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ELECTRONICALLY CONDUCTING DONOR-ACCEPTOR (D-A) TYPE POLYMER SYNTHESIZED USING 3,4-ETHYLENEDIOXYTHIOPHENE (EDOT) WITH BERBERINE ISOLATED FROM *COSCINIUM FENESTRATUM*

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The interactions between electron-rich and electron-poor units within a polymer refer to the D-A type behaviour in polymers, which leads to the synthesis of 3rd generation of electronic conductive polymers (ECP). Currently, available D-A type ECPs utilize synthetic D and A materials, although a rich wealth of naturally available materials fulfil requirements as A or D units. Berberine (9,10-dimethoxy-5,6-dihydro-2H-7λ5- [1,3] dioxolo[4,5-g] isoquinolino[3,2-a] isoquinolin-7-ylium) which is an extendedly conjugated cation with an electron-rich methylenedioxy and methoxy donor (D) moieties and electron-deficient isoquinolium acceptor (A) moieties, was isolated from methanolic extract of the stem of *Coscinium fenestratum* and the structure was confirmed by ^{1}H-NMR spectroscopic data. Electrochemical synthesis is a better strategy than chemical synthesis to obtain conjugated polymers. Herein, we present the study of berberine for copolymerization with EDOT as an ECP, which can be used for future electronic devices. The polymers deposited on the working electrode had similar redox characteristics to the monomers, with potential shifts between 0.0 V- 1.8 V potential range that prove the identity of the respective polymers. In the investigated potential range, irreversible peaks which are lower potential than the monomer were observed at +0.8 V and +1.7 V in the first scan. During successive scans, their height was found to be increased through the subsequent cycles. The morphological structure of the polymer confirmed that the structure of the polymer is different from the monomer structure. Atomic ratios of the synthesized materials were calculated experimentally using energy-dispersive X-ray (EDX) analysis, which confirms the theoretical composition of the polymers. The use of conjugated molecules isolated from natural products for designing D-A type electronically conducting and infrared active oligomers and polymers for applications in the broad area of optronics and photonics is novel and adds value to biomaterials while making the process of D-A type polymer synthesis environmentally friendly.

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Keywords: Berberine, Electrochemical synthesis, Electronic conductive polymers, *3,4-Ethylenedioxythiophene*, Optronic and photonic devices