

Eurotium cristatum alleviates hyperuric acid-induced renal injury by regulating uric acid metabolism

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Abstract:

Introduction: Hyperuricemia is a direct consequence of abnormal uric acid metabolism. Currently, dietary intervention is recommended and increasingly accepted by patients as a preventive or complementary non-pharmacological treatment for hyperuricemia. *Eurotium cristatum* (*E.cristatum*), the dominant strain in Fu brick tea, functions to improve metabolism, inhibit pathogens and regulate intestinal flora. However, few studies have directly demonstrated that *E.cristatum* can have an ameliorative effect on hyperuricemia.

Materials and Methods: We first isolated *E.cristatum* from Fu brick tea in this study. Mice were then divided into normal, model, *E.cristatum* and inactivated *E.cristatum* groups. The hyperuricemia model was established by gavaging potassium oxonate and adenine. After treatment, plasma and urine uric acid, creatinine and urea nitrogen levels were determined. Kidney pathology was detected by hematoxylin-eosin staining, Masson's staining and immunohistochemistry. To investigate the renoprotective effect of *E.cristatum*, the mRNA expression levels of inflammatory and profibrotic factors in the kidney were detected. Furthermore, the expression of uric acid transporter and xanthine oxidase were detected to analyse the effect of *E.cristatum* on uric acid metabolism.

Results: We have successfully isolated *E.cristatum* from Fu brick tea, and when we further investigated its effect on hyperuricemia, we found that *E.cristatum*, especially active *E.cristatum*, can effectively reduce plasma uric acid, creatinine and urea nitrogen levels, and promote urinary uric acid excretion. The uric acid-lowering effect of *E.cristatum* may be mediated by inhibiting uric acid-producing xanthine oxidase and promoting the expression of transporters that facilitate uric acid excretion. In addition, *E.cristatum* has an ameliorating effect on kidney damage caused by high levels of uric acid.

Conclusions: *E.cristatum* could effectively alleviate hyperuricemia through kidney protection and effects on uric acid metabolism.