

Epidemiological studies have shown that populations who consume plant foods rich in polyphenols have lower incidence of chronic inflammatory diseases. Polyphenols have been shown to modulate the inflammatory response by inhibiting secretion of pro-inflammatory cytokines. Raspberries are rich in polyphenols; thus, daily consumption can be an effective means of offsetting inflammation.

**Objective:** To investigate whether raspberry polyphenol extract attenuates the inflammatory response induced by lipopolysaccharide (LPS) in RAW 264.7 macrophages.

**Methods:** Raspberry polyphenol extract was prepared using methanolic extraction, followed by solvent evaporation and freeze-drying. RAW 264.7 macrophages were treated with 0, 50, 100, 200 and 400 µg/ml of raspberry polyphenol extract. After 2 h, cells were then treated with 100 ng/ml of LPS for 6 h. Cells were collected for protein expression analysis of signaling and inflammatory molecules via western blot. Results were analyzed using ANOVA followed by Tukey-Kramer post-hoc test.

**Results:** Treatment with 400 µg/ml raspberry polyphenol extract significantly decreased phosphorylation of NF-κB in LPS stimulated cells compared to LPS alone ( $0.07 \pm 0.03$  vs  $1.00 \pm 0.00$ ,  $P=0.005$ ). LPS treatment significantly increased the expression of interleukin-6 (IL-6), an inflammatory cytokine, compared to the control group ( $P < 0.0001$ ). Pre-treatment with 200 and 400 µg/ml of raspberry polyphenol extract significantly reduced IL-6 expression in LPS stimulated macrophages compared to LPS alone ( $0.52 \pm 0.01$  vs  $1.00 \pm 0.00$ ,  $P=0.004$ ;  $0.38 \pm 0.04$  vs  $1.00 \pm 0.00$ ,  $P = 0.0004$  respectively). The expression of the inflammatory cytokine IL-1β was significantly greater than control in LPS-only treated cells ( $P = 0.001$ ). However, treatment with 400 µg/ml raspberry polyphenol was not able to significantly prevent this effect ( $P = 0.08$ ).

**Conclusion:** Results indicate that raspberry possesses anti-inflammatory properties suggesting a possible role as a complementary and alternative therapy to prevent inflammation. However, *in vivo* and human studies are needed to confirm this.