

## Chapter 8

### Flavonoids in Post-COVID (Long COVID) Recovery

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#### Abstract

The post-COVID-19 era has revealed a growing global health concern known as post-COVID syndrome, or long COVID, affecting nearly 40–50% of individuals following acute SARS-CoV-2 infection, regardless of initial disease severity. This condition manifests through a wide spectrum of persistent symptoms—most notably fatigue, cognitive impairment, mood disturbances, and chronic inflammation. More than 60% of affected individuals experience prolonged fatigue, while neurological symptoms such as memory deficits, executive dysfunction, and “brain fog” may persist for months or even years. The pathophysiology of long COVID is multifactorial, involving dysregulated immune responses, mitochondrial dysfunction, viral persistence, oxidative stress, and neuroinflammation.

In the absence of targeted therapeutic options, natural bioactive compounds—particularly flavonoids—have gained research interest for their potential role in managing post-COVID symptoms. Flavonoids, abundant in fruits, vegetables, teas, and medicinal plants, possess antioxidant, anti-inflammatory, immunomodulatory, and neuroprotective properties. Specific compounds such as quercetin, luteolin, and catechins have demonstrated the ability to modulate cytokine signaling, reduce oxidative stress, and enhance mitochondrial function, all of which are relevant mechanisms in long COVID.

Emerging evidence from preliminary studies and case reports suggests that flavonoid-rich interventions may help alleviate key post-COVID manifestations. Quercetin has shown promise in reducing lung inflammation and fibrosis, while luteolin has been linked to improvements in neuroinflammatory symptoms like brain fog. Furthermore, polyphenol-rich dietary patterns appear to enhance resilience against persistent post-viral complications. These findings highlight the potential of flavonoids as complementary therapeutic candidates for long COVID management.