LC-MS-MS quantitative analysis of Folic Acid, its metabolites and derivatives in serum for clinical research use

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ABSTRACT

Thermoscientific instruments for high-quality mass measurements are utilized in the rapid analysis of multiple matrices of data and different structures and pharmacokinetic profiles. Folic acid and its derivatives are known to play a crucial role in the metabolism of the folate cycle. In this study, various columns and solvent combinations were tested to determine the optimal conditions for the analysis of serum samples. The study was conducted using a 10-F-THF, a 5-F-THF-13C5, 5,10-Methenyl-THF-13C5, 5,10-Methylene-THF, Tetrahydrofolate, Folic Acid, and its metabolites and derivatives. The results were obtained using a 1-D chromatographic configuration achieved with a column, a mobile phase, and a HPLC system.

INTRODUCTION

Folic acid and its derivatives are vital for various cellular and metabolic functions as they are required for the synthesis of nucleic acids and proteins. Inhibitors of folate metabolism are used in the treatment of certain cancers and cardiovascular diseases. The study was conducted using a 1-D chromatographic configuration achieved with a column, a mobile phase, and a HPLC system.

MATERIALS AND METHODS

Shahin BM, Talan MT

METHOD

HPLC Conditions:

Column: Accucore C18, 100 x 2.1 mm, 2.6 µm
Flow Rate: 0.35 ml/min
Gradient: 0.0 min- 90%A:10%B
4.5 min- 5%A:95%B
Flow Rate: 0.35 ml/min
Column Temperature: 30 oC
Injection Volume: 10 µl
Method Conditions:

Figure 3: 1-D Chromatograms, Curves, LOQ

RESULTS

Table 3: Linearity and Sensitivity

<table>
<thead>
<tr>
<th>Compound</th>
<th>Range (ng/ml)</th>
<th>Slope</th>
<th>R²</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folic Acid</td>
<td>0.025 - 1000</td>
<td>0.025</td>
<td>0.9988</td>
<td>70.34</td>
</tr>
<tr>
<td>MeFox</td>
<td>0.025 - 1000</td>
<td>0.025</td>
<td>0.9995</td>
<td>53.09</td>
</tr>
<tr>
<td>5,10-Methenyl-THF</td>
<td>0.1 - 1000</td>
<td>0.1</td>
<td>0.9989</td>
<td>91.04</td>
</tr>
<tr>
<td>5-Methyl-THF</td>
<td>0.025 - 1000</td>
<td>0.025</td>
<td>0.9988</td>
<td>70.34</td>
</tr>
<tr>
<td>Tetrahydrofolate</td>
<td>0.05 - 1000</td>
<td>0.05</td>
<td>0.9944</td>
<td>45.66</td>
</tr>
<tr>
<td>MeFox-13C5</td>
<td>0.025 - 1000</td>
<td>0.025</td>
<td>0.9995</td>
<td>53.09</td>
</tr>
</tbody>
</table>

CONCLUSIONS

The results indicate that the selected columns and solvents are suitable for the analysis of serum samples. The study was conducted using a 1-D chromatographic configuration achieved with a column, a mobile phase, and a HPLC system.

REFERENCES


TRADEMARKS/ LICENSING

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