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Effect of Nano-Prepared *N. sativa* Seed Extract on Cardiac Tissue Structure in Tartrazine-Treated Male Albino Mice

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Abstract

This study investigates the effects of Tartrazine and N. sativa nanoparticles on body weight and cardiac histology in male albino mice. Thirty-six male mice were divided into four groups: a control group receiving physiological saline, a group treated with Tartrazine (20 mg/kg), a group receiving both Tartrazine and N. sativa nanoparticles (100 mg/kg), and a group treated solely with N. sativa nanoparticles (100 mg/kg). The body weights were chronicled before besides after management, and the fallouts were scrutinized expending SPSS version 24. The findings demonstrated a significant increase in body weight in the Tartrazine group compared to the control, suggesting that Tartrazine may influence metabolic pathways. Co-administration of N. sativa nanoparticles with Tartrazine resulted in an even greater increase in body weight, indicating a potential synergistic effect. However, N. sativa nanoparticles alone did not significantly impact body weight. Histological examination of cardiac tissues showed no structural changes in all treatment groups, indicating that the administered doses did not cause cardiotoxic effects. These results suggest that while Tartrazine significantly affects body weight, it does not alter cardiac histology under the conditions studied. The study aimed to elucidate the impact of newly synthesized nanoparticles on hemolytic anemia through the following specific objectives: Synthesis of iron nanoparticles. Preparation of N. sativa extract nanoparticles at varying concentrations., Investigation of the effects of N. sativa seed nanoparticles on cardiac health. Further research is desirable to sightsee the natural and molecular apparatuses causal these relations. These results collectively suggest that while Tartrazine significantly impacts body weight, it does not affect cardiac histology under the conditions studied. The addition of N. sativa nanoparticles seems to modulate the effects of Tartrazine on body weight, although the exact mechanisms remain unclear

Keywords: Heart, nanoparticles, *n. sativa*, tartrazine, Albino Mice

INTRODUCTION

Nanoparticles have received attention in scientific research due to their advantages and applications in multiple fields [1]. The size of nanoparticles is less than one hundred nanometers, and it is because of this small size that gives them distinctive properties compared to other materials that are larger in size [2]. Certain enquiry has publicized the habit of nanoparticles consequent from the aqueous quotation of *N. sativa* seeds, which is a curative plant branded for its various assistances. This research included studying the effect of nanoparticles of aqueous extract of *plant*. For illustration, it has an extraordinary exterior-to-volume fraction, which countenances for improved reactivity and enriched drug distribution competencies [3, 4]. Its other distinctive properties include stability, solubility, and cellular uptake [5].

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The *myocardium*, the thickest and most important layer, is composed of cardiac muscle fibers (cardiomyocytes) that are responsible for the contractile function of the heart. The *epicardium* is the outermost layer, containing connective tissue, blood vessels, and nerves, providing protection and support to the heart [6].

Physiology: The emotion occupations as a double impel to socialize blood over the general and respiratory circuits. The right side of the heart receives deoxygenated blood and pumps it to the lungs for oxygenation, while the left side pumps oxygenated blood to the rest of the body. The contraction and relaxation of the myocardium (systole and diastole) are regulated by electrical impulses generated by the sinoatrial node and conducted through the atrioventricular node, bundle of His, and Purkinje fibers [7].

Recent studies have explored various physiological conditions affecting the heart, such as heart failure and cardiomyopathies. For instance, research has shown that conditions like heart failure due to cardiomyopathy involve complex changes in myocardial structure and function, including fibrosis and altered ventricular compliance Advances in understanding the molecular mechanisms of these diseases can lead to better diagnostic and therapeutic strategies [8].

MEASURABLE AND ROUTINE

The study was directed on 24 male albino mice gotten via the Iraqi Midpoint for Tumor Investigation and Therapeutic Inheritances in Baghdad, elderly 9–11 weeks, and pondering 230–265 grams. The investigational animals were moved to the animal house and sited in plastic pens roofed with metal mesh concealments with scopes of 20 × 30 × 50 cm. The animals were provided with healthy drinking water, where the animals were divided into three groups the control group (6 mice) with only physiological solution, the group treated with tartrazine 20 mg/kg (6 mice), the group treated with tartrazine and nano-extract of black seed (6 mice) at a concentration of 100 mg/kg, the third group (6 mice) treated only with nano-quotation of dark seed at an awareness of 100 mg/kg.

N. sativa was procured since the arcades of Najaf/Iraq. It was then ground into powder in a grinding machine. Preparing the extract from *N. sativa* concentrate, this progression was supported out below the situations designated hitherto [9], and this route was done three epochs for six beings in a gloomy incubator shaker, then it was clarified with riddle paper. Subsequently that, the deposit was placid and parched in an emptiness oven seven times at 40°C that, the nano-extract of *N. sativa* was prepared using method [10] and then ground with an electric hand grinder and store in a clean box until use.

RESULT

The study results were analyzed using the statistical software package SPSS (Social Sciences), version 24. The T-Test was employed to calculate the differences in animal weights before and after treatment, and the F-test, through Analysis of Variance (ANOVA), was used to determine significant differences at the level of $P \leq 0.05$ among the earnings.

The Influence of Management with Tartrazine, Tartrazine Through *N. sativa* Nanoparticles, Besides *N. Sativa Nanoparticles* on the Overall Organization mass (kg) in Male Albino Mice

The results indicate a significant increase in the total body weight of mice treated with Tartrazine compared to the control group. The mean body weight in the Tartrazine group (20 mg/kg) was 337.4 ± 2.182 g, which was considerably greater than the control cluster (298.0 ± 13.9 g) with a P-data of 0.0044. Correspondingly, the collection pickled with Tartrazine then *N. sativa* nanoparticles (100 mg/kg) showed a further significant increase in body weight, with a mean of 383.3 ± 2.731 g and a P-data of 0.0040. However, in the group treated with only *N. sativa* nanoparticles (100 mg/kg), the mean body weight was 259.6 ± 4.488 g, and this change was not statistically significant compared to the control group, with a P-value of 0.3271. This suggests that while Tartrazine and its combination with *N. sativa* nanoparticles significantly influence body weight, the nanoparticles alone do not have a significant effect on the total body weight of the mice. Stand (Table 1) [1].

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Table 1. The influence of management through Tartrazine, Tartrazine using *N. sativa* nanoparticles, besides *N. sativa* nanoparticles on the overall organization mass (g) in male albino mice.

Total Body Weight/g	**Mean ± SD**	**P-value**	
Control	298.0 ± 13.9		
Tartrazine 20 mg/kg	337.4 ± 2.182	0.0044	Significant
Tartrazine with *N. sativa* nanoparticles 100 mg/kg	383.3± 2.731	0.0040	Significant
N. sativa nano-specks 100mg/kg	259.6 ± 4.488	0.3271	Non-Sign

Note: The statistics characterize the nasty (regular), while ± characterizes the normal mistake.

Influence of *N. sativa* Nano-Speck and Tartrazine Dye on Histological Assembly of Heart in Male Albino Mice

A histological longitudinal division of the cardiac muscle of test center white albino mice from the cluster conserved with physiological average saline (Figure 1) ratifications ordinary separated, Similarly, in the group treated with Tartrazine dye at 20 mg/kg and black seed nanoparticles at 100 mg/kg (Figure 2), and in the group treated solely with black seed nanoparticles at 100 mg/kg (Figure 3), no histological alterations in the cardiac muscle structure were noted (H&E 400X) (Figure 4).

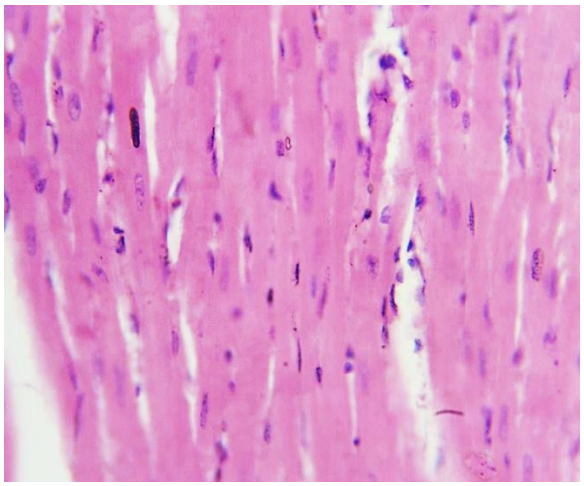

Figure 1. A histological Longitudinal section of the section of the cardiac muscle of a laboratory white albino mice in the group treated with Physiological normal saline, showing normal branched striated cardiac myocyte with intact intercalated discs, centrally located nuclei H&E 400X.

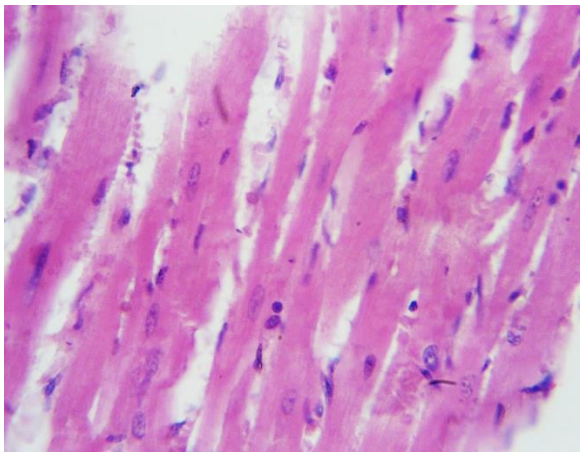

Figure 2. A histological Longitudinal segment of the division of the cardiac muscle of a test center white albino mice in the cluster preserved with Tartrazine colorant at a attentiveness of 20 mg/kg and management with nano-specks of black seeds at a attentiveness of 50 mg/kg, It is distinguished that there are no histological modifications in the erection of cardiac muscle H&E 400X.

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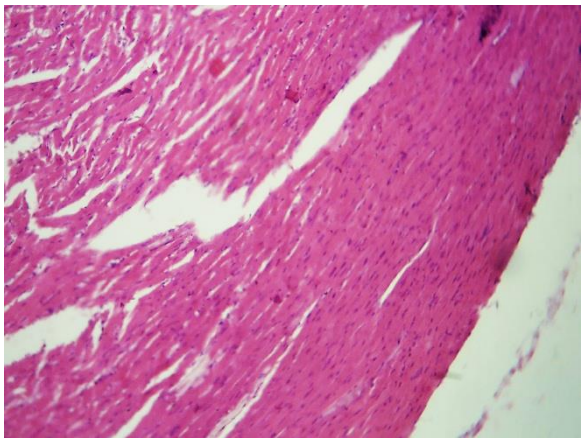

Figure 3. A histological Longitudinal segment of the division of the cardiac muscle of a test center white albino mice in the cluster preserved with Tartrazine colorant at a attentiveness of 20 mg/kg and management with nano-specks of black seeds at a attentiveness of 100 mg/kg, It is distinguished that there are no histological modifications in the erection of cardiac muscle H&E 400X.

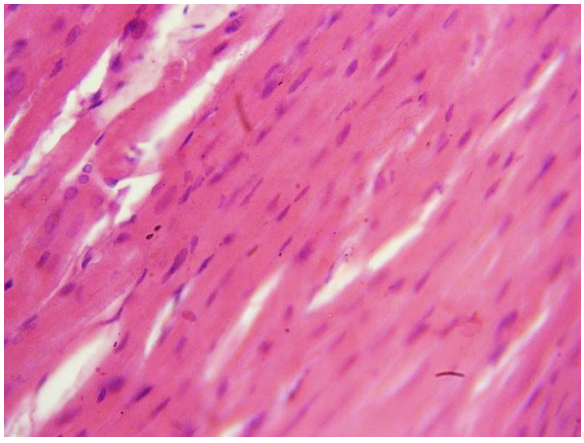

Figure 4. A histological Longitudinal division of the sector of the cardiac muscle of a workroom white albino mice in the clutch pickled with nano-specks of black seeds at an attentiveness of 100 mg/kg, It is eminent that there are no histological variations in the arrangement of cardiac muscle H&E 400X.

DISCUSSION

The study aimed to evaluate the effects of Tartrazine and *N. sativa* (black seed) nanoparticles on total body weight and cardiac histology in male albino mice. The statistical analysis using SPSS version 24 showed significant variations in body weight among different treatment groups. Mice treated with Tartrazine (20 mg/kg) exhibited a significant increase in body weight compared to the control group, suggesting a potential effect of Tartrazine on metabolic pathways or feeding. The co-administration of Tartrazine with *N. sativa* nanoparticles (100 mg/kg) resulted in an even greater increase in body weight, indicating a possible synergistic effect between Tartrazine and the nanoparticles. This combined treatment might influence metabolic activities, possibly through modulation of oxidative stress or inflammatory pathways, which have been linked to weight gain [11].

This indicates that while the nanoparticles might possess bioactive properties, they do not independently affect body weight in a manner like Tartrazine. *N. sativa* but have not demonstrated a direct influence on body mass when administered alone [12–14].

The histological examination of the cardiac muscle across various groups revealed no significant structural changes, irrespective of the treatment. In the control group treated with physiological saline, normal cardiac architecture with intact intercalated discs and centrally located nuclei was observed.

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Similarly, no histological alterations were detected in groups treated with Tartrazine alone or in combination with *N. sativa* nanoparticles, as well as in the group treated solely with the nanoparticles [15]. This suggests that, at the doses administered, neither Tartrazine no *N. sativa* nanoparticles induce cardiotoxic effects or alter the structural integrity of cardiac tissues in male albino mice [16, 17].

These results collectively suggest that while Tartrazine significantly impacts body weight, it does not affect cardiac histology under the conditions studied. The addition of *N. sativa* nanoparticles seems to modulate the effects of Tartrazine on body weight, although the exact mechanisms remain unclear. Further studies focusing on biochemical and molecular markers are needed to elucidate the interactions between Tartrazine, *N. sativa* nanoparticles, and their combined effects on systemic physiology and organ function [18].

CONCLUSIONS

The co-administration of Tartrazine with *N. sativa* nanoparticles (100 mg/kg) resulted in an even greater increase in body weight, indicating a possible synergistic effect between Tartrazine and the nanoparticles. This combined treatment might influence metabolic activities, possibly through modulation of oxidative stress or inflammatory pathways.

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