Toxicological evaluation and polyphenols characterization of *Pterospartum tridentatum* leaf extracts

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**Background:**

- *Pterospartum tridentatum* Willk. (prickled broom) is an autochthonous plant, common in Portuguese territory.
- Leaves are used in cooking, to flavour rice ("arroz de canqueje"), roast meat, game animals or as a condiment in salads.
- Despite its wide traditional use, no toxicological assessment of this plant has been performed previously.

**Goals:**

- Polyphenols characterization of *P. tridentatum* leaf water extract
- Evaluation of antioxidant activity of *P. tridentatum* extract
- Assessment of potential toxicological effects of *P. tridentatum* leaf water extracts.

**Chemical characterization:**

- Table 1: Resonance of major (M+H) ions observed in the ESI-MS spectrum of the aqueous extract of *P. tridentatum* leaves corresponding to phenolic compounds, with the indication of the mass product ions observed in their MS^2^ spectra.

**Polyphenols content:**

<table>
<thead>
<tr>
<th>Flavonoids</th>
<th>Phenols</th>
</tr>
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<tbody>
<tr>
<td>(catechin equivalents: mg</td>
<td>(GAE, mg Eq. g^-1</td>
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<tr>
<td>EGCG)</td>
<td></td>
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<tr>
<td>R. officinalis</td>
<td>88.08 ± 0.20</td>
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<tr>
<td><em>P. tridentatum</em></td>
<td>68.64 ± 0.42</td>
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</tbody>
</table>

**Toxicological evaluation:**

- The results suggest that in the range of concentrations used (up to 40 µg mg protein^-1^), the mitochondrial phosphorylative system is not directly inhibited by *P. tridentatum* leaves aqueous extract, as P/O ratio is not affected, although a partial dissociation between oxidative and phosphorylative systems must occur.

- A partial energetic uncoupling induced by *P. tridentatum* leaf extract, decreasing membrane potential was observed, suggesting a decrease in ROS production.

- Hence, the mild mitochondrial stress induced by the polyphenols present in *P. tridentatum* extract, act as horrimic stimuli and can account for the antioxidant properties of *P. tridentatum* observed in vitro and contribute also to a higher mitochondrial flexibility.

- Our results show that used as condiment, the daily dosages of *P. tridentatum* (a few grams/day) seem to be not harmful.

**References:**


**Figures:**

- Fig. 1 – Chromatographic profile of aqueous fraction of *P. tridentatum* leaves at 280 nm. The numbers on the figure correspond to the fractions that were collected for ESI-MS analysis.

- Table 1: Resonance of major (M+H) ions observed in the ESI-MS spectrum of the aqueous extract of *P. tridentatum* leaves corresponding to phenolic compounds, with the indication of the mass product ions observed in their MS^2^ spectra.