Bio-based methyl coumalate involved

Morita-Baylis-Hillman reaction

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$^1$H and $^{13}$C NRM Spectra of Synthesized Compounds

<table>
<thead>
<tr>
<th>Compounds</th>
<th>SI</th>
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<tbody>
<tr>
<td>2a-1</td>
<td>2 - 13</td>
</tr>
<tr>
<td>2m-u</td>
<td>14 - 21</td>
</tr>
<tr>
<td>3a</td>
<td>23</td>
</tr>
<tr>
<td>4a</td>
<td>24</td>
</tr>
<tr>
<td>5a-b</td>
<td>25 - 26</td>
</tr>
<tr>
<td>6a-b</td>
<td>27 - 28</td>
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</tbody>
</table>
Methyl 3-(hydroxy(4-nitrophenyl)methyl)-2-oxo-2H-pyran-5-carboxylate (2a):
Methyl 3-(hydroxy(phenyl)methyl)-2-oxo-2H-pyran-5-carboxylate (2b):
Methyl 3-((4-fluorophenyl)(hydroxy) methyl)-2-oxo-2H-pyran-5-carboxylate (2c):
Methyl 3-((4-bromophenyl)(hydroxy)methyl)-2-oxo-2H-pyran-5-carboxylate (2d):
Methyl 3-((2-bromophenyl)(hydroxy)methyl)-2-oxo-2H-pyran-5-carboxylate (2e):
Methyl 3-((4-cyanophenyl)(hydroxy)methyl)-2-oxo-2H-pyran-5-carboxylate (2f):
Methyl 3-(hydroxyl (2-nitrophenyl) methyl)-2-oxo-2H-pyran-5-carboxylate (2g):
Methyl 3-(hydroxy(4-(trifluoromethyl)phenyl)methyl)-2-oxo-2H-pyran-5-carboxylate (2h):
Methyl 3-(1-hydroxybutyl) -2-oxo-2H-pyran -5-carboxylate (2j):
Methyl 3-(1-hydroxybutyl) -2-oxo-2H-pyran -5-carboxylate (2j):
Methyl 3-(1-hydroxyethyl)-2-oxo-2H-pyran-5-carboxylate (2k):
Methyl 3-(furan-2-yl (hydroxy)methyl)-2-oxo-2H-pyran-5-carboxylate (2l):
Methyl 3-((4-methylphenylsulfamido)(phenyl)methyl)-2-oxo-2H-pyran-5-carboxylate (2m):
Methyl 3-((4-methylphenylsulfonyl)amido)(4-(trifluoromethyl)phenyl)methyl)-2-oxo-2H-pyran-5-carboxylate (2n):
Methyl 3-((4-methylphenylsulfonamido) (4-nitrophenyl) methyl) -2-oxo-2H-pyran-5-carboxylate (2o):
Methyl 3-((4-cyanophenyl) (4-methylphenylsulfonamido) methyl) -2-oxo-2H-pyran-5-carboxylate (2p):
Methyl 3-((4-methylphenylsulfonamido) (2-nitrophenyl)methyl)- 2-oxo-2H-pyran-5-carboxylate (2q):
Methyl 3-((4-methylphenylsulfonamido) (p-tolyl)methyl)-2-oxo-2H-pyran-5-carboxylate (2r)
Methyl 3-((4-methoxyphenyl) (4-methylphenylsulfonamido) methyl)-2-oxo-2H-pyran-5-carboxylate (2s):
Methyl 3-((4-fluorophenyl)(4-methylphenylsulfonyl)amino)methyl)-2-oxo-2H-pyran-5-carboxylate (2t):
Methyl 3-((4-bromophenyl) (4-methylphenylsulfonamido) methyl)-2-oxo-2H-pyran-5-carboxylate (2u):
Methyl 2-(hydroxy(4-nitrophenyl)methyl)-[1,1'-biphenyl]-4-carboxylate (3a):
Methyl 3-(acetoxy(4-nitrophenyl)methyl) -2-oxo-2H-pyrany-5-carboxylate (4a):
Methyl 1-(4-nitrophenyl)-8-oxo-3,3a,4,5-tetrahydro-1H-5,7a-(epoxymethano)isobenzofuran-6-carboxylate (5a):
Methyl 1-(4-nitrophenyl)-8-oxo-2-tosyl-1,2,3,3a,4,5-hexahydro-5,7a-(epoxymethano) isoindole-6-carboxylate (5b):
Dimethyl 6-hydroxy-3-(4-nitrophenyl)-1,3,3a,6,7,7a-hexahydroisobenzofuran-3a,5-dicarboxylate (6a):
Dimethyl 6-hydroxy-3-(4-nitrophenyl) -2-tosyl-2,3,3a,6,7,7a-hexahydro-1H-isooindole -3a,5-dicarboxylate (6b):