A PROJECT REPORT ON

Synthesis of Acetanilide by using Plant Extracts

A Green Protocol

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CERTIFICATE

This is certified that the project report title " Synthesis of Acetanilide by using Plant Extracts – A Green Protocol" completed by kalyani pushpalatha neeshma…… .. under the guidance of P Nirmala and E.Anitha…… in Chemistry. This has not been submitted to any other institute or University for the award of any degree.

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Synthesis of Acetanilide by using Plant Extracts – A Green Protocol

Aim of the project: To practice the Green protpcols in Organic laboratory.

Objectives: To create the awareness among the students about:

(i) The impotance of ecofriendly organic synthesis.

(ii) The usage ofwaste plant extractsin organic synthesis.

Keywords:Green Chemistry, Acetanilide.

Materials: Rice straw, Vigna mungo (Black gram)

Introduction:

The term Green chemistry, offered to the scientific community in 1991 was designed for elimination or decrease in hazardous substances, trying to reduce the exposure of humans and environment to chemicals. Green chemistry deals with synthesis procedures, without or at least with reduced negative impact on human health and environment. An absolutely Green synthesis does not exist: as an alternative, Greener synthesis is more truthful definition. These processes can decrease negative impact on the environment, to minimize risks for the environment, several methods of control can be applied: use of alternative selected precursors, solvents, catalysts and reagents, real-time process monitoring, shorter syntheses.

Green chemistry aims at the use of biodegradable, eco-friendly catalyst and the use of plant extracts as catalyst and solvent enhance this application. Plants as green solvents and catalyst offers shorter reaction time, use of non-toxic solvent making an overall extraction process more environment friendly. Thus, owing to the principles of Green Chemistry researchers nowadays are focusing their interest on the use of agricultural waste residues in chemical reactions.

Present work: Modern synthetic chemistry encompasses the challenge of establishing sustainable, cost-effective reaction alternatives that prevent waste and pollution and here, catalysis plays a vital role. The use of traditional, expensive, and harmful reagents, however, poses a serious threat to the environment. Therefore, discovering green catalytic methods to replace these traditional approaches is essential and can have a big influence on the

environment. Bio-derived catalysis using enzymes, acids, and metal ions present in plant extracts and fruit juices has shown great potential in replacing conventional reagents and solvents. In recent days, many researchers focus on highlighting the most
significant innovations that have been achieved by using plant sources for organic synthesis to promote sustainable and green chemistry practices. The use of these natural feedstocks can lead us to more sustainable and cleaner chemical synthesis, which is critical in our current times of increasing environmental concern.

The acetylation of alcohols, phenols and amines using water extract of waste plant extract of rice straw ash and seed husk of *Vigna mungo* ash at room temperature reported recently[2].

Thus, citing to all the advantages of the plant extracts and considering the increasing pressure from environmentalist, we tried to create the awareness among the students about the of use the waste plant extract of Vigna mungo and Rice straw which are available in surroundings, as a catalyst in the synthesis of acetanilide.

The easy availability of these plants in surroundings and cost effectiveness of the reaction,eco-friendly naturehigh yields and mild reaction conditions gain much attention among existing Green Procedures. The high catalytic activity may be due to the basic nature of the waste plant extract and the presence of various fibres, proteins, polyphenols, lignins, cellulose and vitamins in these extracts enhance them to proceed as an efficient catalyst.

Acetylation reactions have been an important transformation in organic synthesis. These reactions have beenused as protective group reactions in agricultural andpharmaceutical industries. The transformation hasbeen usually carried out with acetic acid or acetic anhydride in presence of acidic or basic conditions. Amineswith carboxylic acid derivatives such as acetyl chloride, acids or esters undergo N-acetylationreactions.

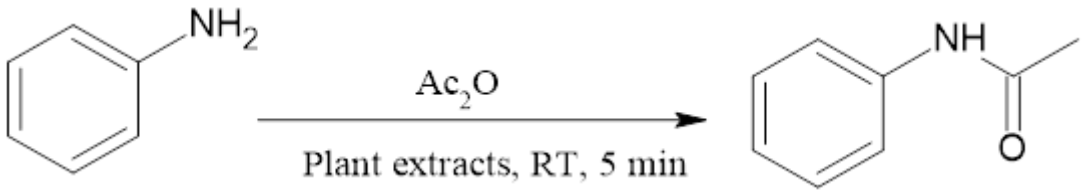
Synthesis of Acetanilide by using Vigna mungo and Rice straw Extracts

Materials: Aniline, acetic anhydride, Vigna mungo and rice straw

Preparation of catalyst:

Vigna mungo (black gram) and rice straw were collected from the nearby agriculture fields around our college in Siri Cilla. They were air dried and the husk of Vigna mungo was removed, and the rice straw was separated. It was then washed with water and air dried. 4 g of both dry Vigna mungo husk and rice straw were taken separately and burnt to ashes and 3.5 g of ash was obtained. This was then warmed at 50 °C in 100 mL water separately for 15 min where almost all the ashes got dissolved, and filtered with filter paper. The filtrate obtained is thus named as Water Extract of Vigna mungo seed husk (WEVMS) and Water extract of rice straw ashes (WERSA). Both the extracts were then used as a catalyst for the acetylation reaction of aniline.

Procedure for acetylation of aniline:



To a mixture of 5 ml aniline (0.05 mol) and 6 ml acetic anhydride (0.06 mol), 7 ml of the WERSA/ 4 ml of WEVMS was added and stirred at room temperature for 40 min. The completion of reaction is confirmed by complete consumption of

aniline by using P^H papers. The product was extracted with ethyl acetate, dried over anhydrous Na_2SO_4 and evaporated.

Conclusion:

The acetanilide is prepared by following environmentally-friendly, economic, excellent protocol by using waste material of plants. The easy availability of the catalyst, cost effectiveness, less reaction time, high yield products, mild reaction conditions proved to be a green and excellent protocol for the acetylation reaction.

References:

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2. Rituparna Chutia, · Bolin Chetia,Springer Nature Switzerland AG 2020.