Antinociceptive Effect of *Pterospartum tridentatum* on Experimental Type II Diabetes

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Introduction

Painful Diabetic Neuropathy (PDN) is one of the most common complications of type-2 diabetes mellitus (T2DM)[1], yet efficient pain relief remains challenging[2]. *Pterospartum tridentatum*, an Iberian Peninsula native plant [3] used in folk medicine [3,4], displays significant antioxidant activity that could counteract oxidative stress caused by T2DM-induced vascular complications [5,6].

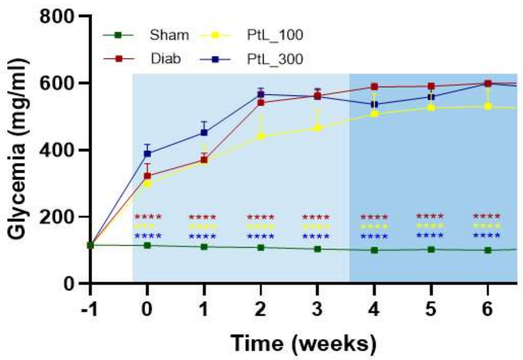
The **aim** of this work was **to evaluate** *in vivo* the antinociceptive and protective **effects** of ***Pterospartum tridentatum*** methanolic extracts in rats with **experimental T2DM**.

Materials and Methods

***In vivo* studies**	
Subjects	• Adult male rats, var. Wistar han
Animal model (week 0)	• Streptozotocin-nicotinamide model [7]
Treatment (daily gavage weeks 4-6)	- PtL extract - 100 mg/Kg (**PtL100**), n=7 - PtL extract – 300 mg/Kg (**PtL300**), n=7 - Vehicle solution - PBS (**Diab**, n=6 and **Sham**, n=6)
Glycemia	• Blood glucose test (weekly) [8]
Nociceptive behavior (weekly)	• Mechanical (Von Frey test [9]) and thermal allodynia (acetone test[9]); • Mechanical (Randal-Sellito test[10]) and thermal hyperalgesia (tail-flick test[11])
Histopathology	• Internal organs (liver, kidney, pancreas and spleen)
Statistical analysis	• GraphPad Prism software: ANOVAtwo-way

Results

Glycemia



Induction of **T2DM increased blood glycemia** in rats throughout the experimental period **independently** of **PtL treatment**.

Figure 1. Evaluation of blood glucose levels throughout the experiment.

Cold and Mechanical Allodynia

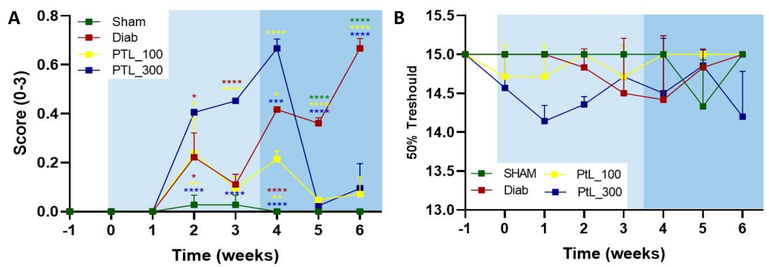


Figure 2 - Evolution of the thermal (A) and mechanical (B) allodynia throughout time.

T2DM animals developed **cold allodynia**, an effect **reversed** by **PtL treatment**

Hyperalgesia

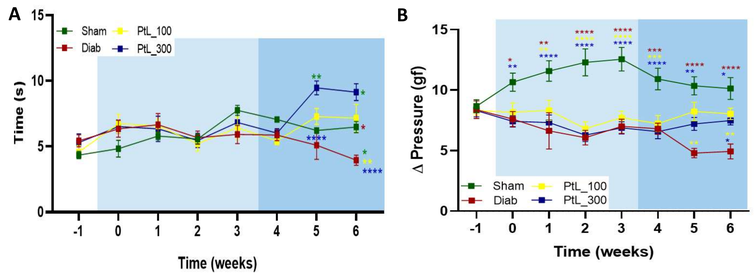


Figure 3 - Evolution of the thermal (A) and mechanical (B) hyperalgesia throughout time.

Both **PtL treatments reversed** thermal and mechanical **hyperalgesia**

Histopathology of Internal organs

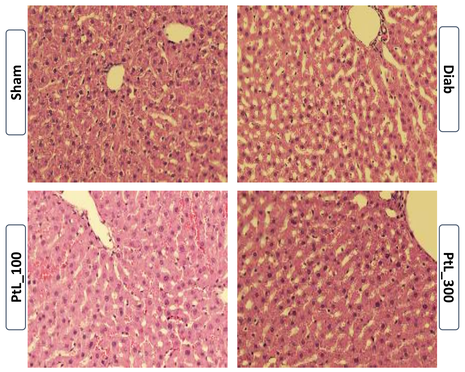
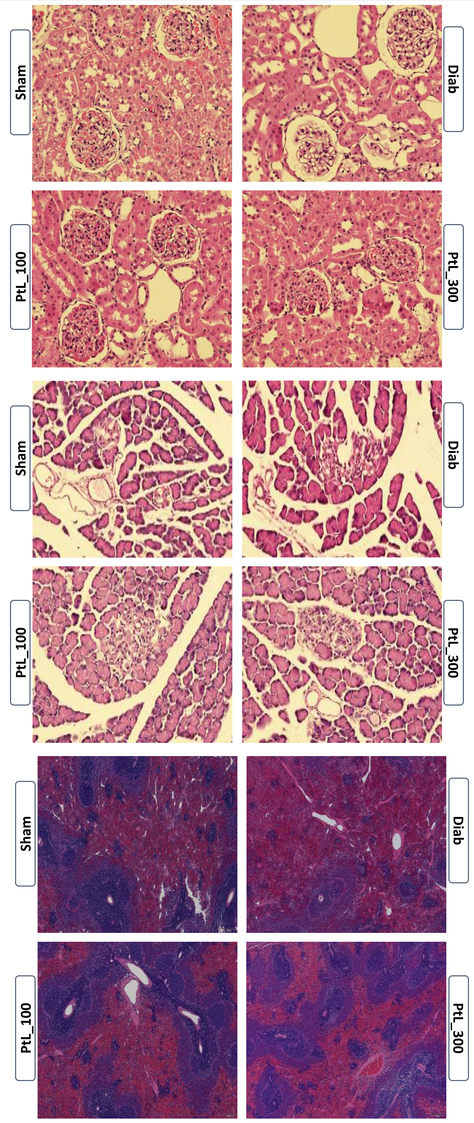


Figure 4 – Photomicrographs of Liver samples. H&E stain. Magnification 40x (scale bar - 50µM)

Both **PtL treatments** display **hepato-protective** effects, partly preventing morphological damage to hepatic **sinusoids**, **capillary hypertrophy**, and **cell vacuolization**.



Both **PtL treatments** partially **protected** from **parenchymal**, **podocyte** and **mesangial** cell **loss**, and decreased **proximal tubule** damage

Figure 5 – Photomicrographs of kidney samples. H&E stain. magnification 40x (scale bar - 50µM)

PtL treatments partially **protected** the citoarchitecture of the **Langerhans islets**, decreasing the dispersion in the **β-cells**.

Figure 6 – Photomicrographs of pancreatic samples. H&E stain. Magnification 40x (scale bar - 50µM)

Both **PtL treatments** partly **reversed** the **abnormalities** caused by experimental T2DM, to the **white and red pulp** in the spleen

Figure 7 – Photomicrographs of speen samples. H&E stain. Magnification 4x (scale bar - 200µM)

Conclusion

PtL extracts partially **prevented** the development/progression of **T2DM complications** at the behavioural and tecidular levels, highlighting its **potencial** as an **adjuvant therapy** for **diabetic patients**.

Reference

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