

fermentlife®

TURMERIC



EVALUATION OF CYTOTOXICITY AND ANTI-INFLAMMATORY ACTIVITY

Aim

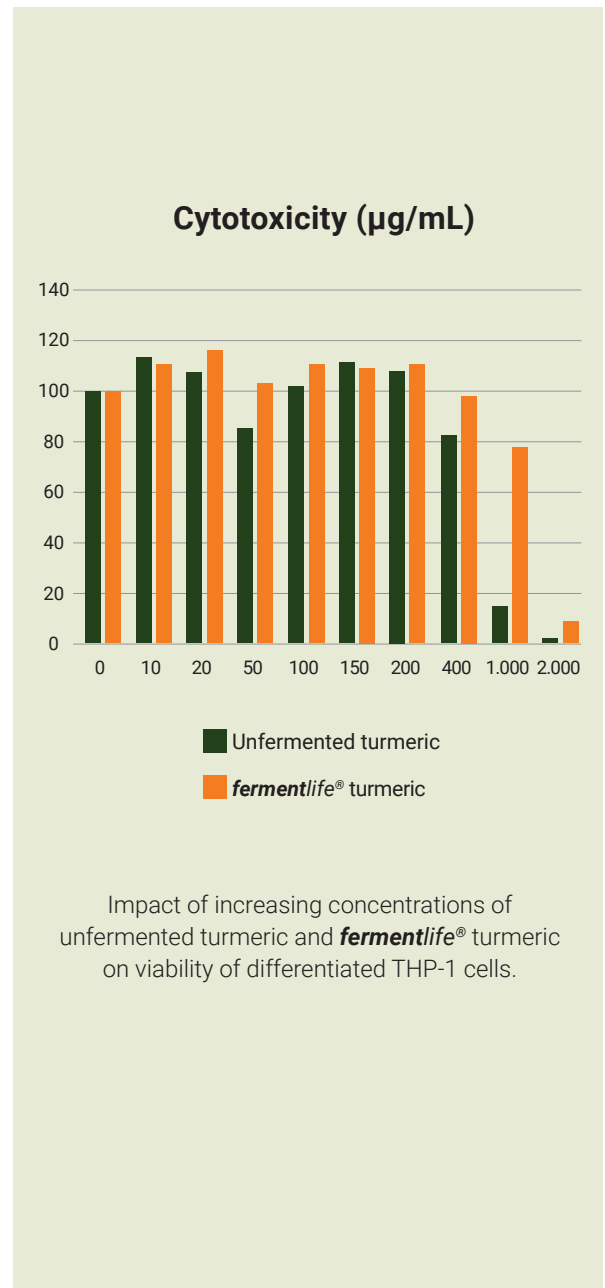
The study aims at determining cytotoxicity and anti-inflammatory activity of Cellavent's innovative raw material **fermentlife® turmeric**; a fermented turmeric product with strong post- and parabiotic activity.

A. Cytotoxicity

Method: Cytotoxicity of the samples was investigated on in vitro macrophages THP-1 model assessed by performing a dose-response curve at increasing concentrations with the aim of identifying the maximum non-toxic concentration. A formulation is considered cytotoxic if it reduces viability by more than 30% when compared with LPS-treated cells.

Results: Every substance is cytotoxic above a certain concentration. **fermentlife® turmeric** and unfermented turmeric raw material induce negative effects on macrophages viability with the highest non-toxic concentrations of 1.000 µg/mL for the fermented and 400 µg/mL for the unfermented version.

This means that the fermented matrix of **fermentlife® turmeric** is cytotoxic compared to the unfermented variant only at a 2.5-fold higher concentration and thus significantly safer. This reduction in cytotoxicity allows to conclude that fermentation-based metabolites induce protective effects. This is in line with studies showing less toxicity and higher viability of cells treated with lactic acid bacteria components, or their cell-free supernatant [1-4].



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B. ANTI-INFLAMMATORY ACTIVITY

Method: The anti-inflammatory activity of the sample was assessed on in vitro macrophage model by measuring the release of IL-1 β . Diclofenac, a well-known anti-inflammatory drug, was used as a positive control of anti-inflammatory activity while cells treated with LPS only were used as positive control of inflammation.

Results: The exposure at the pro-inflammatory stimulus LPS results in a significant increase in the release of IL-1 β . In the presence of Diclofenac, the release of IL-1 β is abolished, confirming its anti-inflammatory activity.

At a concentration of 1.000 $\mu\text{g}/\text{mL}$ **fermentlife**[®] turmeric completely suppresses the release of IL-1 β to 0.00 ± 0.00 pg/mL and thus proves strong anti-inflammatory activity.

Summary:

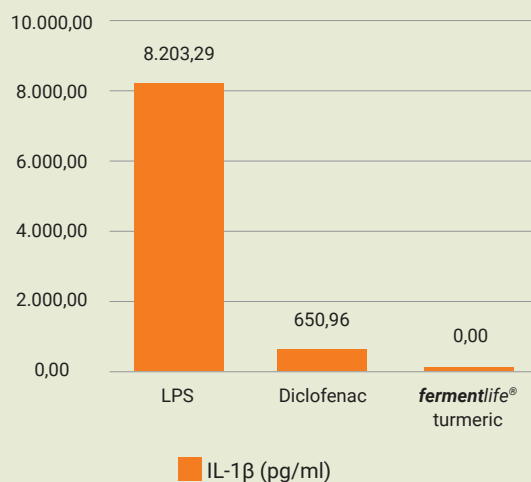
Considering the obtained results, **fermentlife**[®] turmeric is endowed with a high anti-inflammatory activity leading to the complete abolition of IL-1 β release from inflamed THP-1 cells. With its para- and postbiotic effect, based on the fermentative matrix changes as well as the proven anti-inflammatory effect, **fermentlife**[®] turmeric is a highly bioactive raw material, which is especially interesting for the target area of intestinal health.

References

- ¹ Yan, F., Cao, H., Cover, T. L., Whitehead, R., Washington, M. K., & Polk, D. B. (2007). Soluble proteins produced by probiotic bacteria regulate intestinal epithelial cell survival and growth. *Gastroenterology*, 132(2), 562–575.
- ² Yong, C. C., Yoon, Y., Yoo, H. S., & Oh, S. (2019). Effect of Lactobacillus Fermentation on the Anti-Inflammatory Potential of Turmeric. *Journal of Microbiology and Biotechnology*, 29(10), 1561–1569.
- ³ Lee, K., Kim, H. J., Kim, S. A., Park, S.-D., Shim, J.-J., & Lee, J.-L. (2021). Exopolysaccharide from Lactobacillus plantarum HY7714 Protects against Skin Aging through Skin-Gut Axis Communication. *Molecules* (Basel, Switzerland), 26(6).
- ⁴ Du, X., Rodriguez, J., & Wee, J. (2022). Dietary Postbiotics Reduce Cytotoxicity and Inflammation Induced by Crystalline Silica in an In Vitro RAW 264.7 Macrophage Model. *Foods* (Basel, Switzerland), 11(6).

Statistical analysis All data are presented as mean of three independent experiments. To determine if statistically significant differences between treatments were present, a t-test analysis was performed. The t-test is a statistical method used to test differences between two means. The differences between groups were considered significant if $p < 0.05$. All statistical analyses were performed with the OriginLab software.

Anti-inflammatory activity



IL-1 β expression reported as pg/mL following treatment of differentiated THP-1 cells with a pro-inflammatory stimulus LPS, anti-inflammatory Diclofenac and **fermentlife**[®] turmeric