**Mentha aquatica** L. extract effects on mitochondrial bioenergetics

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**Background:**
- *Mentha aquatica* L. (water mint), a Lamiaceae, is a perennial herb common in marshes and damp places from the South-western Cape to tropical Africa, where it is used as a sedative and anticonvulsant.
- Due to its strong odor and particular taste, *Mentha aquatica* L. is used in food processing, to flavor beverages, ice-creams and candles.
- Despite its wide traditional use, no toxicological assessment of this plant has been performed.

**Results**

**Polyphenols characterization**

![Graph showing polyphenols characterization](image)

- Main polyphenols of *Mentha aquatica* extract:
  - Eriodictyol-O-rutinoside (identified as the major flavanone in *M. aquatica* accounting for almost 50% of the total quantified phenolic).
  - Phenolic acid, rosmarinic acid (46.2 ± 8.8 mg/g of extract).
  - Flavone, luteolin-7-O-glucoside (4.3 ± 10.0 mg/g of extract).
  - Flavone, naringenin-7-O-rutinoside (24.4 ± 3.7 mg/g of extract).
  - Bioflavonol, hesperitin-7-O-rutinoside (25.9 ± 3.6 mg/g of extract).

**Membrane potential & Respiratory indexes**

![Graph showing membrane potential and respiratory indexes](image)

- Mitochondrial parameters, RCR and uncoupled respiration are significantly decreased by *Mentha aquatica* ethanolic extract, either in the presence of glutamate + malate or succinate, as respiratory substrates, in the range of concentrations used (up to 25 μg plant extract per mg protein) → mitochondrial dysfunction, affecting respiratory chain.

**In conclusion,** the present study suggests that a high daily consumption of (ethanolic) extract of *M. aquatica* leaves, as a nutraceutical, should be regarded as hazardous due to its chemical composition and effects on mitochondrial OXPHOS. Nevertheless, the mild mitochondrial stress induced by the polyphenols present in *M. aquatica* extract, at lower dosages act as hormetic stimuli and can account for the antioxidant and anti-inflammatory properties of *M. aquatica* observed in vivo [1] and contribute to a higher mitochondrial flexibility [2].

**References:**