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Fluorescence Studies of 4-Furanone and 4-Oxazolone Substituted Synthesized Coumarins.

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Abstract : 3-(coumarin-4-yl)-5-(substituted benzoyl)-2-(3H)- furanones have been prepared from3-(substituted benzoyl propionic acid and coumarin-4-aldehyde and characterized on the basis of IR, ^{1}H NMR and mass spectrometric data. Some of the compounds have been tested for antibacterial activity.

I. INTRODUCTION

The chemistry of butenolides has attracted more attention in the last few decadesdue to their novel biological actions was used as an important anthelmintic and ascaricidal gents.[1,2] The butenolide ring present in cardenolides shows a strong oral cardiotonic activity.[3] The 3,3-diethylbutylrolactone has been reported to have anticonvulsant activity.[4] While the butenolides have exhibited antibiotic activity.[5] anti-inflammatory , analgesic , antitumor, antiviral and anticancer properties also.[6,7] and potential pharmaceutical interest.[8,9]

In the present investigations, we report the synthesis and reaction of 3-(coumarin-4-yl)-5-(substituted benzoyl)-2-(3H)-furanones following the literature procedure.[10] with appropriate modificaion , and a study of biological acitivity of the resulting products. These compounds were synthesized according to Scheme I. Similarly, 3-(coumarin-4-yl)-5-(substituted benzoyl)-2-(3H)-Oxazolones,[11,12] In our earlier work, we have assigned E-configuration based on NOE
experiments. [13] These compounds were synthesized according to Scheme II.

II. RESULTS AND DISCUSSION:

In our earlier work, we have assigned E-configuration based on NOEexperiments. [13] Similarly, 3-(coumarin-4-yl)-5-(substituted benzoyl)-2-(3H)-Oxazolones, were synthesized from (un)substituted benzoyl glycine by reacting with coumarin-4-aldehyde in the presence of Sodium acetate in acetic anhydride (Scheme II) . The structures assigned to the compounds were supported by the results of I.R, ^{1}H NMR and Mass. Physiological studies: The synthesized molecules of Furanones (20-32) showed λmax between 330nm to 420nm, while the synthesized molecules of Oxazolones (41-59) showed λmax between 330nm to 420nm.

III. EXPERIMENTAL (General Procedure)

4-[(7-propanoyloxy–2H-1-benzopyran-2-one-4-yl) methylene–2-phenyl-(4H) furanone**20**: 7-propanoyloxycoumarin-4-carboxaldehyde,**9** (1.23g, 0.005 moles), fused sodium acetate (2.0gm) and benzoyl propionic acid, **17** (0.98g, 0.0055moles) were intimately mixed by grinding in mortal . The mixture was mixed with acetic anhydride (3ml) , heated on a boiling water bath for 20min.,with shaking and stirring, diluted from ethanol solvent afforded 20; yield 0.95g(49%); mp 260-262°C. IR(KBr):3152, 839,1767, , 1620, 1506, 1251, 1221, 1135, 1006, 757 cm^{-1}; ^{1}H-NMR($CDCl_3$): δ =1.30(3H, t, J = 7.61Hz), 2.64-2.71(m, 2H), 6.62(s, 1H), 6.73(s,1H), 7.09(1H, d, J = 2.3Hz), 7.13(1H, d, J = 2.3Hz), 7.19(1H, d, J = 2.3Hz), 7.28(2H, d, J = 8.2 Hz,), 7.42(s, 1H), 7.67(2H, d, J = 8.2Hz), 7.73(1H, d, J = 8.6Hz); MS: mz (M^+,389).

4-[(7-propanoyloxy-2H-1-benzopyran-2-one-4-yl)methylene-2(4-methoxyphenyl)-5(4H)furanone 21; yield 1.19g (57%); mp 256-258°Cr. IR(KBr): 3163, 3035, 2868,1783, 1561, 1349, 1281, 755 cm^{-1}; ^{1}H-NMR($CDCl_3$): δ= 1.29(3H, t, J = 7.52Hz), 2.61-2.69 (m, 2H), 3.89(s, 3H), 6.68(s, 1H), 7.00 (1H, d, J = 9.2Hz), 7.12(1H, d, J = 2.2Hz),7.14(1H, d, J = 2.2Hz), 7.23(2H, d, J = 2.2Hz), 7.39(s, 1H), 7.73-7.77(s, 3H); MS: mz (M^+, 419). 4-[(7-butanoyloxy-2H-1-benzopyran-2-one-4-yl)methylene-2-phenyl-5(4H)furanone 22; yield 0.95g (61%); mp 260-262°C. IR(KBr): m.p.=270-272°Cchar).IR(KBr):3155, 927, 2878,1750, 619, 1574, 1506, 1214, 1133, 990,856,753 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ= 0.98(3H, t, J = 7.4Hz), 1.49-1.75 (m, 2H), 2.52 (2H, t, J = 6.9Hz), 6.54(s, 1H), 6.66(s, 1H), 7.01-7.23(m, 5H), 7.34(s, 1H), 7.59 (2H, d, J = 8.6Hz), 7.63(s, 1H).

4-[(7-butanoyloxy-2H-1- benzopyran -2-one-4-yl)methylene-2(4-methyl)phenyl-5(4H) furanone**23**;The compoun was obtained as orange yellow needle from ethanol,1.19g (yield=57%, m.p.=265-268°C char). IR(KBr): 3163, 3035, 1783, 1699, 1561, 134

1281, 988, 750cm^{-1}; ^{1}H-NMR($CDCl_3$): δ=1.07(3H, t, J = 7.4Hz), 1.76-1.87(m, 2H), 2.43
(s, 3H), 2.60(2H, t, J = 7.4Hz), 6.61(s, 1H), 6.68(s, 1H), 6.73(s, 1H), 7.08(1H, d, J = 2.3Hz), 7.12 (1H, d, J= 2.0 Hz), 7.27 (1H, t, J = 6.2Hz), 7.42(s, 1H), 7.65-7.75(m, 3H). 4-[(7-butanoyloxyH-1-benzopyran-2-one-4-yl)methylene-2-(4-methoxyphenyl)-5(4H) furanone24 ; yield 1.27g (59%); mp 260-262^{o}C. IR(KBr): 3159, 2997, 2841, 1778, 1705, 1607, 1504,1233, 989, 828cm^{-1}; ^{1}H-NMR($CDCl_3$) : δ=1.07(3H, t, J = 7.5Hz),1.78-1.84(m, 2H), 2.60(2H, t, J =7.8Hz), 3.90(s, 3H), 6.67(2H, d, J=2.3Hz), 7.12(2H, d, J = 2.3Hz),7.13(2H, t,
J=2.3 Hz), 7.20(1H, d, J = 2.3Hz),7.39(s, 1H),7.74-7.77(m,2H).
4-[(7-benzoyloxy-2H-1-benzopyran-2-one-4-yl)methylene-2(4-methyl)phenyl-5(4H) .
furanone**25**, yield 1.52g (61%); mp284-286^{o}C. IR(KBr):3161, 3030, 2917, 1785, 1474,1413, 1347, 1260, 1134, 1025, 990 &752cm^{-1}; ^{1}H-NMR($CDCl_3$): δ=2.57(s, 3H), 6.65 (s,1H), 6,77(s, 1H), 7.20-7.47(m, 4H), 7.49(s, 1H), 7.55(2H, t, J = 7.5Hz), 7.69(2H, t, J = 7.3Hz), 7.81 (2H, d, J= 8.8Hz), 8.22(2H, d, J = 7.0Hz).4-[(7-benzoyloxy-2H-1-benzopyran-2-one-4-yl)methylene–2(4-methoxy)phenyl-5(4H)
furanone26; yield 1.23g (53%); mp284-286^{o}C. IR(KBr): 3161, 3030, 2917, 1785, 1474, 1413, 1347, 1260, 1134, 1025, 990 & 752 cm^{-1}; ^{1}H-NMR($CDCl_3$) δ: 3.90(s, 3H), 6.70 (s, 1H), 6.91-7.20 (m, 3H), 7.29(s, 1H),7.32 (1H, t, J = 6.6Hz), 7.35(1H, t, J = 7.3Hz), 7.53-7.81 (m, 6H), 8.22 (2H, d, J = 7.3Hz); MS: mz(M^+ ,467).
4-[(7-(2-chlorobenzoyloxy -2H-1- benzopyran -2-one -4-yl)methylene-2(4-methyl) phenyl-5(4H)furanone**27**, yield 1.52g (59%); mp258-260^{o}C. IR(KBr): 3161, 3030, 2917, 1785, 1474,1413, 1347, 1260, 1134, 1025, 990,752cm^{-1}; ^{1}H-NMR(D_2SO_4) δ 2.59(s, 3H), 6.93(s, 1H), 7.24(s, 2H), 7.44-7.71(m, 6H), 7.87(1H, d, J = 8.8Hz), 8.07(2H, d, J = 7.0Hz), 8.24(s, 1H), 8.42(1H, d, J = 7.0Hz). 4-[(7-Benzyl-2H-1-benzopyran-2-one-4-yl)methylene-2(4-methyl)phenyl-5-(4H)
Furanone**28;** yield 1.42g (53%); mp245-247^{o}C. IR(KBr):3160, 2997, 2841, 1778, 1705, 1607, 1504, 1351, 1251, 1142, 829cm^{-1}; ^{1}H-NMR($CDCl_3$): δ2.44(s, 3H), 5.17(s, 2H), 6.62(s, 1H),6.96(2H, d, J = 2.45Hz),7.00(1H, d, J = 2.5Hz), 7.30(1H, d, J = 8.3Hz), 7.37(s, 1H), 7.38-7.64(m, 6H),7.67(3H, d, J = 6.4Hz).
4 -[(7- Benzyl -2H-1- benzopyran -2-one -4-yl) methylene -2(4-methoxy)phenyl-5-(4H) furanone**29**; yield 1.40g (62%); mp284-286^{o}C. IR(KBr):3160, 2841, 1778, 1705, 1607, 1504, 1351, 1251, 989, 829 cm^{-1}; ^{1}H-NMR($CDCl_3$): δ 3.89(s, 3H), 5.16(s, 2H), 6.50(s, 1H), 6.68(s, 1H), 6.95-7.12(m, 4H),7.26-7.44(m, 6H),7.64(s, 1H),7.67(s, 1H),7.75(s, 1H). 4-[(7-(2'-Chlorobenzyl-2H-1-benzopyran-2-one-4-yl)methylene-2-phenyl)-5-(4H)
furanone30; yield 1.20g (53%); mp215-218^{o}C. IR(KBr): 3146, 1784, 1716, 1610, 1538, 1507, 1352, 1281, 1185, 1160, 1035, 993 and 743cm^{-1}; ^{1}H-NMR($CDCl_3$): δ= 5.27(s, 2H), 6.51(s, 1H), 6.79(s, 1H), 6.91-7.03(m, 3H), 7.29-7.34(m, 3H), 7.43-7.54(m, 5H), 7.64-7.77(m, 1H), 7.78 (1H, d, J = 3.6Hz), 7.82(1H, d, J = 9.9Hz).
4-[(7-(4-NitroBenzyl)–2H-1-benzopyran-2-one -4 -yl)methylene –2(4-methyl)phenyl-5-(4H)furanone**31**; yield 1.49g (62%); mp 290-293^{o}C. IR(KBr):3032, 2856, 1778, 1701, 1611,1518, 1346, 1281, 1185, 1148, 987 & 827; ^{1}H-NMR ($CDCl_3$) :δ=2.66(s, 3H), 5.36(s, 2H), 6.47(s, 1H), 6.78(s, 1H), 6.91-6.96(3H, t, J = 3.6Hz), 7.60(1H, d, J = 2.6Hz), 7.62(3H, d, J = 3.6Hz,), 7.75(3H, t, J,= 3.6 Hz), 8.25(2H, t, J= 3.6Hz).
4-[(7-(4-Cyano Benzyl –2H-1-benzopyran-2-one -4-yl)methylene -2(4-methyl)phenyl- 5 - (4H)furanone**32;** yield 1.25g (58%); mp284-286^{o}C. (yield=58%, m.p.=250-255^{o}Cchar). IR(KBr): 3436, 3072, 2854, 1728, 1612, 1509, 1352,1214, 1183, 1019 and 966 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ= 2.43(s, 3H), 5.22 (s, 2H), 6.52(s,1H), 6.74(s, 1H), 6.92(3H, d, J = 2.6Hz), 7.00(1H, d, J = 2.6Hz), 7.28(s, 1H), 7.43(s,1H),7.57(2H, d, J = 8.4Hz), 7.66-7.57(m, 5H).
By successfully study of furanone,we prepared analogues Oxazolones which tremendous application in antitumour and anticancer activity. 4-(7-propanoyloxy-2H-bezopyran-2-one-4-yl)methylene)-2-phenyl-5(4H) oxazolone41: 7-propanoyloxy benzopyran-2-one-4-carboxaldehyde (1.23g,0.005moles), fused sodium acetate (2.0gm) and benzoyl propionic acid, 17 (0.98g, 0.0055moles) benzoyl Glycine 38 (0.98g ,0.0055moles) mixed with Ac_2O (3ml), heated on a boiling water bath for 20 min. Cooled and filtered,dried, yield1.03 g (53%); mp 235-237^{o}C. IR(KBr): 3135, 3064, 2941, 1766, 1619, 1558, 1452, 1355, 1297, 1137, 978 ,769 cm^{-1}; ^{1}H-NMR($CDCl_3$): δ=1.30 (3H, t, J = 7.50Hz), 2.10-2.69(, 2H), 2.43(s, 3H), 2.60(2H, t, J = 7.4Hz), 7.17(1H, d, J = 2.2Hz), 7.21(1H, d, J = 2.2 Hz), 7.58 (2H, t, J = 7.2 Hz), 7.69-7.84(m, 3H), 8.23(1H, d, J =7.0 Hz), 8.84(2H, d, J = 6.7Hz). MS: mz (M^+, 389).
4-((7-propanoyloxy-2-one-4-yl)methylene)-2-(2-chlorophenyl)5(4H) oxazolone42: The compound was obtained as
yellow needle from ethylacetate,1.08g(yield=51%,
m.p.=210-220^{o}C). IR(KBr):3135, 2943, 1801, 1760, 1617, 1559, 1474, 1350, 1262, 1132, 977, 866 &733 cm^{-1}; ^{1}H-NMR($CDCl_3$):δ=1.30(3H, t, J = 7.6Hz), 2.60-2.71(m, 2H), 7.58

(2H, d, J = 7.6Hz), 7.21(1H, d, J =2.2Hz), 7.58(2H, t, J = 2.73Hz), 7.75(s, 1H), 7.82 (1H, d, J = 8.6 Hz), 8.16 (1H, d, J = 7.0Hz). MS: mz (M^+, 423).

4-(7-Butonoyloxy-2H-bezopyran-2-one-4-yl)methylene)-2-phenyl-5(4H)oxazolone **43;** yield 1.02g (53%); IR(KBr): 3097, 2944, 1780,1760, 1617, 1558, 1328, 1262, 1137, 902 & 697 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ=1.07(3H , t , J = 7.4Hz), 1.56-1.88 (m, 2H),2.61 (2H, t, J = 7.22Hz), 7.11-7.20(m, 2H), 7.41(s, 1H),7.57 (2H, t, J = 7.0Hz), 7.68 (1H, d, J = 7.0Hz), 7.80(2H, d, J = 8.6 Hz), 8.22(2H, d, J =7.02Hz).

4-(7- Butonoyloxy -2H -bezopyran –2- one-4 -yl) methylene)-2-(2-chlorophenyl-5(4H) oxazolones**44**;yield 1.18g (53%); 190-200°C. IR(KBr): 3083 , 2935, 1803, 1761, 1608, 1559, 1473,1264, 1179,974 ,740 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ= 1.30(3H, t, J = 4.5Hz), 1.56-1.88 (m, 2H), 2.60(2H, d, J = 7.6Hz), 7.15(2H, d, J = 7.8Hz), 7.48(s, 2H), 7.84(2H, d, J = 5.5Hz), 7.79(2H, t, J = 7.6Hz), 8.16(1H, d, J = 6.63Hz).

4-((7-benzoyl-2H-bezopyran-2-one-4-yl) methylene)-2-phenyl-5(4H) oxazolone.45;
(52%); 1.13g(yield = 52%, m.p.= 24-243 °C char). IR(KBr): 3078,1870, 1449, 1326, 1248, 1133, 1052, 975, 864 & 769cm^{-1}. ^{1}H-NMR($CDCl_3$):δ=7.36(s,1H), 7.95-8.16(m,7H), 8.21-8.48(m,3H), 8.43-8.48(m, 2H), 8.74(, d, J = 7.68Hz).

4-((2-chorobenzoyl)-2H-bezopyran-2-one-4-yl)methylene)-2-(2-chlorophenyl-5(4H) oxazolone46; yield 1.01g (39%); 190-200°C. IR(KBr): 3078, 1800, 1736,1558, 1449, 326, 1248, 1132,1051, 978, 864 & 699 cm^{-1}; ^{1}H($CDCl_3$):δ=7.00(s, 1H), 7.39(s, 2H), 7.427.59(m, 4H),7.70(1H, t, J = 7.7Hz,), 7.80(2H, t, J = 7.7Hz), 7.99-8.13(m, 3H). 4-[7-(2-(Chlorobenzyl)-2H-bezopyran-2-one-4-yl)methylene)]-2-phenyl-5(4H) oxazolone47; yield 1.12g (49%); mp190-200°C. IR(KBr):3077, 1800, 1710, 1609, 1554, 1450,1374, 1350, 1280, 1175, 1064, 1064, 1008, 884,697 cm^{-1}; ^{1}H-NMR ($CDCl_3$) : δ= 5.27(s, 2H), 6.95-7.03(m, 2H), 7.23-7.30 (m, 6H), 7.32 (2H, d, J = 3.9Hz), 7.50 (s, 1H), 7.57(s, 1H), 7.61(1H, d, J = 3.5Hz), 7.74(1H, d, J = 8.6Hz).

4-[7-(2-Chlorobenzyl)-2H- bezopyran -2-one-4-yl)methylene)]2-(2-chlorophenyl-5-(4H) oxazolone48; yield 1.23g (50%); mp256-258°C. IR(KBr):3080, 1802, 1719, 1617, 1536, 1471, 1430, 1396, 1346, 1209, 1144, 1117, 1033, 1004, 961 &736 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ= 5.27 (s, 2H) , 6.95-7.03(m, 2H),7.23-7.30(m, 6H), 7.32(2H, d, J = 3.9Hz), 7.50 (s, 1H), 7.57(s, 1H), 7.61 (1H, d, J = 3.5 Hz), 7.74(1H, d, J = 8.6Hz). 4-[7-(4-(nitrobenzy)l-2H-bezopyran-2-one-4-yl)methylene)]-2-(2-chlorophenyl)-5(4H) oxazolone49; yield 0.98g (38%); 245-248°C. IR(KBr):2923, 2226, 1801, 1714, 1600, 1554, 1452,1327, 1282, 1145, 1067, 981, 821, 699 & 549 cm^{-1}; ^{1}HNMR($CDCl_3$): δ= 5.22(s, 2H), 6.92(1H, d, J = 2.34Hz), 6.98 (1H, d, J = 2.7Hz), 7.02(1H, d, J = 2.7Hz),7.44-7.63(m, 6H), 7.69-7.77(m, 3H), 8.16(1H, d, J = 7.0Hz). 4-[7-(4-cyanobenzyl-2H-bezopyran-2-one-4-yl)methylene)]-2-phenyl-5(4H)oxazolone 50; yield 1.14g (51%); 250-255°C. IR(KBr):2923, 2226, 1801, 1714, 1512, 1452, 1353, 1327,1282, 1145, 1067, 821549cm^{-1}; ^{1}H-NMR($CDCl_3$):5.22(s, 2H), 6.92(s, 1H),6.99(1H, d, J = 9.0Hz), 7.24(s, 2H), 7.40 (s, 1H), 7.55-7.77(m, 8H), 8.22(2H, d, J = 7.8Hz). 4-[6-methyl-2H-1-bezopyran-2-one-4-yl) methylene)]-2-phenyl-5(4H) oxazolone51; yield 0.75g (51%); 253-255°C.IR(KBr):3066, 1801, 1716, 1654 , 620, 1546, 1452, 1346, 1298, 1178, 1066, 759cm^{-1};^{1}H-NMR($CDCl_3$):δ= 2.48(s, 3H),7.30(1H, d, J = 8.6Hz), 7.40(1H ,d, J = 8.6Hz), 7.48(s, 1H), 7.54-7.62(m, 3H), 7.70(1H, t, J = 7.5 Hz), 7.76(s, 1H), 8.23(2H, d,J=7.4 Hz).

4-[6-methyl-2H-1-bezopyran-2-one-4-yl)methylene)]-2-(2-Chloro)phenyl-5(4H) oxazolone**52**; yield 0.73g (51%); 268-270°C.IR(KBr):3066, 1801, 1716, 1654, 1620, 1546, 1452, 1346, 1298, 1178, 1066, 883 &759cm^{-1}. ^{1}H-NMR($CDCl_3$):δ=2.48(s,3H),7.30 (1H, d, J = 8.2Hz), 7.40(1H, d, J = 8.2Hz), 7.47(1H, d, J = 8.0Hz), 7.54-7.62(m, 4H), 7.76(s, 1H), 8.18(1H, d, J = 8.2Hz).

4-[6-methyl-2H-1-bezopyran-2-one-4-yl)methylene)]2-(2-methyl)phenyl-5(4H) oxazolone**53**;
yield 0.80g (49%); 231-232°C. 0.80g(yield=49%, m.p.=231-232°C). IR(KBr):3066,2922,1803,1712, 1652,1537, 1353,1261, 1182, 1089,871cm^{-1}; ^{1}H-NMR($CDCl_3$):δ=2.45(s, 3H),2.82(s, 3H), 7.29(1H, d, J = 8.3Hz), 7.35-7.42 (m,3H), 7.48(s, 1H), 7.54(1H, t, J = 7.3 Hz), 7.61(s, 1H), 7.70(s,1H), 8.15(1H, d, J = 8.3Hz).

4-[7-methyl-2H-1-bezopyran-2-one-4-yl) methylene)]-2-phenyl-5(4H) oxazolone**54**: yield 0.73g (51%); 268-270°C.
The compound was obtained as orange yellow needles from ethanol,0.56g (yield=34%, m.p.=281-283°C). IR(KBr):3064, 1805, 1714, 1649, 1560, 1537, 1450, 1348, 1174, 952 and 887cm^{-1}. ^{1}H-NMR($CDCl_3$):δ= 2.48(s, 3H), 7.19(1H, d, J = 7.1Hz), 7.21(s, 1H) 7.45(s, 1H), 7.57(2H, t, J = 7.0 Hz), 7.68-7.77(m, 3H), 8.23(2H, d, J = 7.4 Hz).

4-[7-methyl-2H-1-bezopyran-2-one-4-yl)methylene)]-2-(2-Chloro)phenyl-5(4H) oxazolone**55**: yield 0.64g (35%); 275-277°C. IR(KBr): 3085, 1805, 1712, , 1618, 1546, 1471, 1344, 1274, 1182, 1043,777 cm^{-1}; ^{1}H- NMR($CDCl_3$): δ2.48(s, 3H),7.18(d, J = 7.8Hz, 1H), 7.21(s, 1H), 7.45(1H, t, J = 7.1Hz), 7.51-7.63(m, 3H), 7.70(m, 2H), 8.20 (1H, d, J = 8.3Hz).

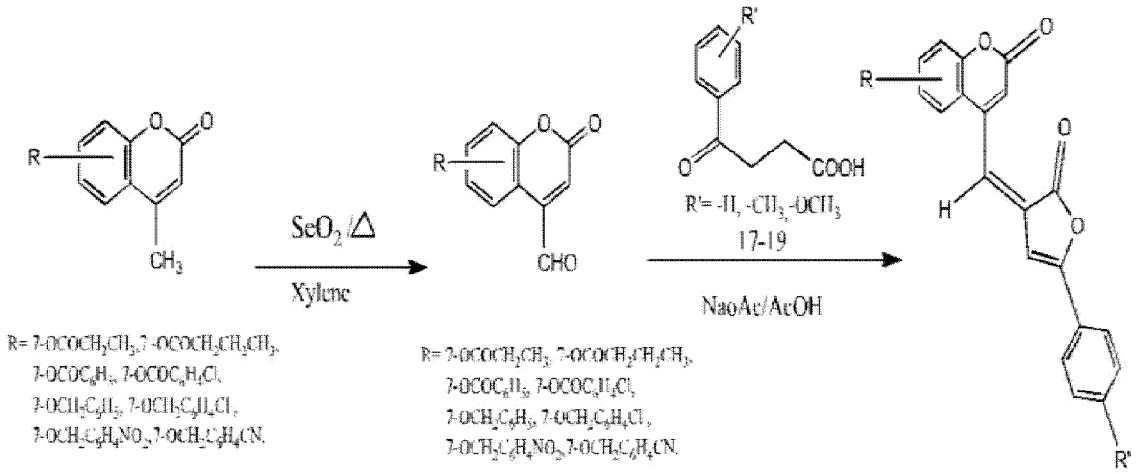
4-[7-acetoxy-2H-1-bezopyran-2-one-4-yl)methylene)]-2-(2-Chloro)phenyl-5(4H) oxazolone56: yield 0.86g (42%); 226-240°C. IR(KBr):3097, 1797, 1701, 1620, 1554, 1537,1350, 1269, 1186, 894 &727 cm^{-1}; ^{1}H-NMR ($CDCl_3$): δ=2.32(s, 3H),7.22(1H, d, J = 8.6 Hz), 7.34(s, 1H), 7.56(s, 1H), 7.61(1H, t, J = 8.2 Hz), 7.67(s, 1H), 7.70-7.787(m, 2H),8.13(1H, d, J = 8.6 Hz), 8.22(1H, d, J = 8.6 Hz).

4-[7-acetoxy-2H-1-bezopyran-2-one-4-yl)methylene)]-2-(2-methyl)phenyl-5(4H) oxazolone57: yield 0.73g (51%); 268-270°C. 1.07g (yield=55%,m.p.=245-247°C).IR(KBr): 3097, 1805, 1760, 1718, 1604, 1556, 1535, 1348, 1265, 1178, 1027, 1178, 1020, 896 & 736cm^{-1}; ^{1}H-NMR(DMSO): δ=2.30(s, 3H), 2.66(s, 3H), 7.22(d,J=8.2Hz,1H),7.34(s, 1H), 7.47-7.51(m, 3H), 7.59(s, 1H), 7.63(1H, t, J = 7.7Hz), 8.03(1H, d, J = 8.2Hz), 8.21(1H, d, J = 8.2 Hz).

4-[2H-1-napth[1,2-b]pyran-2-one-4-yl)methylene)]-2-(2-methyl)phenyl-5(4H) oxazolone
58 yield 0.28g (51%); mp263-265°C. IR(KBr):3062, 17971, 1712, 1600, 1552, 1533, 1357,1271, 1184, 1087, 883 and727cm^{-1}; ^{1}H-NMR($CDCl_3$): δ=2.8(s, 3H), 7.44(2H, d, J = 8.8Hz), 7.58(1H t, J = 7.9Hz), 7.63(s, 1H), 6.68-7.72(m, 2H), 7.84 (1H, d, J = 8.8Hz), 7.76(s, 1H),7.92-7.98(m, 2H), 8.14 (1H, d, J = 8.8Hz), 8.56(1H, t , J = 8.2Hz).

4-[2H-1-napth[2,3-b]pyran-2-one-4-yl)methylene)]-2-(2-methyl)phenyl-5(4H) oxazolone59;yield 0.70g (38%); 268-270°C. IR(KBr):3066, 1797, 17311552, 1514, 1131, 1271, 1176,1271, 1033, 877,723cm^{-1}; ^{1}H-NMR($CDCl_3$):δ=2.78(s, 3H), 7.34-7.42(m, 2H), 7.50-7.54(m, 2H),7.58(2H, t, J = 7.8Hz),7.70(s, 1H),7.92(1H, d, J = 8.3Hz), 7.97(1H, d, J = 8.3Hz), 8.04(1H, d, J = 8.3Hz), 8.14(1H, t, J = 8.3Hz), 8.31(1H, t, J = 8.3Hz).

Scheme I:-Synthesis of 4-Furanone substituted Coumarins:



R= 7-OCOCH$_2$CH$_3$,7-OCOCH$_2$CH$_2$CH$_3$, 7-OCOC$_6$H$_5$, 7-OCOC$_6$H$_4$Cl, 7-OCH$_2$C$_6$H$_5$, 7-OCH$_2$C$_6$H$_4$Cl, 7-OCH$_2$C$_6$H$_4$NO$_2$,7-OCH$_2$C$_6$H$_4$CN.

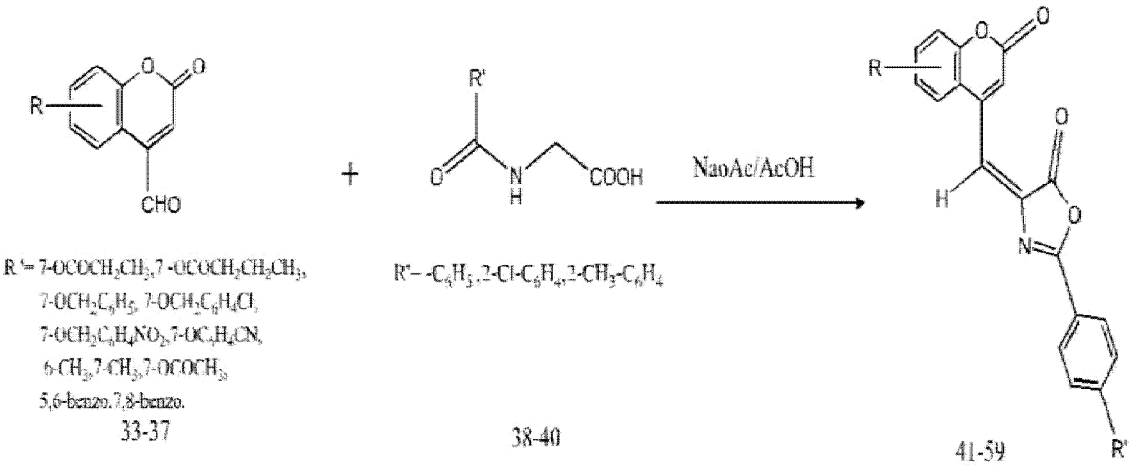
1-8

R= 7-OCOCH$_2$CH$_3$, 7-OCOCH$_2$CH$_2$CH$_3$, 7-OCOC$_6$H$_5$, 7-OCOC$_6$H$_4$Cl, 7-OCH$_2$C$_6$H$_5$, 7-OCH$_2$C$_6$H$_4$Cl, 7-OCH$_2$C$_6$H$_4$NO$_2$,7-OCH$_2$C$_6$H$_4$CN.

9-16

20-32

Scheme II:-Synthesis of 4-Oxazolone substituted Coumarins:



R'= 7-OCOCH$_2$CH$_3$,7-OCOCH$_2$CH$_2$CH$_3$, 7-OCH$_2$C$_6$H$_5$, 7-OCH$_2$C$_6$H$_4$Cl, 7-OCH$_2$C$_6$H$_4$NO$_2$,7-OCH$_2$C$_6$H$_4$CN, 6-CH$_3$,7-CH$_3$,7-OCOCH$_3$, 5,6-benzo,7,8-benzo.

33-37

R'– -C$_6$H$_5$,2-Cl-C$_6$H$_4$,3-CH$_3$-C$_6$H$_4$

38-40

41-59

Physiological Studies: Absoption Spectra of Furanones andOxazolone :

No.	R and R'	λmax	No.	R and R'	λmax
1	R= $COCH_2CH_3$, R'=H	390	17	R=$COCH_2CH_2CH_3$,R'=Cl	390
2	R=$COCH_2CH_3$, R'= OCH_3	380	18	R= COC_6H_5, R'= H	360
3	R=$COCH_2CH_2CH_3$,R'= H	420	19	R= COC_6H_4Cl, R'= Cl	370
4	R=$COCH_2CH_2CH_3$,R'=CH_3	395	20	R= $CH_2C_6H_4Cl$, R'= H	370
5	R=$COCH_2CH_2CH_3$,R'=OCH_3	380	21	R= $CH_2C_6H_4Cl$, R'= Cl	380
6	R= COC_6H_5, R'= CH_3	360	22	R= $CH_2C_6H_4NO_2$, R'= Cl	370
7	R= COC_6H_5, R'= OCH_3	330	23	R= $CH_2C_6H_4CN$, R'= H	380
8	R= COC_6H_4Cl, R'= CH_3	360	24	R=6-CH_3, R'= H	380
9	R= $CH_2C_6H_5$, R'= CH_3	410	25	R=6-CH_3, R'= Cl	380
10	R= $CH_2C_6H_5$, R'= OCH_3	400	26	R=6-CH_3, R'= CH_3	380
11	R= $CH_2C_6H_4Cl$, R'= CH_3	350	27	R=7-CH_3, R'= H	380
12	R= $CH_2C_6H_4NO_2$, R'= CH_3	360	28	R=7-CH_3, R'= Cl	360
13	R= $CH_2C_6H_4CN$, R'= CH_3	380	29	R= 7-$OCOCH_3$, R'= Cl	360
14	R= $COCH_2CH_3$, R'= H	370	30	R= 7-$OCOCH_3$, R'= CH_3	370
15	R= $COCH_2CH_3$, R'= Cl	390	31	R= 5,6-C_4H_4, R'= CH_3	370
16	R=$COCH_2CH_2CH_3$,R'= H	380	32	R= 7,8-C_4H_4, R'= CH_3	370

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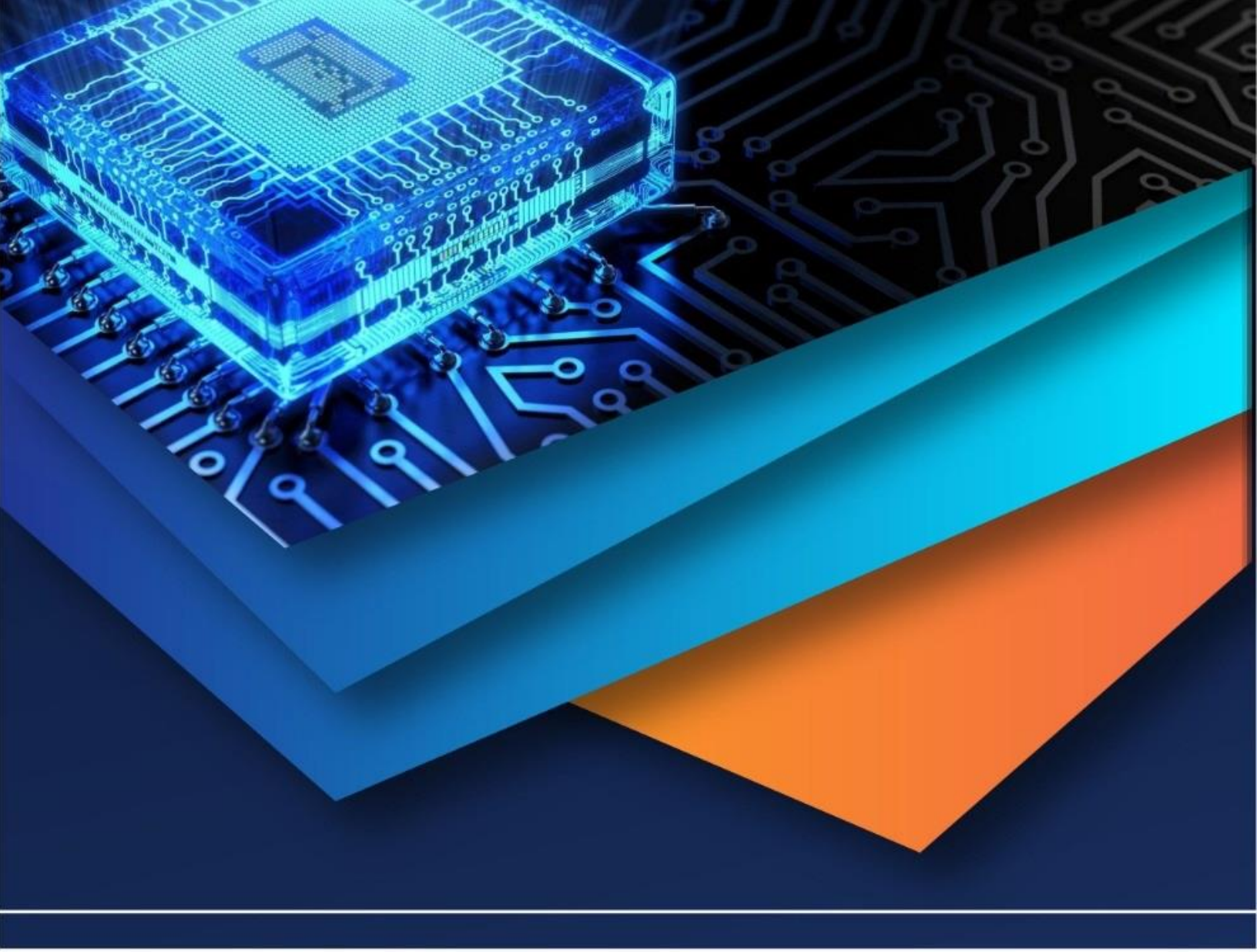

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