Comprehensive Antimicrobial Activity of PANI by Poles Apart Solvents

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Abstract

Various types of organic solvents as THF, DMSO and DMF were used to carry out polymerization of aniline using its aqueous solution. It was studied as to how these solvents affect the polymerization of aniline and its conductivity and biological activity . The investigations of synthesize polymers involved UV visible spectroscopy and FTIR spectroscopy. The studies reveal that the use of different organic solvents on biological activities of PANI.

Keywords: Ubbelohde viscometry, Antimicrobial scanning, Conductive polymer, Polypyrrole (PPy), Chemical oxidative polymerization, Polymerization technique

Introduction

Polyaniline is more thoroughly studied and better described in the context of biological properties. Conductivity and electrochemical behavior have received the majority of attention thus far. Recent research into polyaniline's potential applications in biomedicine has been prompted by the compound's intriguing qualities. Compared to other ICPs, PANI has better thermal stability. Additionally, the processability is not too bad. PANI is better than other ICPs because of all these factors. Its oxidation and protonation sites can be readily changed to control its extensive range of electrical properties .

Material and Methods

A solution was made by dissolving 0.47 grams of aniline in one molar hydrochloric acid solution. To the above solution was added with different amount of THF or DMSO or DMF. This was done along with constant stirring. After of five minutes 0.2M ammonium persulphate solution was added. This solution was obtained by dissolving APS in hydrochloric acid

The polymerization procedure started using drop-by-drop APS solution. Stirring lasted eight hours. Precipitate was filtered and collected. Repeatedly cleaned with ethanol and distilled water. The product was vacuum-dried for 48 hours.

Result and Discussion

The determination of the antibacterial activity was done in vitro. For this purpose **bacteria *Bacillus subtilise*** were used. The preparation of the wells was done in agar plates which were seeded. The introduction of the test compound in the quantities 20, 40, 60 and 80 µl was done.

Table 4.6: Antibacterial Activity assessed against the bacteria *Bacillus subtilise*

Sample	Solvent	Volume	Standard (Ciprofloxacin)	20µl	40µl	60 µl	80 µl
CP-1	Tetrahydrofuran	3 ml	**33mm**	**Nil**	**Nil**	**Nil**	**Nil**
CP-2	Tetrahydrofuran	7 ml	**33mm**	**Nil**	**Nil**	**Nil**	**Nil**
Cp-3	Dimethylformamide	3 ml	**33mm**	**Nil**	**Nil**	**10mm**	**11mm**
Cp-4	Dimethylformamide	7 ml	**33mm**	**Nil**	**Nil**	**Nil**	**Nil**
Cp-5	Dimethylsulphoxide	3 ml	**33mm**	**Nil**	**Nil**	**Nil**	**Nil**
Cp-6	Dimethylsulphoxide	7 ml	**33mm**	**Nil**	**Nil**	**Nil**	**8mm**

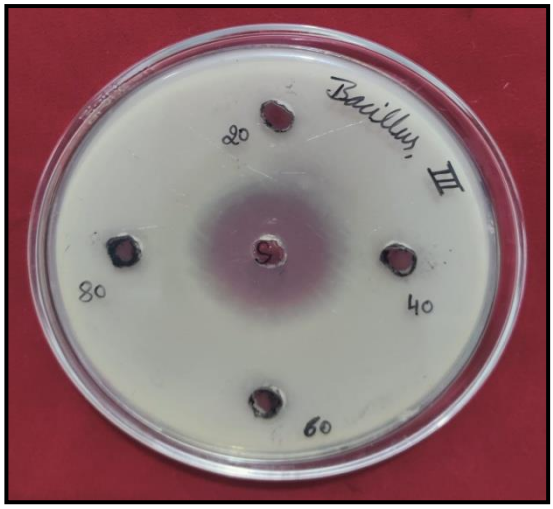

Figure 1: Anti bacterial assay of polymer obtained by adding 3 ml DMF

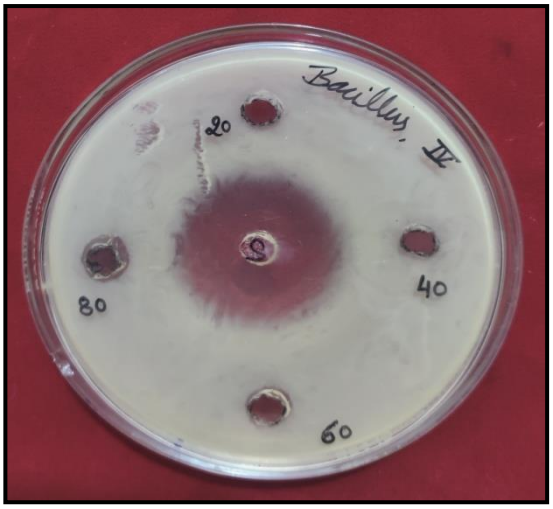

Figure 2: Anti bacterial assay of polymer obtained by adding 7 ml DMF

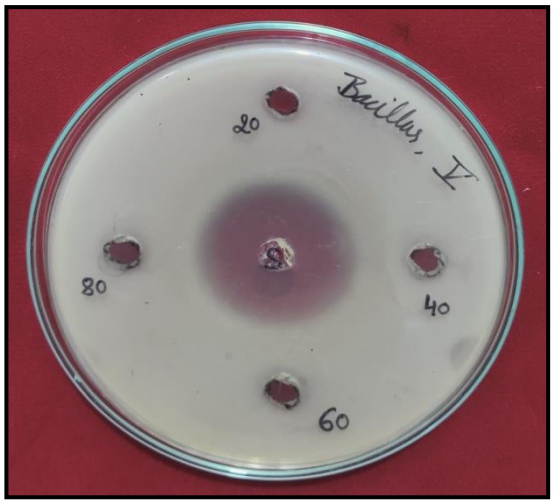

Figure 3: Anti bacterial assay of polymer obtained by adding 3 ml DMSO

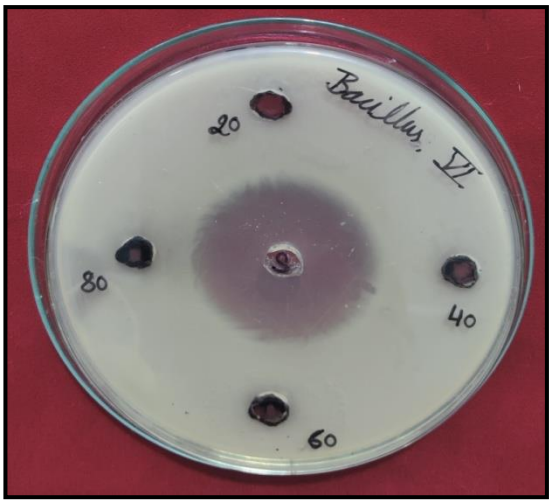

Figure 4: Anti bacterial assay of polymer obtained by adding 7 ml DMSO

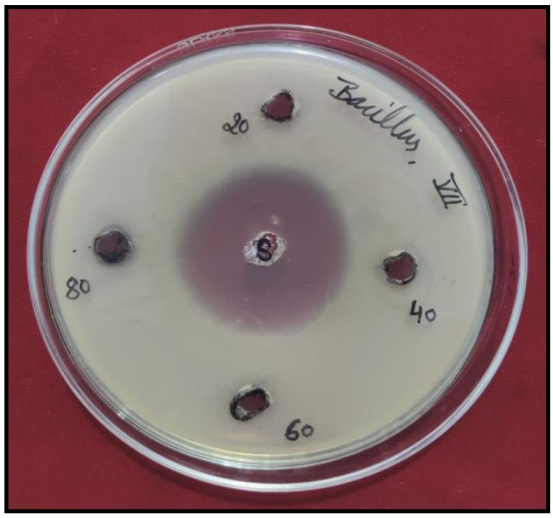

Figure 5: Anti bacterial assay of polymer obtained by adding 3 ml THF

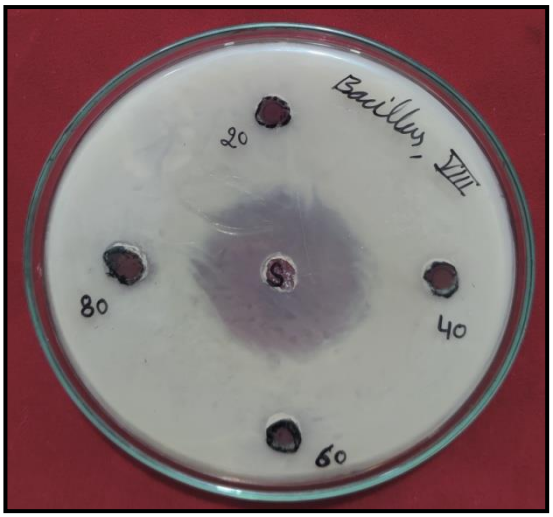

Figure 6: Anti bacterial assay of polymer obtained by adding 7 ml THF

Conclusion

The antibacterial assay was performed for the synthesized polymers. The effect of microorganism on the polymeric materials used in these is of vital nature and hence the results can be used to safeguard the interest of the end user of the industry.

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