

17 UNDERGRADUATE RESEARCH CRITIQUE

Research Critique on “The Effects of Spirulina Under High-Intensity Interval Training on Levels of Nesfatin-1, Omentin-1, and Lipid Profiles in Overweight and Obese Females: A Randomized, Controlled, Single-Blind Trial”

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ABSTRACT

Introduction: Obesity is a significant issue considering health. When confronted with the problem, people suppose exercise to be the primary solution. However, bioactive supplementation is also an attractive way to manage obesity and physiological conditions. These days, the combinatorial effects of both methods highlight a powerful direction for improving health. Spirulina, a photosynthetic cyanobacteria, is a GRAS-level superfood in respect to its antioxidative and anti-inflammatory characteristics and high concentration of protein and minerals. For this reason, researchers have performed studies about the effect of spirulina supplements under several exercise conditions worldwide.

Purpose/Objective: Overweight and obese females were examined for their levels of nesfatin-1, omentin-1, and lipid profiles under spirulina supplementation and high-intensity interval training (HIIT).

Methods: The research follows a randomized, quasi-experimental controlled, and single-blinded with a pre- and post-test design. Twenty overweight and obese women (body mass index = 29.32 ± 3.01 kg/m², age = 21.55 ± 1.76 years) were randomly allocated into HIIT + spirulina ($n = 10$) and HIIT + placebo ($n = 10$). Running an anaerobic sprint test for HIIT protocol consists of six intervals at 35 m maximal speed runs, with a rest of 10 s in each trial (3 times/week, 4 weeks). The HIIT + spirulina group took 500 mg of spirulina pills twice daily for 4 weeks.

Results: The HIIT+spirulina group showed significantly increased serum levels of nesfatin-1 ($p < 0.0001$) but the HIIT + placebo ($p = 0.61$) group did not. Serum levels of nesfatin-1 were significantly different between the two groups ($p = 0.04$). In the case of omentin-1, its serum levels increased in both groups ($p < 0.05$), and there was no significant difference between the groups ($p = 0.49$). In addition, no inter- and intra-group differences were significantly observed in total cholesterol levels, triglycerides, low-density lipoprotein cholesterol, and high-density lipoprotein cholesterol between the groups ($p > 0.05$).

Conclusion: Overweight and obese females expressed increased levels of both nesfatin-1 and omentin-1 but not for the level of lipid profiles under spirulina supplementation and HIIT.

Critique: The primary significance of this work is that HIIT+spirulina increased serum levels of nesfatin-1 in overweight and obese females, not affecting lipid profiles. However, further discussion is needed on the design and results of the study since the results are unclear. Also, the authors acknowledge limitations of this study, even though the results are well worthwhile, due to very few reports of the combinatorial effect of spirulina and exercise on women. There are some limitations found in the work. As the authors acknowledge, a short experimental period, a low dose of spirulina pills, and an inadequate number of participants can be limitations. However, more importantly, the study should have had four experimental groups, adding HIIT(X)+spirulina, HIIT(O)+placebo to the pre-existing two groups. Having more groups would distinguish the effect of each factor from the overall response, as shown in others. Also, the authors might have expected dramatic variations of biomarkers in their design. However, the given ambiguous results except for nesfatin-1 might have led them to discuss experimental limitations instead of the results. The authors should have focused on the physiological meaning of the results in their design because the variations can be meaningful in women's health. Furthermore, this study verified that spirulina supplement influences biomarkers of this study for women despite some limitations. As the authors acknowledge, spirulina dose and training period are the main factors. Therefore, a statistical experimental design would be helpful to identify the sensitivity of each factor on responses. Fractional factorial designs are feasible because they are adequate to analyze results with limited participants.

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