

propidium iodide (PI). Cell viability was measured using an MTT assay, and apoptosis was determined using FACS analysis after stained with annexin V/propidium iodide (PI). The expression of genes related to apoptosis (including bax, bcl-2 and caspase-3) was measured by RT-PCR. Results show that morphological damage was obvious, cell permeability was significantly elevated, apoptosis was significantly increased, and the expression of bax and caspase-3 was significantly increased while bcl-2 was decreased following heat treatment. Pretreatment with *A. rugosa* attenuated heat stress induced damage, elevated permeability as well as apoptosis. The expression of bax and caspase-3 was significantly decreased while bcl-2 was increased in the *A. rugosa* anti-stress group compare with the heat stress group. In conclusion, our results show that *A. rugosa* can prevent heat stress induced-apoptosis in rat intestinal epithelial cell line via regulated the gene expression of bax, caspase-3 and bcl-2.

Keywords: Traditional Chinese herbal, *A. rugosa*, Apoptosis, Intestinal epithelial cell line

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***Nigella sativa* exerts anti-inflammatory and anti-tumor activities in vitro**

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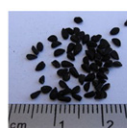
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Introduction: Immunonutrition has long been recognized as a notion whereby a dynamic and functional interplay exists between nutrition and the immune system. The search for natural immunomodulatory drugs holds a great hope for discovering effective remedies for preventing and treating a wide range of medical conditions. In this study, the potential immunomodulatory effects of *Nigella sativa* are investigated in light of splenocyte proliferation, macrophage function, and NK anti-tumor activity using BLAB/c and C57/BL6 primary cells.

Methods: Splenocyte proliferation was assessed by [³H]-thymidine incorporation. ELISA was performed to assess cytokine secretion by splenocytes and macrophages, and Griess assay was performed to evaluate NO production by macrophages. Using YAC-1 lymphoma cells, the potential of *Nigella sativa* extract to promote the cytotoxic activity of NK cells was also examined by JAM assay.

Results: Our findings reveal that the aqueous extract of *Nigella sativa* significantly enhances splenocyte proliferation in a dose-responsive manner. In addition, the aqueous extract of *Nigella sativa* favors the secretion of Th2, versus Th1, cytokines by splenocytes. The secretion of IL-6, TNF α , and NO; key pro-inflammatory mediators, by primary macrophages is significantly suppressed by the aqueous extract of *Nigella sativa*, indicating that *Nigella sativa* exerts anti-inflammatory effects in vitro. Finally, experimental evidence indicates that the aqueous extract of *Nigella sativa* significantly enhances NK cytotoxic activity against YAC-1 tumor cells, suggesting that the documented anti-tumor effects of *Nigella sativa* may be, at least in part, attributed to its ability to serve as a stimulant of NK anti-tumor activity.

Discussion: Our data present *Nigella sativa* as a traditionally used herb with potent immunomodulatory, anti-inflammatory, and anti-tumor properties. We anticipate that *Nigella sativa* ingredients may be employed as effective therapeutic agents in the regulation of diverse immune reactions implicated in various conditions and diseases such as cancer.



Nigella sativa

<i>Immune Function</i>	<i>Effect</i>
Splenocyte Proliferation	↑
Th1 Cytokine Profile	↓
Th2 Cytokine Profile	↑
Macrophage Inflammatory Response	↓
NK Cytotoxic Activity	↑

Keywords: Anti-inflammation, Anti-tumor, Macrophage, *Nigella sativa*

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Effects of seeds mixture rich in ω -3 and ω -6 fatty acids on hyperlipidemia and oxidant status in hypercholesterolemic rats: Evaluation of hepatoprotective property

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Hypolipidemic, antioxidant and hepatoprotective activities of mixture of Flax/Sesame (LS) and Flax/Peanut (LA) were carried out to ascertain the claim of its utilization against diseases. The seeds mixture rich in unsaturated fatty acids were prepared with 5/1 ratio of ω -6/ ω -3 fatty acids and were orally administered ad libitum to rats by standard diet for 30 days. High cholesterol fed diet rats (CD-chol) exhibited a significant increase in total plasma and liver lipid parameters and atherogenicity and a significant decrease in high-density lipoproteins (HDL) and HDL/TC ratio (HTR). Administration of (LS) or (LA) seeds mixture to hypercholesterolemic rats (MS-LSchol and MS-LAchol groups respectively) significantly ameliorated lipid parameters and showed an increase of PUFAs (ALA and LA) and MUFAs and a decrease of SFAs in plasma and liver of MS-LSchol and MS-LAchol groups. Furthermore, malondialdehyde levels decreased and the efficiency of antioxidant defense system (SOD, CAT and GSH) was improved compared to CD-chol group. Liver histological sections showed lipid storage in hepatocytes of CD-chol group and an improvement was noted in both supplemented groups. Our results suggested that both seeds mixtures of Flax/Sesame and Flax/Peanut have anti-atherogenic and hepatoprotective effects.

Keywords: ω -3 and ω -6 PUFAs, Hypercholesterolemic rats, Atherogenic index, Antioxidant activities

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N-acylamines in inflammation; Nutrient-derived mediators bridging nutrition and pharma

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