



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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Antioxidant Effects of Kepel Fruit (*Stelechocarpus burahol*) For Future Perspective of Chronic Kidney Disease Diet: A Systematic Literature Review

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Objectives : Chronic kidney disease (CKD) is characterized by progressive loss of renal function and is strongly associated with elevated oxidative stress and inflammation, which contribute to nephron damage and progression to end-stage renal failure. Natural antioxidants have been explored as potential adjunctive agents to mitigate oxidative damage in CKD. *Stelechocarpus burahol* (Blume), commonly known as Kepel fruit, is an endemic Indonesian fruit traditionally used for medicinal purposes and increasingly studied for its high content of phenolic and flavonoid bioactive compounds with potent antioxidant properties. These phytochemicals may modulate oxidative processes that are also implicated in the pathophysiology of CKD, such as lipid peroxidation and decreased activity of endogenous antioxidant enzymes. Despite abundant preclinical research, the extent to which Kepel fruit antioxidants could influence oxidative stress and renal outcomes has not been systematically reviewed in the context of chronic kidney injury.

Methods : A systematic literature review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. PubMed, Embase, and Scopus were searched for studies published between January 2023 and January 2026 investigating antioxidant properties of *Stelechocarpus burahol* with relevance to oxidative stress and renal pathophysiology.

Results : Out of 112 titles identified, 87 full-text articles were screened, four studies met the inclusion criteria. Recent phytochemical and experimental studies demonstrated that Kepel fruit extracts possess strong antioxidant activity, with high levels of phenolic compounds, flavonoids, and anthocyanins capable of scavenging free radicals and reducing oxidative stress markers. Although no clinical studies in CKD patients were identified, the antioxidant mechanisms observed are biologically relevant to pathways implicated in CKD progression.

Conclusions : Current evidence suggests that *Stelechocarpus burahol* exhibits potent antioxidant properties with potential relevance to CKD pathophysiology. Further preclinical studies in kidney disease models and well-designed clinical trials are required to establish its nephroprotective efficacy in CKD patients.

Table 1 Kepel Fruit.jpeg



Author (Year)	Study Design / Population	Intervention / Exposure	Main Outcomes / Results	Authors' Conclusions
Sari et al., 2023	In vitro experimental study using standard antioxidant assays (DPPH, ABTS, FRAP)	Ethanollic extract of Kepel fruit pulp at varying concentrations	Demonstrated strong free radical scavenging activity in a dose-dependent manner; antioxidant capacity comparable to standard antioxidants	Kepel fruit extract possesses potent antioxidant activity and may reduce oxidative stress relevant to chronic degenerative diseases
Rahmawati et al., 2024	Phytochemical analysis of plant materials	Kepel fruit peel and flesh extracts	High total phenolic content (TPC) and flavonoid concentration; significant antioxidant index values	Kepel fruit is a rich source of natural antioxidants, supporting its potential therapeutic role in oxidative stress-related disorders
Putri et al., 2025	Systematic review of bioactive compounds from <i>Stelechocarpus burahol</i>	Analysis of phenolic acids, flavonoids, and anthocyanins	Consistent evidence of antioxidant and anti-inflammatory properties across experimental studies	Bioactive compounds of Kepel fruit may have nephroprotective relevance through oxidative stress reduction pathways
Lee et al., 2025	In vitro biochemical and cell-free assays	Purified Kepel fruit fractions enriched with polyphenols	Significant reduction in oxidative stress biomarkers and lipid peroxidation indicators	Kepel fruit fractions show strong antioxidant potential, supporting further investigation in oxidative stress-related diseases such as CKD

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