

**Potential use of *Pennisetum purpureum* for phytoremediation and bioenergy
production: a mini review**

ABSTRACT

Organic and/or heavy metal pollutants in soil and wastewater can be remediated by phytoremediation. Phytoremediation combines the disciplines of plant physiology, soil microbiology and soil chemistry. There are several ways by which plants extract, stabilize, filtrate, volatilize or degrade the contaminants. However, the effectiveness of phytoremediation relies upon the type of plant used. *Pennisetum purpureum*, commonly referred to as Napier grass, is one of the exceptional phytoremediators due to its rapid growth rate and ability to survive in highly contaminated soils. In the present review, the potential use and applicability of *P. purpureum* to remediate various contaminated areas was highlighted and comprehensively discussed, especially the five phytoremediation mechanisms involved (i.e., phytodegradation, phytoextraction, phytofiltration, phytostabilization, phytovolatilization). The application and management of *P. purpureum* in soil and wastewater phytoremediation were also critically presented. The coupling of phytoremediation and bioenergy is the zero-waste concept that can be applied since *P. purpureum* contains high lignocellulosic content that can be utilized as carbon source for biofuel production, such as ethanol and butanol.

Keyword: Napier grass; Phytodegradation; Phytoextraction; Phytofiltration; Phytostabilization; Phytovolatilization