4,6].

When examining patients with pathologically confirmed gastric cancer. According to the results of hematological analyzes, a significant decrease in hemoglobin and albumin levels can be seen [11].

Computed tomography also has a special role in the diagnosis of various pathologies of the stomach. A number of studies in the field of radiology have shown ways to assess various pathologies of the stomach using computed tomography images. This approach is based on the study of abnormal signs in the stomach based on computed tomography images [21].

In patients who underwent endoscopic examination, a gastric wall thickness of more than 5 millimeters (mm) was considered pathological when computed tomography was used. Statistical values of hemoglobin and albumin were examined, indicating the development of diseases such as gastritis, chronic atrophic gastritis, intestinal metaplasia, H. pylori infection, and gastric ulcer, carcinoma, lymphoma, carcinoid, and stromal tumors[1].

In patients who underwent endoscopic examination and had blood samples taken at one-month intervals, a gastric wall thickness of more than 5 millimeters (mm) was considered pathological when computed tomography was used. Statistical values of hemoglobin (Hb) and albumin were examined, indicating the development of diseases such as gastritis, chronic atrophic gastritis, intestinal metaplasia, Helicobacter pylori (H. pylori) infection, and gastric ulcer, carcinoma, lymphoma, carcinoid, and stromal tumors[2].

Several studies have also been conducted on animals. For example, studies on the stomachs of dogs have shown that gastric tumors are relatively rare in dogs. However, according to statistics of gastric tumors, adenocarcinomas account for 60%, followed by leiomyomas (19%) and leiomyosarcomas (8%). According to their cytological characteristics, adenocarcinoma cells have a stony ring-shaped appearance. They are sometimes more difficult to detect because they are located under the gastric mucosa[25].

In white rats fed with natural food, the following morphofunctional changes are observed in the stomach wall. The presence of a well-formed mucous membrane was detected in the stomach of 7-day-old rats fed with natural food. The single-layer cylindrical epithelium covering the mucous membrane contains pits through which the glandular ducts flow. Numerous gastric glands located in 10 rows were noted in the straight plate of the mucous membrane. The thickness of the mucous membrane is 61.6 μm. In the submucosa, there is a diffuse accumulation of lymphoid tissue. Lymphoid clusters are strictly oriented along the organ wall. The concentration of lymphoid formations in the submucosa and on the border with the muscularis mucosa is different. The thickness of the lymphoid clusters under the mucous membrane is 92.4-77.0 μm, and in the part of the mucous membrane bordering the

muscularis mucosa it is 46.2 μm. The thickness of the well-developed muscularis mucosa is 770 μm. The thickness of the circular muscle layer is 308 μm, which significantly exceeds the thickness of the longitudinal layer, i.e. 154 μm. In rats at 21 and 30 days of age, all layers of the wall are formed and clearly differentiated. The mucosa contains numerous folds lined by a single-layered columnar epithelium. The thickness of the mucosa varies between 462 and 1078 μm. The number and size of eccrine cells in the gastric mucosa increased. Chief and parietal cells were detected in the pyloric part and in the fundus. Lymphoid nodules were noted in the submucosa among diffuse lymphoid clusters. The thickness of the submucosa is 1078 μm. The outer longitudinal layer of smooth muscle cells thickens - 462 μm. The thickness of the inner circular layer is 1386 μm, and the oblique layer of smooth muscle cells is 1232 μm. The number of arterial and venous vessels in the straight plate of the mucosa increases significantly. The number of arterial and venous vessels in the serous membrane corresponds to the number of vessels in 7-day-old rats [28,29,30].

Research. Changes in proteins and enzymes under the influence of E-171 and E-173 dyes during the digestive process have not been sufficiently analyzed in living organisms. There are no biological methods of treatment related to the effects of E-171 and E-173 in rats, since how they do this and their harmful effects are not well understood, and extensive research should be conducted in this regard. Related changes, a good analysis of digestive properties and coordinated treatment methods should be carried out by extensive studies and laboratories.

Objective. To study the changes in the morphofunctionality of substances secreted in the stomach wall of rats under the influence of food dyes E-171, E-173 and conduct biochemical blood tests**.**

Material and methods of investigation: The following laboratory research methods are used in the research work: Study of histological and biochemical changes. E-171, E-173 then involves microscopic examination of the stomachs of rats. Comparison of the histological characteristics of the stomachs of rats exposed to the dye with the stomachs of rats in the control group helps to determine the degree of damage and the effect of structural changes.

Experimental animals: 56 15-20-day-old white male rats kept in the vivarium of Samarkand State University were taken for the experiment. Of these, 28 were female and 28 were male rats. The animals were kept in a ventilated room at a temperature of 20ºC. The lighting regime was 12/12 (light on from 8.00), they were fed with standard feed.

Experimental procedure: Rats were divided into groups 1-control, 2-TiO, 3-Al, 4-TiO+Al and kept in separate cages. They were fed for 3 months for the experiment. They were fed daily with the usual food in group 1, 40 mg of E-171 dye

in group 2, 40 mg of E-173 dye in group 3, and 40 mg of E-171 and 40 mg of E-173 dye mixed with the usual food in group 4. After three months of the experiment, 32 of the white-skinned rats weighed 200±20 g, and 24 of them weighed 170±20 g.

Results of the experiment:

indeks	control	TiO	Al
Glyukosa, mmol/l	5,36±0,09	5,96 ±0,015	3,47±0,07
Xolesterin, mmol/l	1,76±0,15	1,56 ±0,19	1,86±0,12
Albumin, g/l	42,51±1,63	35,6 ±1,15	38,2±1,04
Alaninaminotransferaza, (ALT)	22,45±7,29	26,8 ±3,3	34,7±1,68
Aspartataminotransferaza, (AST)	24,67±2,59	55,4 ±5,67	38,64±3,63
Uric acid	351,23±57,98	212,3 ±47,4	205,7±69,44
Alkaline phosphatase	50,05±1,45	139 ±2,1	65,9±2,0

Conclusion: Biochemical parameters in the blood of rats show no significant abnormalities. However, the absence of this toxicity has not been proven. In some studies, the development of pulmonary fibrosis, manifestations of nephrotoxicity, liver damage and manifestations of myocardial disease have been detected. From the results of the above biochemical analysis, we can see that the glucose level in rats that consumed food dye E-171 is slightly higher than that of rats in the control group, and the amount of Albumin is lower. In rats that consumed food dye E-173, the amount of Albumin is lower, and the amount of Cholesterol is slightly higher than that of the control group. Samples taken from the stomachs of rats are used in the process of preparing histological preparations.

References.

1. Алыков, Н.М. Идентификация и количественное определение синтетических красителей в пищевых продуктах/Алыков Н.М., Родионова М.А. //Экологические системы и приборы. – 2005. – № 9. – С. 19–21.
2. Аляхнович Н.С., Новиков Д.К. Распространенность, применение и патологические эффекты диоксида титана // Вестник ВГМУ. - 2016. - №2. – С.16.
3. Бессонов В.В. Анализ эффективности установленных в России гигиенических нормативов по применению пищевых красителей. /В.В.Бессонов //Вопросы питания. – 2011. – Т. 80, №2. – С.41-44.

4. Бессонов В.В., Передеряев О.И., Богачук М.Н., Малинкин А.Д. Пищевые красители в современной индустрии пищи: безопасность и контроль // Пищевая промышленность. – 2012. - №12. – С. 1-5.

5. Онищенко Г.Г., Арчаков А.И., Бессонов В.В. и др. Методические подходы к оценке безопасности наноматериалов // Гиг. и сан. – 2007. – № 6. – С. 3–10.

6. Онищенко Г.Е., Ерохина М.В., Абрамчук С.С. и др. Влияние наночастиц диоксида титана на состояние слизистой оболочки тонкой кишки крыс // Бюл. экспер. биол. – 2012. – Т. 154, № 8. – С. 231–237.

7. Гмошинский И.В., Багрянцева О.В., Хотимченко С.А. Токсиколого-гигиеническая оценка наночастиц диоксида титана в составе пищевой добавки Е171 (обзор данных литературы и метаанализ) // Анализ риска здоровью. – 2019. – № 2. – С. 145–163.

8. Huang RJ, Choi AY, Truong CD, Yeh MM, Hwang JH. // Diagnosis and Management of Gastric Intestinal Metaplasia: Current Status and Future Directions.// Gut Liver. 2019 Nov 15;13(6):596-603.

9. Jagmohan Mishra, Souvagya Panigrahi. // A Study of Changes in Stomach Wall at Sites Other Than the Ulcer in Chronic Duodenal Ulcer Patients // India. 2011.

10. Jebaraj, K Dalton; Anand, A Jeya. // Histopathological Changes in Stomach Wall at Sites Other than the Ulcer Site in Peptic Ulcer Disease and its Association with Helicobacter pylori // 2020

11. Jun-young Seo, Do Hoon Kim, Ji Yong Ahn, Kee Don Choi, Hwa Jung Kim, Hee Kyong // Differential Diagnosis of Thickened Gastric Wall between Hypertrophic Gastritis and Borrmann Type 4 Advanced Gastric Cancer//2023

12. Johnson, R., & Patel, M. // Peptic Ulcers and Their Implications. London: Gastroenterology Studies. // 2020.

13. K.A.Zufarov. // Gistologiya // 2005

14. Kabilan Chokkappan, Dinesh Chinchure, Ashish Chawla, Manickam Subramanian, Vijay Krishnan, Jagadish Narayana Shenoy, Sivasubramanian Srinivasan. //An Approach to Various Gastric Pathologies Using an “Image Appearance−Based Classification” on Computed Tomography // Singapur. 2015

15. L.M. Mosyichuk, Yu.A. Gaydar, I.A. Klenina, O.P. Petishko // Morphofunctional parallels of the stomach in patients with chronic atrophic gastritis // 2022.

16. Neumann WL, Coss E, Rugge M, Genta RM. // Autoimmune atrophic gastritis--pathogenesis, pathology and management. // Nat Rev Gastroenterol Hepatol. // 2013 Sep;10(9):529-41.

17. R.H.Hunt, M.Camilleri, S.E.Crowe, E.M.El-Omar, J.G.Fox, E.J.Kuipers, P.Malfertheiner, K.E.L.McColl., D.M.Pritchard., M.Rugge, A.Sonnenberg, K.Sugano., and J.Tack // The stomach in health and and Disease // India. 2015.

18. Rajeev Ramachandra Kolgi, G. Bhargavi, Nataraju Angaswamy, M.V.Srinivasulu and S. Shankara Somashetty. // A Short Review - Biochemical Aspects and Advancements in Gastric Cancer. // India. 2024

19. Samy A. Azer;.Ayoola O. Awosika;.Hossein Akhondi. // Gastritis // 2024

20. Saranya, A. Geetha and S.M.K.Narmadha selvamathy a Biochemical Study on the Gastroprotective Effect of Andrographolide in Rats Induced with Gastric Ulcer // India. 2011.

21. Tellez-Avila FI, Duarte-Medrano G, Lopez-Arce G, Herrera-Mora D, Ramirez-Luna MA, Valdovinos-Andraca F, Elizondo-Rivera J. // EUS-guided tissue samples for the diagnosis of patients with a thickened gastric wall and prior negative endoscopic biopsies. // Acta Gastroenterol Belg. 2019.

22. Talia F. Malik; Karthik Gnanapandithan; Kevin Singh. //Peptic Ulcer Disease // 2023.

23. Taylor, L.; McCaddon, A.; Wolffenbuttel, B.H.R. // Creating a Framework for Treating Autoimmune Gastritis—The Case for Replacing Lost Acid. Nutrients // 2024, 16, 662.

24. Thompson, A., & Anderson, R. // Autoimmune Gastritis: Pathophysiology and Treatment. // Boston: Immunology Publications. // (2023).

25. Zoe Miller, Camille Longue, Sivert Nerhagen, Emma J. Holmes // What is your diagnosis? Gastric wall thickening in a dog. // 2022

26. А.Б. Мусукаева, И.А. Мизиев, А.Д. Асланов, Р.А. Ахкубеков, Р.М. Захохов, М.Ш. Мустафаев, В.А. Виссарионов // Особенности патогистологических изменений в слизистой желудка и двенадцатиперстной кишки при острых гастропатиях // Россия 2017. 29-34.

27. Э.А.Рустамов //Морфологические изменения слизистой оболочки желудка до и после хирургического лечения // Россия 2012. Хирургия. Журнал им. Н.И. Пирогова. 2012.№ 5С.20 25.

28. Молдавская А.А., Калаев А.А. // Морфофункциональные особенности строения стенки желудка у экцпериментальных животных в зависимости от характера вскармливания (естественное, смешанное, искусственное) // Фундаментальные исследования. 2005. № 5. С. 21-23;

29. Мизиев И.А., Аттоева Д.И., Атмурзаев М.М., Бакцанова М.Х., Ахкубеков Р.А., Ачабаева А.Б. // Профилактика и лечение острых эрозивно-язвенных поражений желудка и двенадцатиперстной кишки. Известия Кабардино-Балкарского государственного университета. // 2013;3(2):75-78

30. Милюков В.Е., Долгов Е.Н., Нгуен К.К. // Расстройства регионарного кровотока и микроциркуляции в патогенезе острых язв желудка. Регионарное кровообращение и микроциркуляция. // 2012;11(3):12-17.