



Original Article

ANALYSIS OF FATTY ACIDS FROM OIL OF GREEN TEA (*CAMELLIA SINENSIS L*) BY GAS CHROMATOGRAPHY COUPLED WITH FLAME IONIZATION DETECTOR AND ITS ANTICANCER AND ANTIBACTERIAL ACTIVITY *IN VITRO*

MEGHAMALA MANDAL¹, Koushik DAS^{2*}, DILIP KUMAR NANDI³, BALARAM DAS⁴, SREENIVAS R. J.⁴

¹Department of Nutrition and ²Physiology, Raja Narendra Lal Khan Women's College, Midnapore, 721102, West Bengal, India, ³Department of Physiology, Ramnagar College, Purba Medinipur, 721441, West Bengal, India, ⁴Food Chemistry Division, National Institute of Nutrition (ICMR), Hyderabad 500007, Telangana, India
Email: koushikphysiology@yahoo.com

Received: 21 Sep 2018 Revised and Accepted: 04 Feb 2019

ABSTRACT

Objective: Tea is a widely consumed beverage worldwide. The effect of green tea is mainly due to its high polyphenolic (-) epigallocatechin-3-gallate (EGCG) content in the culture of cancer cell and bacterial cells. The present work was carried out to investigate the efficacy of green tea oil (CTO) against cancer cells and bacterial cells.

Methods: In this study green tea oil was prepared from green tea for different experiment and determination of fatty acids profile from green tea oil. In the present study, peripheral blood lymphocyte (PBL) was chosen as human peripheral blood lymphocytes and blood cancer MCF-7 cells were chosen as human cancer cells. To fulfill our aims and also to evaluate the activity of this phyto medicine against normal lymphocytes and cancer cells the cell samples were divided into 26 experimental groups in the following ways. Each Petri dish contains 2 x 10⁶ cells.

Results: CTO shows a potent anticancer agent but nontoxic to normal cells. The CTO decreases the reduced glutathione (GSH) level and increase the oxidized glutathione (GSSG) level significantly (P<0.05) in MCF-7 cells. But in lymphocytes the GSH level and GSSG level were almost the same with the control group but doxorubicin (DOX) significantly decreased the GSH and increase the GSSG level. Green tea oil treatment causes generation of reactive oxygen species (ROS) in MCF-7 cells revealed by DCFH₂DA staining. Agar diffusion test shows the CTO is effective against multi-drug resistant bacteria.

Conclusion: This phyto medicine has a potent anticancer activity without damaging the normal lymphocytes. So, this drug can be used for further treatment of anticancer and antibacterial.

Keywords: Green tea, Green Tea Oil, Polyphenolic (-) Epigallocatechin-3-gallate, Cancer, Phyto medicine

© 2019 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ijppa.2019.11.020088>

INTRODUCTION

Cancer is the second foremost life-threatening disease worldwide causes of human death. In spite of substantial advancement in biomedical researches on cancer biology, identifications of cancer biomarkers, different surgical procedures, antibody therapy, radiotherapy, and chemotherapy, the overall survival rate of cancer patients have not significantly improved in the last few decades [1]. In the present scenario, different pathogenic bacteria particularly multidrug-resistant bacteria also have become national and international concern [2]. According to the centers for disease control (CDC) report, there has a possibility of a post-antibiotic world, where a minor cut or a small injury could be fatal because the antibiotic efficacies will lose. Among them, the most problematic pathogens are *Pseudomonas aeruginosa*, *Escherichia coli* and *Staphylococcus aureus*, all the bacterial strains show multidrug resistance. Natural assets or resources including plant derived molecules have been used to prevent human diseases for thousands of years. The therapeutic benefits of several plant products, as well as phyto-chemicals, have become one of the major areas of interest in cancer therapy and control of drug-resistant bacteria. Natural substances show a rising role in different biomedical applications. Severe side effects of various traditional and conventional chemotherapeutic drugs are one of the major problems for cancer therapy. Thus, to overcome this important issue, phytochemical based antimicrobial and anticancer drug development becomes the major thrust area of many researchers. Green tea (*Camellia sinensis L.*) contain various phyto components such as polyphenols (catechins), caffeine (called thea), tannin

elements like molybdenum and phosphorus, which have been found to protective effect against bacterial infections[3] and viral infections[4] as well as anticarcinogenic [6] and antimutagenic activities [7], inflammation [8], platelet aggregation [9] and elevation of vascular reactivity [10]. We consume mainly tea aqueous beverage for health benefits comes from mainly polyphenols consumption include catechins 45.9% (-)epigallocatechin gallate, 18.2% (-)epicatechin gallate, 10.1% (-)epicatechin and 4.2% (-)epigallocatechin [3]. There is no data regarding green tea oil (CTO) which is considered a kind of edible oil because the predominant fatty acids (FA) are the monounsaturated fatty acid (MUFA) i.e. oleic acid and the polyunsaturated fatty acid (PUFA) i.e. linoleic acid, they are essential in human nutrition and helps to reduce levels of low-density lipoprotein (LDL) cholesterol, total cholesterol and the triglycerides. Besides, it is most important that CTO contains mono, di, trichloroacetic acid (conjugated mono and polyunsaturated fatty acid). The present study was carried out to evaluate the CTO mediated selective cytotoxicity on cancer cells *in vitro* experimental settings. Doxorubicin (DOX) was taken as a positive control for the study as it is a potent chemotherapeutic agent. Simultaneously, human peripheral blood lymphocyte (PBL) was taken as a normal cell and any toxicity due to CTO treatment was carefully investigated.

MATERIALS AND METHODS

Culture media and chemicals

Histopaque 1077, DMEM, penicillin, streptomycin, gentamycin (G418), Doxorubicin, were procured from Sigma (St. Louis, MO, USA). Fetal bovine serum (FBS) was purchased from Gibco/Invitrogen,

Activate Windows
Go to Settings to activate Windows.



EFFECT OF PHYTOSTEROL EXTRACT FROM SESAME SEED ON EXPERIMENTALLY INDUCED HYPERLIPIDEMIC RATS: DOSE DEPENDENT STUDY

SHREOSHI MALLICK¹, MEGHAMALA MANDAL¹, SUCHISMITA ROY², SHRABANI PRADHAN¹, SHREYA MANDAL¹, RAJ KUMAR MAITI³, DILIP KR. NANDI¹, RUPA DASGUPTA² AND KOUSHIK DAS^{*1}

¹Research Unit, Department of Nutrition of Raja N. L. Khan Women's College, Midnapore-721101, Dist- Paschim Medinipur, West Bengal, India

²PG Dept. of Zoology of Raja N. L. Khan Women's College, Midnapore-721101, Dist- Paschim Medinipur, West Bengal, India.

³Department of Physiology, Bankura Christian College, Bankura- 721101, West Bengal, India.

ABSTRACT

Hyperlipidemia is a medical condition where there is an elevation of lipids, or fats, in the blood. The purpose of the study was to evaluate the hypolipidemic effect of sesame seed on experimentally induced hyperlipidemic albino rats. The study was carried out with thirty Wistar stain albino male rats and the groups were Group I was denoted as control, they were provided normal food, water with 1g multi-vitamin for 60 days. Group II was denoted as hyperlipidemic, from 1st to 14th day they were provided normal food, water and on the 15th to 60th day (45 days) they were provided normal food with 3.7 ml coconut oil with 1mg/kg cholesterol per rat, 1g multi-vitamin, and 5% sucrose for induction of hyperlipidemia. Group III, Group IV, Group V were denoted as treatment I, II, III respectively and they were treated as group II rats and fed orally sesame seed extract at the dose of 25, 50 and 75 mg/kg body weight/day/rat orally for 45 days respectively. The result of the present study showed that the toxicity level and total fat content of liver, intestine, and adipose tissue were significantly decreased and the antioxidant enzyme profiles were significantly increased in treatment I, II and III groups than the hyperlipidemic group. Sesame seed (*Sesamum indicum*) is the rich natural sources of phytosterol which have great reducing capability for lowering the blood cholesterol, triglyceride level and total fat content of the different tissues.

KEY WORDS: Phytosterol, sesame, hypercholesterolemia, hyperlipidemia.



KOUSHIK DAS

Research Unit, Department of Nutrition of Raja N. L. Khan Women's College, Midnapore-721101, Dist- Paschim Medinipur, West Bengal, India

*Corresponding author

Activate Windows
Go to Settings to activate Windows.