

# Anti-inflammatory properties of black soldier fly larvae oil show promise for conditions such as ulcerative colitis

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Black soldier fly larvae. Credit: Entoprotech Ltd

Research conducted at The Hebrew University of Jerusalem has shed light on the anti-inflammatory properties of black soldier fly larvae

(BSFL) oil. Led by Prof. Betty Schwartz, from the Faculty of Agriculture, Food and Environment at the Hebrew University of Jerusalem, the study focuses on leveraging metabolomics to modulate toll-like receptor (TLR) signaling pathways. The findings hold significant promise for revolutionizing dietary approaches to inflammatory-related conditions, such as ulcerative colitis.

Ulcerative colitis, a persistent inflammatory bowel disease, often necessitates dietary adjustments. A pivotal factor is the profile of fatty acids within the diet. The research team's investigation delves into the anti-inflammatory potential of BSFL oil, rich in medium chain fatty acids (MCFAs) like C12:0, and its potential role in mitigating inflammation linked to [ulcerative colitis](#).

The study introduces an innovative methodology, comparing the anti-inflammatory effects of BSFL oil with those of C12:0 through the activation of cell lines (THP-1 and J774A.1) by TLR4 and TLR2. The research explores the protective effects of BSFL oil against acute colitis induced by dextran sulfate sodium (DSS). The study is published in the *International Journal of Molecular Sciences*.

The findings demonstrate that, while both BSFL oil and C12:0 suppress proinflammatory cytokines in lipopolysaccharide (LPS)-stimulated macrophages, only BSFL oil exhibits anti-inflammatory properties in Pam3CSK4-stimulated macrophages.

The study's insights extend to the genetic level, revealing that BSFL oil could potentially influence cellular energy utilization and immune function through signaling pathways such as mTOR and PPAR, facilitating the utilization of fats for energy. In contrast, the impact of C12:0 mainly revolves around cholesterol synthesis.

Additionally, the study identifies beneficial compounds within BSFL oil,

including eicosanoids, oxylipins, and isoprenoids, which appear to collaborate in quelling inflammation within the body.



Black soldier larvae oil. Credit: Entoprotech Ltd

The researchers ventured into an in vivo setting, where a diet enriched with BSFL oil (at 20%) yielded promising outcomes. This [dietary intervention](#) led to improvements in body weight restoration, decreased colon shortening, reduced splenomegaly, and an accelerated phase of secretory IgA response. These results underscore the innovative potential

of BSFL oil as a modulator of inflammation.

The researchers assert that these findings present compelling evidence of BSFL oil's potent anti-inflammatory characteristics and its capacity to counter inflammation associated with colitis.

The study's distinct insights into TLR2 and TLR4 activation for macrophage innate immune function could pave the way for groundbreaking strategies in managing [inflammatory diseases](#). Moreover, the identification of anti-inflammatory compounds in BSFL oil lays the groundwork for prospective investigations into precision [anti-inflammatory](#) approaches.

**More information:** Hadas Richter et al, Anti-Inflammatory Activity of Black Soldier Fly Oil Associated with Modulation of TLR Signaling: A Metabolomic Approach, *International Journal of Molecular Sciences* (2023). [DOI: 10.3390/ijms241310634](https://doi.org/10.3390/ijms241310634)

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