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Anti-Obesity Activity Of Hot Red Pepper *(Capsicum Annum L.)*In Experimental Rats

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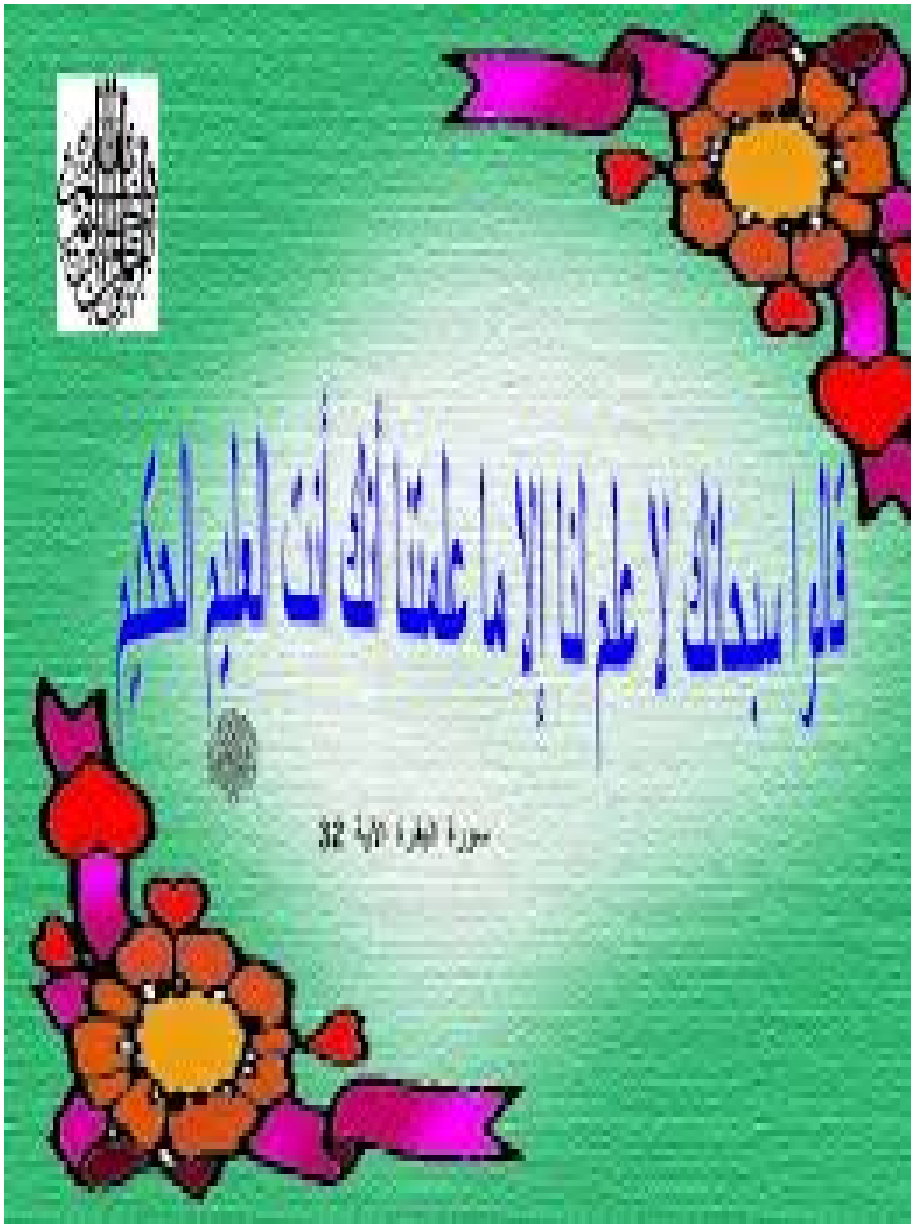
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Dedication

This work is lovingly dedicated to my mother for her constant, unconditional love and support throughout my entire life. There are not enough words I can say to describe just how important my mother is to me, and what a powerful influence she continue to be. . .

Abstract

Obesity is implicated as a risk factor for multiple medical conditions including diabetes, heart diseases, hepatic diseases and others. The main goal of this study was to identify the main components of red pepper (RP), and to investigate the anti-obesity effect of (*RP*) flesh and (RP) seeds on biochemical alteration elicited by high fat high sucrose (HFHS) diet.

Obesity was induced by feeding adult male albino rats (440 g fat and 220 g sucrose/kg diet) for eight weeks.The results of RP analysis revealed that each 100g of fresh RP contains 90.2 g% moisture, 2.19% protein , 4.61 g% carbohydrate, while fat content was 1.9 g%, both ash and crude fiber content were the same about 0.7 g%, it also contains 141.2 mg% vitamin C, 13.6 mg% calcium and 1.03mg % iron . HPLC analysis showed that RP flesh contains 1.08 g% capsaicin and RP seeds contain 2.72 g% capsaicin. The results of the biological trial indicated that (HFHS) diet caused a significant increase in body weight and lee's index and also showed a reduction in food intake. In addition there was a significant increase in serum glucose , insulin , total cholesterol (TC), triacylglycerols (TAG), very low density lipoprotein(VLDL-C), low density lipoproteins (LDL-C), total lipid (TL), and phospholipid with a significant decrease in high density lipoproteins (HDL-C) in untreated obese rats when compared with normal healthy controls . Obesity is also associated with a significant increase in serum leptin and insulin like growth factor 1(IGF-1), whereas there was a significant decrease in serum adiponectin and glucose-6 phosphate dehydrogenase (G6PD). The results revealed that RP flesh or RP seeds attenuate the biological and biochemical alteration of HFHS diet in the experimental rats. The anti-obesity effect of RP flesh and RP seeds was evident through the significant reduction in body weight reached 26.1% and 26% by RP flesh and RP seeds respectively compared to control group, similarly administration of RP flesh/ RP seeds decreased the food intake and lee's index. Moreover, RP flesh /RP seeds decreased leptin by 47.3% and 52.6% respectively compared to HFHS group, also significantly increased adiponectin by 119.35% compared to HFHS group. In addition it decreased glucose level reached (43.8% and 44.5 %) by RP flesh and RP seeds respectively compare to HFHS group. Treatment also, significantly improved insulin, homeostasis model assessment-estimated insulin resistance (HOMA-IR), (G6PD), (IGF1) and lipid profile.

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ROUCTON

Introduction

In the past two decades, the world has seen a sustained increase in obesity, and the levels of overweight and obese persons worldwide have reached epidemic proportions ***(*Cao. *2014).***Currently about 1.5 billion people in the world are overweight,about 200 million men and 300 million women are obese. More than one in ten of the world's adult populations are obese. Overweight and obesity are the fifth leading risk for global deaths (***WHO.2014).***

Obesity is an excessive accumulation of energy in the form of body fat which impairs health. The main cause of obesity epidemic is clear: overeating, especially that of foods, which are rich in fats, extracted sugars or refined starches. This combined with decline in physical activity results in an imbalance of intake and expenditure of calories, resulting in excess weight and eventually obesity. Co-morbidities commonly associated with obesity include diabetes, cardiovascular and respiratory diseases, dyslipidemia, degenerative joint disease, stress incontinence and some form of tumors and other various diseases. Dyslipidemia is a widely accepted risk factor for coronary artery disease and is an important feature of metabolic syndrome. Obesity especially visceral obesity causes insulin resistance and is associated with dyslipidemia, impaired glucose metabolism, and hypertension all of which exacerbate atherosclerosis***(Singh et al., 2011).***

Recent researches demonstrate the potential of natural products to counteract obesity. These natural products are various and different including crude extracts or isolated pureproducts which can induce body weight reduction and

prevent diet-induced obesity. Therefore they can be used as a strategy for treating obesity***(Gamal et al., 2014).***

Hot red pepper *(Capsicum annuum L.)* is an important vegetable used for our daily consumption. Peppers are good sources of vitamins C and E, provitamin A, and carotenoids. Peppers also contain various phenolics and flavonoids.These compounds are antioxidants and can reduce harmful oxidation reactions in the body; thus consumption of peppers may prevent various diseases associated with free radical oxidation, such as cardiovascular diseases, cancer, and neurological disorders**.**Scientific research has proven that, *capsicum annum*, is the only crop that produce alkaloid compound called capsaicinoids especially capsaicin, which is responsible for the hot taste. Capsaicinoids are alkaloids that are important in the pharmaceutical industry for their neurological effectiveness.It's reported that capsaicin, the pungent principle in hot red peppers (RP), reduces hunger, stimulates thermogenesis, and alters substrate oxidation in humans***(Ludy and Mattes, 2011 and Ranajit et al., 2013).).***

Capsaicin, is the active ingredient of hot chili pepper, which is not only used as spice to foods, but also has antiobesity properties by causing the body to heat up, promoting expenditure of calories. Moreover there is epidemiological evidence for an association between consumption of capsaicinoid-containing foods and lower incidence of obesity. According to these animal and human studies, dietary capsaicin may be considered a functional agent that helps to prevent obesity.The effects of capsaicin on body weight and fat mass have been interpreted as due to