

GRG TRUST RESEARCH PROJECT

Development of natural organic biopolymers as implant biomaterials/ Eco-friendly green corrosion inhibitors

PI: **Dr. Subramanian Chitra**

Co PI: -

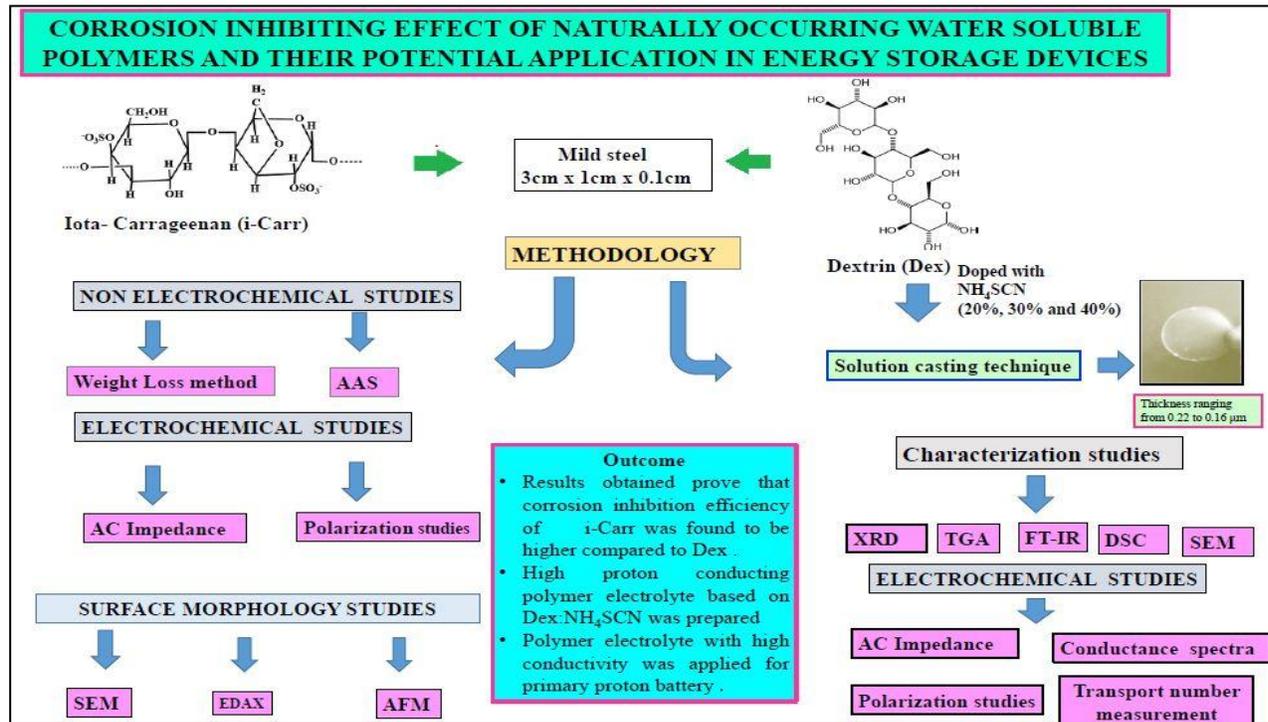
Amount Sanctioned: **Rs. 5,00,000**

Year: **2017-19**

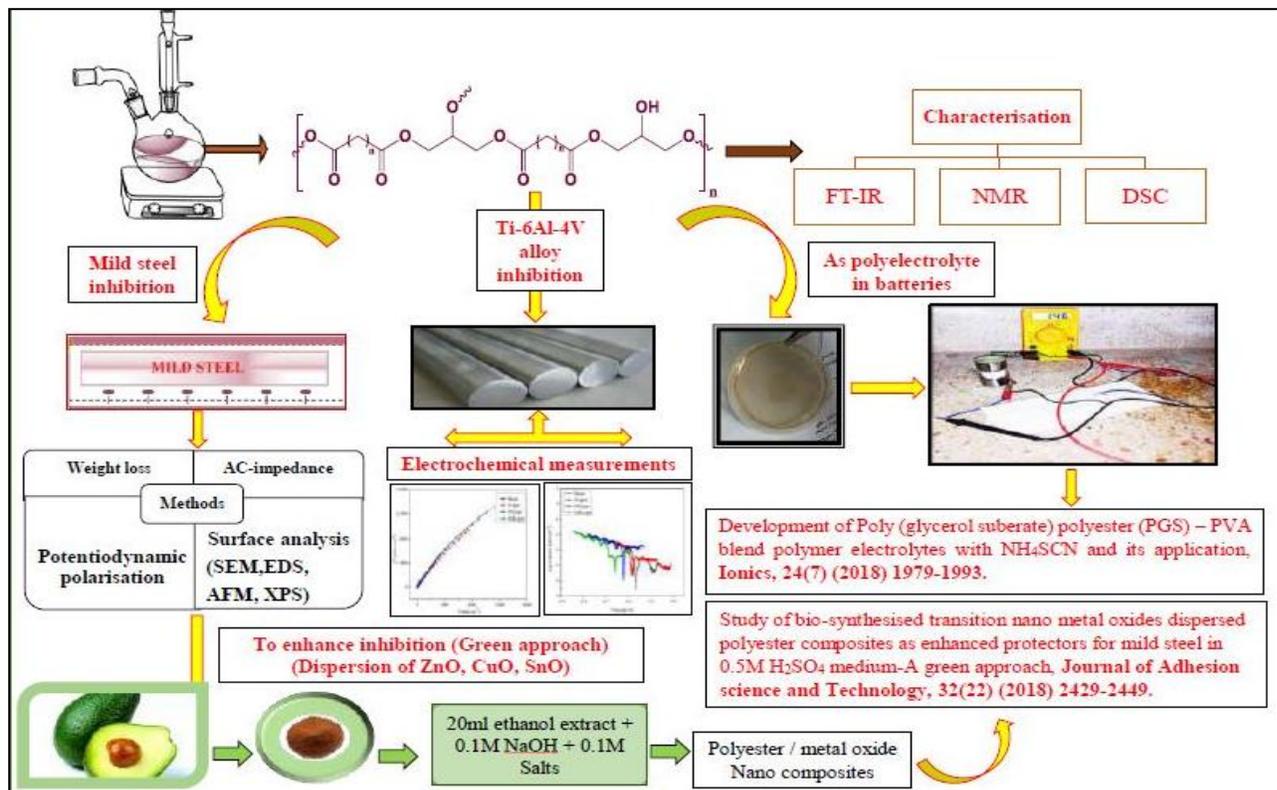
Project outcomes:

- ✓ Electrochemical and Non- electrochemical investigations were carried out to reveal the better inhibition property of the various inhibitors like naturally occurring polymers, synthesized polyesters and plant materials.
- ✓ Surface morphology studies like UV- Visible, FT-IR, Raman, XRD, SEM-EDS and AFM were employed to confirm the formation of a protective layer on the mild steel.
- ✓ Best inhibitors were adapted for further applications such as
 1. In energy storage devices
 2. Corrosion inhibitor for reinforced steel material
 3. Modification of synthesized polyesters to bio-synthesized nano-metal oxides polyesters for inhibition of mild steel in acid medium
 4. Corrosion mitigator for biomaterials like Titanium alloys
 5. Encapsulation of plant material in to nano clay for corrosion inhibition on mild steel.
 6. Enhancement of corrosion inhibition property of synthesized organic compounds using antibiotic drugs.

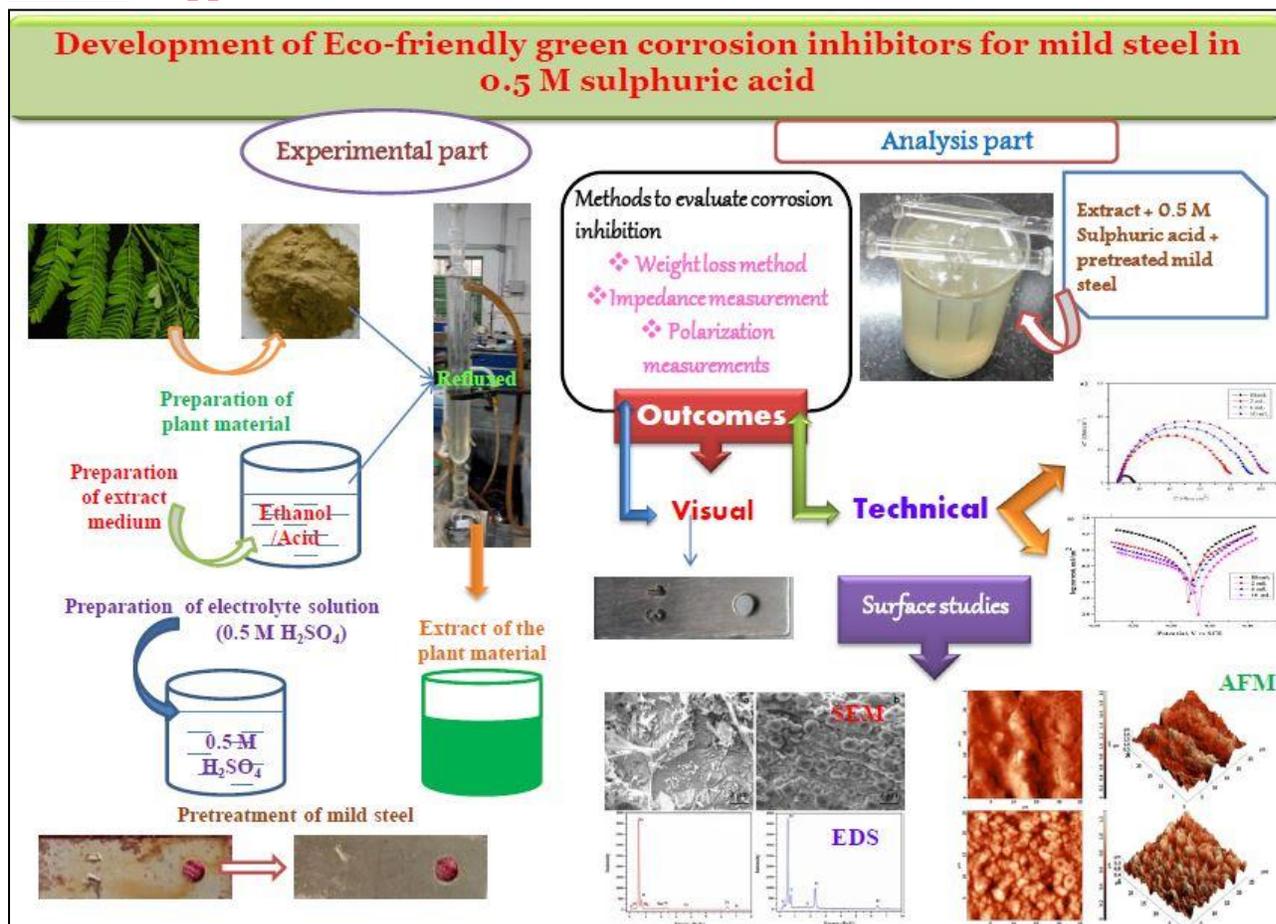
Part I : Application of naturally occurring water soluble polymers



Part II : Application of synthesized polyesters



Part III : Application of Plant materials



❖ Publications:

1. Development of poly(glycerol suberate) polyester (PGS)–PVA blend polymer electrolytes with NH₄SCN and its application, **Ionics**, 2018, 1-15.
2. Study of bio-synthesised transition nano metal oxides dispersed polyester composites as enhanced protectors for mild steel in 0.5 M H₂SO₄ medium-a green approach, **Journal of Adhesion Science and Technology**, 2018, 1-21.
3. Comparative study of adsorption of linear aliphatic/aromatic polyesters at metal/0.5 M H₂SO₄ interface, **Journal of environmental chemical engineering**, 5 (6), 2018, 6714-6722.

4. Linear polyesters as effective corrosion inhibitors for steel rebars in chloride induced alkaline medium—an electrochemical approach, **Construction and Building Materials**, 165, 2018, 866-876.
5. Anticorrosive potential of ethanol extract of *Delonix elata* for mild steel in 0.5 M H₂SO₄ - a green approach, **Bulgarian Chemical Communications**, 51(1), 2019, 31 – 37.
6. Synergistic effect of antibiotics on the inhibition property of aminothiazolyl coumarin for corrosion of mild steel in 0.5 M H₂SO₄, **Journal of Molecular Liquids**, 284, 2019, 316-32.
7. Implications of eco-addition inhibitor to mitigate corrosion in reinforced steel embedded in concrete, **Construction and Building Materials**, 213, 2019, 246-256.
8. Corrosion resistance of *cissus quadrangularis* extracts on mild steel in sulphuric acid medium: electrochemical and surface studies, **Rasayan Journal**.
9. Evaluation of inhibition effect of *Rosa damascena* leaves extract as an eco-friendly inhibitor for mitigating corrosion on mild steel in 0.5M sulphuric acid medium, **International Journal of Scientific Research and Reviews**.

- ❖ Conference/ Seminar/ Workshop: Attended several National and International conferences, seminars and workshops
- ❖ Books: -
- ❖ Any other achievements: Best paper award in 3 international conferences and 1 national conference.

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