INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

SPECIAL ISSUE FOR INTERNATIONAL LEVEL CONFERENCE "ADVANCES IN SCIENCE, TECHNOLOGY & MANAGEMENT" (IC-ASTM)

ISOLATION, IDENTIFICATION AND SYNTHESIS OF ANALOGUES OF KAEMPFEROL ISOLATED FORM PHYLLANTHUS NIRURI

KETKI. D. BANSOD, PRADIP P. DEOHATE

1. Department of Chemistry, Shri RLT college of Science Akola 444 001.
2. Department of Chemistry, Smt. Maherbanu Junior College of Science, Akola

Accepted Date: 05/09/2017; Published Date: 10/10/2017

Abstract: Kaempferol has been isolated from *Phyllanthus niruri* and identified. Five analogues of Kaempferol have been synthesized and characterized by chemical and spectral data.

Keywords: Kaempferol, Analogues.

Corresponding Author: KETKI. D. BANSOD

Co Author: - PRADIP P. DEOHATE

Access Online On:

www.ijpret.com

PAPER-QR CODE

How to Cite This Article:

Ketki D. Bansod, IJPRET, 2017; Volume 6 (2): 163-167

INTRODUCTION

Flavonoids have been reported to show variety of biological activities including antimicrobial [1], cytotoxicity [2], anti-inflammatory [3] as well as antitumor activities [4]. The work of Hertog and co-workers showed the inverse correlation between flavonoids intake and coronary heart disease mortality [5]. Flavonoids have attracted the interest of researchers because they are powerful antioxidants which can protect the human body from free radicals [6-8]. Kaempherol is the Flavonoid which is the bioactive ingredient of medicinal plants. Therefore it was thought worth experimenting to isolate and characterize this bioactive antioxidant form the plants of genus *Phyllanthus* and to synthesize the analogues of the isolated Kaempferol.

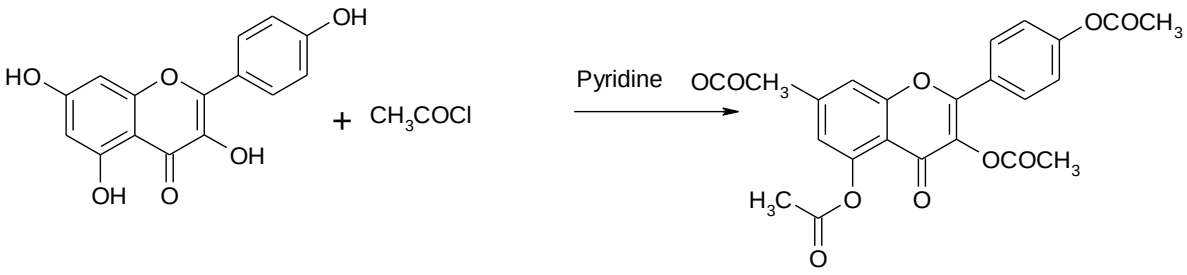
MATERIAL AND METHOD

Kaempferol was isolated from the plant of Phyllanthus niruri and identified by TLC, UV and NMR analysis and following analogues have been synthesized

Kaempferol Acetate (4a)

3,4',5,7-Tetra-O- Acetyl Kaempferol

Kaempferol (0.001 mole, 0.28 g) was dissolves in a mixture of dimethyl formamide (20 ml) and pyridine (2 ml). This solution was kept in ice bath at 5^0C. Acetyl chloride (0.004mole, 0.312g) was slowly added with constant stirring. The mixture was allowed to stand at room temperature for 24 hours. The mixture was poured on crushed ice. The solid so obtained was filtered off , washed with cold water and dried. The crude product was crystallized from methanol as white needles. Yield 74%, Melting point 178^0C



Kaempferol **4a**

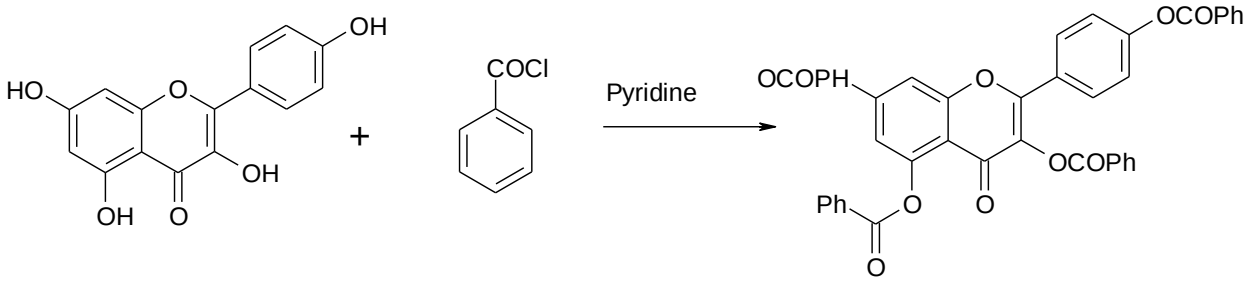
3,4',5,7-Tetra-O- Acetyl Kaempferol

NMR δ 1.12(6H , s, $OCOCH_3$), δ 3.4 (6H ,s, $OCOCH_3$),δ 6.18 (1H , d, ArH), δ 6.39 (1H , d, ArH), .δ 6.88 (2H , d, ArH), δ 7.55 (2H , d, ArH),

Kaempferol Benzoate (4b)

3,4',5,7-Tetra-O- Benzoyl Kaempferol

Kaempferol (0.001 mole, 0.28 g) was dissolves in a mixture of dimethyl formamide (20 ml) and pyridine (2 ml). This solution was kept in ice bath at 5^0C. benzoyl chloride (0.004mole, 0.56g) was slowly added with constant stirring. The mixture was allowed to stand at room temperature for 24 hours. The mixture was poured on crushed ice. The solid so obtained was filtered off , washed with cold water and dried. The crude product was crystallized from glacial acetic acid as yellowish crystals . Yield 61 %, Melting point 164 ^{0}C

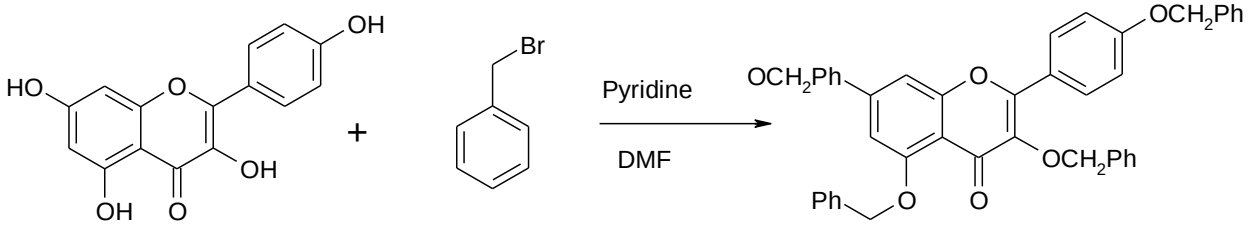


Kaempferol **4b**

3,4',5,7-Tetra-O- Benzoyl Kaempferol

3,4',5,7-Tetra-O- Benzyl Kaempferol (4c)

Kaempferol (0.001 mole, 0.28 g) was dissolves in a mixture of dimethyl formamide (20 ml) and pyridine (2 ml). This solution was kept in ice bath at 5^0C. benzyl bromide (0.004mole, 0.684g) was slowly added with constant stirring. The mixture was then refluxed for 2 hours. The mixture was then allowed to cool and poured on crushed ice. The solid so obtained was filtered off , washed with cold water and dried. The crude product was crystallized from glacial acetic acid as yellowish crystals . Yield 65 %, Melting point 178 ^{0}C

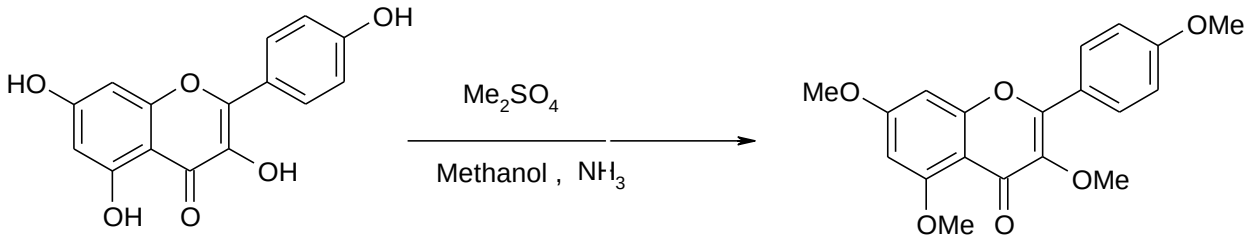


Kaempferol **4b**

3,4',5,7-Tetra-O- Benzyl Kaempferol

3,4',5,7-Tetra-O- methyl Kaempferol (4d)

Kaempferol (0.001 mole, 0.28 g) was dissolves in methanol (20 ml) and liquid ammonia (2 ml). To this mixture dimethyl sulphate (0.004 mole, 0.504g) a was added slowly and the mixture was refluxed for four hours. The mixture was allowed to cool and poured on crushed ice. The solid so obtained was filtered off , washed with cold water and dried. The crude product was crystallized from methanol as colorless crystals. Yield 65 %, Melting point 162 ^{0}C .

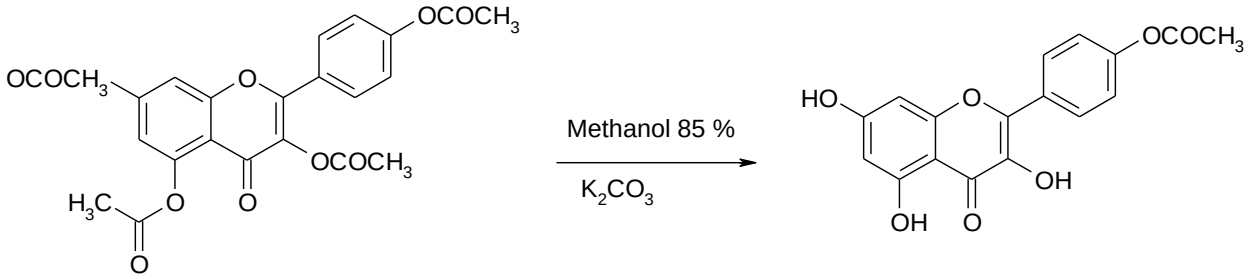


Kaempferol **4d**

3,4',5,7-Tratra-O- methyl Kaempferol

Acetyl Kaempferol (4e)

A mixture of kaempferol teracetate 4a(0.001 mole, 0.454 g), , anhydrous potassium carbonate in catalytic amount and methanol 85% (50 ml) was kept in microwave for 3 min. The reaction mixture was allowed to cool and concentrated. The solid so obtained on cooling was filtered off and crystallized from ethanol as white crystals. Yield 60 % and melting point 158^{0}C.



Microwave

Kaempferol Acetate **4e**

Acetyl Kaempferol

^{1}H NMR (Plate No 4e) : δ 2.04(3H , s, $OCOCH_3$), δ 6.89 (1H ,d, ArH),δ 7.23 (1H , d, ArH), δ 7.23 (2H , d, ArH), δ 9.25 (1H , s, OH), δ 9.87 (1H , s, OH), δ 12.46 (1H , s, OH),

ACKNOWLEDGEMENT

Authors are thankful to the Management and Principal of Shri R. L.T College of Science, Akola for providing the necessary facilities. Authors are also thankful to the Management and Principal of Smt. Maherbanu Junior College of Science, Akola.

REFERENCE

1. Proestos, C., Boziaris I.S. and Nychas, J.E. Analysis of Flavonoids and Phenolic Acids in Greek Aromatic Plants: Investigation of Their Antioxidant Capacity and Antimicrobial Activity. Food Chem.2005. 93: 1998-2004.

2. Yenjai, C., Prasanphen, K., Daodee, S. Kittakoop, P. Bioactive flavonoids from Kaempherilia Parviflora. Fitoterapia. 2004. 75: 89-92.

3. Furuta, T., Kimura, T., Kondo, S., Wakimoto, T., Nukaya, H., Tsuji, K. and Tanaka, K. Concise Total Synthesis ofFlavone C-glycoside having Potent Anti-inflammatory Activity. Tetrahedron. 2004. 60: 9375-9379.

4. Xia, Y., Yang, Z. Y., Xia, P., Bastow, K. F., Nakanishi, Y. and Lee, K.H. Antitumor Agents. Part 202: Novel 2'-Amino Chalcones: Design, Synthesis And Biological Evaluation. Bioorganic and Medicinal Chemistry Letters. 2000. 10: 699-701.

5. Hertog, M. G. L. Dietary Antioxidant Flavonoids and Risk of Coronary Heart Disease. The Zuthpen Elderly Study. Lancet. 1993. 342: 1007-1011.

6. Mellou, F., Lazari, D., Skaltsa, H., Tselepis, A. D., Kolisis, F. N., Stamats, H. Biocatalytic Preparation of Acylated Derivatives ofFlavonoids Glycosides Enhances Their Antioxidantand Antimicrobial Activity. Journal of Biotechnology. 2005. 116: 295-304.

7. Rusak, G., and Gutzeit, H.O. StructurallyRelated Flavonoids with Antioxidative Properties Differentially Effect Cell Cycle Progressive and Apoptosis of Human Acute Leukimia Cells. Nutrient Research. 2005. 25: 141-153.

8. Zhao, F.P., Strack, D., Baumert, A., Subramaniam, R., Ngah, K. G., Tett, F. C., Swee, N. T, Lian, S. C. Antioxidant Flavonoids from Leaves of Polyganum Hydropiper L.. Phytochemistry. 2003. 62: 219-228.