

***Prinsepia utilis* Royle meal extract as a green and effective inhibitor for corrosion of cold rolled steel in H<sub>2</sub>SO<sub>4</sub> and HCl solutions**

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**Abstract:** Plant corrosion inhibitors than traditional corrosion inhibitors have the advantages of low price, green, easy to produce and attracted much attention; this study uses ultrasound-assisted extraction method to prepare a new type of *Prinsepia utilis* Royle meal extract corrosion inhibitor (PURME), through the weight loss, electrochemical and surface analytical techniques to study the corrosion inhibition of cold rolled steel in sulfuric and hydrochloric acid solutions PURME and the mechanism of action. The results showed that PURME had good corrosion inhibition effect on cold rolled steel in both sulfuric acid and hydrochloric acid, and the corrosion inhibition performance reached 89.25% and 91.28% at 20 °C, respectively. The electrochemical test results show that PURME is a hybrid corrosion inhibitor which mainly inhibits the cathodic reaction, and the whole corrosion inhibition process is controlled by charge transfer, and its corrosion inhibition mechanism is the “geometric coverage effect”. Surface tests show that PURME can reduce the surface roughness and corrosion of steel sheets, and PURME is mainly composed of flavonoids and phenols, which can be adsorbed on the steel surface to form a dense protective film; quantitative calculations were carried out to further illustrate the adsorption behavior of PURME on the surface of the steel and the interactions with the metal surface.

**Keywords:** prinsepia utilis royle meal; corrosion relief; sulfuric acid; hydrochloric acid; cold-rolled steel

### Reference

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