

**EFEK PEMBERIAN *LACTOCOCCUS LACTIS D4* TERHADAP
GAMBARAN HISTOPATOLOGI FIBROSIS GINJAL PADA TIKUS
MODEL *UNILATERAL URETERAL OBSTRUCTION***



Diajukan ke Fakultas Kedokteran Universitas Andalas sebagai pemenuhan salah satu syarat untuk mendapatkan gelar Dokter Spesialis Bedah Umum

Tesis

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ABSTRACT
**THE EFFECT OF *LACTOCOCCUS LACTIS D4* ADMINISTRATION
ON RENAL FIBROSIS HISTOPATHOLOGY IN RATS WITH
UNILATERAL URETERAL OBSTRUCTION MODEL**

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Background : Obstructive nephropathy is a common cause of chronic kidney disease (CKD), characterized by renal fibrosis due to urinary flow obstruction. *Lactococcus lactis D4*, a probiotic strain isolated from *dadiah* (a traditional fermented buffalo milk from Indonesia), has demonstrated potential anti-inflammatory and immunomodulatory effects, suggesting a therapeutic role in reducing renal fibrosis.

Objective : This study aims to evaluate the effect of *Lactococcus lactis D4* on renal fibrosis in a rat model of unilateral ureteral obstruction (UUO) using histopathological analysis with Sirius red staining.

Methods : A laboratory-based experimental study was conducted on male *Sprague-Dawley* rats aged 6-7 weeks. The rats were divided into three groups: Sham (laparotomy without UUO), P1 (UUO without *Lactococcus lactis D4*), and P2 (UUO with *Lactococcus lactis D4*). *Lactococcus lactis D4* was administered orally at a dose of 8×10^9 CFU/mL for 7 days. Histological analysis of renal fibrosis was performed using *Sirius red* staining, and quantitative assessment was done using *ImageJ* software. Data were analyzed statistically using *ANOVA* followed by *post-hoc* testing.

Results : The Sham group showed minimal fibrosis ($17.07 \pm 0.58\%$), while the P1 group experienced a significant increase in fibrosis ($28.68 \pm 3.27\%$, $p = 0.013$). The P2 group, which received *Lactococcus lactis D4*, exhibited a significant reduction in fibrosis ($7.11 \pm 1.14\%$, $p = 0.001$), lower than both the Sham and P1 groups. Statistical analysis showed significant differences in fibrosis levels among the groups ($p = 0.001$).

Conclusion : *Lactococcus lactis D4* significantly reduced renal fibrosis in the UUO rat model, indicating its potential as a therapeutic agent for inhibiting renal fibrosis.

Further studies are required to explore the molecular mechanisms and clinical applications of *Lactococcus lactis D4* in renal fibrosis and chronic kidney disease.

Keywords : obstructive nephropathy, renal fibrosis, *Lactococcus lactis D4*, unilateral ureteral obstruction, probiotics, kidney disease