

# WULFENIA

International Journal of Multidisciplinary Research

ISSN: 1561-882X



**Volume 33 · Issue 4**

April 2026

[multidisciplinarywulfenia.org](http://multidisciplinarywulfenia.org)

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*Keywords: microbiome, gut health, dietary patterns, microbial diversity, geographic variations, Bifidobacterium*

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*Keywords: optimization, resource allocation, network systems, linear programming, heuristic methods, efficiency*

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