The Effect of Protein Encapsulation of Calcium Carbonate on the Bioaccessibility of Calcium using In Vitro Digestion

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1. Introduction

- In the intestine, calcium forms insoluble complexes with other dietary components such as phytate or oxalate, compromising absorption and supplement efficacy.²³
- Protein encapsulation may reduce this chelation and enhance the absorptive efficiency of calcium supplements through nanoprotection of calcium ions.³

2. Aim

To investigate the effect on calcium bioaccessibility of encapsulating calcium carbonate (CC) with caseinate.

3. Study Design

Equal concentrations of calcium from two calcium sources: CC and Caseinate-Encapsulated CC (CECC), separately underwent four in vitro digestion experiments, each with a different level of inhibitor, as outlined in figure 2.

4. Methodology

This study employed a static model of gastric and small intestinal digestion.¹ Each experiment was completed per tripliate.

5. Results

Figure 4 illustrates that protein-encapsulation did not influence calcium bioaccessibility in the absence of inhibitors.

6. Conclusion

- The results of this study illustrate the strong calcium-binding abilities of phytate and oxalate, however, do not support the use of caseinate-encapsulation to enhance the bioaccessibility of calcium from calcium carbonate.
- Further study is required to determine the effect of caseinate-encapsulation on in vitro and in vivo bioavailability.

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Bibliography