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The impacts of milk butter from iraqi-bred cows fed on a diet mixed with fenugreek seed on the lipid profile of wistar rats in al-diwaniyah city, iraq

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Abstract

The current study was carried out to study the impacts of milk butter from Iraqi-bred cows fed on a diet mixed with fenugreek seed on the lipid profile of Wistar ratsin Al-Diwaniyah City, Iraq. The experiment contained the recruitment of 10 lactating locally-bred cows (LLBCs) fed with 12.5gm/animal/day for 24months of soaked fenugreek seeds (SFSs), SFS group. As a cow control (CC) group, 10 LLBCs were used with no treatment. After the end of this experiment, the milk was utilized to produce butter. Then, the SFS-originated butter (SFSB) was orally-administered to 10 rats at 0.08mg/kg daily for 30 days, SFSB group. For the rat control (RC) group, 10 rats were orally-administered with CC-originated butter (CCB) at 0.08mg/kg daily for 30 days, CCB group. After the end of the rat experiment, the body weight and serum profile of lipidsof rats for both SFSB and CCB groups were measured.The result showed that the oral supply of the butter from SFS cows induced potentially (p<0.05) increased in the HDL levels in the SFSB rats. In addition, the LDL and VLDL from the same rats revealed no significant (p>0.05) changes after using the butter originated from the cows treated with SFS. Significant (p<0.05) elevations were recorded in the levels of TC, TG, and weights in the rats treated with the butter produced from the SFS cow milk. The study concludes that feeding cows with fenugreek seeds has successful impacts in increasing the levels of HDL “good lipid” and decreasing the levels of LDL and VLDL “bad lipids” in the rats treated orally with butter produced from these cows.

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Introduction

Fenugreek, or Trigonella, is a member of the Fabaceae family and gets its name from the Latin word for "little triangle" because of the shape of its flowers. *Trigonella foenum-graecum* L., commonly known as fenugreek, has been used medicinally since at least 4000 B.C. In 1500 B.C. Egypt, the Ebers Papyrus (one of the oldest known preserved medicinal documents) described the herb and its advantages. Indian, Pakistani, Afghan, Iranian, Nepalese, Egyptian, French, Spanish, Turkish, Moroccan, North African, Middle Eastern, and Argentine farmers all cultivate it commercially [1]. Fenugreek seeds (FSs) are loaded with useful compounds like phospholipids and glycolipids, oleic, linolenic, and linoleic acids, choline, vitamin A, B1, B2, C, nicotinic acid, niacin, and many others [2,3].

The health benefits of fenugreek have been connected to the herb's potent antioxidant characteristics. Notably, sprouting seeds outperform dry seeds that haven't sprouted in this regard. But fenugreek's aqueous fraction shows much stronger antioxidant potential than flavonoids and phenolics [4]. To name a few, fenugreek includes flavonoids, alkaloids, saponins, and other antioxidants in relatively high concentrations. Among the many phenolic compounds found in the seed extract are gallic acid, protocatechuic acid, catechin, gentisic acid, chlorogenic acid, vanillic acid, and syringic acid. The alkaloids in fenugreek, mostly trigonelline, make up 35% of the endosperm. All of these chemicals are considered biologically active because they produce pharmacological impacts in the human body after ingestion [5]. Therefore, as they have hypoglycemic, antilipidemic, anticarcinogenic, and cholagogic characteristics, their utilization should be encouraged in daily diet for the management of hypercholesterolemia, cancer, and diabetes mellitus. The volatile oils and alkaloids that contribute to the plant's unpleasant odor and bitterness and flavor can be removed prior to consumption [6,7].

The current study was carried out to study the impacts of milk butter from Iraqi-bred cows fed on a diet mixed with fenugreek seed on the lipid profile of Wistar ratsin Al-Diwaniyah City, Iraq.

Materials and Methods

Ethical procedures

All ethical criteria involving the care and use of cows and rats were followed according to national and international guidelines.

Experiments

The experiment contained the recruitment of 10 LLBCs fed with 12.5gm/animal/day for 24 months of SFSs, SFS group; the

dose was the quarter of the dose used byKirar*et al* [8], who used SFS for 90 days only, and because the long period of treatment in the current study, which lasted for 24 months, a low dose was recommended. As a CC group, 10 LLBCs were used with no treatment. After the end of this experiment, the milk was utilized to produce butter. Then, the SFSB was orally-administered to 10 rats at 0.08mg/kg daily for 30 days, SFSB group. For the RC group, 10 rats were orally-administered with CCB at 0.08mg/kg daily for 30 days, CCB group. The initial weight for all rats were between 162 to 185gm. All animals, cows and rats were housed under standard conditionsand randomly assigned for the experimental groups. After the end of the rat experiment, the body weight and serum profile of lipids (high density lipoprotein (HDL), low density lipoprotein (LDL), very low density lipoprotein (VLDL), triglycerides (TG), and total cholesterol (TC)) of rats for both SFSB and CCB groups were measured.

Statistical procedures

The GraphPad Prism v7.0 was used to analyze the finding data, which were presented, elsewhere, as mean±SEM, and computed for any significance in differences between groups using student-*t*-test. The value of less than 5% was considered as significance.

Results

The lipid profiles of cow serum and milk were not changed after the end of the cow experiment (data not shown). The result showed that the oral supply of the butter from SFS cows induced potentially ($p<0.05$) increased in the HDL levels in the SFSB rats. In addition, the LDL and VLDL from the same rats revealed no significant ($p>0.05$) changes after using the butter originated from the cows treated with SFS. Significant ($p<0.05$) elevations were recorded in the levels of TC, TG, and weights in the rats treated with the butter produced from the SFS cow milk (Table 1).

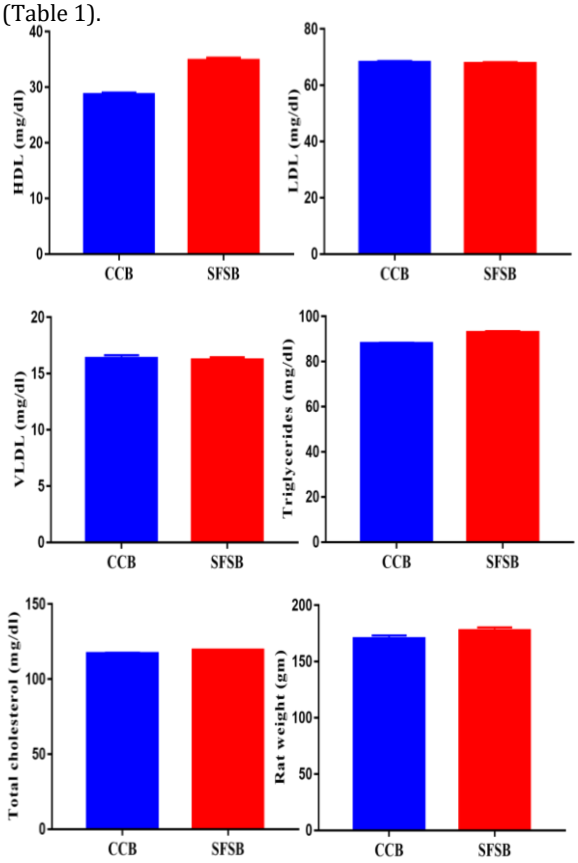

Table 1: The concentrations of lipid profile and body weights in rats orally-treated with butter produced from milk of cows fed with soaked fenugreek seeds.

Discussion

There are a number of natural food supplements that have been utilized to improve product quality and safety, such as lowering cholesterol in milk, as well as animal health and efficiency. Plants from the leguminous family, like fenugreek, are used to create feed additives. It can be observed in every region of the world. These seeds have many uses, including as a source of nutrition for humans, cattle, and sheep, as well as a means of enhancing lactation and milk production in female ruminants [8].

The lipid profiles for both cow serum and milk were not altered due t the use of SFS and this agrees with Kirar*et al* [8], who also didn't recognize changes in any of these parameters in buffalos after using SFS for 90 days. Expanding the fenugreek threshold to 15% in Nubian goats led to a reduction in blood glucose level, but the difference was not proportionally meaningful, as published by Babekir [9]. A significant reduction in serum cholesterol and total protein presence was also noted after dosage with FSs at doses of 5%, 10%, and 15%. Hamdani ewes had no noticeable difference in cholesterol and globulin concentrations when FSs were added to their basal ration at levels of up to 1.2 g/kg live body weight, as revealed by Al-Sherwany [10]. Although, the present work didn't find changes in the lipid profiles of cow serum and milk, the study revealed significant changes in the levels of some serum lipids of the rat treated with SFSB. These changes could be due to important modifications in the lipid quality and structures of the milk belonged to the cows treated with SFS for 24 months.For example, the saturation, carbon length, and isometry of fatty acyl moieties in phospholipids all have unique effects on healt .Physical and biological membrane characteristics including surface packing of lipids, thickness of bilayer, lipid lateral mobility, distribution of microdomain are all influenced by alterations in membrane lipids. Thus, the electric charge, curvature of membrane, existence of particular lipids, etc., of a given membrane determine the excess and category of peripheral signaling proteins available at that membrane. Therefore, these changes in the signals may affect the type of blood lipoproteins present in certain animals, especially those rats treated with SFSB [12–15].

Conclusion

The study concludes that feeding cows with fenugreek seeds has successful impacts in increasing the levels of HDL "good lipid" and decreasing the levels of LDL and VLDL "bad lipids" in the rats treated orally with butter produced from these cows.

References

1. Ahmad A, Alghamdi SS, Mahmood K, Afzal M. Fenugreek a multipurpose crop: Potentialities and improvements. Saudi J Biol Sci [Internet]. 2016 Mar 1 [cited 2022 Oct 1];23(2):300–10. Available from: /pmc/articles/PMC4894452/
2. Meghwal M, Goswami TK. A review on the functional properties, nutritional content, medicinal utilization and potential application of fenugreek. J Food Process Technol. 2012;3(9):181.
3. Khole S, Chatterjee S, Variyar P, Sharma A,

Devasagayam TPA, Ghaskadbi S. Bioactive constituents of germinated fenugreek seeds with strong antioxidant potential. J Funct Foods. 2014 Jan 1;6(1):270–9.

4. Tewari D, Jóźwik A, Łysek-Gładysińska M, Grzybek W, Adamus-Białek W, Bicki J, et al. Fenugreek (Trigonella foenum-graecum L.) Seeds Dietary Supplementation Regulates Liver Antioxidant Defense Systems in Aging Mice. Nutrients [Internet]. 2020 Sep 1 [cited 2022 Oct 1];12(9):1–12. Available from: /pmc/articles/PMC7551560/
5. Singh P, Bajpai V, Gond V, Kumar A, Tadigoppula N, Kumar B. Determination of Bioactive Compounds of Fenugreek (Trigonella foenum-graecum) Seeds Using LC-MS Techniques. Methods Mol Biol [Internet]. 2020 [cited 2022 Oct 1];2107:377–93. Available from: https://pubmed.ncbi.nlm.nih.gov/31893460/
6. Yao D, Zhang B, Zhu J, Zhang Q, Hu Y, Wang S, et al. Advances on application of fenugreek seeds as functional foods: Pharmacology, clinical application, products, patents and market. Crit Rev Food Sci Nutr [Internet]. 2020 Aug 5 [cited 2022 Oct 1];60(14):2342–52. Available from: https://pubmed.ncbi.nlm.nih.gov/31286789/
7. Heshmat-Ghahdarijani K, Mashayekhiasl N, Amerizadeh A, Teimouri Jervekani Z, Sadeghi M. Effect of fenugreek consumption on serum lipid profile: A systematic review and meta-analysis. Phytother Res [Internet]. 2020 Sep 1 [cited 2022 Oct 1];34(9):2230–45. Available from: https://pubmed.ncbi.nlm.nih.gov/32385866/
8. Kirar M, Ghosh S, Baghel RP, Jain A. Effect of fenugreek (methi) seed supplementation on performance of lactating murrah buffaloes. Buffalo Bull. 2020;39(2).
9. Babekir NS. Efect of Fenugreek (Trigonella foenum graecum) seed supplementation on feed intake and chemical blood profle of Nubian Goats. University of Khartoum, Khartoum, Sudan.; 2015.
10. Al-Sherwany DAO. Feeding efects of Fenugreek seeds on intake, milk yield, chemical composition of milk and some biochemical parameters in Hamdani ewes. Al-Anbar J Vet Sci. 2015;8(1):49–54.
11. Torres M, Parets S, Fernández-Díaz J, Beteta-Göbel R, Rodríguez-Lorca R, Román R, et al. Lipids in Pathophysiology and Development of the Membrane Lipid Therapy: New Bioactive Lipids. Membranes (Basel) [Internet]. 2021 Dec 1 [cited 2022 Oct 1];11(12):919. Available from: /pmc/articles/PMC8708953/
12. Khmelinskaia A, Ibarguren M, De Almeida RFM, López DJ, Paixão VA, Ahyayauch H, et al. Changes in membrane organization upon spontaneous insertion of 2-hydroxylated unsaturated fatty acids in the lipid bilayer. Langmuir [Internet]. 2014 Mar 4 [cited 2022 Oct 1];30(8):2117–28. Available from: https://pubmed.ncbi.nlm.nih.gov/24490728/
13. Ibarguren M, López DJ, Encinar JA, González-Ros JM, Busquets X, Escribá P V. Partitioning of liquid-ordered/liquid-disordered membrane microdomains induced by the fluidifying effect of 2-hydroxylated fatty acid derivatives. Biochim Biophys Acta [Internet]. 2013 [cited 2022 Oct 1];1828(11):2553–63. Available from: https://pubmed.ncbi.nlm.nih.gov/23792066/
14. Noguera-Salvà MA, Guardiola-Serrano F, Martin ML, Marcilla-Etxenike A, Bergo MO, Busquets X, et al. Role of the C-terminal basic amino acids and the lipid anchor of the Gγ2 protein in membrane interactions and cell localization. Biochim Biophys acta Biomembr [Internet]. 2017 Sep 1 [cited 2022 Oct 1];1859(9 Pt B):1536–47. Available from: https://pubmed.ncbi.nlm.nih.gov/28235469/
15. Álvarez R, López DJ, Casas J, Lladó V, Higuera M, Nagy T, et al. G protein-membrane interactions I: Gαi1 myristoyl and palmitoyl modifications in protein-lipid interactions and its implications in membrane microdomain localization. Biochim Biophys Acta [Internet]. 2015 Nov 1 [cited 2022 Oct 1];1851(11):1511–20. Available from: https://pubmed.ncbi.nlm.nih.gov/26253820/