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Novel solid forms of riluzole: prediction, synthesis and structure elucidation

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Identification and optimisation of available solid forms provides an opportunity to overcome pharmaceutical and biopharmaceutical challenges, aiding in the development of more promising alternatives. Riluzole is a drug used to treat amyotrophic lateral sclerosis. Recent reports reveal its potential applications in Alzeihmers, cancer chemotherapy and pain related disorders. However, the drug displays severe hepatotoxicity. The study was hence designed to develop organoprotective solid forms with neutraceutical coformers to reduce the dose and counter the toxic side effects. Riluzole is an amino benzothiazole derivative and is slightly soluble in water. Due to presence of free amino group, it is capable of forming both salts and cocrystals. The present study reports prediction as well as synthesis of salts and cocrystals of riluzole with various coformers. Prediction model using Material Studio® 7.0 revealed novel solid forms with hydrogen bond formation between -NH2 group of riluzole and –COOH group of coformers with medium (1.79- 2.38 Å) hydrogen bond length. These findings were validated experimentally where single crystal XRD analysis for novel forms of riluzole with ferulic acid (FRA) and malonic acid (MLN) were obtained, that crystallized in P21/c space. Novel forms of riluzole with FRA, MLN, syringic acid, fumaric acid, maleic acid, and succinic acid were successfully prepared and characterized by DSC, powder-XRD, and FTIR. Solid forms with FRA and SYRA are under evaluation for hepatoprotective effects in Hep G2 cell lines.

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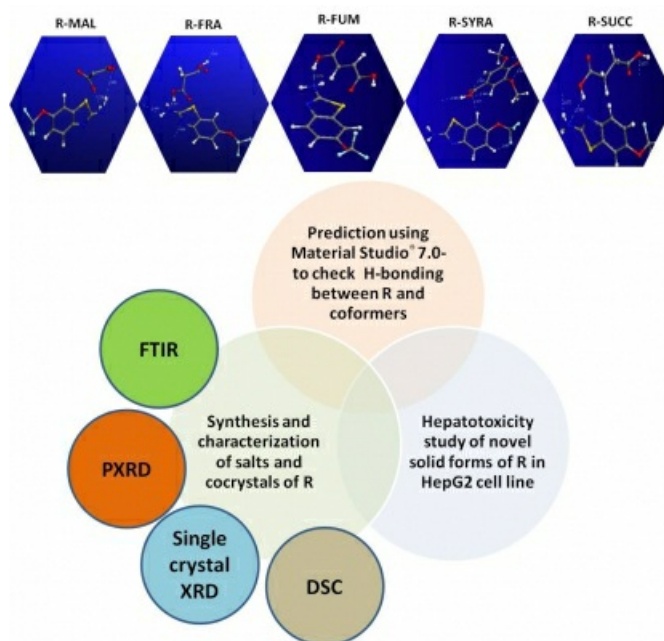
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