





NMR-based dissection of cocoa anti-amyloidogenic activity

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The research of foods and natural products to be employed as nutraceuticals has largely increased, becoming of great importance in the field of prevention against diseases lacking effective therapies, as Alzheimer's disease. In this context, we used an NMR-based approach to detect anti-A β molecules in natural edible matrices (*Salvia sclareoides*, green tea, green and roasted coffee, *Peucedanum ostruthium* and hop), in order to identify food and beverages able to provide the regular intake of natural compounds capable of interfering with toxic amyloidogenic aggregates.

Here we present a recent study on cocoa extracts.¹ Cocoa (*Theobroma cacao*) is a rich source of polyphenols and its beneficial effects for human health are well known, including anti-oxidant, anti-inflammatory and neuroprotective activities. However, the molecular mechanisms through which these biological activities are carried out have not been elucidated yet.

We analyzed extracts from *Lavado, Natural* and commercial cocoa (not fermented, fermented and industrially processed, respectively). In particular, the metabolic profile of *Lavado* cocoa was characterized for the first time by NMR spectroscopy, showing a significant difference with fermented and processed varieties in the contents of theobromine and flavanols.

A combined protocol, based on NMR spectroscopy, preparative reversed-phase (RP) chromatography, atomic force microscopy, *in vitro* biochemical and cell assays, was used to investigate and compare the potential anti-amyloidogenic properties of the cocoa extracts. *Lavado* variety was the most active and the catechins and theobromine were the chemical components of cocoa hindering A β peptide on-pathway aggregation and toxicity in a human neuroblastoma SH-SY5Y cell line. These findings support the use of *Lavado* cocoa extracts in the formulation of nutraceutical and functional foods useful for the prevention of Alzheimer's disease and other neurodegenerative diseases.

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References

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