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Effects of Copaiba Oil on Myocardial Morphology in Streptozotocin-Induced Diabetic Rats

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INTRODUCTION

Diabetes mellitus is associated with cardiovascular complications, including structural and functional alterations of the myocardium. Copaiba oil (Copaifera spp.) has been traditionally used for its anti-inflammatory, antioxidant, and wound-healing properties. This study aimed to evaluate the potential cardioprotective effects of copaiba essential oil (OEC) on the myocardial morphology of diabetic rats.

METHOD

Male Wistar rats (70 days old, n=40) were divided into five groups (n=8 each): control (CT), control treated with OEC 200 mg/kg (C200), diabetic control (DC), diabetic treated with OEC 100 mg/kg (D100), and diabetic treated with OEC 200 mg/kg (D200). Diabetes was induced by intravenous streptozotocin (65 mg/kg). OEC was administered daily by gavage for 18 days. After euthanasia, the hearts were collected, weighed, and processed for histological and stereological analyses. Parameters included cardiosomatic index and volume densities (Vv) of cardiomyocytes, collagen, and blood vessels. Statistical analysis was performed using ANOVA with Tukey's post-test ($p<0.05$).

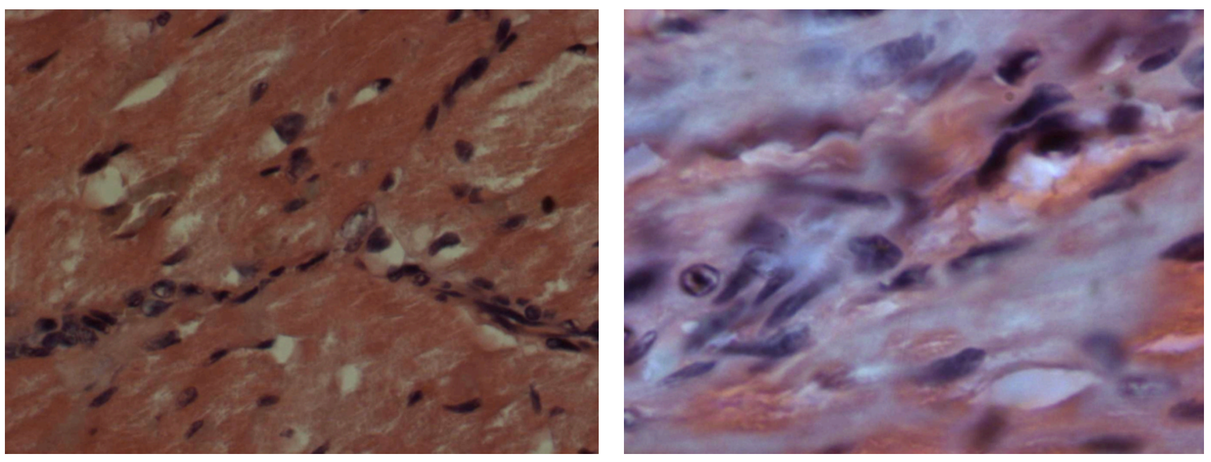
RESULTS & DISCUSSION

Diabetic animals showed significantly reduced body and heart weights compared to controls ($p<0.001$). However, no significant differences were observed among groups in cardiosomatic index or stereological parameters of cardiomyocytes, collagen, and vessels. Interestingly, OEC administration in diabetic rats was associated with worsened hyperglycemia, with final blood glucose levels exceeding those of untreated diabetic controls. No morphological evidence of cardioprotection or reduction of inflammatory infiltrates was detected.

Stereological data of cardiomyocytes, collagen, and myocardial vessels from the hearts of the control group (CT), OEC200 group (C200), diabetic with OEC100 (D100), diabetic with OEC200 (D200), and diabetic control (DC)

Groups	Vv % cardiomyocytes	Vv % collagen	Vv % myocardial vessels
CT	76,67 ± 8,2	21,58 ± 6,0	2,3 ± 6,4
C200	74,75 ± 4,3	19,98 ± 4,7	5,1 ± 3,5
D100	77,09 ± 2,9	19,87 ± 4,3	3,0 ± 2,3
D200	76,82 ± 4,5	17,90 ± 3,2	5,2 ± 3,5
DC	74,20 ± 5,7	21,84 ± 5,2	4,0 ± 3,1
p=	0,4881	0,5957	0,2801

Data wasn't considered relevant using the Anova software



Inflammatory cells in-between heart muscle cells

CONCLUSION

Copaiba oil did not promote cardioprotective effects in this model of type 1 diabetes. On the contrary, it aggravated hyperglycemia in diabetic rats, while producing only mild hypoglycemic effects in controls. These findings highlight the need for caution regarding indiscriminate use of copaiba oil in diabetic patients and underscore the importance of further studies addressing dosage, administration, and chemical composition standardization to better clarify its cardiovascular effects.

FUTURE WORK / REFERENCES

- Extend treatment period (> 8 weeks) and evaluate biochemical oxidative markers (MDA, SOD, CAT).
- Test higher doses (≥ 250 mg/kg) for pharmacological efficacy.
- Explore ultrastructural and molecular pathways of myocardial remodeling.

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