

RESUMO SIMPLES - CEXA - CIÊNCIAS EXATAS E DA TERRA

**INFLUENCE OF OVALBUMIN ON THE ANTIOXIDANT CAPACITY OF
PHENOLIC COMPOUNDS DURING IN VITRO DIGESTION AND INTESTINAL
LACTOBACILLUS FERMENTATION**

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Antioxidant capacity is a key bioactivity of phenolic compounds but can be significantly affected during gastrointestinal digestion. Protein–phenolic interactions may influence their stability and functionality, although their behavior under digestive conditions remains poorly understood. This study evaluated the effect of ovalbumin (24 mg/mL) on antioxidant capacity of gallic acid, caffeic acid, cyanidin-3-glucoside, and quercetin (62.5 mg/L each) during INFOGEST in vitro digestion followed by Lactobacillus fermentation (*L. brevis*, *L. plantarum*, *L. casei*, *L. johnsonii*, and *L. rhamnosus*). Antioxidant capacity was determined using the ORAC colorimetric method and measured by UV–Vis spectrophotometry. As expected, phenolic compounds exhibited high antioxidant

capacity in the undigested sample (1033 mg TE/L) and after gastric digestion (1018 mg TE/L), reflecting strong radical scavenging activity and stability under acidic conditions. After gastrointestinal digestion, a pronounced decrease was observed (226 mg TE/L), likely due to degradation, oxidation, and reduced reactivity under alkaline conditions. Following probiotic fermentation, antioxidant capacity became undetectable, suggesting microbial metabolism and transformation of phenolic compounds into lower-activity metabolites. In contrast, in the presence of ovalbumin, higher ORAC values were observed at all stages: 1219, 1215, 618, and 345 mg TE/L for undigested, gastric, gastrointestinal, and post-fermentation samples. This enhancement may be explained by formation of protein–phenolic complexes, which can improve phenolic solubility, reduce oxidation, and modulate their release during digestion. Notably, these effects were not attributed to a direct antioxidant contribution of ovalbumin, as samples containing only the protein showed measurable activity only after gastric digestion (213 mg TE/L), likely due to peptide formation. Thus, phenolic compounds remain the primary contributors to antioxidant capacity, while ovalbumin exerts an indirect protective effect. Overall, these findings highlight the critical role of food matrix interactions and digestive conditions in modulating phenolic stability and antioxidant functionality. Financial support from Fondecyt-ANID (Postdoctorado N°3240626; Regular N°1251474) is acknowledged.

Palavras-chave: egg albumin; antioxidant activity; simulated gastrointestinal digestion; bioaccessibility; lactic acid bacteria.