

Multi-approach assessment of cinnamon as ingredient of functional foods.

Pagliari S.¹ (lead presenter) s.pagliari2@campus.unimib.it

Bruni I.¹, Guzzetti L.¹, Forcella M.¹, Fusi P.¹, Labra M.¹

¹ Department of Biotechnology and Biosciences, University of Milano-Bicocca, Piazza della Scienza 2, 20126, Milano, Italy.

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The "Food Social Sensor Network" (FoodNet) project focuses on the investigation of new plant matrices to find bioactive compounds that could provide support in the prevention of metabolic diseases by acting on the consumer's metabolism.

In particular, the cinnamon (*Cinnamomum* spp.) has been selected for its well-recognized hypoglycemic, antioxidant, hypolipidemic, anti-inflammatory, and antimicrobial properties.

In this project, samples of cinnamon from different countries were analysed to study their phytochemical and therapeutic characteristics.

Since the starting samples were not certified as commercial products, a preliminary molecular analysis using the DNA barcoding approach was carried out to authenticate the species.

Of the 8 samples studied, 4 were identified as *C. verum*, 1 as *C. cassia*, while 3 were not uniquely identified over the genus level.

The phytoextracts were produced from the same samples by aqueous extraction to obtain total water solubility. All the accessions were analysed to verify the content of bioactive phytochemicals, in particular polyphenols and some compounds such as cinnamaldehyde and cinnamic acid. The obtained result showed a polyphenolic composition ranging between 30% and 50% of the total extract, an amount of cinnamic acid ranging between 0.3% and 3.2%, while no cinnamaldehyde was detected.

In the context of functional food an *in vitro* digestion simulation has been developed to understand what happens to a functional extract at the digestive tract level, testing how bioactive molecules can be modified by digestive enzymes and extreme pH conditions.

In digested cinnamon extracts, polyphenols decrease by about 50% but still remain in significant quantities for the purposes of the study, while there was a significant increase of about 8 fold in the content of cinnamic acid, as a putative product of polyphenols degradation.

Finally, an extract of *C. verum*, both digested and undigested, was tested on healthy (CCD841) and cancerous (CaCo2, E705 and SW480) human colon cell lines to assess its bioactivity. The MTT assay revealed potential anticancer activity of the extract on the three cancer cell lines without showing cytotoxic effects on healthy ones.

In conclusion, this study demonstrated an antitumor activity of polyphenols and cinnamic acid in synergy with other molecules not yet identified.

