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RESEARCHARTICLE

**Instrumental Investigations studies of green Inhibition Potential
(Case Study: *Zea mays* cobs extracts on mild steel in Acidic Medium)**

Obagboye Fredrick O., Olasehinde Emmanuel F., Oyewumi Mayowa, Tomilawo Busayo A.

Federal University of Technology, Akure

*Corresponding Author E-mail: obagboye.19@gmail.com

ABSTRACT:

The inhibitive effects of acid extracts of *Zea mays* cobs on the corrosion of mild steel in 1M H₂SO₄ solution were investigated using spectrophotometric method for determination of phytochemicals, Infrared Measurement (FT-IR) to determine the compound contained, Atomic absorption spectrometry (AAS) to study dissolution rate and scanning electron microscopy with energy dispersive X-ray spectroscopy (SEM-EDX) to study the surface morphology of mild steel before immersion in acid, after immersion without the presence of inhibitor and after immersion in the presence of inhibitor. Result of the research shows positive indication that *Zea mays* cobs contains phytochemical that can inhibits corrosion caused by the acid. The FT-IR studies revealed the presence of functional groups such as -NH₂, ROR, -C=C-, -COOH, -C=O, and -CONH₂ in the extract. The SEM-EDX and AAS result confirms that the extract reduced the corrosion rate of mild steel, hence, reduced the dissolution rate of the iron.

KEYWORDS: Instrumental, Characterization, AAS, SEM-EDX, FT-IR, *Zea mays*, Mild steel, Corrosion

INTRODUCTION:

Corrosion is a global challenge facing industry involved in the use of metals for plants or machineries [1, 2, 3]. which is mainly because of processes that result from contact of metal with reactive medium [4, 5]. The processes of corrosion are fast especially after disruption of the surface protective barrier of the corroding material and this is collaborated with different forms of reactions that changes the composition and properties of the metal surface [6].

Corrosion inhibitors are compounds that are added in small quantities to an environment to prevent corrosion of metal [7]. In the fight against corrosion, different inhibitors have been introduced which are classified into synthetic and natural inhibitors. The synthetic inhibitors are toxic and not environmentally friendly. They contain compound like moly- dates, phosphates Sulphur and oxygen which make them to be unsuitable for the purpose [8]. The natural inhibitors which are also known as green inhibitors characteristics include non-toxic, harmless environmentally friendly, biodegradable and cheap [9]. The action of a corrosion inhibitor is characterized by the reduction in rate of either anodic reaction or cathodic reaction or both. Study has shown that natural inhibitors potency is attributed to their content which include hydroxyl (-OH) group, carboxylic acid (-COOH) group, amide (-CONH₂) group etc. [10].

Recent researches on corrosion inhibition had centered on natural inhibitors which are non-toxic, eco-friendly and readily available obtained from plants. Some natural materials that have been reported to have corrosion inhibitory properties include *Tithonia diversifolia*, *Carica papaya*, *Murraya umbellate*, *water hyacinth*,

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