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Antioxidant potential and protein interactions of four tea plant extracts

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Polyphenols are a large group of natural organic compounds mainly found in plants with diverse protective and metabolic functions. Phenolic compounds are well known for their antioxidant properties and the name “antioxidant” is mostly associated with them¹. It’s also known that phenolic compounds, especially tannins, interact with proteins in various significant and distinct ways. This study was focused on examining these characteristics on aqueous extracts of tea plants local to Serbia (freshly picked *Satureja montana*, *Mentha spicata*, *Salvia officinalis* and *Matricaria chamomilla*), which are known to have various amounts and types of phenolic compounds. We examined total concentration of phenolic compounds, tannins, flavonoids, antioxidant activity and interactions with bovine serum albumin and whey protein. It was concluded that *S. montana* extract had the highest concentration of polyphenols and tannins. Flavonoid concentration was measured using the aluminium-chloride method and it was concluded that *S. officinalis* had the highest flavonoid content. Antioxidant activities were measured using DPPH, FRAP and ABTS, which are Single Electron Transfer (SET) mechanism-based antioxidant tests and ORAC which is a Hydrogen Atom Transfer mechanism-based antioxidant test. It was concluded that SET mechanism-based antioxidant activities correspond to the total concentration of polyphenols and tannins, which meant that *S. montana* extract had the highest antioxidant activity. *S. officinalis* extract exhibited the highest antioxidant activity measured by the ORAC assay, which corresponded to the highest Flavonoid concentration. Interactions between plant extracts and bovine serum albumin were measured via spectrophotometric and spectrofluorimetric titrations. It was concluded that *S. montana* exhibited most pronounced interactions with the protein. Nature of such interactions is still unknown but using SDS-PAGE it was concluded that proteins exhibit significant structural changes after interacting with plant extracts.

References

1. Bandyopadhyay P, Ghosh AK, Ghosh C. Recent developments on polyphenol-protein interactions: Effects on tea and coffee taste, antioxidant properties and the digestive system. *Food Funct* 2012;3:592–605.