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Postprandial leucine and insulin responses and toxicological effects of a novel whey protein hydrolysate-based supplement in rats

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Background

The purpose of this study was: aim 1) compare insulin and leucine serum responses after feeding a novel hydrolyzed whey protein (WPH)-based supplement versus a whey protein isolate (WPI) in rats during the post-absorptive state, and aim 2) to perform toxicological analysis on rats that were fed different doses of the novel WPH-based supplement over a 30-day period.

Methods

In male Wistar rats (~250 g, n = 40), serum insulin and leucine concentrations were quantified up to 120 min after one human equivalent dose of a WPI or the WPH-based supplement. In a second group of rats (~250 g, n = 20), we examined serum/blood and liver/kidney histopathological markers after 30 days of feeding low (1human equivalent dose), medium (3 doses) and high (6 doses) amounts of the WPH-based supplement.

Results

In aim 1, leucine levels were significantly higher at 15 min after WPH vs. WPI ingestion ($p = 0.04$) followed by higher insulin concentrations at 60 min ($p = 0.002$). In aim 2, liver and kidney histopathology/toxicology markers were not different 30 days after feeding with low, medium, high dose WPH-based supplementation or water only. There were no between-group differences in body fat or lean mass or circulating clinical chemistry markers following the 30-day feeding intervention in aim 2.

Conclusion

In comparison to WPI, acute ingestion of a novel WPH-based supplement resulted in a higher transient leucine response with a sequential increase in insulin. Furthermore, chronic ingestion of the tested whey protein hydrolysate supplement appears safe.

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