

Phenolic Compounds in Spray-Dried Berry Leaf Powders: Impact of Carrier Agents on *In Vitro* Bioavailability

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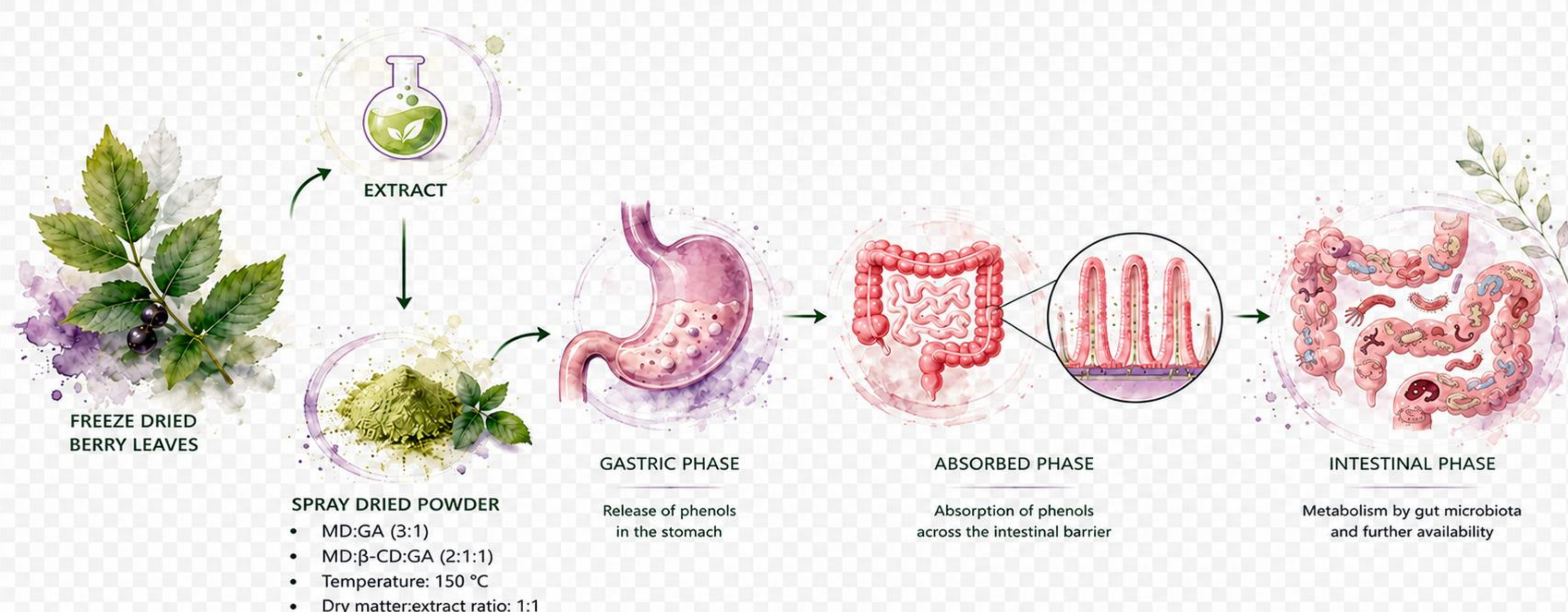
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INTRODUCTION

Berry fruit leaves are often considered waste and by-products, despite being a rich source of polyphenols with significant antioxidant and health-promoting properties. Due to their sensitivity to environmental conditions, stabilization is required to preserve their biological activity. Spray drying, combined with different carrier agents, represents an effective approach for protecting these compounds.

The aim of this study was to evaluate the influence of different carrier combinations (MD:GA and MD:β-CD:GA) during spray drying on the bioavailability of phenolic compounds from blackcurrant, redcurrant, blueberry, and chokeberry leaves, and to compare their bioavailability with that of the corresponding extracts.

MATERIAL AND METHODS



RESULTS AND DISCUSSION



The highest phenolic content was observed in the initial stages of digestion in both extracts and powders. Depending on the sample, 20–93% of phenolic compounds were available during the gastric phase, 1.60–4.65% were absorbed through the small intestine, and 13.90–64% remained available for the colonic microbiota. The higher polyphenol absorption observed for the non-encapsulated extract may be attributed to the slower release of bioactive compounds from the encapsulated system and their interactions with the carrier components. Although the encapsulation system effectively protected the bioactive compounds during digestion, it may have limited their release and, consequently, their availability for absorption under the conditions of the simulated gastrointestinal digestion.

CONCLUSION

In general, no substantial differences were observed between the carrier combinations regarding phenolic compound bioavailability. Blueberry leaves exhibited the highest phenolic content and the greatest bioavailability. The results indicate that spray drying effectively preserves phenolic compounds and enables their controlled release during digestion.

Picture 1. *In vitro* bioavailability of polyphenols from non-encapsulated and encapsulated a) blackcurrant b) redcurrant c) blueberry c) chokeberry leaf extracts obtained at same conditions with different carriers.