

# Green non-toxic catalysts for ring-opening polymerizations of biodegradable polymers at room temperature for biohybrid materials

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### Iron(III) bromide

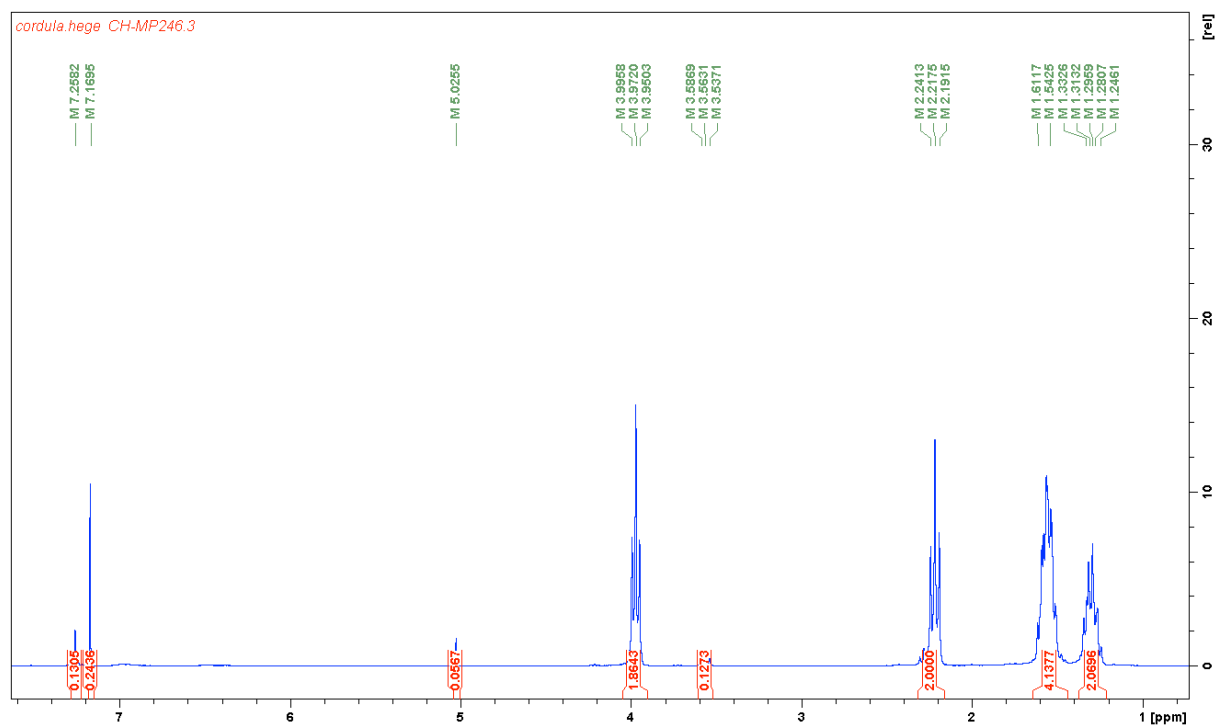


Figure 1. Iron(II) bromide 400:1:5 benzyl alcohol <sup>1</sup>H NMR

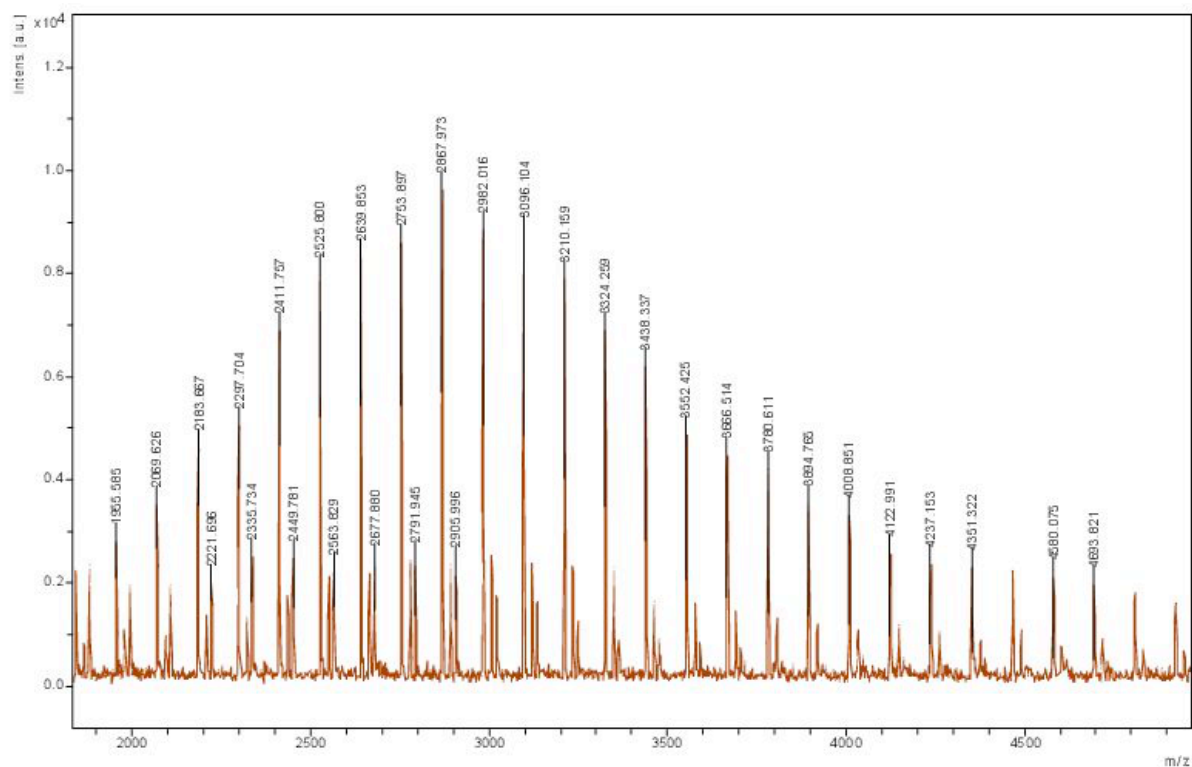


Figure 2. Iron(III) bromide, 400:1:5, benzyl alcohol, MALDI-TOF

### Iron(III) chloride 400:1:5 benzyl alcohol

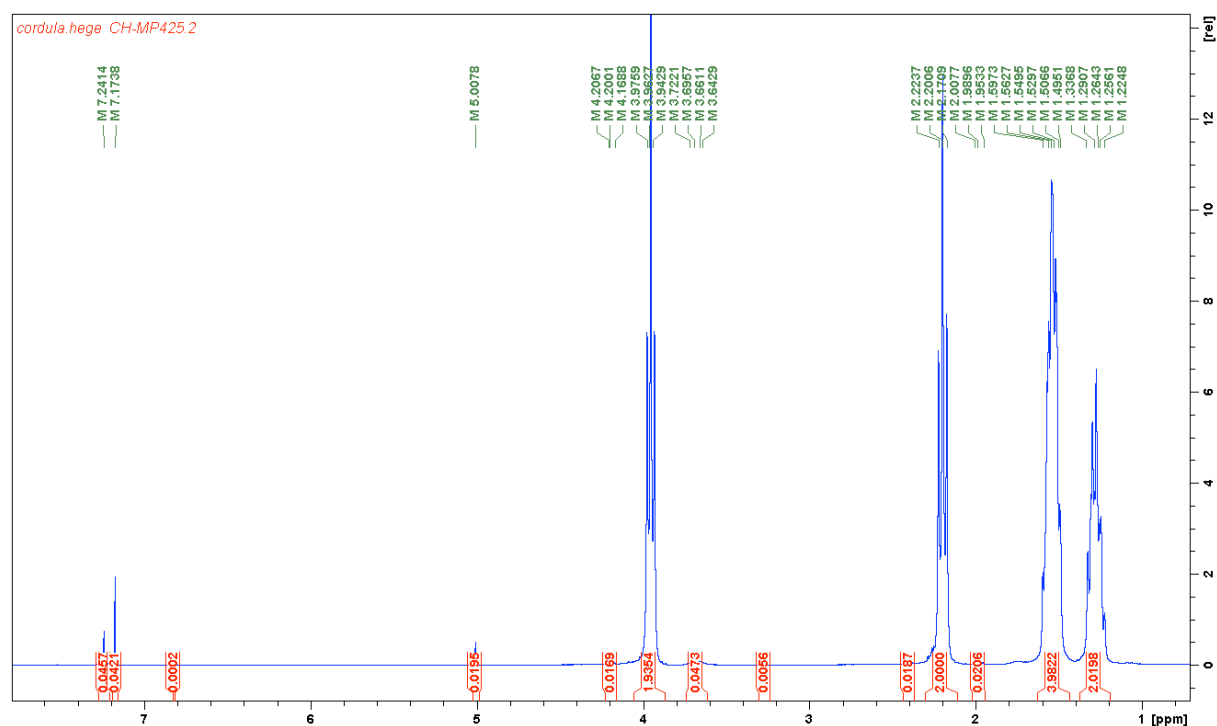


Figure 3. Iron(III) chloride, 400:1:5, benzyl alcohol,  $^1\text{H-NMR}$

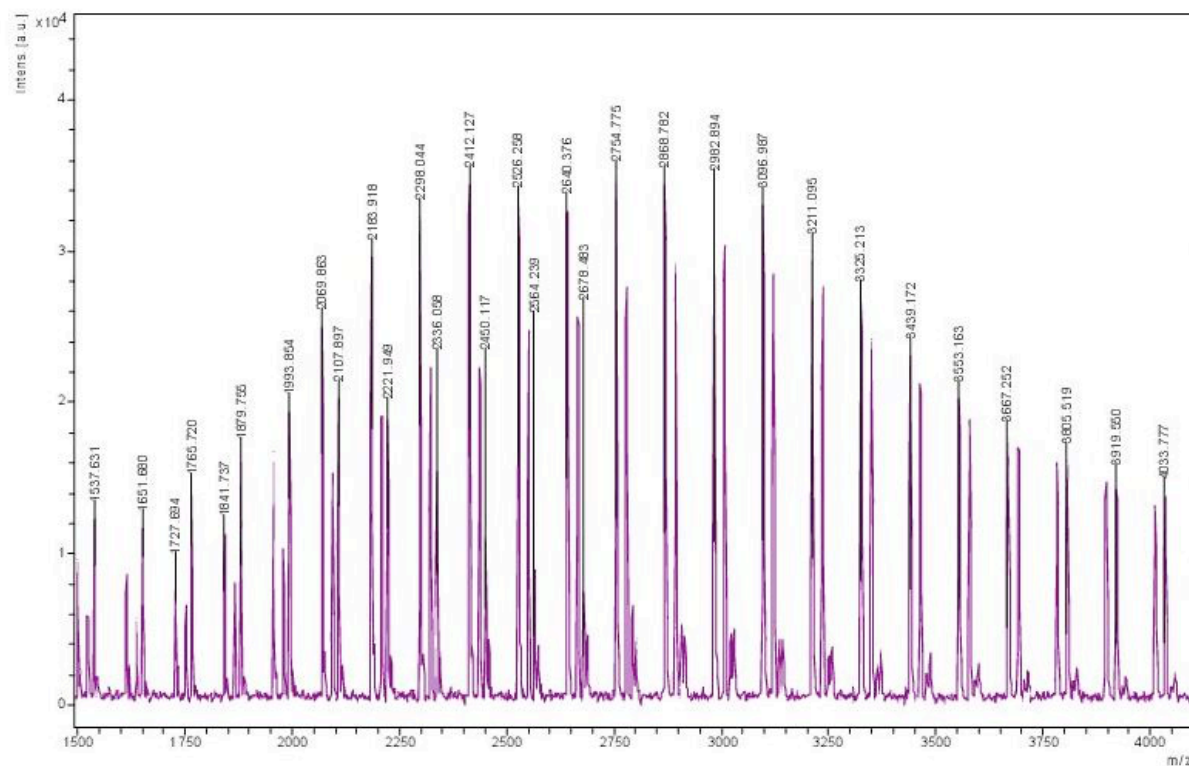


Figure 4. Iron(III) chloride, 400:1:5, benzyl alcohol, MALDI-TOF

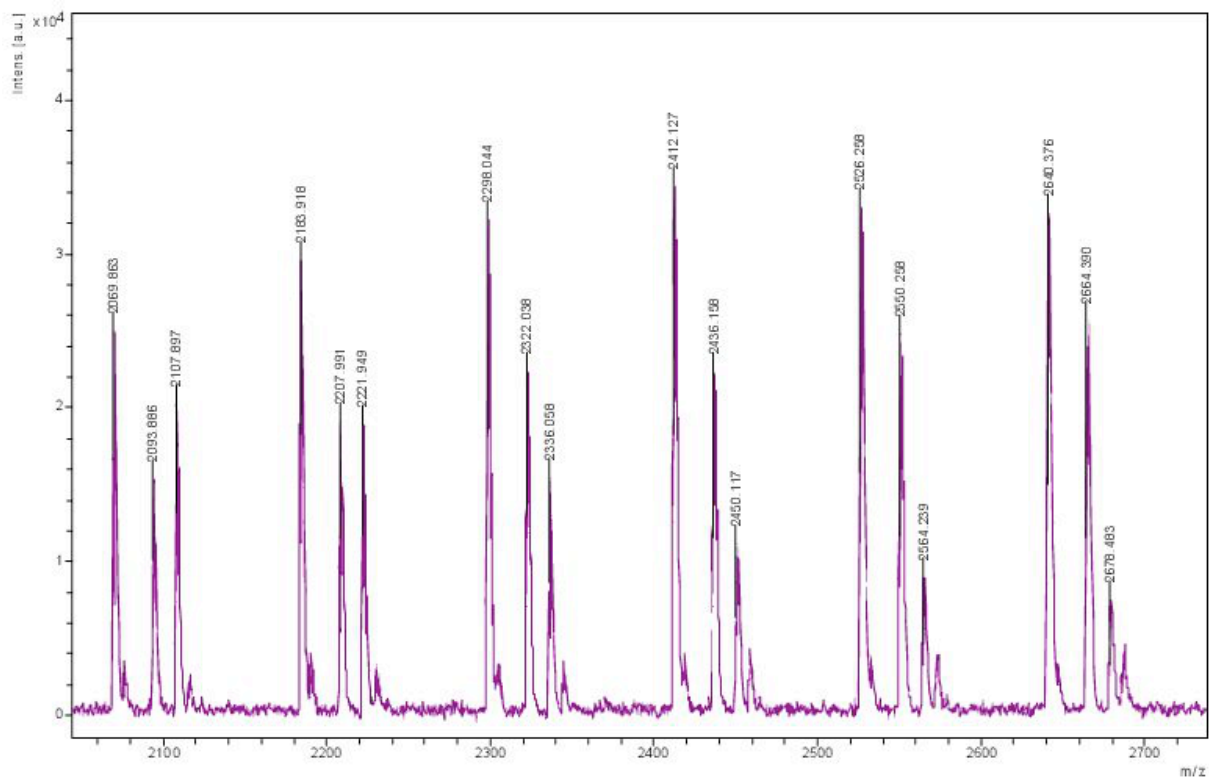


Figure 5. Iron(III) chloride, 400:1:5, benzyl alcohol, MALDI-TOF detail

### Iron(III) perchlorate 400:1:5 benzyl alcohol

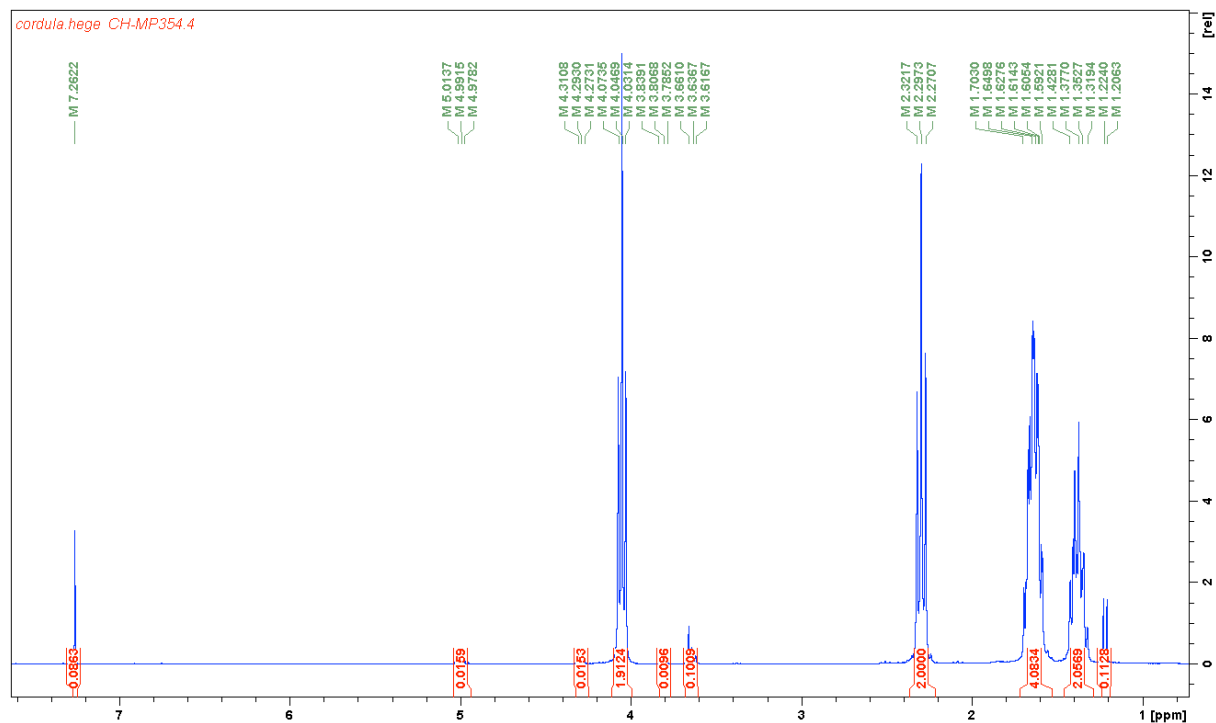


Figure 6. Iron(III) perchlorate, 400:1:5, benzyl alcohol, <sup>1</sup>H-NMR

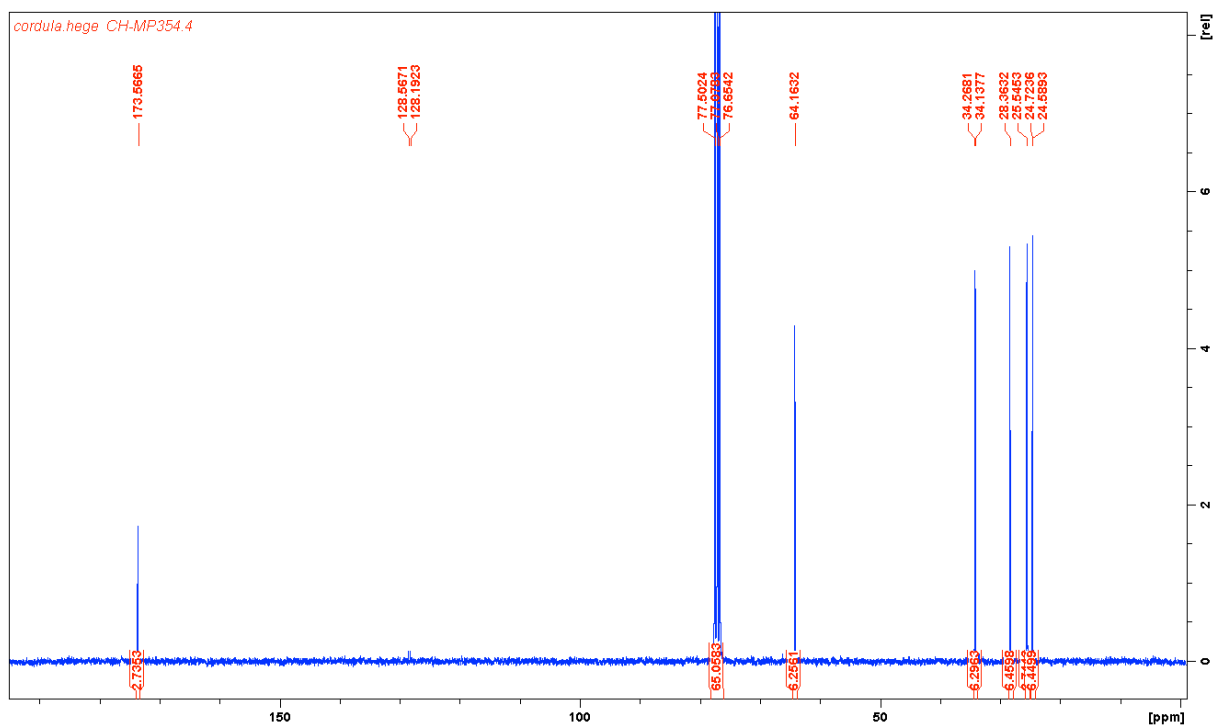


Figure 7 Iron(III) perchlorate, 400:1:5, benzyl alcohol,  $^{13}\text{C}$ -NMR

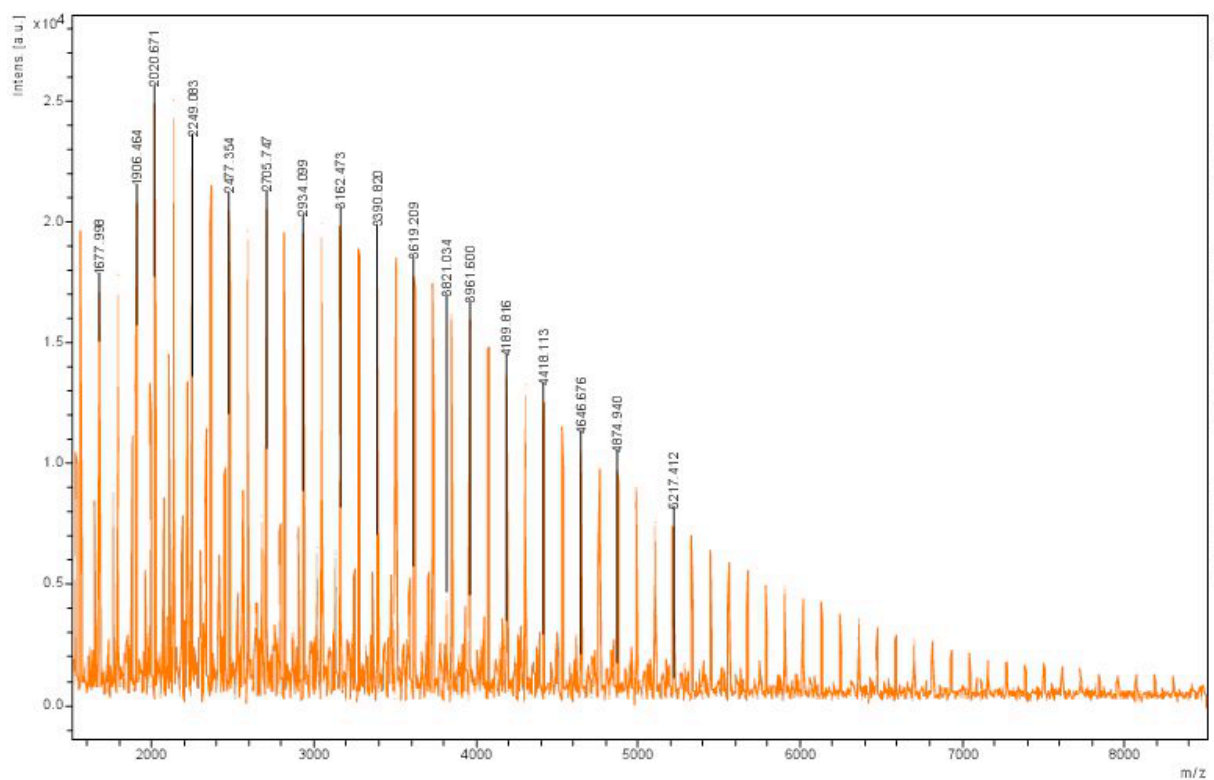


Figure 8. Iron(III) perchlorate, 400:1:5, benzyl alcohol, MALDI-TOF

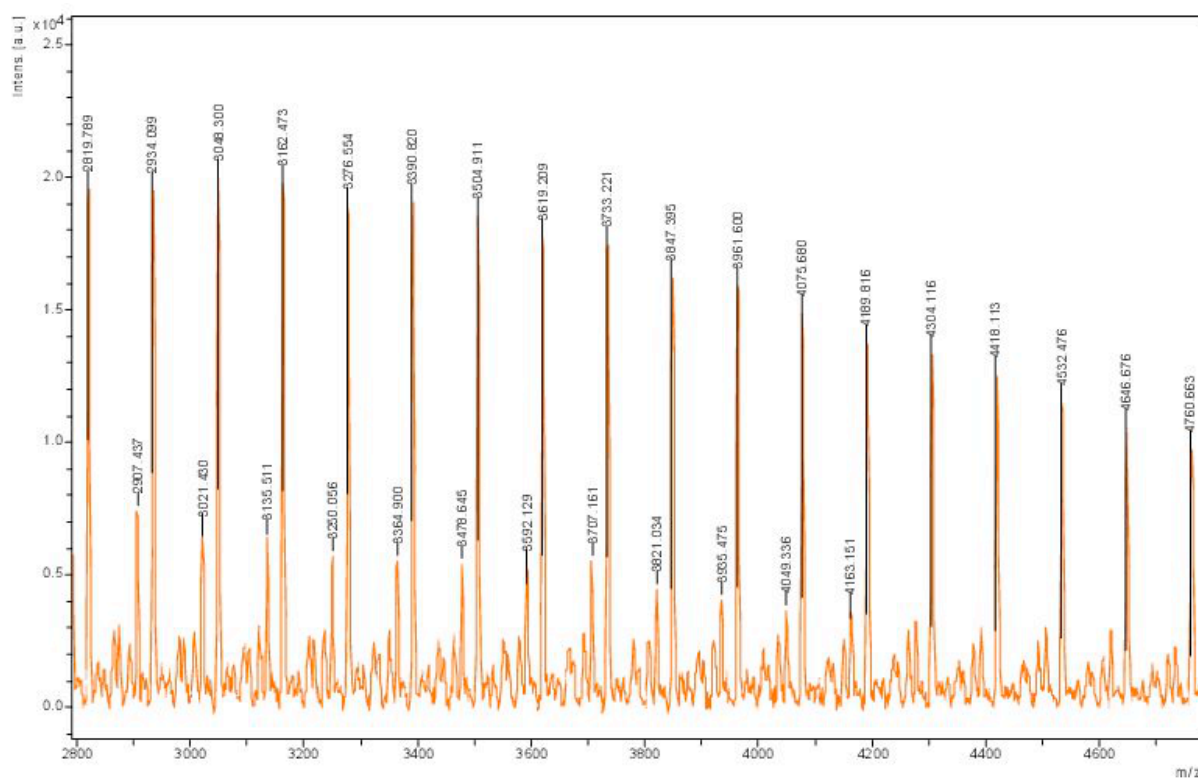


Figure 9. Iron(III) perchlorate, 400:1:5, benzyl alcohol, MALDI-TOF detail

Iron(III) perchlorate 400:1:5, water

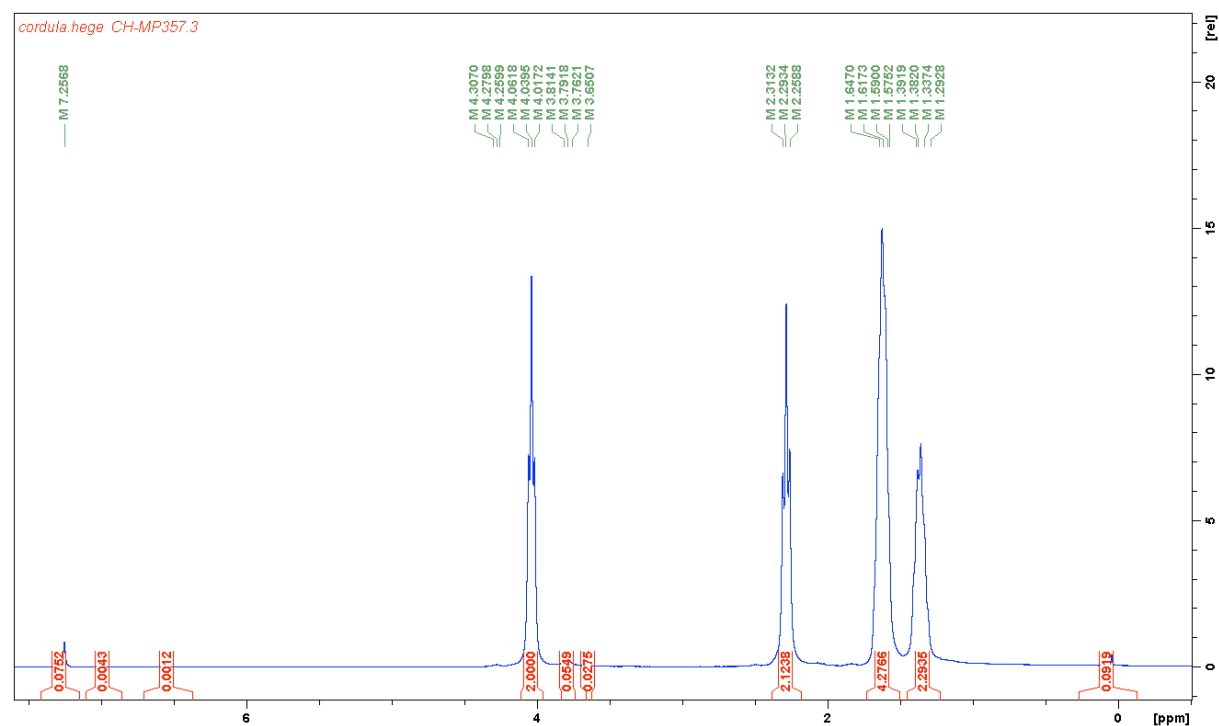


Figure 10. Iron(III) perchlorate, 400:1:5, water, <sup>1</sup>H-NMR

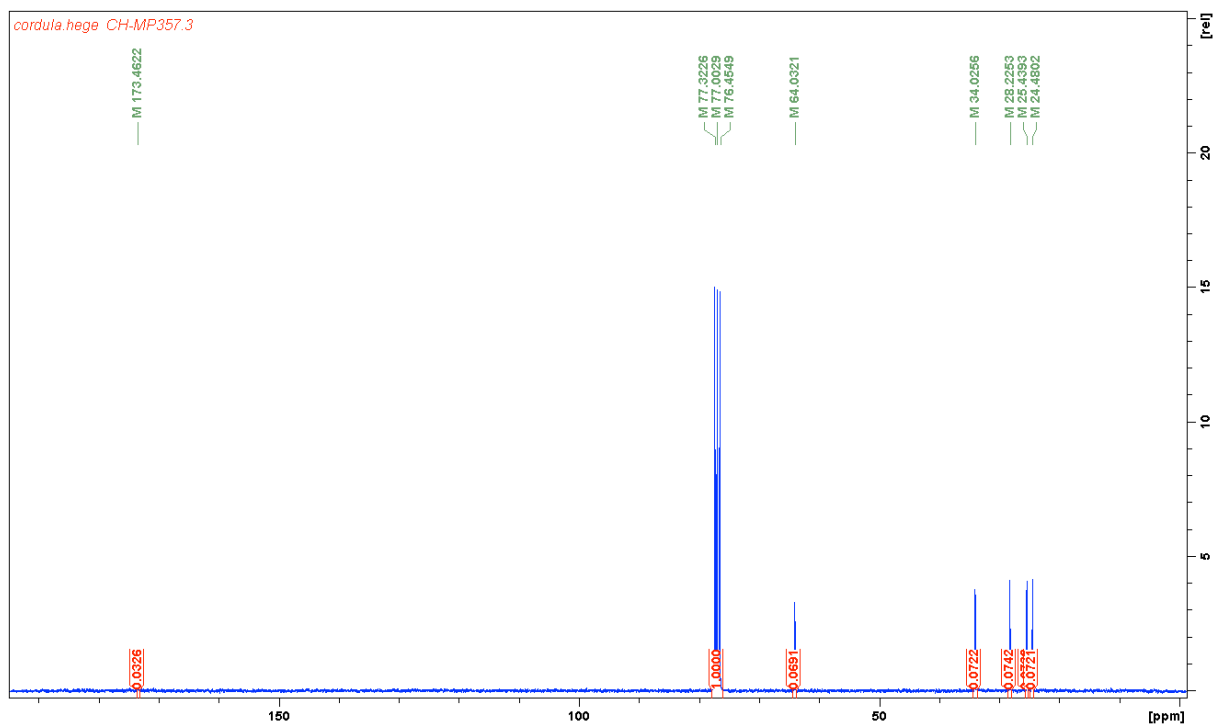


Figure 11. Iron(III) perchlorate, 400:1:5, water,  $^{13}\text{C}$ -NMR

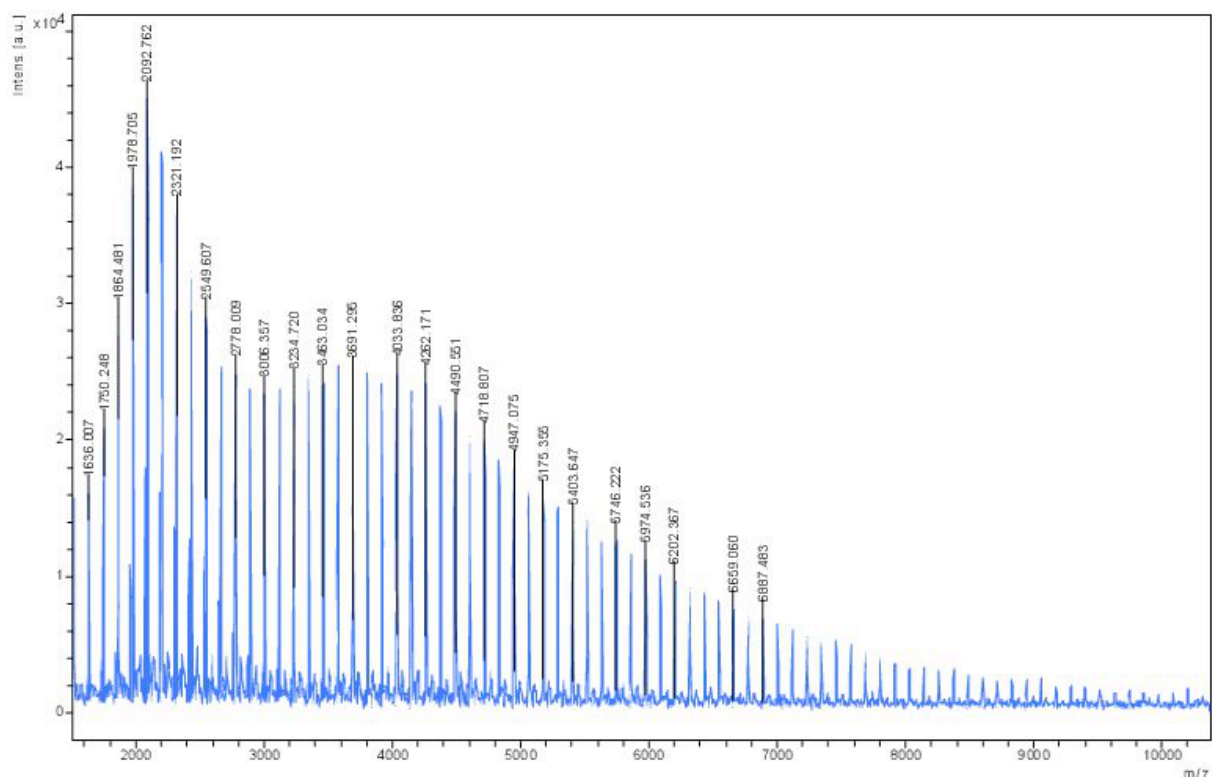


Figure 12. Iron(III) perchlorate, 400:1:5, water, MALI-TOF

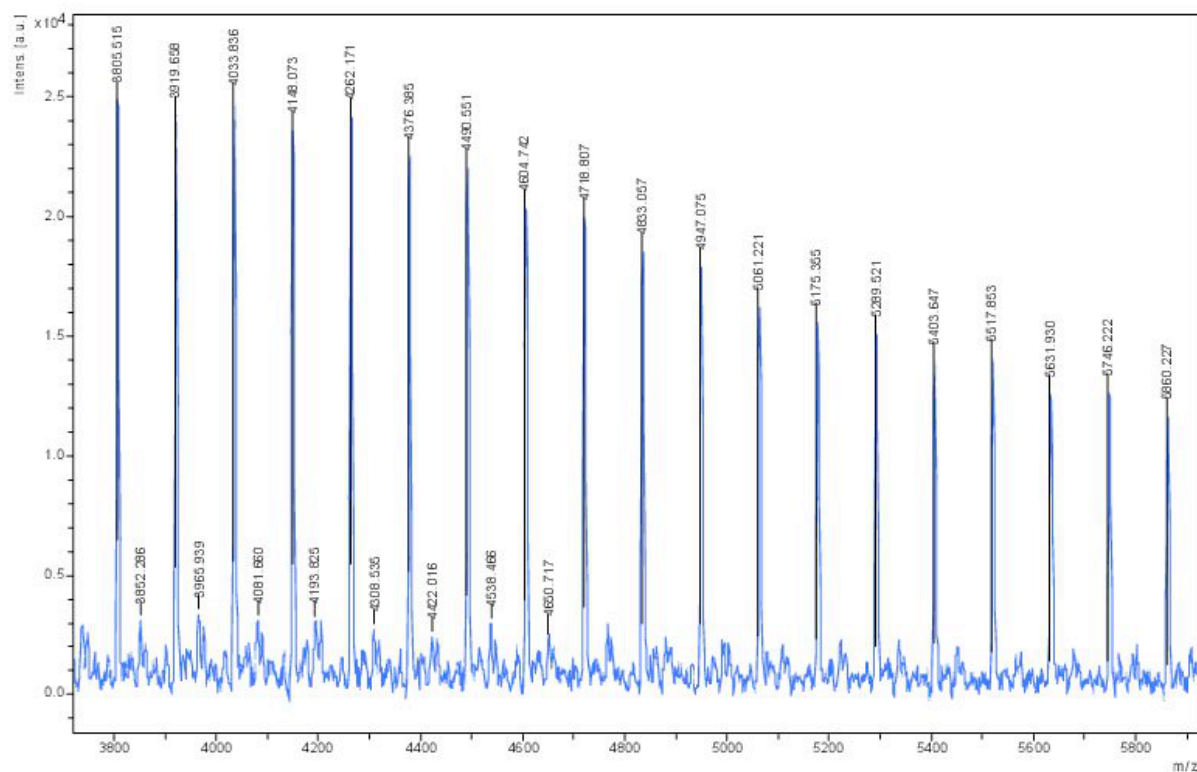


Figure 13. Iron(III) perchlorate, 400:1:5, water, MALDI-TOF

### Iron(III) perchlorate, 400:1:5, 2-propanol

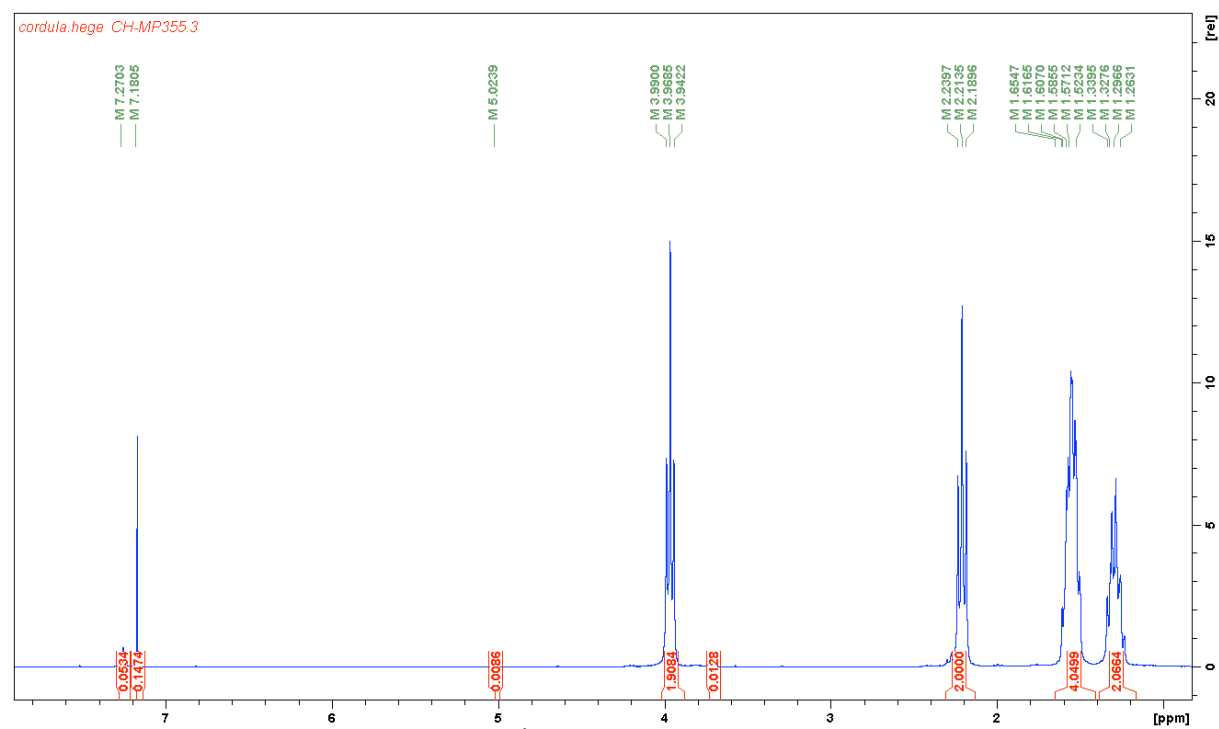


Figure 14. Iron(III) perchlorate, 400:1:5, 2-propanol,  $^1\text{H-NMR}$



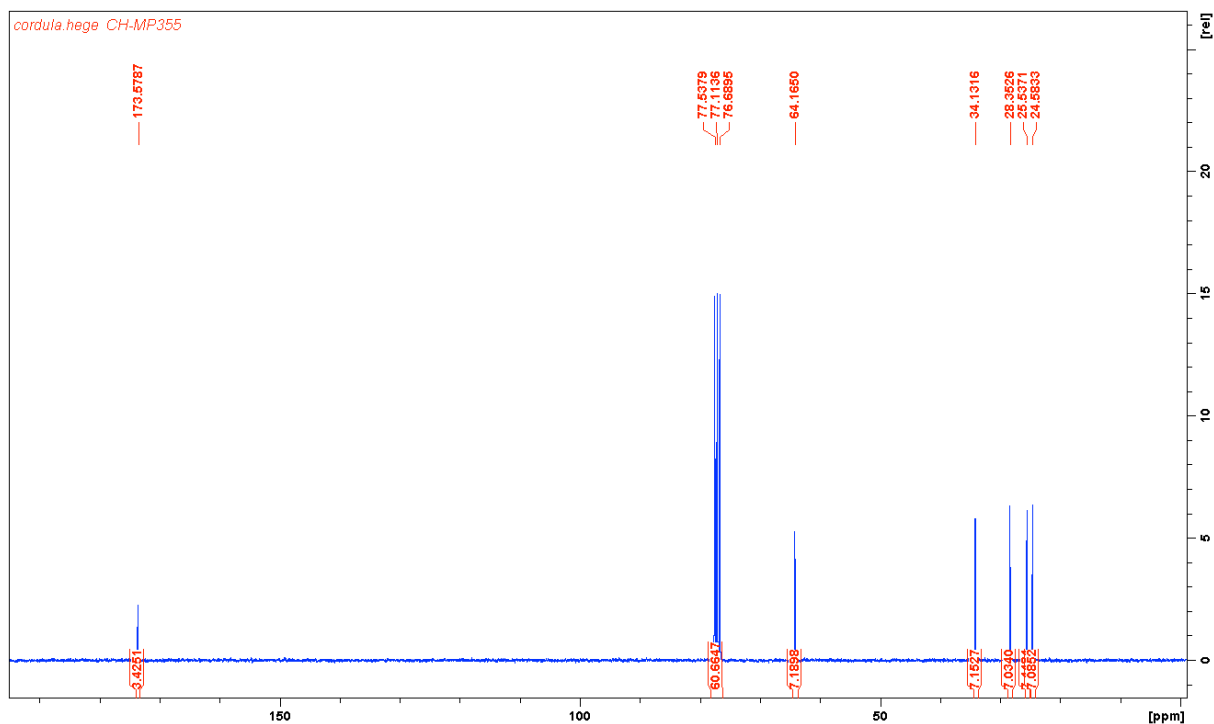


Figure 15. Iron(III) perchlorate, 400:1:5, 2-propanol,  $^{13}\text{C}$ -NMR

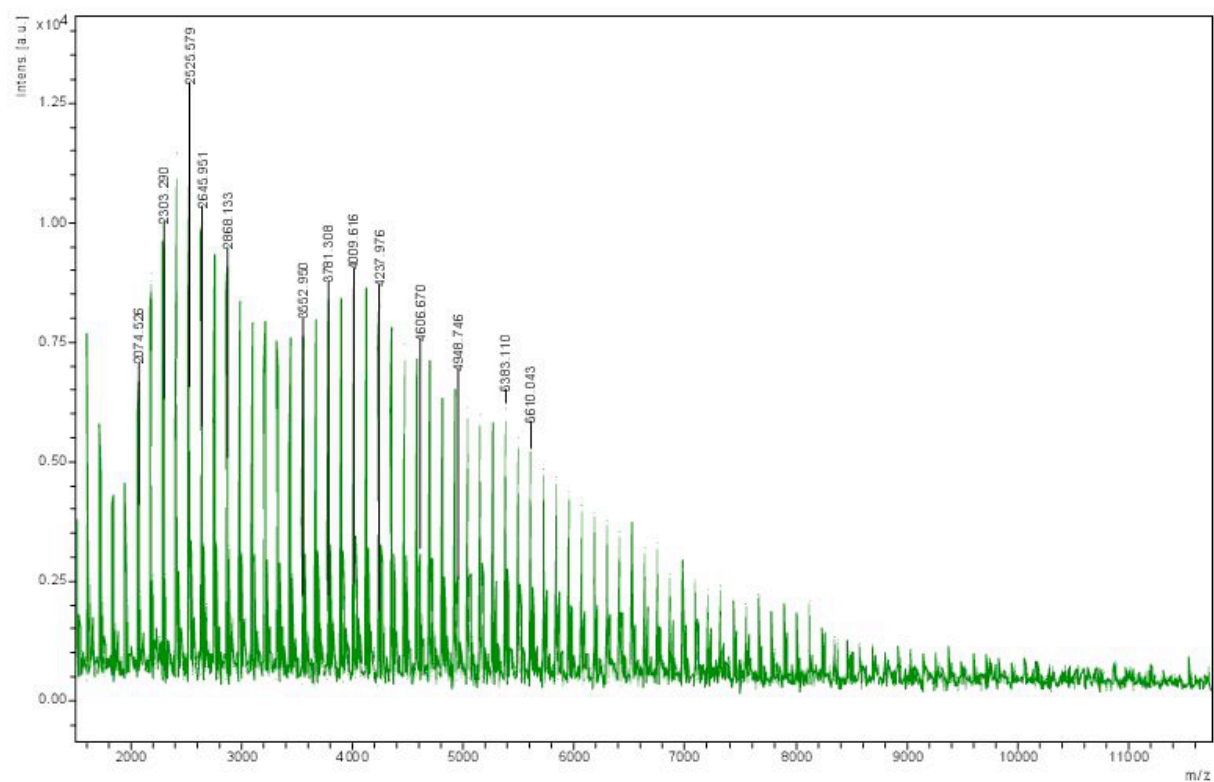


Figure 16. Iron(III) perchlorate, 400:1:5, 2-propanol, MALDI-TOF

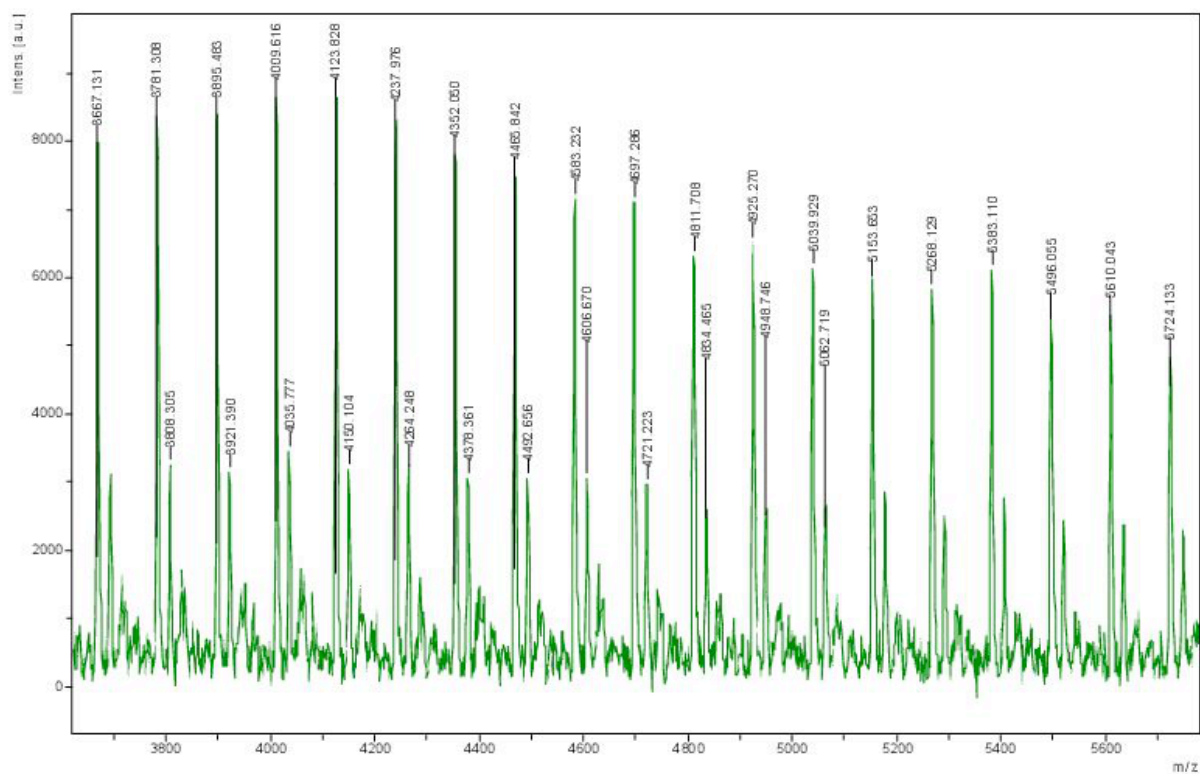


Figure 17. Iron(III) perchlorate, 400:1:5, 2-propanol, MALDI-TOF detail

### Iron(III) perchlorate, 400:1:5, 2-allylphenol

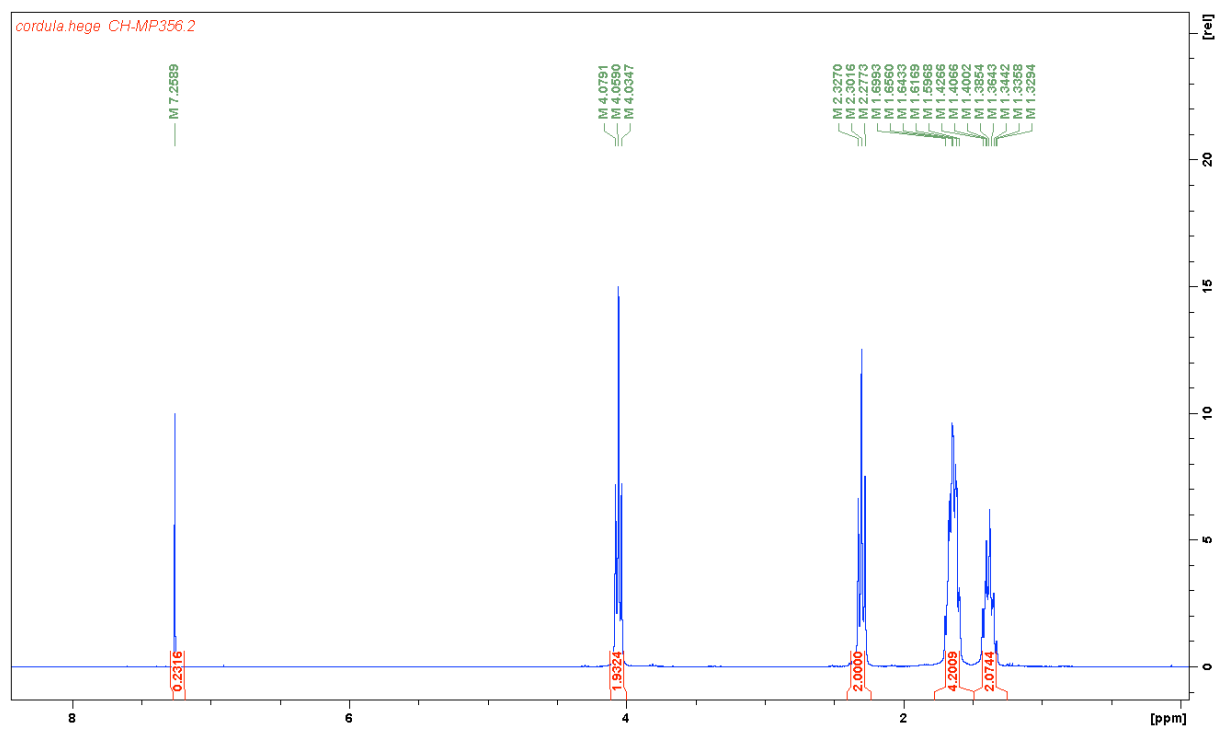


Figure 18. Iron(III) perchlorate, 400:1:5, 2-allylphenol, <sup>1</sup>H-NMR

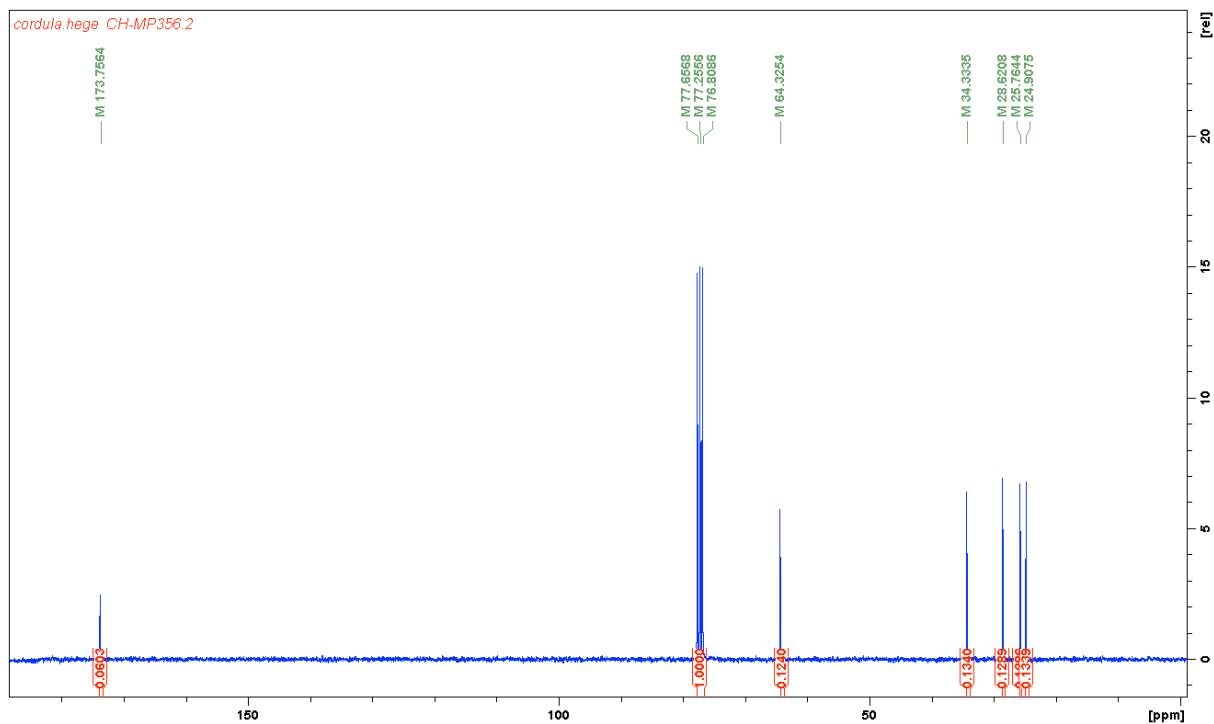


Figure 19 Iron(III) perchlorate, 400:1:5, 2-allylphenol,  $^{13}\text{C-NMR}$

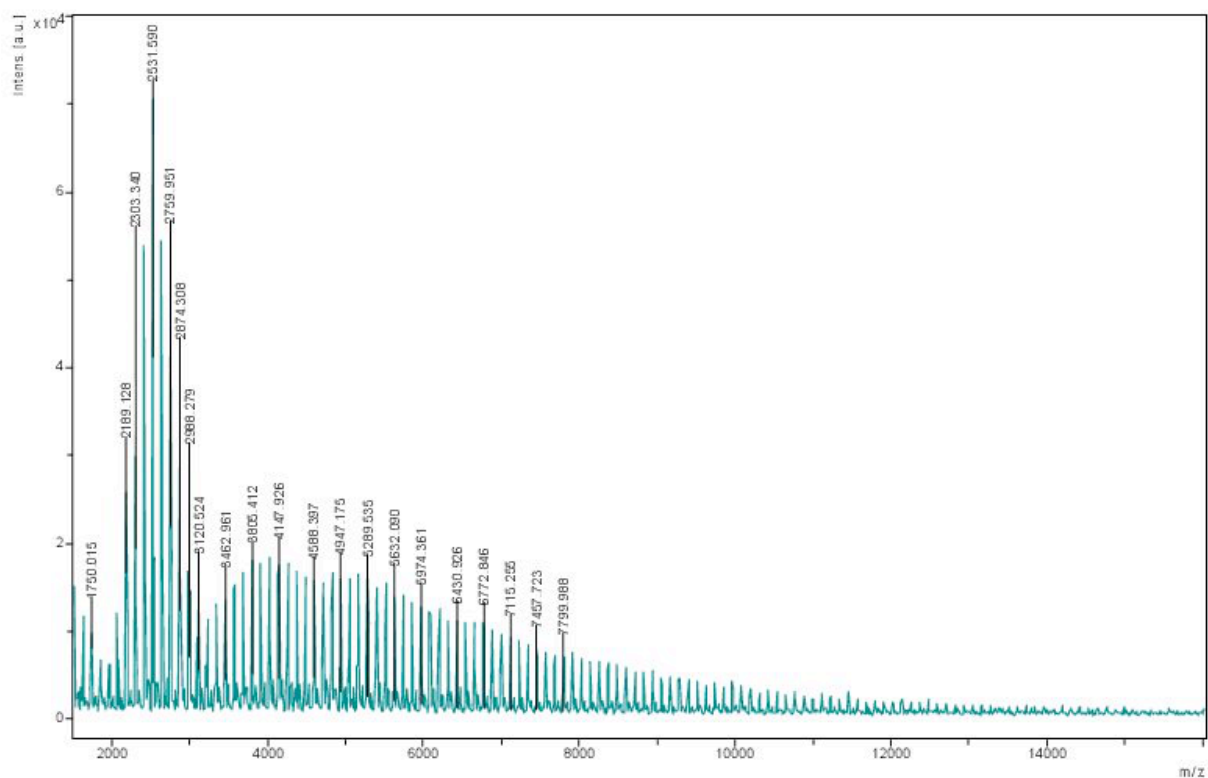


Figure 20. Iron(III) perchlorate, 400:1:5, 2-allylphenol, MALDI-TOF

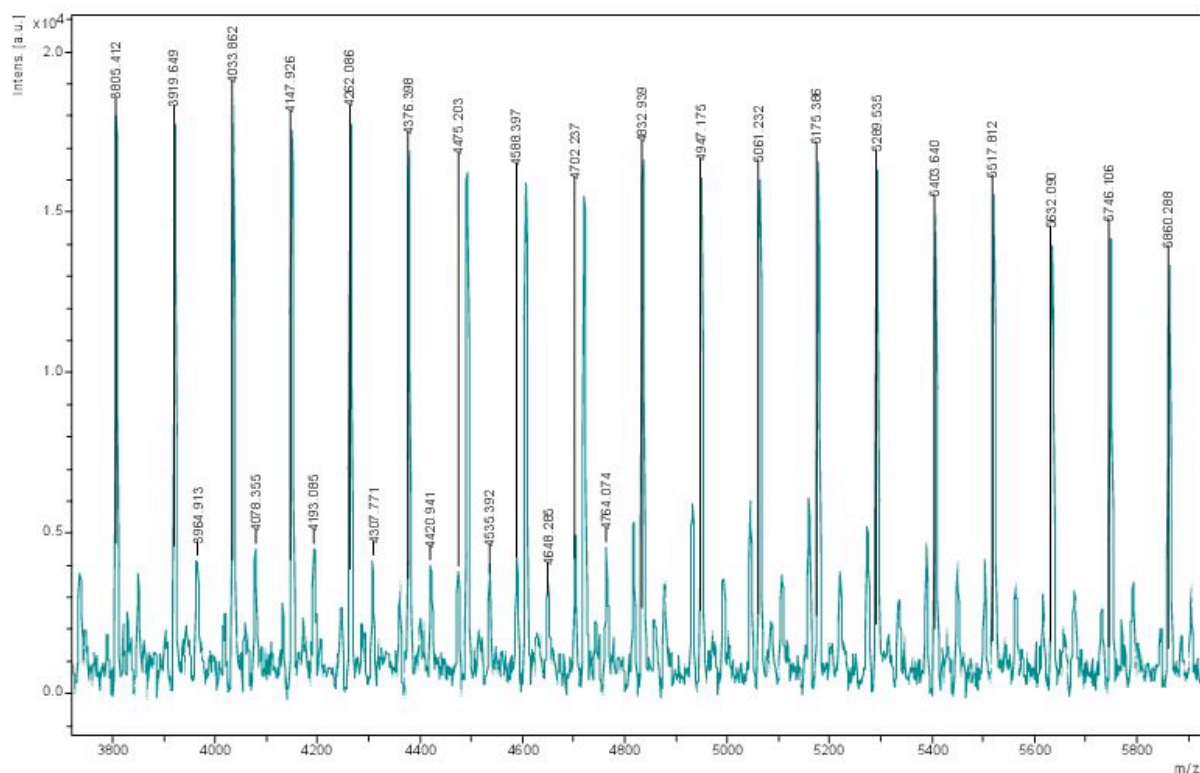


Figure 21. Iron(III) perchlorate, 400:1:5, 2-allylphenol, MALDI-TOF details

### Allylphenol Experiments

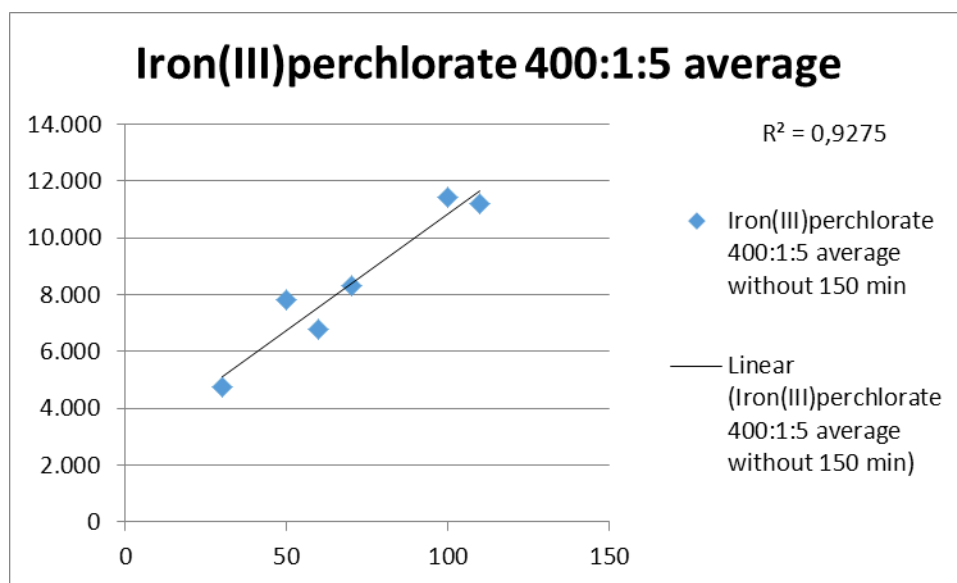


Figure 22. Kinetic experiment with iron(III) perchlorate and 2-allylphenol at 25 °C

Average of three experiments, the reaction is usually completed after 2 hours.

### UV-Vis experiment: Iron(III) perchlorate in ethylacetate with 2-allylphenol

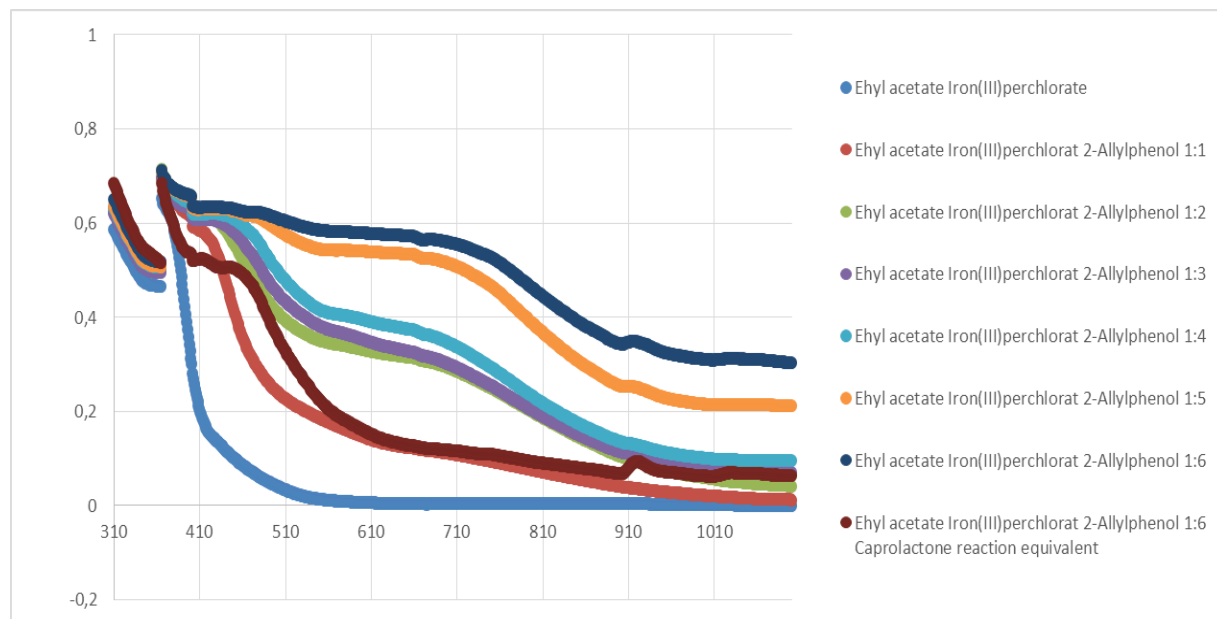


Figure 23. UV-Vis Experiment iron(III) perchlorate with 2-allylphenol in ethyl acetate

The measurement could not be investigated in  $\epsilon$ -caprolactone, because the polymerization occurred too fast. Caprolactone leads to a replacement of 2-allylphenol in the iron-complex.