



## **Preventive anti-inflammatory effects of Brazilian Robusta coffee extracts**

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Coffee, one of the most widely consumed beverages in the world, is a major dietary source of many bioactive substances. Interestingly, many recent studies have shown that coffee consumption has potentially inverse correlations with chronic diseases such as cancer, cardiovascular disease, obesity and diabetes. Green coffee contains, as its main component, chlorogenic acid, which is known to have anti-inflammatory effects <sup>[1]</sup>. Roasting affects taste, colour, and aroma of coffee. The Maillard reaction, a major reaction during the roasting process, produces melanoidins <sup>[2]</sup>, which contribute to the overall antioxidant capacity and anti-inflammatory effects of coffee <sup>[3]</sup>.

In this work, coffee extracts were obtained before and after the roasting process. Moreover, roasted coffee extract was fractionated to separate high-molecular weight from low-molecular weight melanoidins. To evaluate the *in vitro* anti-inflammatory effects of green and roasted coffee extracts, we studied their capability of reducing the production of pro-inflammatory mediators. The pre-treatment of THP-1-derived macrophages, subsequently challenged with lipopolysaccharide (LPS), results in a reduced production of TNF-alpha. These results led us to investigate whether this anti-inflammatory property was linked to TLR4 receptor. Test performed using Hek-Blue hTLR4 cells showed a partial reduction of TLR4-mediated cytokine production due to the pre-treatment with coffee extract. Therefore, we decided to assess the putative preventive anti-inflammatory effect of coffee extracts on Caco-2 cells, an epithelial cell line which lacks cell surface expression of TLR4. Caco-2 cells pre-treated with extracts displayed a decreasing level of IL-8 production upon IL-1beta stimulation.

Taken together, these results suggest that roasting affects the preventive anti-inflammatory properties of coffee extracts. Remarkably, although chlorogenic acid is degraded during roasting, melanoidins produced within this process play an important role in the beneficial effects of coffee. The exact mechanism of action of melanoidins is currently under investigation.

## References

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<sup>&</sup>lt;sup>[3]</sup> Choi, S., Jung, S. and Ko, K. S. (2018) 'Effects of coffee extracts with different roasting degrees on antioxidant and anti-inflammatory systems in mice', Nutrients, 10(3). doi: 10.3390/nu10030363.