

## Processed coffee alleviates DSS-induced colitis in mice

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### **ABSTRACT:**

**Background:** Coffee is one of the most widely consumed beverages in the world and it has been demonstrated that it has important therapeutic activities not only because of its caffeine content but also owing to the presence of other biologically active small molecules such as chlorogenic acid, trigonelline and cyclopentadiones. However, chlorogenic acid is degraded into catechol, pyrogallol and hydroxyhydroquinone, which are thought to induce irritation of the gastric mucosa. To reduce the content of irritant compounds processing methods have been developed prior to roasting the coffee beans.

**Objectives:** The aim of this study was to study the anti-inflammatory and gastro-protective effects of processed coffee (Idee-Kaffee) on in LPS-treated human primary monocytes and in a murine model of colon inflammation (IBD model).

**Results:** In this study we have analyzed the effects on inflammatory events in cultured cells and in mice drinking a commercially available processed coffee. The processed coffee inhibited lipopolysaccharide (LPS)-induced proinflammatory cytokines such as interleukin (IL)-1 $\beta$ , tumor necrosis factor (TNF) $\alpha$ , IL-6 and IL-8, and other inflammatory mediators such as prostaglandin (PG)E<sub>2</sub> and 8-isoprostane in cultured human primary monocytes. Oral administration of dissolved processed coffee, i.e., in its usual beverage form, improved greatly the adverse macroscopic and histological features of dextran sodium sulfate (DSS)-induced colitis in mice in a dose-dependent manner. Processed coffee not only largely prevented DSS-induced colitis but also dramatically suppressed *in vivo* NF- $\kappa$ B and STAT3 activities through inhibition of I $\kappa$ B $\alpha$  and STAT3 phosphorylation. Furthermore, this soluble

coffee bean extract reduced the expression of proinflammatory cytokines TNF $\alpha$ , IL-11, and IL-6 and the expression of cyclooxygenase (COX)-2 in colonic tissues.

**Conclusions:** This work identified processed coffee as an anti-inflammatory beverage with the capacity to reduce substantially DSS-induced colitis as well as the colitis-associated cellular inflammatory events.

**Keywords:** coffee, Inflammatory Bowel Disease, NF- $\kappa$ B, STAT3, cytokines