Bocharov A. V. The influence of flavancontent means on gut mucosa state at rats received peroxide sunflower oil. Journal of Education, Health and Sport. 2018;8(8):1200-1205. eISNN 2391-8306. DOI http://dx.doi.org/10.5281/zenodo.1451782
http://ojs.ukw.edu.pl/index.php/johs/article/view/6166

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part b item 1223 (26/01/2017).
1223 Journal of Education, Health and Sport eISSN 2391-8306 7

The authors declare that there is no conflict of interests regarding the publication of this paper.
Received: 02.08.2018. Revised: 14.08.2018. Accepted: 31.08.2018.

UDC 615.07:615.015:616.88

THE INFLUENCE OF FLAVANCONTENT MEANS ON GUT MUCOSA STATE AT RATS RECEIVED PEROXIDE SUNFLOWER OIL

A. V. Bocharov

Bukovina State Medical University (Chernovtsy, Ukraine)

flavan.ua@gmail.com

Abstract

Aim: To investigate influence of flavancontent antidysbiotic means in gut mucosa state at rats, received peroxide sunflower oil (PSO).

Materials and methods: Rats received PSO daily in dose 1 ml duration 2,5 mounts. From 31-th day of the experiment rats received flavancontent means (quertulin, lequin, lekasil) in dose 300 mg/kg. The activities elastase, urease, catalase and content of MDA were determined into gut mucosa.

Results: The activities elastase, urease and content of MDA were increased in rats received PSO, but activities lysozyme and catalase were reduced. The flavancontent means were lowered the activities of elastase, urease and content of MDA, but were increased activities lysozyme and elastase.

Conclusion: PSO made dysbiosis and inflammation in gut mucosa. Flavancontent means mode mucosoprotective action.

Keywords: gut, lipid peroxide product, dysbiosis, mucosit, bioflavonoide, antidysbiotic means.

ВПЛИВ ФЛАВАНВМІСНИХ ЗАСОБІВ НА СТАН СЛИЗОВОЇ ОБОЛОНКИ ТОНКОЇ КИШКИ ЩУРІВ, ЯКІ ОТРИМУВАЛИ ПЕРЕОКИСНЕНУ СОНЯШНИКОВУ ОЛІЮ

А. В. Бочаров

Буковинський державний медичний університет (м. Чернівці, Україна)

Резюме

У щурів, які отримували щоденно переокиснену соняшникову олію (ПСО) на протязі 2,5 місяців в дозі 1 мл, розвивається в слизовій тонкої кишки запалення (мукозит), дисбіоз, зниження рівня антиоксидантного захисту і неспецифічного імунітета. Введення, починаючи з 31-го дня досліду, з кормом флаванвмісних антидисбіотичних засобів (квертуліна, леквіна або лекасила) в дозі 300 мг/кг здійснило мукозопротекторну дію та усунуло дисбіотичні і запальні явища.

Ключові слова: переокиснена олія, тонка кишка, дисбіоз, запалення, біофлавоноїди, антидисбіотичні засоби.

INTRODUCTION

Prolonged storage of unrefined oils or heat treatment of fats and fat containing products cause peroxide oxidation of unsaturated fatty acids with the formation of various toxic products [1-3]. In our previous work [4] we showed a negative effect on the state of the mucous membrane of the colon of peroxide sunflower oil rats. The introduction of feed with a number of flavan-containing antidysbiosis agents greatly eliminated inflammatory and dystrophic events.

The purpose of this work was to study the effect of flavan-containing antidysbiosis agents on the mucosal condition of the small intestine of rats receiving peroxide sunflower oil. The choice of flavan-containing agents is due to high antioxidant, anti-inflammatory and cytoprotective properties of bioflavonoids [5-6]..

MATERIALS AND RESEARCH METHODS

The following flavan-containing antidysbiotic means were used in this work: quertulin, lequin and lecasil, the composition of which and the corresponding normative and technical documentation are presented in Table 1. All three means of production «Odessa biotechnology».

Table 1. Characteristics of flavan-containing agents

Means	Storage	Normative documentation
Quertulin	Quercetin Inulin Calcium citrate	10.8-13903778-010: 2012 Conclusion of the Ministry of Health # 05.03.02-06 / 44464 dated May 17, 2012
Lequin	Lecithin Quercetin Inulin Calcium citrate	10.8-37420386-003: 2016 Conclusion of the Ministry of Health # 05.03.02-08 / 8400 dated March 21, 2016
Lecasil	Lecithin Thistle seed cake Calcium citrate	10.8-37420386-005: 2017 The conclusion of the Ministry of Public Health № 002.123.20-2 / 12102 dated April 25, 2017

Experimental studies were performed on 34 white rats of the vistar line (males, 7 months, live weight 238-253 g), which were divided into 5 groups: 1-a - control (intact rats); The 2nd, 3rd, 4th and 5th groups received daily peroxide sunflower oil (PSO) in a dose of 1ml per rat [7]. Rats of the third group, starting from the 31st day of the experiment, were given daily with food of quertulin (300 mg / kg), the rats of the 4th group received from the 31st day in the same dose lequin and the rat of the 5th group - lecasil. Euthanasia of animals was performed on the 76th day of the trial under thiopental anesthesia (20 mg / kg) by total bleeding from the heart. A portion of the small intestine (21,0 cm from the colon) was isolated, washed from the chyme by 0.9% cold solution of NaCl, scraped off the mucous membrane and stored at minus 30 ° C for further biochemical examination.

The level of biochemical markers of inflammation [8] was determined in the homogenate of the mucous membrane: the activity of elastase and the content of malondialdehyde (MDA), as well as the activity of the antioxidant enzyme catalase [9], the bacterial enzyme urease [10], and the activity of lysozyme by the bacteriolytic method [11]. According to the ratio of catalase activity and MDA content, antioxidant-prooxidant index of API was calculated [8], and the ratio of relative activity of urease and lysozyme was calculated by the degree of dysbiosis by AP Levitsky [12].

The results of experiments were subjected to standard stat processing [13].

RESULTS AND DISCUSSION

Table 2 shows the results of determining the level of markers of inflammation. As can be seen from these data, in the rats receiving PSO, the level of both markers of inflammation is significantly increased. The use of flavan-containing agents reliably lowered the level of in-

flammation markers, with quertulin to a greater extent lowered the level of MDA, and lequin and lecasil - the activity of elastase.

Table 2. Influence of flavan-containing agents on the level of inflammation markers in the small intestine mucosa of the rats receiving peroxide sunflower oil (PSO) (M ± m)

№№	Group	Elastase, μ-kat / kg	MDA, mmol / kg
1	Control	1,40±0,09	7,54±0,26
2	PSO	1,90±0,12 p<0,01	10,42±0,28 p<0,01
3	PSO+ quertulin	1,60±0,03 p<0,05; p_1<0,05	6,89±0,34 p>0,05; p_1<0,01
4	PSO + lequin	1,57±0,05 p>0,05; p_1<0,05	7,22±0,22 p>0,3; p_1<0,01
5	PSO + lekasil	1,50±0,04 p>0,1; p_1<0,01	8,13±0,37 p>0,05; p_1<0,05

Notes. p – in comparison with gr.1; p_1 – in comparison with gr. 2.

Table 3 presents the results of determining the activity of catalase and the API index. It can be seen that in the rats receiving PSO both indicators are significantly lowered, and the introduction of flavan-containing agents reliably increases them, especially the quertulin.

Table 3. Influence of flavan-containing agents on catalase activity and API index in the mucosa of the small intestine of rats fed peroxide sunflower oil (PSO) (M ± m)

№№	Group	Catalase, μ-cat/kg	API
1	Control	4,35±0,28	5,77±0,36
2	PSO	3,53±0,17 p<0,05	3,39±0,18 p<0,01
3	PSO + quertulin	4,96±0,29 p>0,05; p_1<0,05	7,20±0,39 p<0,05; p_1<0,01
4	PSO + lequin	4,26±0,28 p>0,5; p_1<0,05	5,90±0,28 p>0,3; p_1<0,01
5	PSO + lecasil	4,57±0,36 p>0,3; p_1<0,05	5,62±0,31 p>0,3; p_1<0,01

Notes. See tabl. 2.

Table 4 presents the results of determining the activity of urease, lysozyma and the degree of dysbiosis. From these data it is seen that in rats receiving PSO, somewhat increased activity of urease, however, it is significantly lower in rats receiving medicinal products. On the contrary, the activity of lysozyme is significantly reduced in rats receiving PSA, but the introduction of flavan-containing agents significantly increases them, although they do not re-

turn to control. The degree of dysbiosis in the mucosa of the small intestine of rats receiving PSO is increased by 2.8 times. All applied means reduce it to the level of control, with more effective were the quertulin and lequin.

Table 4. Influence of flavan-containing agents on the activity of urease, lysozyme and degree of dysbiosis in the mucous membrane of the small intestine of rats fed peroxide sunflower oil (PSO) (M ± m)

№№	Group	Urease, mc-cat / kg	Lysozyme, unit / kg	Degree of dysbiosis
1	Control	1,41±0,24	417±16	1,00±0,12
2	PSO	1,59±0,37 p>0,3	166±11 p<0,001	2,82±0,25 p<0,01
3	PSO + quertulin	0,72±0,29 p>0,05; p_1>0,05	272±27 p<0,01; p_1<0,05	0,74±0,13 p>0,05; p_1<0,01
4	PSO + lequin	0,74±0,14 p<0,05; p_1<0,05	289±14 p<0,01; p_1<0,01	0,75±0,09 p>0,05; p_1<0,01
5	PSO + lecasil	0,78±0,31 p>0,05; p_1>0,05	220±7 p<0,001; p_1<0,01	1,04±0,08 p>0,5; p_1<0,01

Notes. See tabl. 2.

Thus, the studies conducted by us showed a pathogenic effect on the condition of the mucous membrane of the small intestine of the long-term use of peroxide sunflower oil. This pathogenic effect manifests itself in the development of dysbiosis, a decrease in the level of antioxidant defense and the development of inflammatory-dystrophic process (mucositis). Applied flavan-containing antidysbiotic agents greatly reduce the negative effect of PSO on the mucous membrane of the small intestine.

CONCLUSIONS

1. Prolonged use of peroxide sunflower oil results in the development of dysbiosis and mucositis in the mucous membrane of the small intestine.

2. The use of flavan-containing antidysbiotic means carries out a therapeutic and prophylactic action when consuming PSO.

REFERENCES

1. Voskresenskiy ON., Levitsky AP. Peroxide lipids in the living organism. Questions of medical chemistry 1970; 16(6): 561-581. (in Russian)

2. Nagler LG, Lankin VZ, Kazachenko AI et al. The rate of free radical oxidation of C18 diene and triene fatty acids and the effectiveness of their inhibition by β-carotene in aqueous micellar solutions. Biochemistry. 2003; 68(2): 243-249. (in Russian)

3. Plavinskii SL, Plavinskaia SI. Increased levels of lipid peroxidation products as a risk factor for death in a prospective study. Human physiology. 2002; 28(1): 116-120. (in Russian)

4. Bocharov AV. Antiinflammation and antidysbiotic actions of flavancontent means on rat colon mucosa after received the peroxide sunflower oil. Journal of Education, Health and Sport. 2017; 7(7): 1150-1160

5. Levitsky AP, Makarenko OA, Levchenko OM [et al.]. Bioflavonoid hepatoprotectors. Odessa: KP OGT, 2014: 86. (in Russian)

6. Makarenko O, LevitskyA. Biochemical mechanisms of therapeutic and prophylactic effects of bioflavonoids. Journal of Pharmacy and Pharmacology. 2016; 4(8): 451-456.

7. Levitsky AP, Makarenko OA, Pochtar' VN et al. The peroxide model of stomatitis. Journal of dentistry. 2005; 4: 7-10. (in Russian)

8. Levitsky AP, Denga OV, Makarenko OA, Dem'yanenko SA, Rossachanova LN., Knava OE. Biochemical markers of inflammation of oral cavity tissue: method guidelines. Odessa, KP OGT, 2010: 16. (in Russian)

9. Girin SV. The modification of the method of the determination of catalase activity in biological substrates. Laboratory diagnostics. 1999; 4: 45-46. (in Russian)

10. Gavrikova LM, Segen IT. Urease activity of oral liquid in patients with acute odontogenic infection of maxillo-facial part. Dentistry. 1996; The extra issue: 49-50. (in Russian)

11. Levitsky AP. Lysozyme instead of antibiotics. Odessa, KP OGT, 2005: 74. (in Russian)

12. Levitsky AP, Denga OV, Selivanskaya IA, Makarenko OA, Demyanenko SA, Tsiselskiy YuV. The method of estimation of the degree of dysbiosis (dysbacteriosis) of organs and tissues. Patent of Ukraine 43140. IPC (2009) G01N 33/48. Application number u 200815092. Date of filling: 26.12.2008. Publ.: 10.08.2009. Bul. № 15. (in Ukrainian)

13. Truhacheva NV. Mathematical Statistics in biomedical research using application package Statistica. Moskow, GJeOTAR-Media, 2012: 379. (in Russian)