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"Effects of probiotics as one of functional foods to reduce high risk of cardiovascular diseases and colon cancer"

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Dedication…

This work is dedicated to my family;
My mother, my husband, my brother, my sister, my daughter: Nadine & my son: Mohammed.

Thanks to their love, encouragement, continuous help and support, I was always inspired to complete this work.

To my father (covered with Allah mercy).

بسم الله الرحمن الرحيم

(و قالوا الحمد لله الذي
هدانا لهذا و ما كنا لنهتدي
لولا أن هدانا الله)

صدق الله العظيم ..؛

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Abstract

Some functional foods such as probiotics play a beneficial role functions in the treatment of some health problems and emollurate the oxidative stress mechanisms and other risks which improving the quality of life. Cardiovascular diseases as well as colon cancer are two of the most important health problems, so we interest to choose the two tested probiotics yoghurt and fermented kidney beans as biofunctional foods to reduce the high risk of these two diseases.

Chemical analyses of the two tested probiotics were determined. For biological and biochemical uses evaluations female Swiss albino mice (n = 160) were classified into two major sections. The first section subdivided into healthy and atherogenic mice groups (atherogenicity induced by HFHC diet); while the second section subdivided into healthy and carcinogenic mice (cancer induced by injection colon by 2×10^6 Ehrlich ascites tumor cells).

Results of the first section were as follows: Biochemical values of lipids profile revealed that, induction of atherogenicity caused a significant increase in TC, TG and bad cholesterol LDL-C by 55.07 %, 19 % and 305.50 % respectively comparing with healthy group, with significant decrease in good cholesterol HDL-C (25.80 ± 4.30 mg/dl, v.s 35.20 ± 6.10 mg/dl). Feeding on one of the two tested probiotics led to significant decrease in plasma lipids profile of treated atherogenic mice of TC, TG and bad cholesterol LDL-C except that of good cholesterol HDL-C. Values of liver TC and TG go hand in hand with the levels of plasma TC and TG. Moreover levels of liver GSH revealed the antioxidant status of the atherogenic case which was decreased significantly, while there was a significant modulation in case of consuming yoghurt and FKB. With respect to faecal bile acids excretion, results showed that, when atherogenic mice fed on supplemented diet with either yoghurt or FKB excreted more bile acids than those of untreated group, the percentage of increment were being 45.65 % and 53.21 % respectively. Microscopic examination of aorta of carcinogenic mice feeding on either yoghurt or fermented kidney beans showed decreases of ulcers of superficial epithelial cells and the extravasated cells caused by atherogenicity.

Results of the second section were as follows: Hemoglobin (Hb) concentration and percentage of hematocrit (Hct) in blood of carcinogenic mice were significantly increased by consuming one of the two tested probiotics. The increment were 44 % & 47 % respectively in case of Hb concentration and by 41.60 % & 46.80 % respectively in case of Hct compared to untreated carcinogenic mice. Results of numerical counts of RBCs and WBCs go hand in hand with values of Hb and Hct. With respect to oxidative stress status of healthy and carcinogenic mice, results showed that induction of cancer resulted in marked reduction in serum vitamin E, vitamin A and selenium and increment in serum MDA. The functional role of the two tested probiotics decreased the risk of oxidative stress in treated carcinogenic mice by significant increment in serum vitamin E, vitamin A and selenium and decrement of serum concentration of MDA which were 70.46 % and 71.38 % respectively. Results of numerical counts of dead tumor cells indicated that feeding on one of the two tested probiotics led to significant increases of % of dead tumor cells (81.09 ± 2.72 % & 78.89 ± 2.45 % respectively). Microscopic examination of sections of colon indicated that, feeding on one of the two tested probiotics lowers the number and size of the tumor cells, with signs of degeneration and necrosis. Although fermented kidney beans is more effective in which cells of much smaller size than in case of feeding yoghurt and the majority of neoplastic cells were degenerated and lost their nuclei.

جامعة عين شمس
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List of Abbreviations

ACF	Aberrant crypt foci.
AI	Atherogenic index.
AIW	American Institute of Nutrition.
APC	Atrial premature contraction.
CRC	Colorectal cancer.
CVD	Cardiovascular diseases.
CLA	Conjugated linoleic acid.
DVS	Direct vat strain.
DNA	Dioxy ribonucleic acid.
EDTA	Ethylene diamine tetra acetic acid.
FAO	Food Agriculture Organization.
FF	Functional foods.
FDA	Food and Drug Administration.
FKB	Fermented kidney beans.
Hb	Hemoglobin.
Hct	Hematocrit.
HDL-C	High density lipoprotein-cholesterol.
HFHC	High fat high cholesterol diet.
HX	Haematoxylin.
IgA	Immunoglobulin type A**.**