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Effects of lemongrass (*Cymbopogon citratus*) on blood profile and uric acid levels of rats

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ABSTRACT: Lemongrass (*Cymbopogon citratus*) is a medicinal plant with antioxidant and antimicrobial properties. This study evaluated the effects of 20% and 80% lemongrass infusion on haematological profiles and uric acid levels in Sprague Dawley rats. Thirty rats were assigned to three groups: control, 20% infusion, and 80% infusion groups. The results showed no significant differences (P>0.05) in haematological parameters, although fluctuations in erythrocyte and leukocyte indices occurred. The 80% infusion reduced erythrocyte parameters, suggesting potential hypochromic macrocytic anaemia, while the 20% infusion reduced leukocyte counts and uric acid levels. These findings indicate that lemongrass infusion has immunomodulatory and anti-hyperuricemic effects, although higher concentrations may affect erythrocytes.

Keywords:
erythrocytes, lemongrass, leukocytes, rats, uric acid

■ INTRODUCTION

Lemongrass (*Cymbopogon citratus*) is a medicinal plant with antibacterial, anti-inflammatory, antioxidant, and antimicrobial properties. Its essential oil contains citral, which is known for its antimicrobial activity, along with flavonoids, terpenes, tannins, phenolics, and ascorbic acid (Howarto *et al*. 2015). These compounds reduce inflammation and boost immune responses. Flavonoids act as antispasmodic agents, benefiting patients with neurological disorders (Shah *et al*. 2011). Lemongrass exhibits antioxidant, antidiabetic, and antimalarial effects, and its citral-based aroma has anxiolytic properties (Ariska & Utomo 2020).

Studies have explored physiological effects of lemongrass supplementation on hematological parameters, lipid profiles, immune responses, and biochemical indicators in broilers (Al-Awadi *et al*. 2020), lambs (Al-Janabi *et al*. 2023), quails (Alagawany *et al*. 2021), and rodents (Ekpenyong *et al*. 2015). These studies examined dietary supplementation and essential oil extract. Evidence on the effects of lemongrass infusion at varying concentrations on blood profiles and uric acid levels remains limited. This study aimed to evaluate effects of 20% and 80% lemongrass infusion on blood profiles and uric acid levels in rats.

■ MATERIALS AND METHODS

This study used a completely randomised design (CRD) with 30 ten-week-old male Sprague Dawley rats randomly divided into three groups: control, 20% lemongrass infusion, and 80% lemongrass infusion. After a two-week acclimatisation, the rats received 1 mL of infusion daily for two weeks, with food and water ad libitum. Blood samples were collected in week 2 from the lateral caudal vein under local anaesthesia. Uric acid levels were measured using an EasyTouch GCU meter. The remaining 0.1 mL of blood was collected in EDTA tubes and analysed using an Alovision HM560V analyser for haematological parameters. Data were analysed using analysis of variance (ANOVA).

■ RESULTS AND DISCUSSION

Figure 1 shows no significant differences in haematological parameters among rats treated with 20% and 80% *Cymbopo-*

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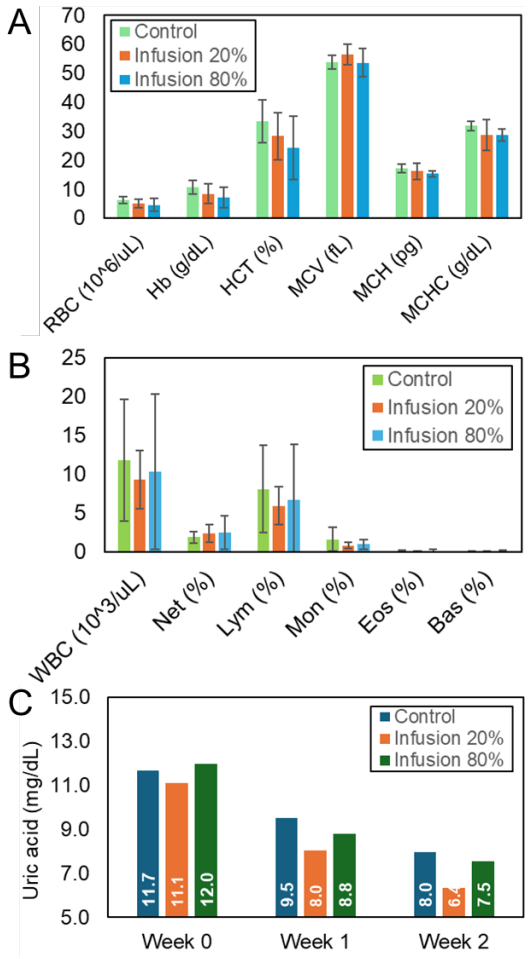

Figure 1. Hematological profile and uric acid of rats after administered lemongrass infusion. (A) Red blood cell, (B) white blood cells, and (C) uric acid levels. Note: red blood cell (RBC), haemoglobin (Hb), haematocrit (HCT), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), mean corpuscular volume (MCV), white blood cells (WBC), neutrophil (Net), lymphocyte (Lym), monocyte (Mon), eosinophil (Eos), and basophil (Bas).

gon citratus infusions compared to controls (P>0.05), despite fluctuations. The 80% lemongrass infusion reduced the RBC count, HGB, and HCT levels, decreased the MCH and MCHC, and increased the MCV. This suggests normocytic or mildly macrocytic hypochromic anaemia, possibly due to bone marrow toxicity or oxidative stress. In hypochromic macrocytic anaemia, reductions in HGB and HCT levels are common (Rahayu *et al*. 2017).

Lemongrass infusion affects the leukocyte profile. The 20% infusion reduced leukocyte, lymphocyte, and monocyte counts compared to the control, indicating immunosuppression from citral and flavonoids in *Cymbopogon citratus* (Shah *et al*. 2011). Higher neutrophil, eosinophil, and basophil counts in the 80% infusion group indicate immune response activation, as citral promotes immune cell recruitment (Tavares *et al*. 2015). Lemongrass infusion modulates leukocyte dynamics based on its concentration.

In addition to haematological effects, the lemongrass infusion influenced uric acid levels. The 20% infusion reduced uric acid concentrations more effectively than the 80% infusion, showing anti-hyperuricaemic activity. This effect stems from bioactive compounds such as flavonoids, saponins, and citral, which exhibit diuretic properties and may inhibit xanthine oxidase activity (Adeneye & Agbaje 2007). This reduction may be related to the antioxidant activity of lemongrass, which can decrease oxidative stress and inflammation associated with hyperuricaemia (Ariska & Utomo 2020).

■ CONCLUSION

The haematological profiles of rats receiving 20% and 80% lemongrass infusion showed no significant changes. However, erythrocyte parameters declined in the 80% group, suggesting potential hypochromic and macrocytic anaemia. The 20% infusion decreased total leukocyte, lymphocyte, monocyte counts, and uric acid levels.

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