

(54) Title of the invention : SUSTAINABLE PROCESS FOR IBUPROFEN SYNTHESIS UTILIZING RENEWABLE ENERGY SOURCES

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(57) Abstract :

The present invention provides a sustainable method for synthesizing ibuprofen using renewable energy sources, including solar, wind, and biomass. The method integrates these renewable sources into a chemical synthesis system via an energy management interface and employs a modified Friedel-Crafts acylation reaction to produce ibuprofen under controlled temperature and pressure conditions. A hybrid battery storage system ensures uninterrupted energy supply during fluctuations in renewable input. The invention further includes real-time monitoring and data acquisition systems for evaluating reaction performance and energy efficiency. Environmental and economic analyses demonstrate that the renewable-energy-powered synthesis process yields comparable or superior outcomes to traditional fossil fuel-based methods in terms of energy consumption, cost-effectiveness, and reduced environmental impact. Statistical tools such as ANOVA, regression analysis, and paired t-tests are employed to validate the results. This invention represents a significant advancement toward the green and scalable production of pharmaceuticals.

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