



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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Preserving the 'Second Life' of Muscle Mass Through Dietary Antioxidants in Chronic Kidney Disease: A Scoping Review

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Objectives : Chronic Kidney Disease (CKD) inevitably triggers a progressive decline in skeletal muscle mass, a condition often termed "muscle wasting," which significantly impairs patient quality of life. This metabolic deterioration is heavily driven by systemic oxidative stress and chronic inflammation, which disrupt proteostasis and fuel catabolic signaling pathways. While conventional management focuses on protein intake, the potential of dietary antioxidants to mitigate this oxidative damage remains under-explored in clinical practice. This review aims to synthesize current evidence regarding the role of dietary antioxidants in preserving muscle mass and function across all stages of CKD.

Methods : Following the Joanna Briggs Institute (JBI) framework, we systematically screened peer-reviewed databases including PubMed and Scopus for literature published between 2021 and 2026. Studies were selected if they evaluated the impact of antioxidant-rich dietary patterns or specific supplemental antioxidants on muscle parameters in CKD populations.

Results : Analysis shows that bioactive compounds like polyphenols, vitamin E, and selenium help stabilize muscle protein turnover. Patients following plant-predominant diets, which are naturally rich in these antioxidants, show a lower risk of sarcopenia compared to those on restrictive diets. We also found that individual supplement use often shows inconsistent results, implying that the synergistic effects of whole-food diets are likely more effective for muscle preservation than isolated micronutrients. Emerging research also points to the Nrf2 signaling pathway as the primary mechanism through which these nutrients protect muscle tissue.

Conclusions : Dietary antioxidants provide a practical and safe strategy for preserving muscle reserves in CKD patients. Future clinical trials should focus on defining specific dietary combinations to better integrate these nutritional strategies into daily nephrology practice.