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Research Article

# Synthesis of new quinoline derivatives based on mono-functional polybenzoxazines for oil-water separation, anti-corrosion and antibacterial applications

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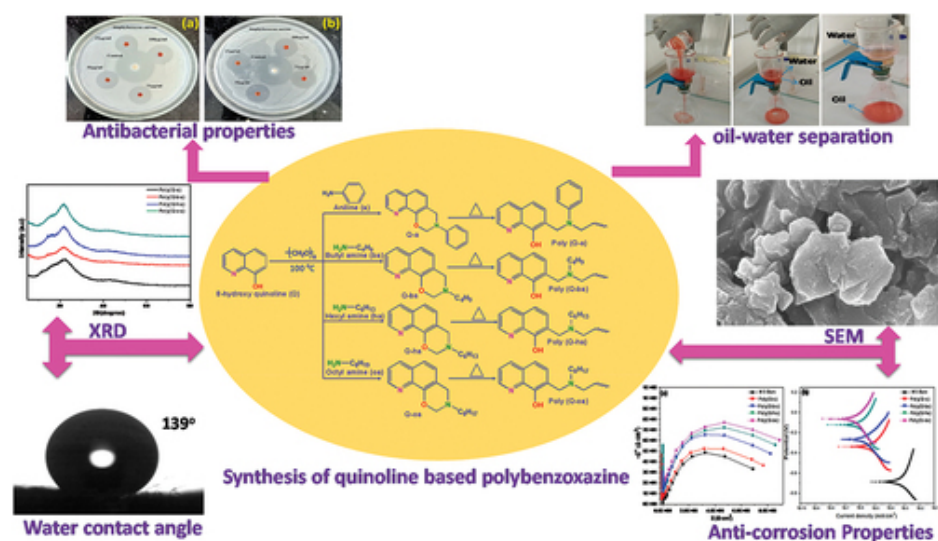
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## ABSTRACT

In the present work, novel and effective quinoline-based polybenzoxazines coatings were prepared on cotton fabrics and mild steels to improve the hydrophobic properties and corrosion resistance, respectively. For this purpose, four quinoline containing mono-oxazine-based benzoxazines were synthesized using 8-hydroxyquinoline (Q), and various monoamines, such as: butylamine (ba), hexylamine (ha), octylamine (oa) and aniline (a). The molecular structure of the benzoxazine monomers was verified by <sup>1</sup>H-NMR and FTIR spectroscopy. The effect of the aliphatic and aromatic functional groups of the benzoxazines on oxazine ring-opening curing was investigated, and the influence of their corresponding materials on thermal and morphological properties was also elucidated. These quinoline-

based monomers have been successfully coated onto the surface: i) cotton fabrics to be used as a water – oil separation method; and ii) mild steel as inhibitor of the corrosion. In this sense, cotton fabric coatings exhibited highly hydrophobic properties (contact angle from 124° to 139°), and subsequently the water oil-separation efficiency was measured to the material that presented the highest contact angle (Poly Q-oa), obtaining a 91% separation efficiency. For benzoxazines coatings on mild steel, impedance tests have indicated that these polymers are corrosion inhibitor effectives. Finally, the antibacterial properties of the quinoline based benzoxazines was also analysed, indicating good antibacterial resistance owing to the existence of long alkyl chains in their respective molecular structure. According to the results obtained from numerous analyses, the quinolone-based polybenzoxazines can be considered as successful materials for applications such as corrosion resistance, oil-water separation, marine coating and microelectronics insulation.

## GRAPHICAL ABSTRACT



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**Q KEYWORDS:** Polybenzoxazines thermal stability oil-water separation anticorrosion antibacterial properties

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