CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.1690802

Available online at: http://www.iajps.com ***Research Article***

ANALYSIS OF EFFECT OF PROBIOTIC YOGURT CONSUMPTION ON OXIDATIVE STRESS AND INFLAMMATORY FACTORS IN CHILDREN

[1]Dr. Syed Muhammad Amad Imtiaz, [1]Dr. Hafiz Muhammad Saad Zafar, [1]Dr. Syed Muhammad Ali Raza

[1]Medical Officer at Children Hospital Complex & ICH, Multan

Abstract:

Introduction: *Oxidative stress which is referred to imbalance between prooxidants and antioxidants is very common in petrochemical workers. Exposure to petrochemical contaminants such as benzene, toluene, ethylbenzene, and xylenes and diesel exhaust particulate leads to increased production of reactive oxygen species (ROS) and free radicals, which in turn would result in increased oxidative stress.* ***Aims and objectives:*** *The basic aim of the study was to analyze the effect of probiotic yogurt consumption on oxidative stress and inflammatory factors in children.* ***Material and methods:*** *This study was conducted at Children Hospital Complex & ICH, Multan during Nov 2017 to May 2018. For this purpose of study we select the children of age 2 years to 10 years who consume the yogurt on daily basis. We get all the data related to dietary intake of selected participants. During the run-in period after stratification for body mass index (BMI) and age, participants were requested to record their dietary intakes for three nonconsecutive days.* ***Results:*** *There was no significant relationship among age, weight, calorie, and nutrients intake in control and supplement groups. the blood levels of SOD, GPX and serum levels of TAC significantly increased, whereas the serum level of TNF-α, MMP2, MMP9, MDA significantly decreased in the supplement group compared to the control group ($p<0.05$). There were no significant differences between the two groups in the serum levels of other biochemical factors such as hs-CRP, IL6, and TNF-α after intense physical activity ($p>0.05$).* ***Conclusion:*** *It is concluded that consumption of probiotic yogurt or multispecies probiotic capsule had beneficial effects on biomarkers of oxidative stress in children.*

Corresponding author:

Dr. Syed Muhammad Amad Imtiaz,

Medical Officer at Children Hospital Complex & ICH, Multan

QR code

Please cite this article in press Syed Muhammad Amad Imtiaz et al., ***Analysis Of Effect Of Probiotic Yogurt Consumption On Oxidative Stress And Inflammatory Factors In Children.,*** *Indo Am. J. P. Sci, 2018; 05(12).*

INTRODUCTION:

Oxidative stress which is referred to imbalance between prooxidants and antioxidants is very common in petrochemical workers. Exposure to petrochemical contaminants such as benzene, toluene, ethylbenzene, and xylenes and diesel exhaust particulate leads to increased production of reactive oxygen species (ROS) and free radicals, which in turn would result in increased oxidative stress. Increase in oxidative stress is widely thought as a mechanism involved in developing cancer, diabetes, Parkinson's disease, Alzheimer's disease, cardiac disease, neurological and psychiatric disorders [1]. Moreover, increased risk of some cancers such as melanoma, bladder and prostate carcinoma and pulmonary mesothelioma has been reported in petrochemical workers.

There are several strategies to reduce oxidative stress including use of antioxidants especially vitamins A, C, and E, carotenoids, polyphenols as well as diets rich in vegetables and fruits. Recently, the use of probiotics to reduce the oxidative stress has been proposed. Probiotics are microorganisms that are believed to provide health benefits for humans and animals when consumed [2]. To the best of knowledge of the authors, no studies are available indicating the effects of probiotics on biomarkers of oxidative stress and inflammatory factors among petrochemical workers. However, it has been assessed on these markers in pregnant women and in subjects with type 2 diabetes mellitus. Asemi *et al.* have carried out a study on pregnant women and have observed a significant decrease of some biomarkers of oxidative stress following use of probiotic yoghurt containing *Lactobacillus acidophilus* La5 and *Bifidobacterium animalis*for 9 weeks [3,4]. Probiotics may reduce oxidative stress through affecting cytokine production, decreasing interleukin 1, tumor necrosis factor-alpha and increasing glutathione (GSH) levels. In addition, blocking superoxide production and hydroxyl radicals, decrease of prooxidants levels, stimulation and reinforcement of immune system may be explained further favorable effects by probiotics on oxidative stress [5].

Aims and objectives

The basic aim of the study was to analyze the effect of probiotic yogurt consumption on oxidative stress and inflammatory factors in children.

MATERIAL AND METHODS:

This study was conducted at Children Hospital Complex & ICH, Multan during Nov 2017 to May 2018. For this purpose of study we select the children of age 2 years to 10 years who consume the yogurt on daily basis. We get all the data related to dietary intake of selected participants. During the run-in period after stratification for body mass index (BMI) and age, participants were requested to record their dietary intakes for three nonconsecutive days. We select 30 participants for this study and divided into two groups. One group was those who daily intake probiotic yogurt and one was those who do not intake yogurt. Fasting blood samples (10 mL) were obtained at the beginning study and end-of-trial. Blood was collected in 2 separate tubes: (1) One without EDTA to separate the serum, in order to quantify serum 8-oxo-7, 8-dihydroguanine (8-oxo-G), high sensitivity C-reactive protein (hs-CRP) and interferon gamma (INF-γ) levels and (2) another one containing EDTA to examine protein carbonyl (PC) and prostaglandin F2-alpha (8-iso-PGF2a). Blood samples were immediately centrifuged (Universal, Germany) at 3500 rpm for 10 min to separate serum.

Statistical analysis

The data of respiratory function were compared between the smoker and non-smoker groups using the independent t-test for normally distributed data or the Mann-Whitney U test for other distributions. Differences were considered statistically significant at $p<0.05$.

RESULTS:

There was no significant relationship among age, weight, calorie, and nutrients intake in control and supplement groups. the blood levels of SOD, GPX and serum levels of TAC significantly increased, whereas the serum level of TNF-α, MMP2, MMP9, MDA significantly decreased in the supplement group compared to the control group ($p<0.05$). There were no significant differences between the two groups in the serum levels of other biochemical factors such as hs-CRP, IL6, and TNF-α after intense physical activity ($p>0.05$).

Table 01: Level of antioxidants in both study groups

Variables	Measurement stage	Supplement group (N=14)	Control group (N=13)	P value
Glutathione peroxidase (U/gHb)	Before	45.2 ± 2.99	44.42 ± 4.45	0.59
	After 2 weeks	50.36 ± 6.11*	45.3 ± 4.46	0.02◆
	After exhausted exercise	52.47 ± 6.38**	47.21 ± 3.41	0.01◆
Superoxide dismutase(U/gHb)	Before	1480.9 ± 108.67	1556.9 ± 174.88	0.1
	After 2 weeks	1509.41 ± 210.21	1526.3 ± 158.65	0.1
	After exhausted exercise	1701.8 ± 146.25**	1558.2 ± 163.14	0.03◆
Total antioxidant capacity (mmol/l)	Before	1.31 ± 0.13	1.25 ± 0.23	0.3
	After 2 weeks	1.54 ± 0.38*	1.28 ± 0.25	0.04◆
	After exhausted exercise	1.72 ± 0.43**	1.31 ± 0.25	0.006◆
Cholesterol (mg/dl)	Before	176.57 ± 31.66	165.38 ± 33.24	0.37
	After 2 weeks	183 ± 24.4	175.69 ± 26.86	0.46
	After exhausted exercise	187.64 ± 27.15	179.46 ± 30.3	0.46
HDL- Cholesterol (mg/dl)	Before	45.85 ± 10.42	41 ± 6.46	0.16
	After 2 weeks	49.85 ± 10.24	43.53 ± 7.27	0.07
	After exhausted exercise	51.42 ± 9.65	50.46 ± 6.43	0.76
Triglyceride (mg/dl)	Before	93.57 ± 60.63	90.76 ± 23.8	0.87
	After 2 weeks	98.78 ± 48.96	101.15 ± 34.87	0.88
	After exhausted exercise	103.79 ± 52.15	100 ± 31.24	0.83
LDL(mg/dl)	Before	112 ±23.6	106.15 ± 30.47	0.58
	After 2 weeks	113.39 ± 18	111.92 ± 24.6	0.86
	After exhausted exercise	128.74 ± 29.57**	135.87 ± 25.67**	0.5

Values are mean ±SD, *P <.05 vs baseline, **P<.05 vs after 2 weeks.
◆P <0.05 in Independent Sample T Test between two groups.

DISCUSSION:

It is found that Elevated basal levels serum hs-CRP and TNF-α in late pregnant women during mild inflammation and due to maternal weight gain, placenta. The potential role of the intestinal microflora in modulating immune responses has led to an interest in using probiotics as preventive and therapeutic interventions [6]. The present study showed that probiotic yoghurt consumption significantly decreased some inflammatory factors such as MMP2 in accordance with an increase of antioxidants levels compared with regular yoghurt consumption. The present study reports the first evidence of improvement in some antioxidants levels in healthy females and the results are in line with the findings of another study [7]. However, no statistically significant changes were observed in MDA and enzymes of antioxidant activity in the supplement group compared to the control group during the intervention which might be explained by the short duration of the study. The precise mechanisms of antioxidant effects of probiotics remain largely unknown [8]. These effects may be partly related to a probiotic mediated decrease in oxidative stress. Moreover, the immune-modulatory and anti-inflammatory effects of probiotics and the modification of intestinal micro-flora could be other probable mechanisms [7]. The MDA concentration insignificantly decreased after probiotic yoghurt administration. Although both the yoghurts (regular and probiotic) given to both groups had bioactive peptides and antioxidant properties, the results showed that probiotic yoghurt was more effective in increasing antioxidative activity than the regular one. It has been documented that physical activity can cause reactive oxygen species (ROS) generation in skeletal muscles [9]. Administration of antioxidant supplementation may play a positive role in metabolism of physical activity. Probiotics are defined as living microbial food ingredients

beneficial to health.34 Probiotic supplementation has antioxidant property and can prevent risky levels of oxidative stress. Consumption of probiotics producing glutathione and having complete glutathione redox cycle enzymes, GPX and glutathione reductase (GRed), may contribute to the reduction of lipid hydroperoxides in the gastrointestinal tract and in hepatocytes and prevent them from entering the circulation [10].

CONCLUSION:

It is concluded that consumption of probiotic yogurt or multispecies probiotic capsule had beneficial effects on biomarkers of oxidative stress in children.

REFERENCES:

1. Uzma N, Kumar BS, Hazari MA. Exposure to benzene induces oxidative stress, alters the immune response and expression of p53 in gasoline filling workers. Am J Ind Med. 2010;53:1264–70
2. Vattanasit U, Navasumrit P, Khadka MB, Kanitwithayanun J, Promvijit J, Autrup H, et al. Oxidative DNA damage and inflammatory responses in cultured human cells and in humans exposed to traffic-related particles. Int J Hyg Environ Health. 2014;217:23–33.
3. Gun RT, Pratt NL, Griffith EC, Adams GG, Bisby JA, Robinson KL. Update of a prospective study of mortality and cancer incidence in the Australian petroleum industry. Occup Environ Med. 2004;61:150–6.
4. Zhang X, Tao N, Wang X, Chen F, Wang M. The colorants, antioxidants, and toxicants from nonenzymatic browning reactions and the impacts of dietary polyphenols on their thermal formation. Food Funct. 2015;6:345–55.
5. Rijkers GT, de Vos WM, Brummer RJ, Morelli L, Corthier G, Marteau P. Health benefits and health claims of probiotics: Bridging science and marketing. Br J Nutr. 2011;106:1291–6.
6. Sadrzadeh-Yeganeh H, Elmadfa I, Djazayery A, Jalali M, Heshmat R, Chamary M. The effects of probiotic and conventional yoghurt on lipid profile in women. Br J Nutr. 2010;103:1778–83.
7. Asemi Z, Jazayeri S, Najafi M, Samimi M, Mofid V, Shidfar F, et al. Effect of daily consumption of probiotic yogurt on oxidative stress in pregnant women: A randomized controlled clinical trial. Ann Nutr Metab. 2012;60:62–8.
8. Kullisaar T, Zilmer M, Mikelsaar M, Vihalemm T, Annuk H, Kairane C, et al. Two antioxidative lactobacilli strains as promising probiotics. Int J Food Microbiol. 2002;72:215–24.
9. Teemu H, Seppo S, Jussi M, Raija T, Kalle L. Reversible surface binding of cadmium and lead by lactic acid and bifidobacteria. Int J Food Microbiol. 2008;125:170–5.
10. Heyman M, Ménard S. Probiotic microorganisms: How they affect intestinal pathophysiology. Cell Mol Life Sci. 2002;59:1151–65.