

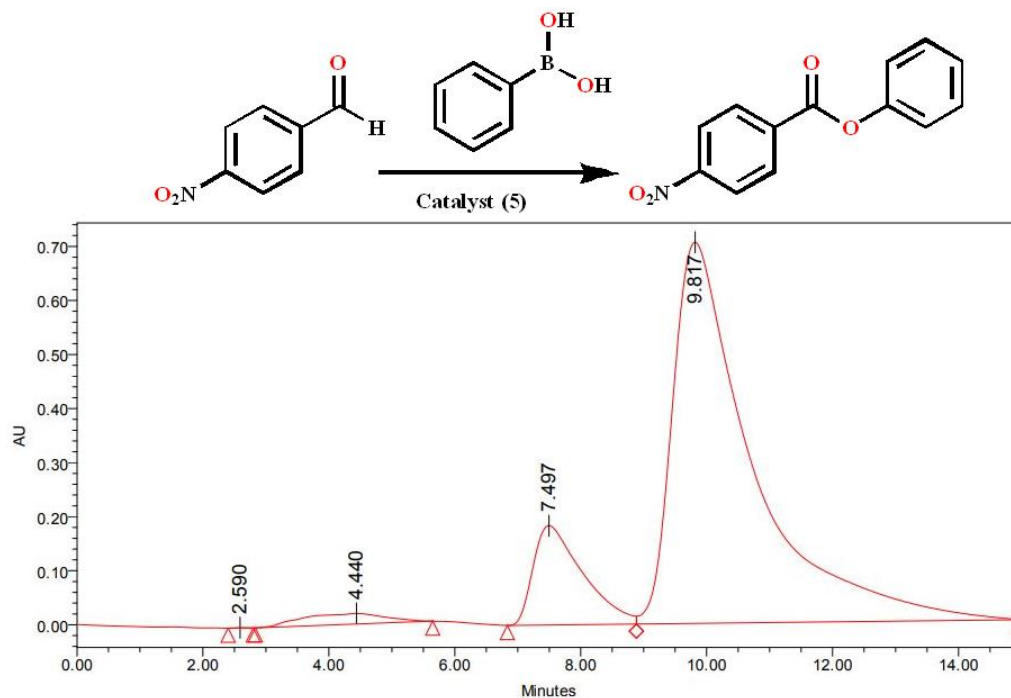
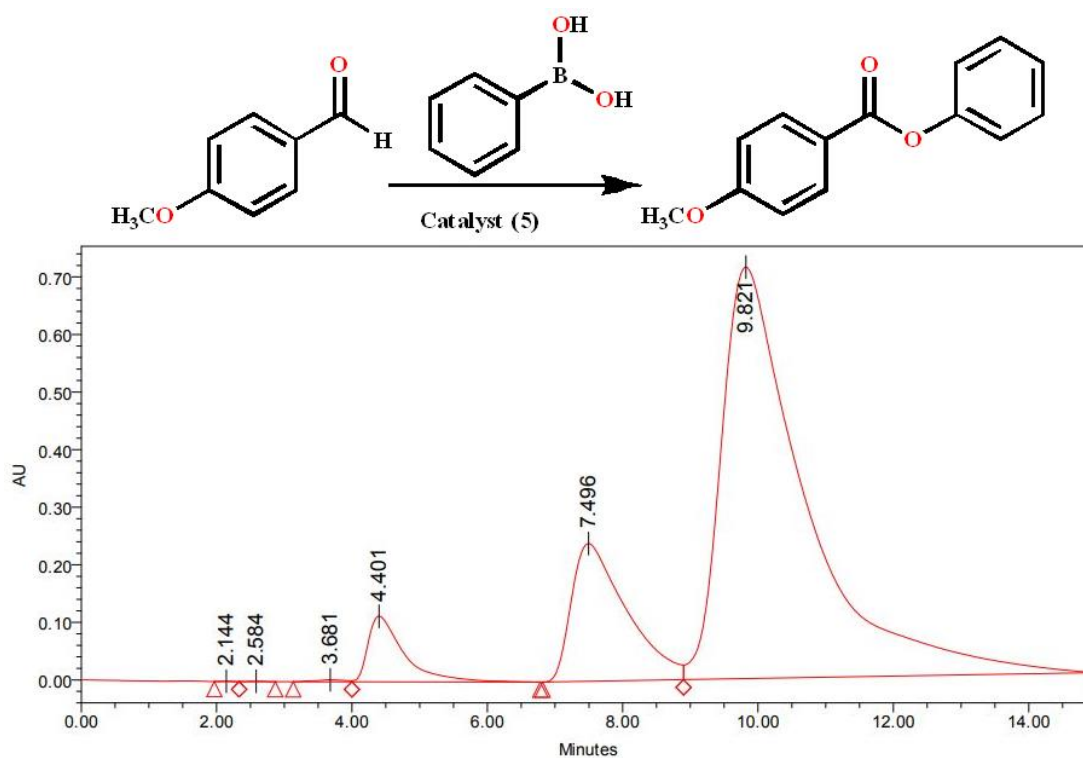
***Appendix B: List of publications***

- [1] Borah, S., Hazarika, A., Borah, G., and Gogoi, N. Influence of aromatic nitro-substituents on auto-reusability of oxime-based fluoride receptors. *Journal of Chemical Sciences*, 130(9): 1-9, 2018.
- [2] Borah, G., Borborah, A., and Gogoi, N.  $\alpha$ -ZrP-supported CdS quantum dot composite material: an efficient and recyclable photocatalyst for selective oxidation of benzyl alcohol. *Bulletin of Materials Science*, 45(3): 1-7, 2022.
- [3] Bhattacharyya, B., Borah, G., Mishra, S., and Gogoi, N. A facile bottom up route to covalently anchor Pd-PEPPSI on layered zirconium(IV) phosphonate: Augmenting catalytic efficacy and recyclability. (*manuscript under review*)
- [4] Borah, G., Bhattacharyya, B., Mishra, S., and Gogoi, N. Imidazolium functionalized zirconium(IV) organophosphonate framework: An efficient heterogenous organocatalyst for aerobic esterification of aldehydes. (*manuscript under preparation*)
- [5] Borah, G., Kashyap, S., Banik, S., Mehta, P., Dowerah, D., Gour, N. K., Deka, R. C., and Gogoi, N. Phosphonate ester functionalized imidazolium salts and their application in organocatalytic aerobic esterification of benzaldehyde. (*manuscript under preparation*)
- [6] Borah, G., Mehta, P., and Gogoi, N. Triphenyl 1-mesityl 1-H imidazole boron: a structural and spectroscopic study. (*manuscript under preparation*)
- [7] Borah, G. and Gogoi, N. Synthesis and structure of a unsymmetric NHC-selenium adduct. (*manuscript under preparation*)

***Appendix C: Conferences, Seminars, Workshops attended and Posters presented***

- [1] Presented a poster entitled “Zirconium Phosphate Nanosheet Supported CdS Quantum Dot Synthesis Characterization and Photocatalytic Studies” at an International Conference on “*Modern Trends in Inorganic Chemistry*” organized by Indian Institute of Technology Guwahati, Assam from 11<sup>th</sup> to 14<sup>th</sup> December, 2019
- [2] Presented a poster entitled “An efficient CdS quantum dot supported by Zirconium Phosphate for selective oxidation of Benzyl Alcohol” at an International Conference on “*Emerging Trends in Chemical Sciences*” organized by Guwahati University, Guwahati, Assam from 13<sup>th</sup> to 15<sup>th</sup> February, 2020
- [3] UGC SAP DRS-II sponsored workshop on Powder X-Ray Diffraction, 2019 organized by Department of Chemical Sciences, Tezpur University, India.

## Appendix A: HPLC, GC-MS and NMR data

Figure A1: HPLC data for **5** catalysed esterification of p-nitrobenzaldehyde with phenyl boronic acidFigure A2: HPLC data for **5** catalysed esterification of p-methoxybenzaldehyde with phenyl boronic acid

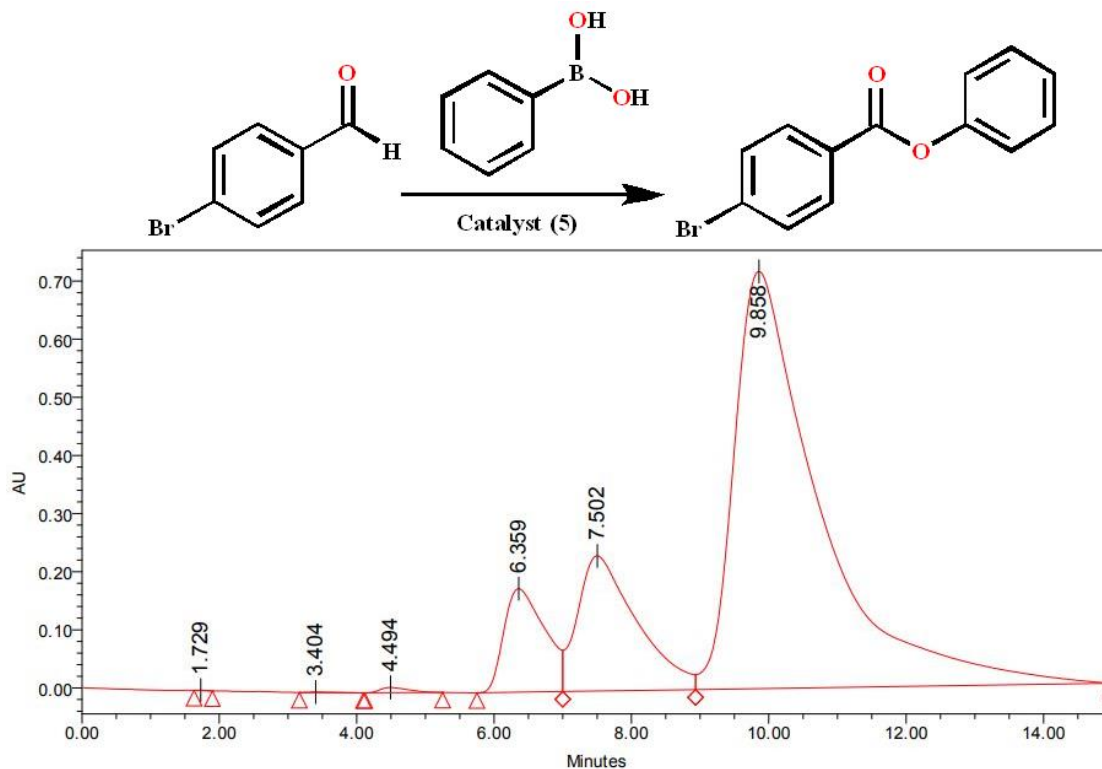


Figure A3: HPLC data for **5** catalysed esterification of p-bromobenzaldehyde with phenyl boronic acid

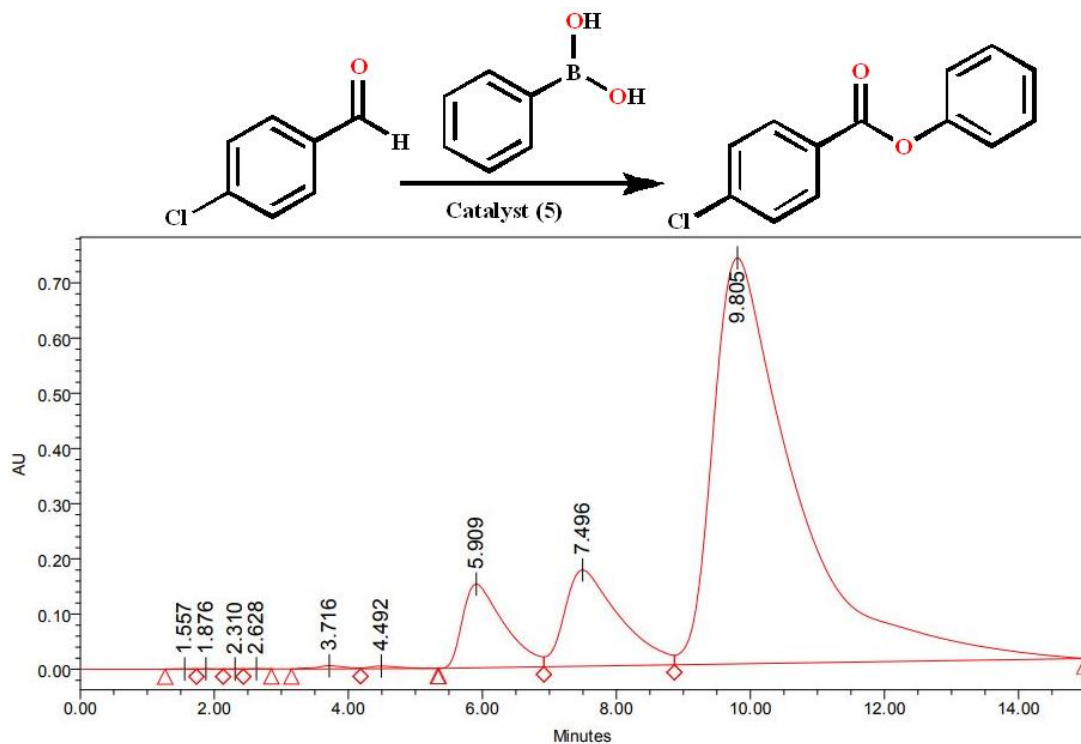


Figure A4: HPLC data for **5** catalysed esterification of p-chlorobenzaldehyde with phenyl boronic acid

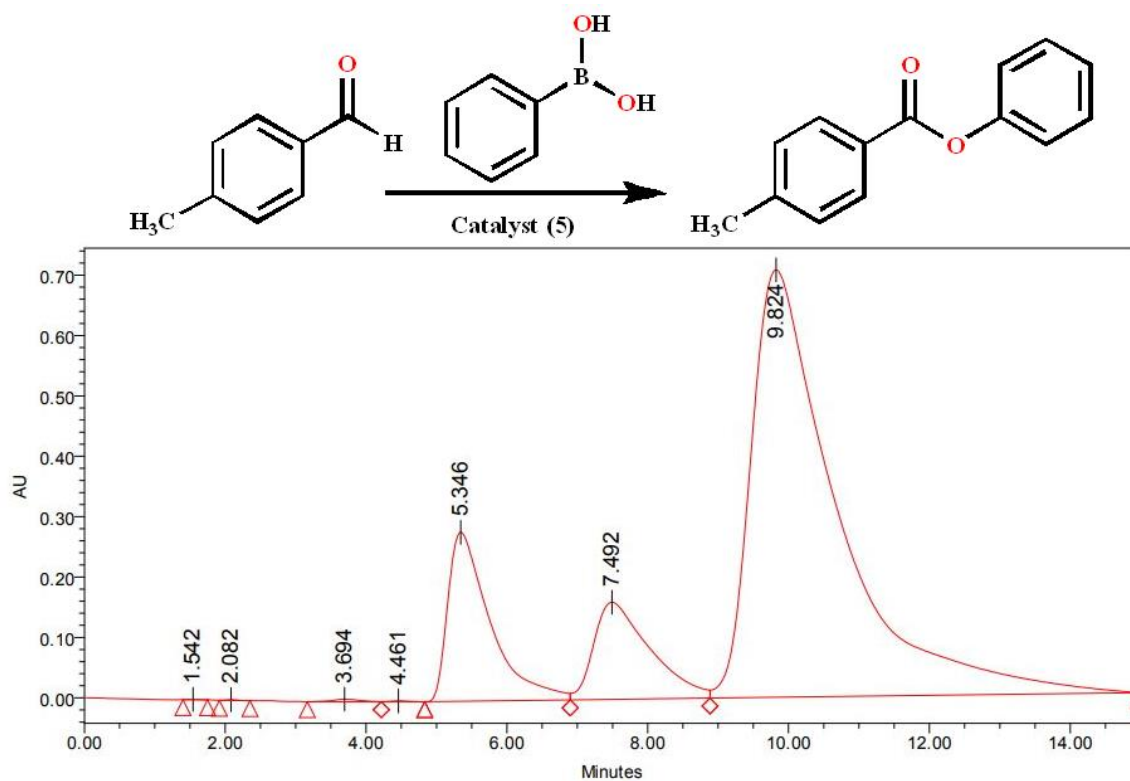


Figure A5: HPLC data for **5** catalysed esterification of p-methylbenzaldehyde with phenyl boronic acid

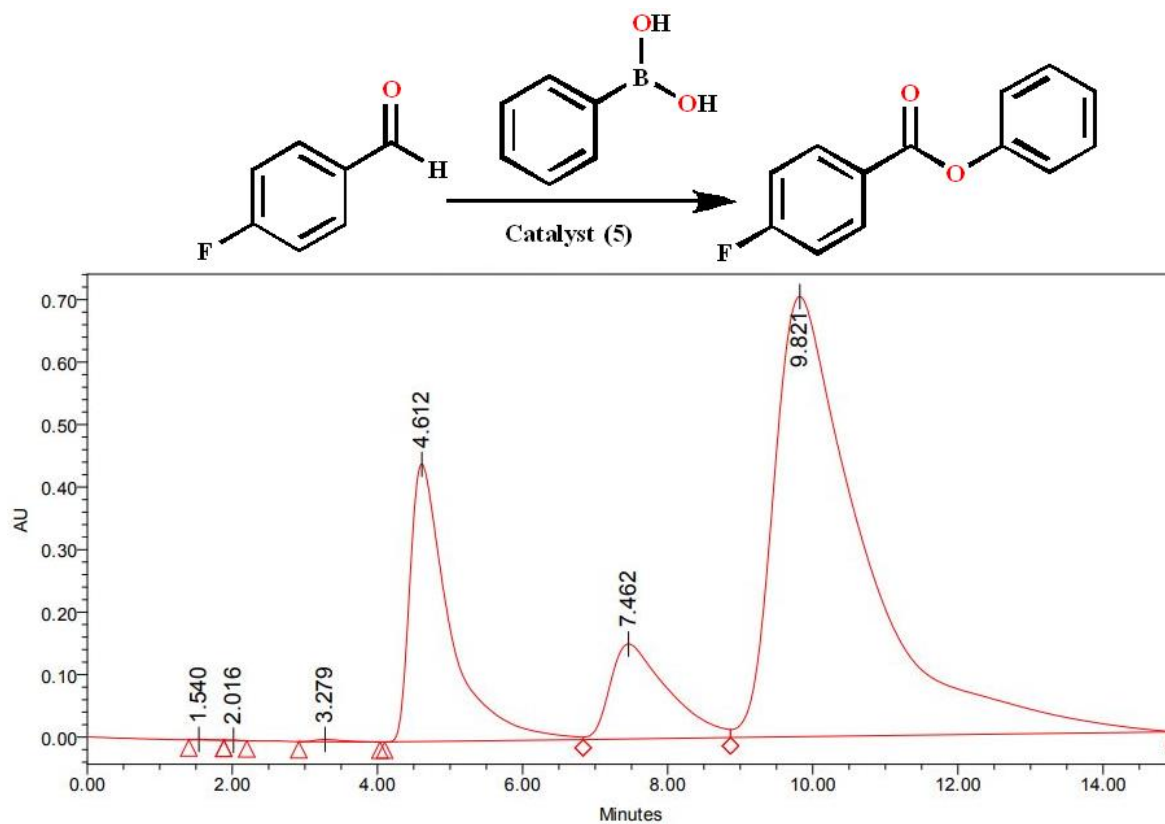


Figure A6: HPLC data for **5** catalysed esterification of p-fluorobenzaldehyde with phenyl boronic acid

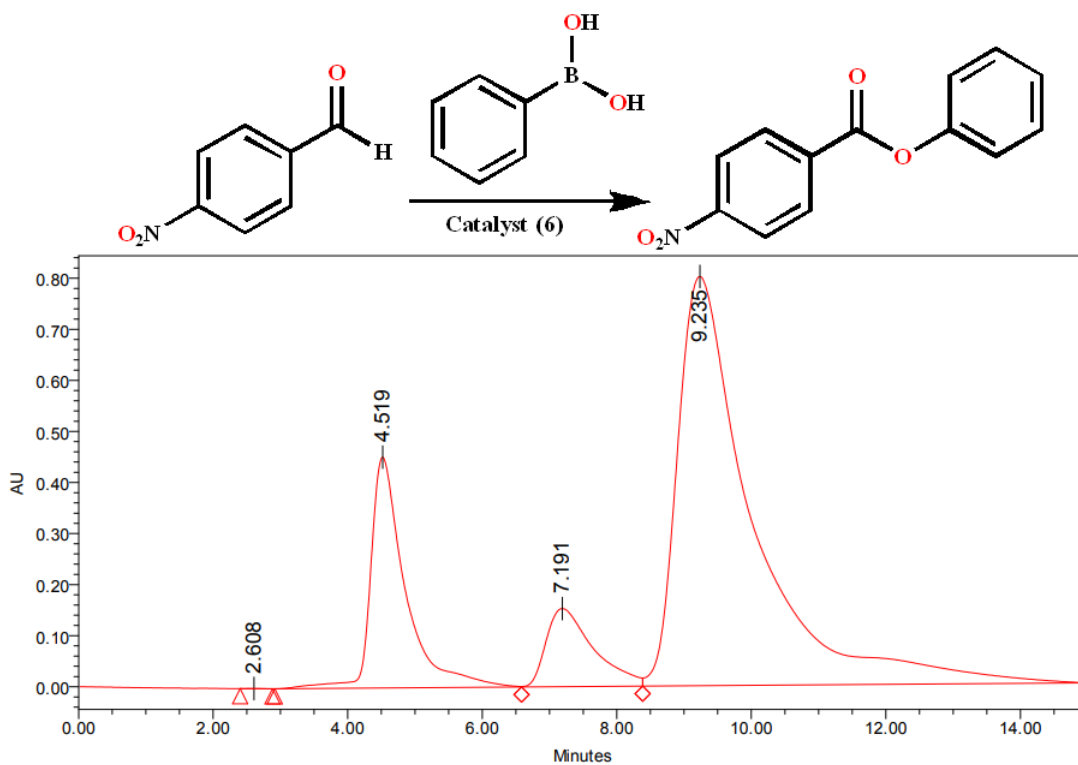


Figure A7: HPLC data for **6** catalysed esterification of p-nitrobenzaldehyde with phenyl boronic acid

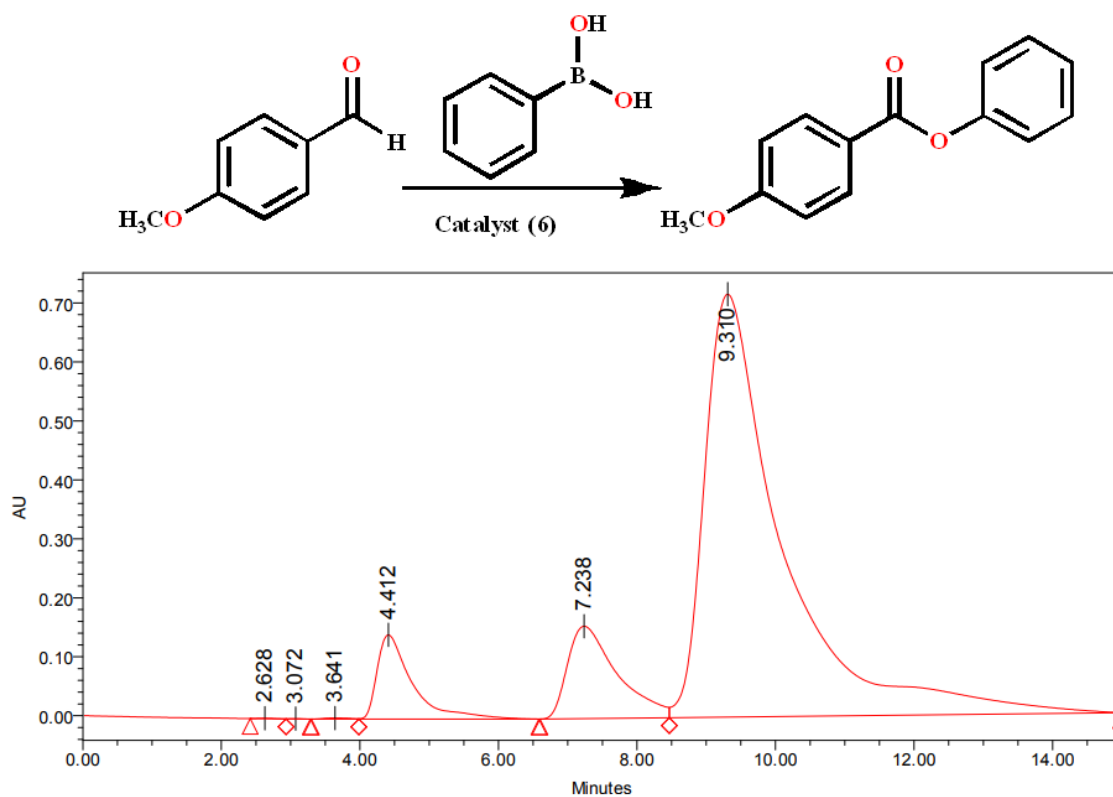


Figure A8: HPLC data for **6** catalysed esterification of p-methoxybenzaldehyde with phenyl boronic acid

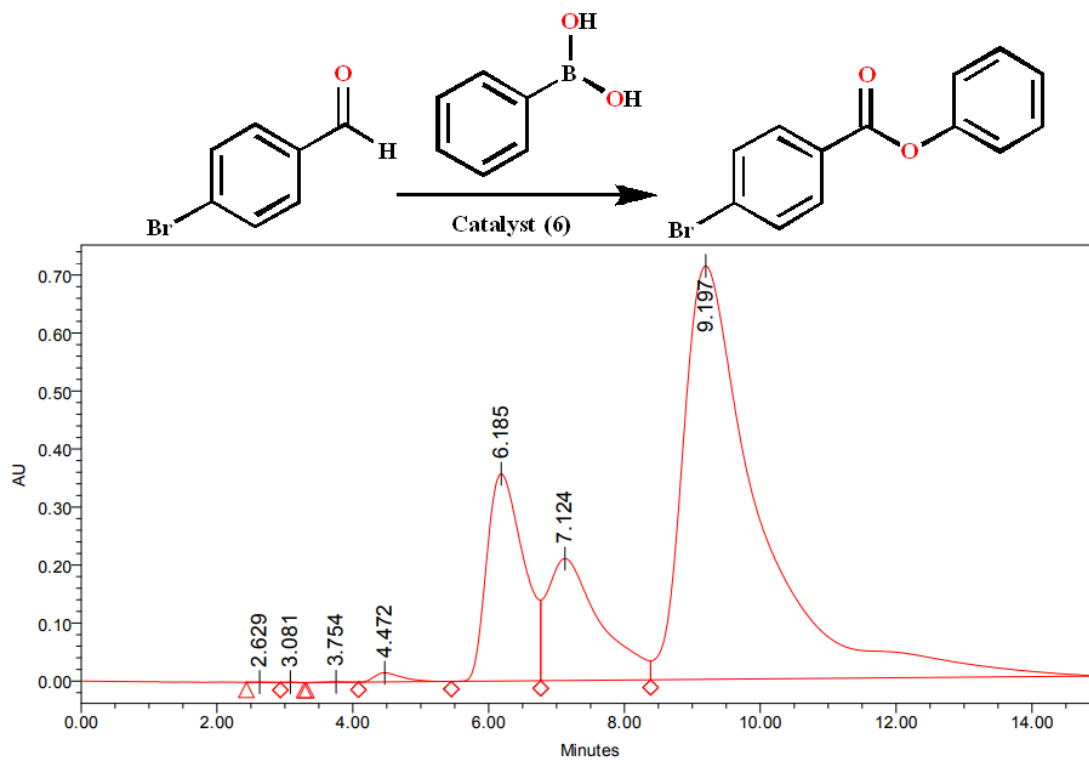


Figure A9: HPLC data for **6** catalysed esterification of p-bromobenzaldehyde with phenyl boronic acid

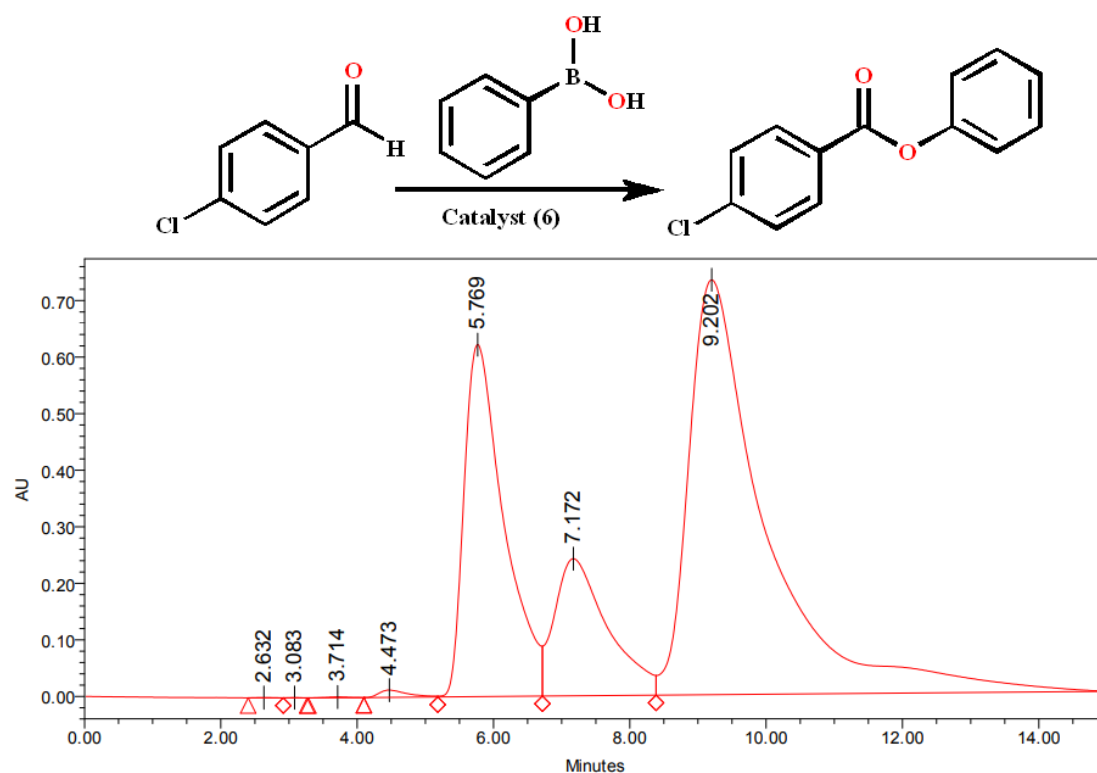


Figure A10: HPLC data for **6** catalysed esterification of p-chlorobenzaldehyde with phenyl boronic acid

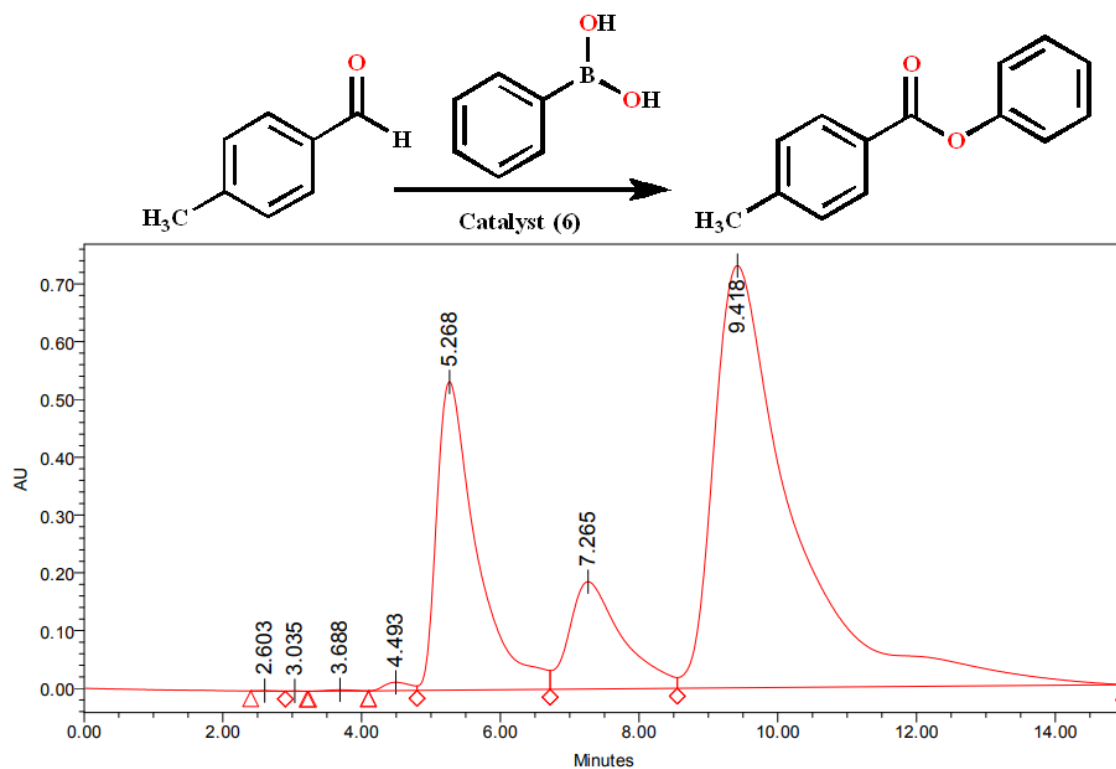


Figure A11: HPLC data for **6** catalysed esterification of p-methylbenzaldehyde with phenyl boronic acid

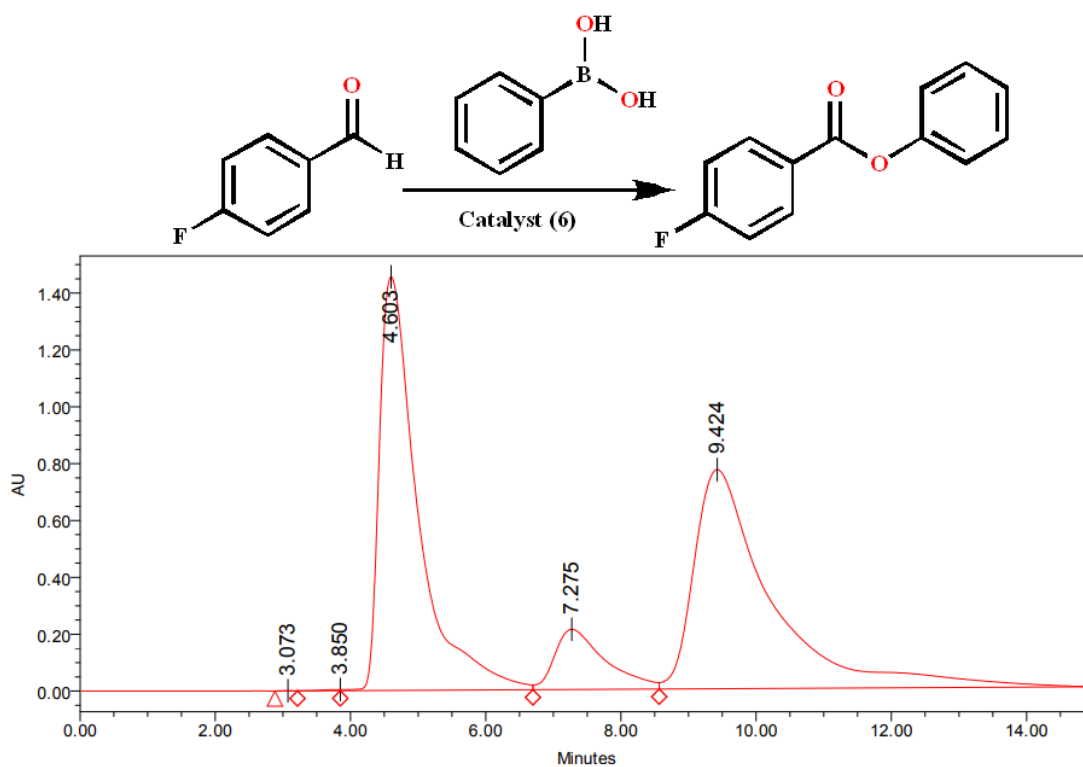


Figure A12: HPLC data for **6** catalysed esterification of p-fluorobenzaldehyde with phenyl boronic acid



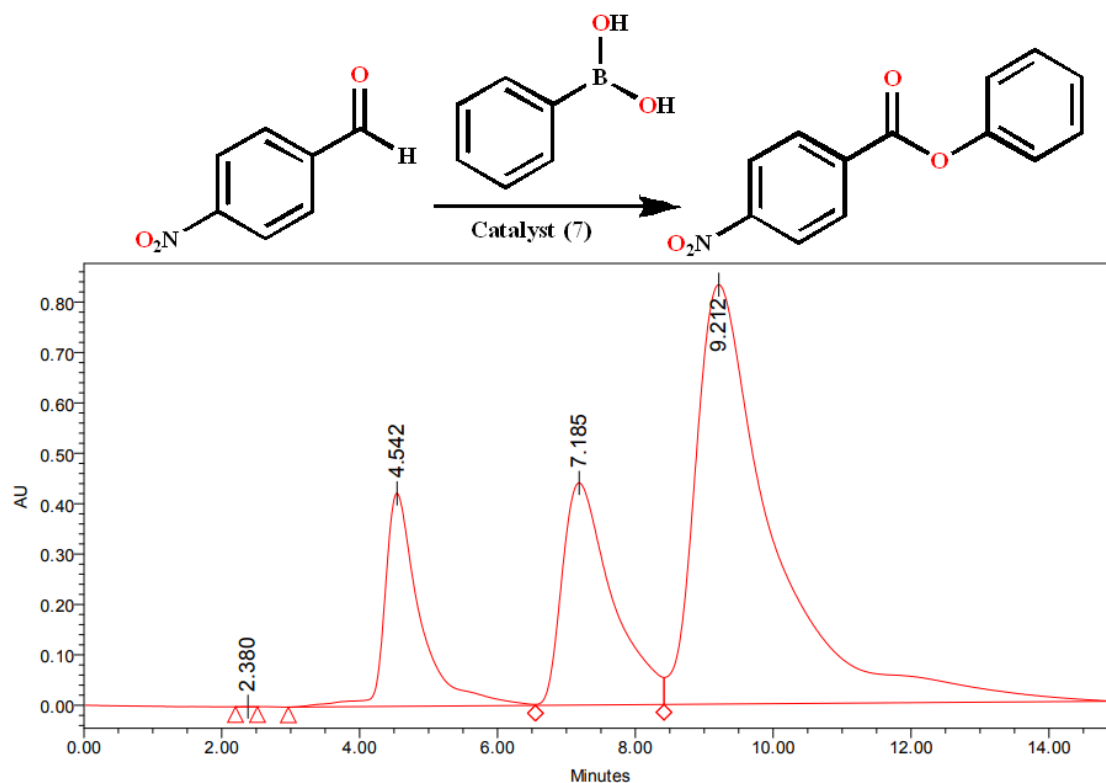


Figure A13: HPLC data for **7** catalysed esterification of p-nitrobenzaldehyde with phenyl boronic acid

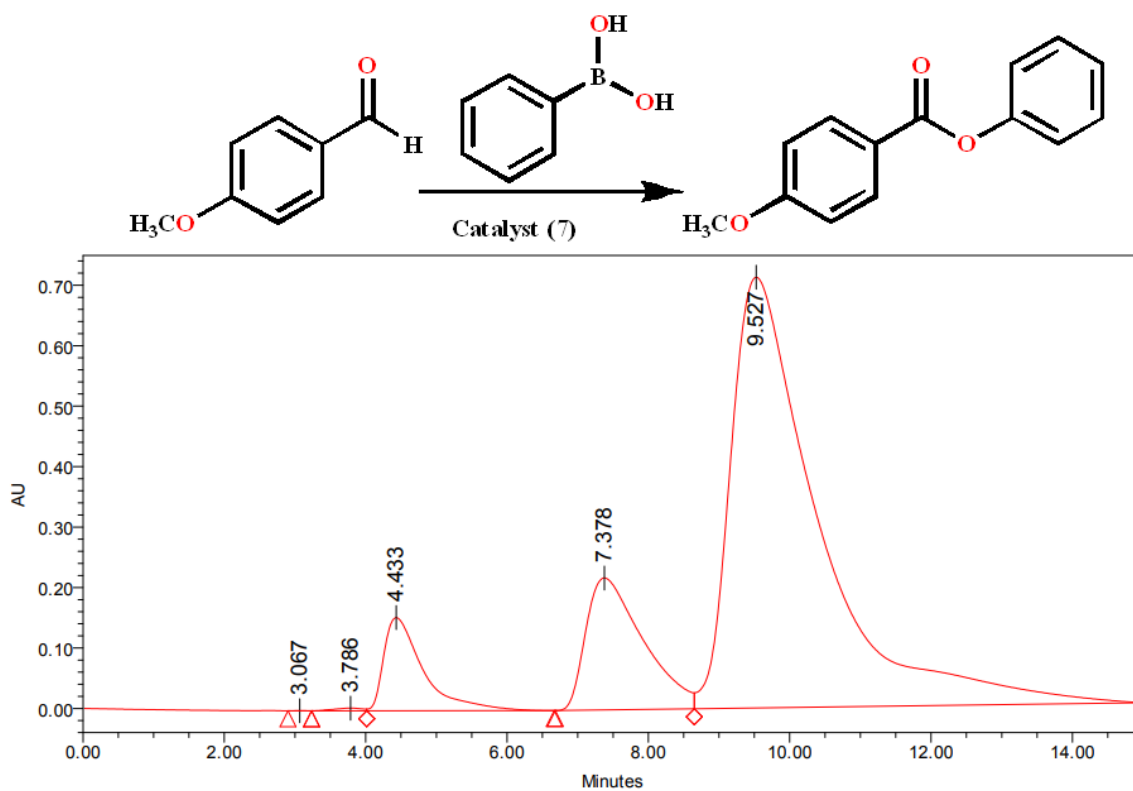


Figure A14: HPLC data for **7** catalysed esterification of p-methoxybenzaldehyde with phenyl boronic acid

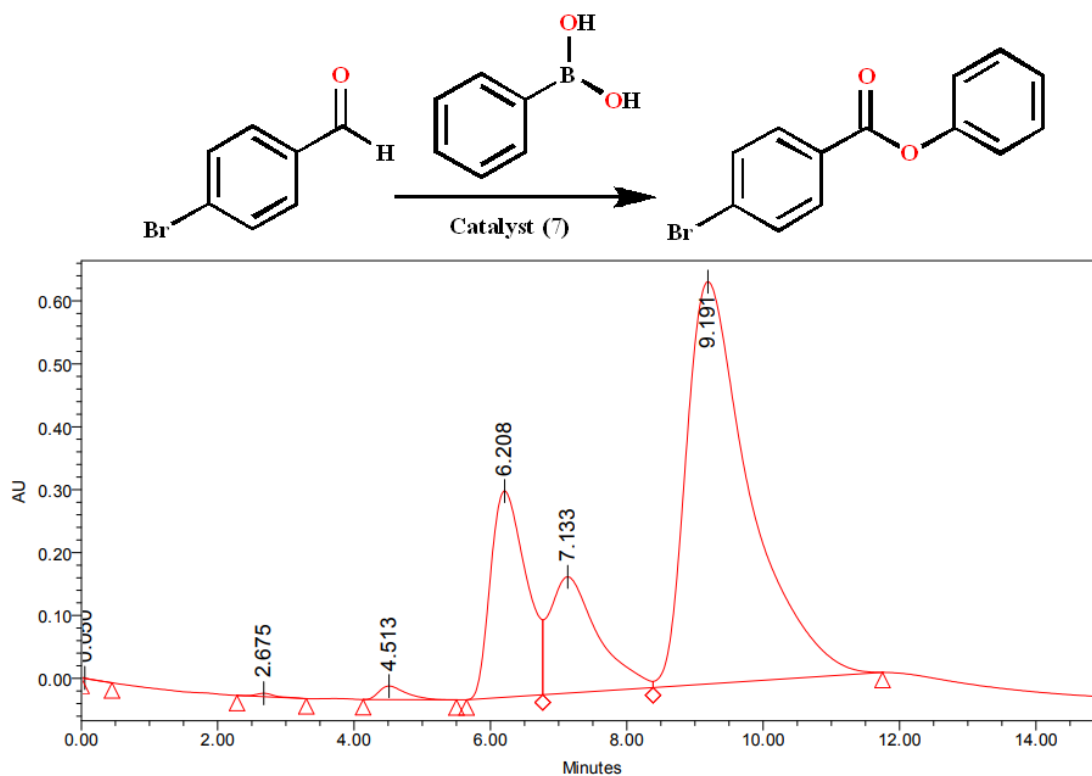


Figure A15: HPLC data for **7** catalysed esterification of p-bromobenzaldehyde with phenyl boronic acid

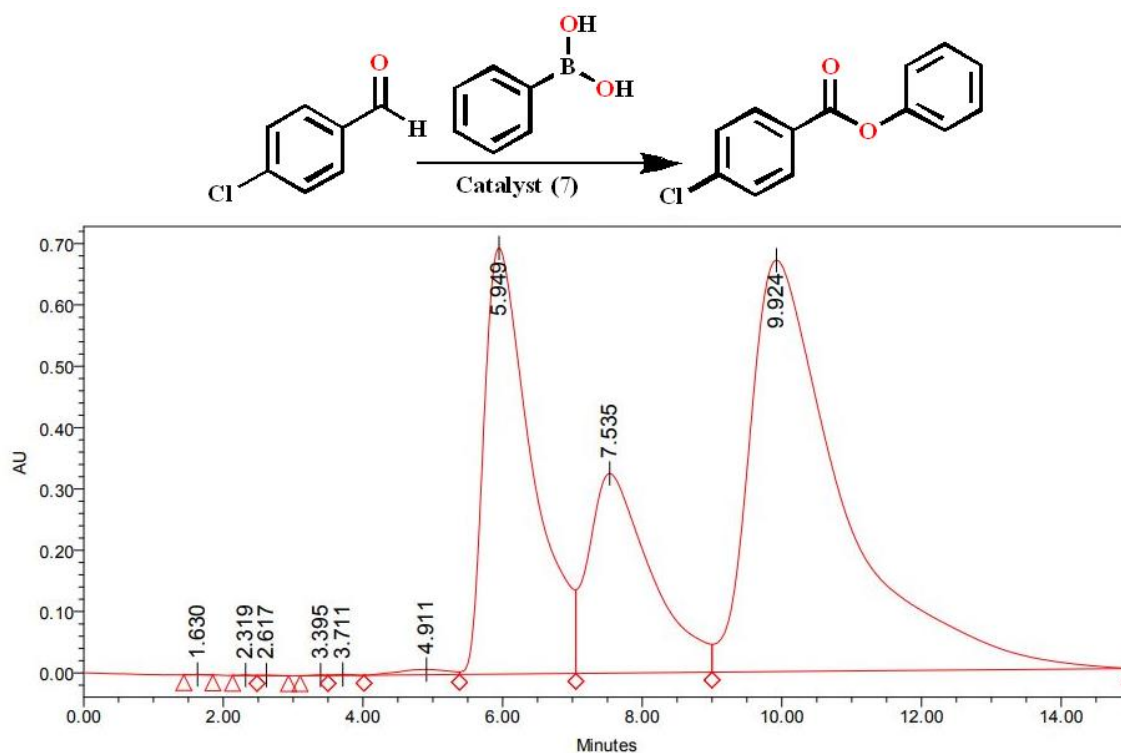


Figure A16: HPLC data for **7** catalysed esterification of p-chlorobenzaldehyde with phenyl boronic acid

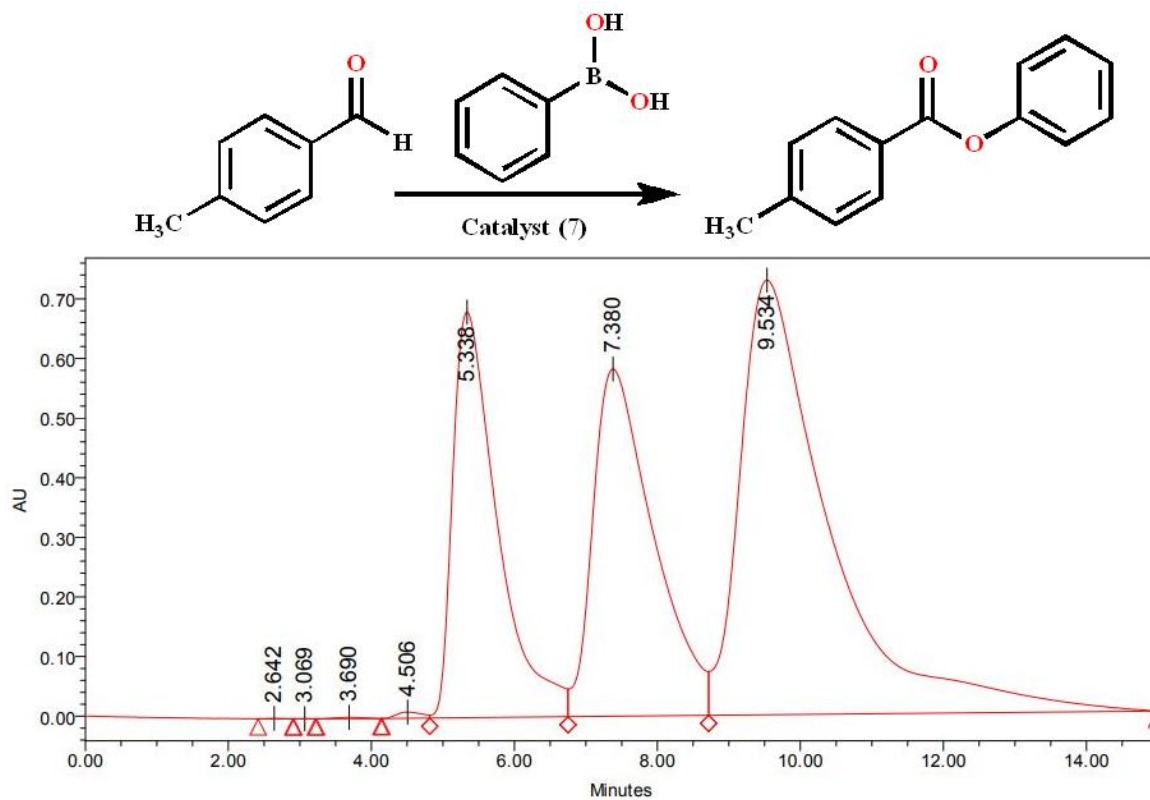


Figure A17: HPLC data for **7** catalysed esterification of p-methylbenzaldehyde with phenyl boronic acid

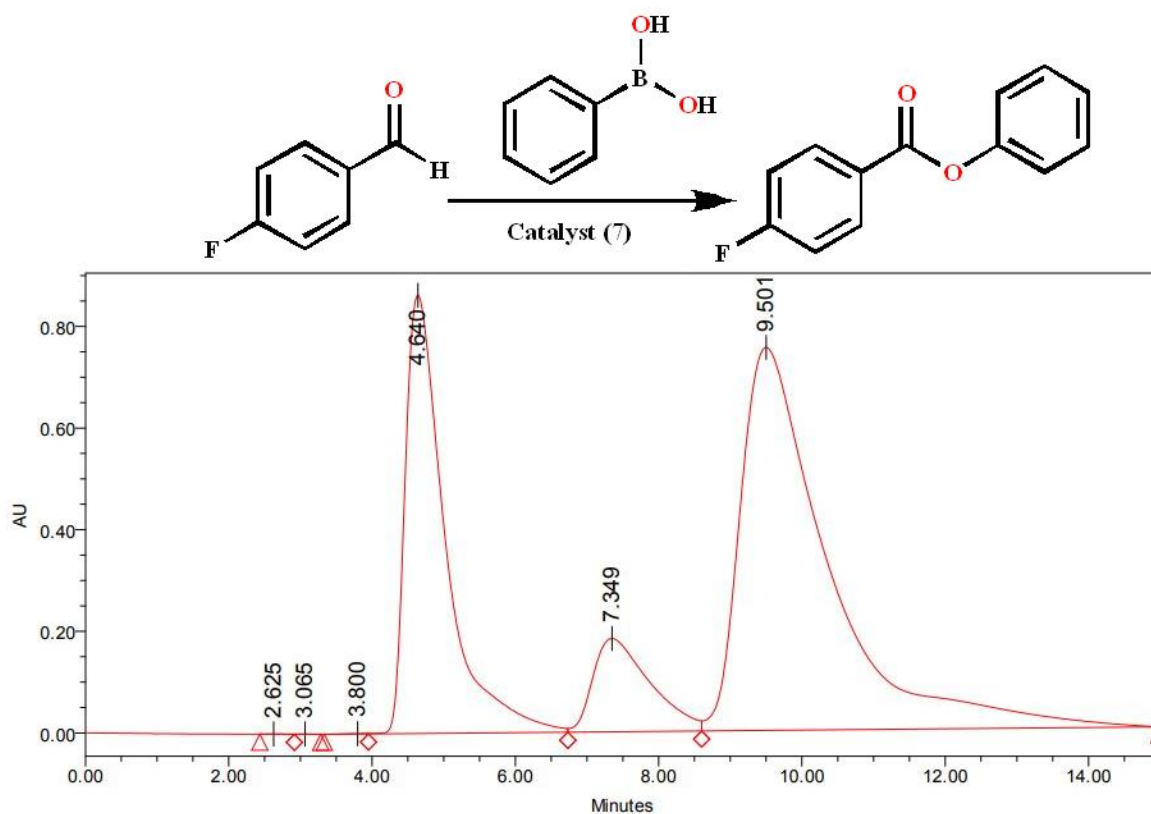


Figure A18: HPLC data for **7** catalysed esterification of p-fluorobenzaldehyde with phenyl boronic acid

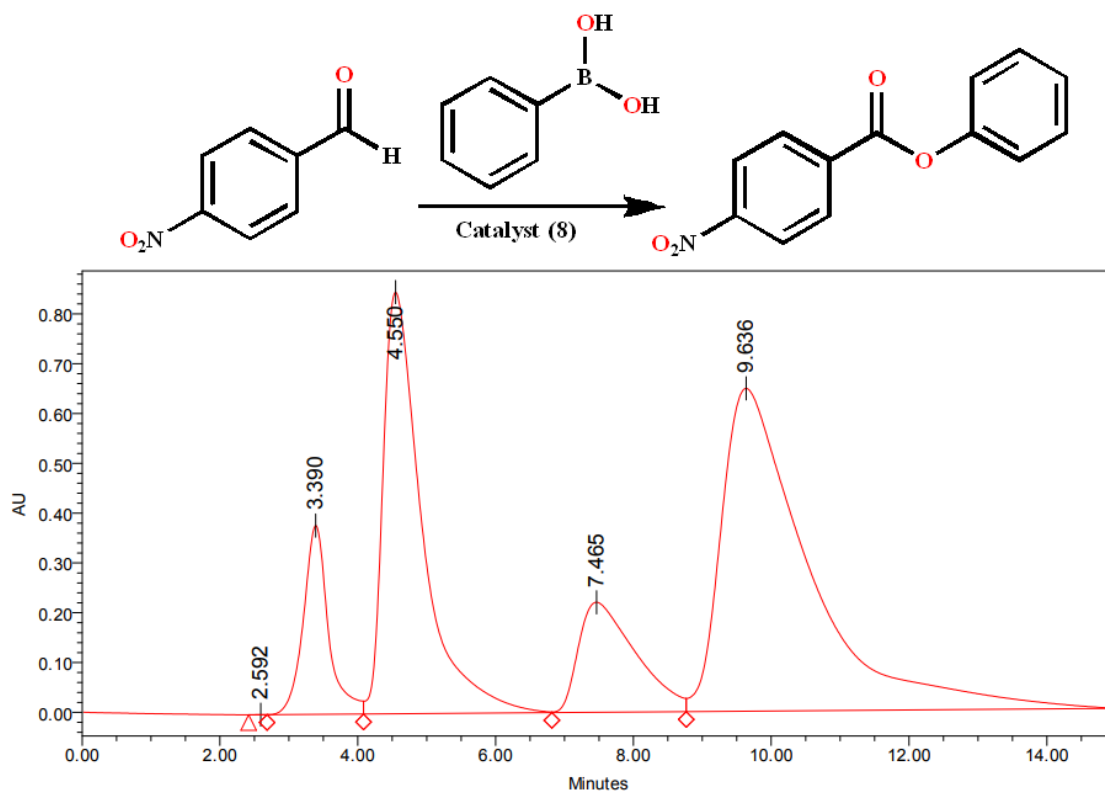


Figure A19: HPLC data for **8** catalysed esterification of p-nitrobenzaldehyde with phenyl boronic acid

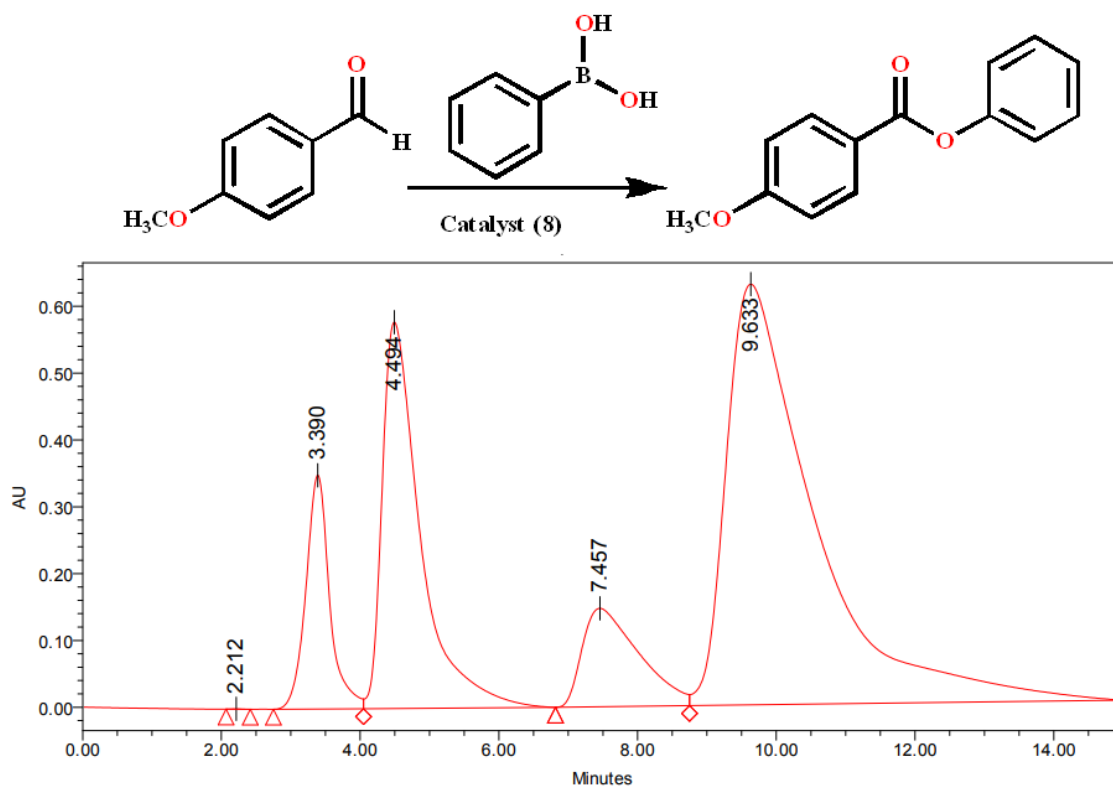


Figure A20: HPLC data for **8** catalysed esterification of p-methoxybenzaldehyde with phenyl boronic acid

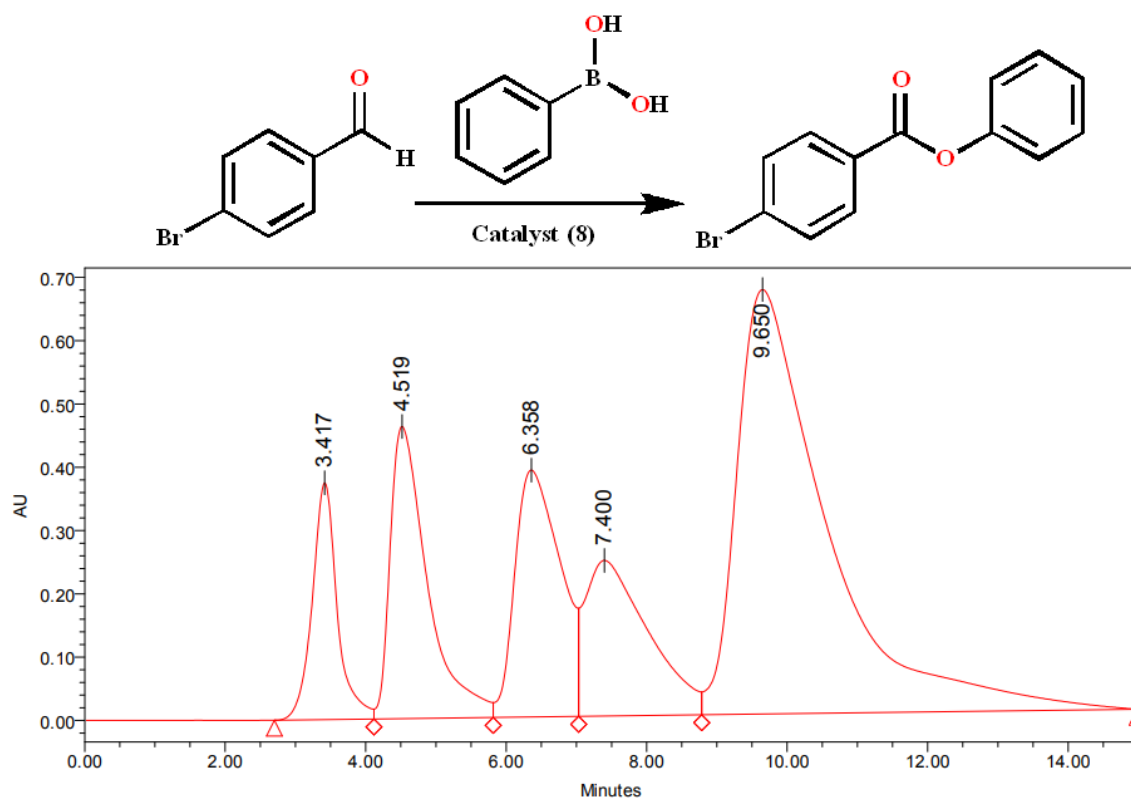


Figure A21: HPLC data for **8** catalysed esterification of p-bromobenzaldehyde with phenyl boronic acid

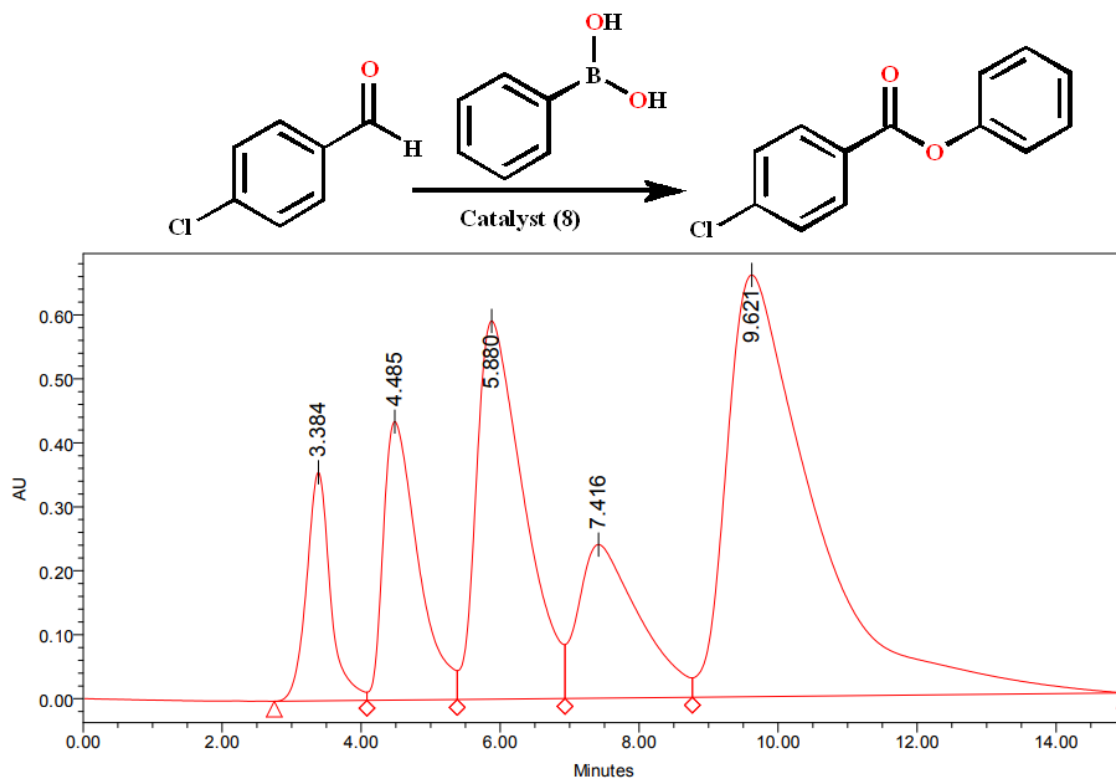


Figure A22: HPLC data for **8** catalysed esterification of p-chlorobenzaldehyde with phenyl boronic acid

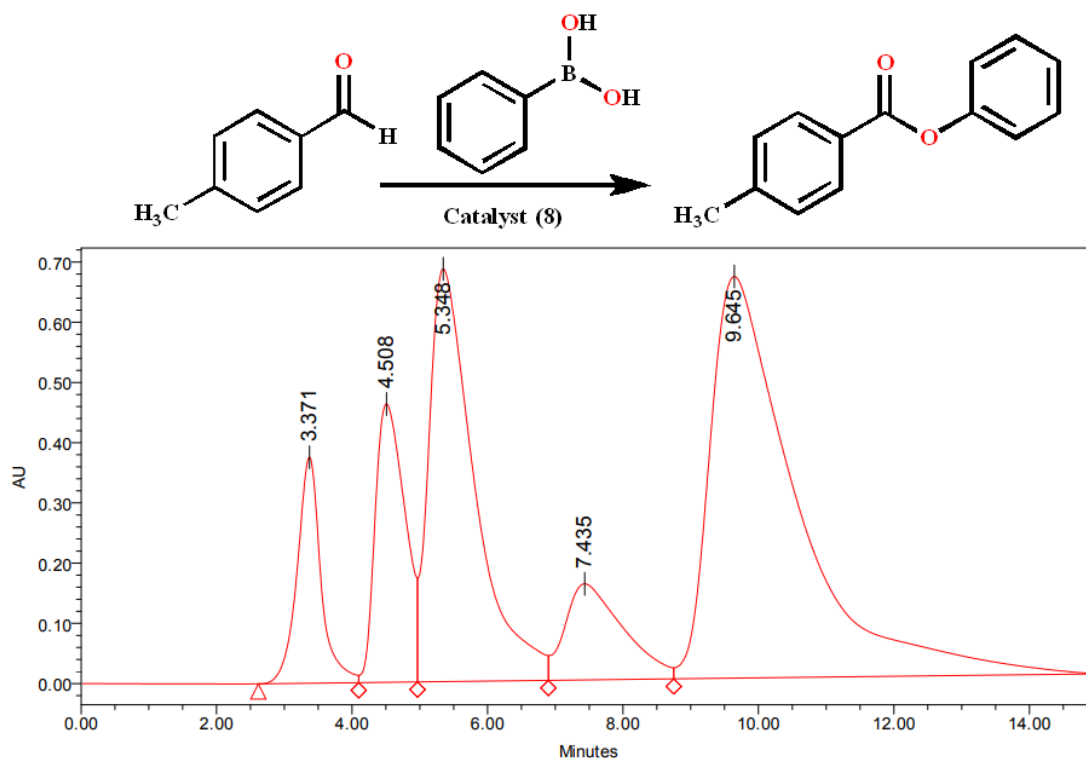


Figure A23: HPLC data for **8** catalysed esterification of p-methylbenzaldehyde with phenyl boronic acid

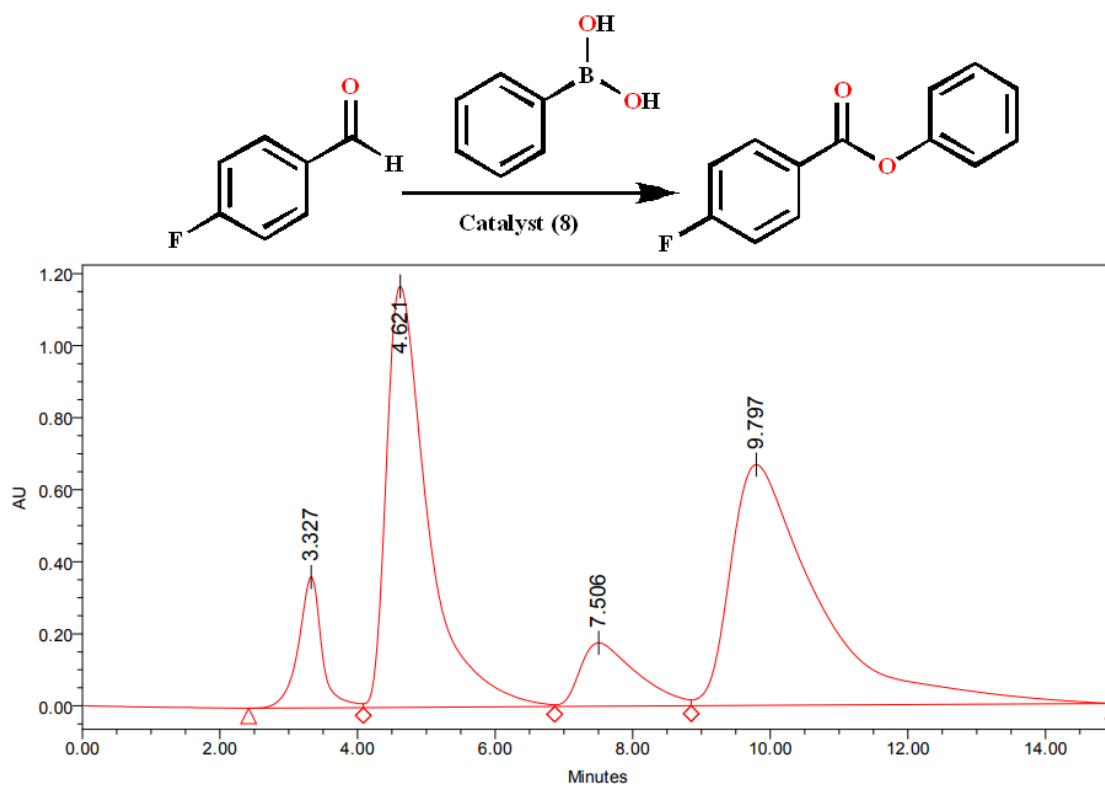


Figure A24: HPLC data for **8** catalysed esterification of p-fluorobenzaldehyde with phenyl boronic acid

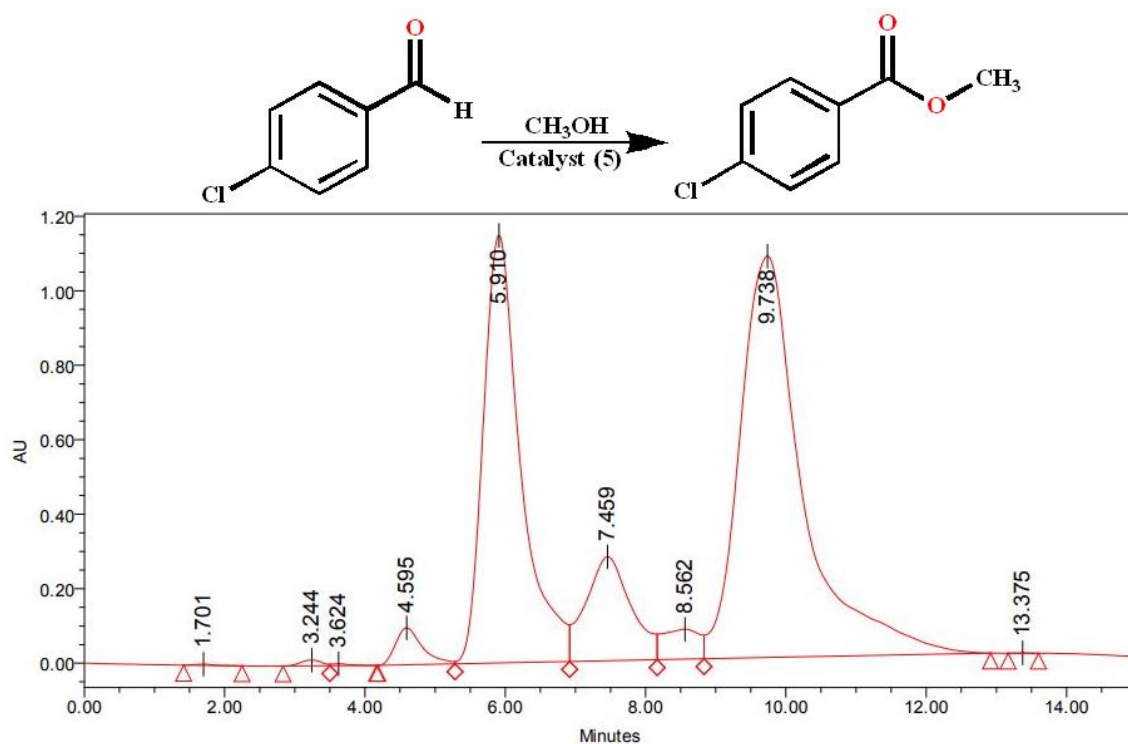


Figure A25: HPLC data for **5** catalysed esterification of p-chlorobenzaldehyde with methanol

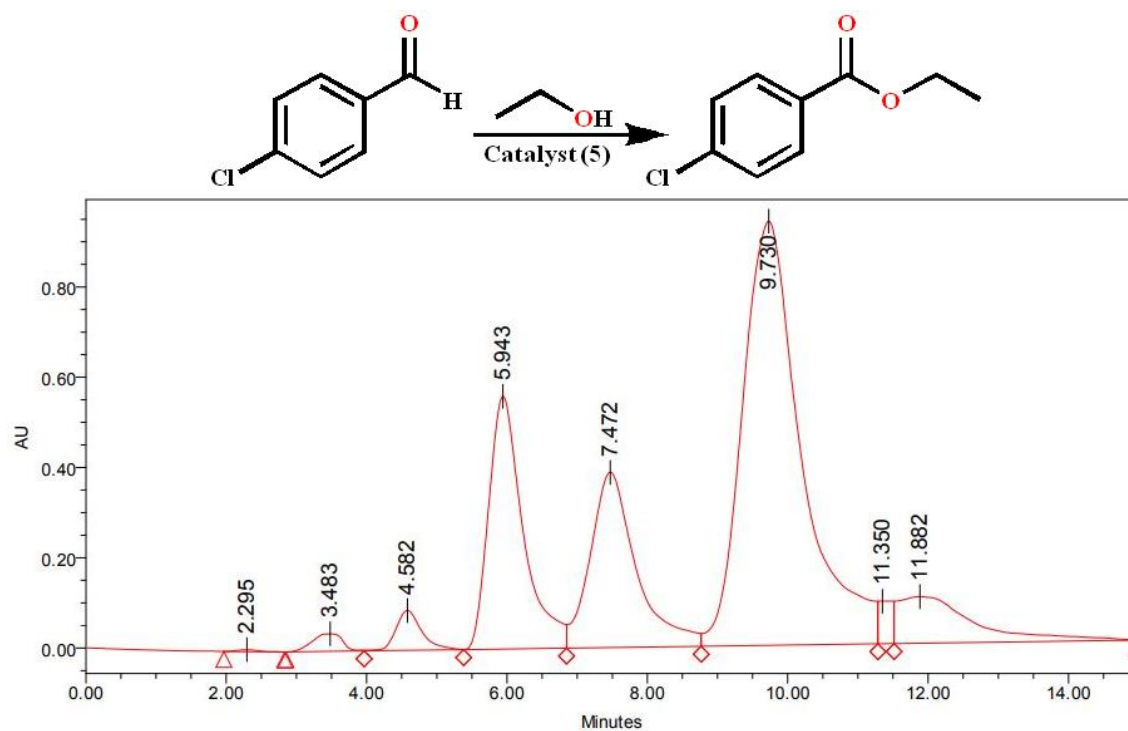


Figure A26: HPLC data for **5** catalysed esterification of p-chlorobenzaldehyde with ethanol

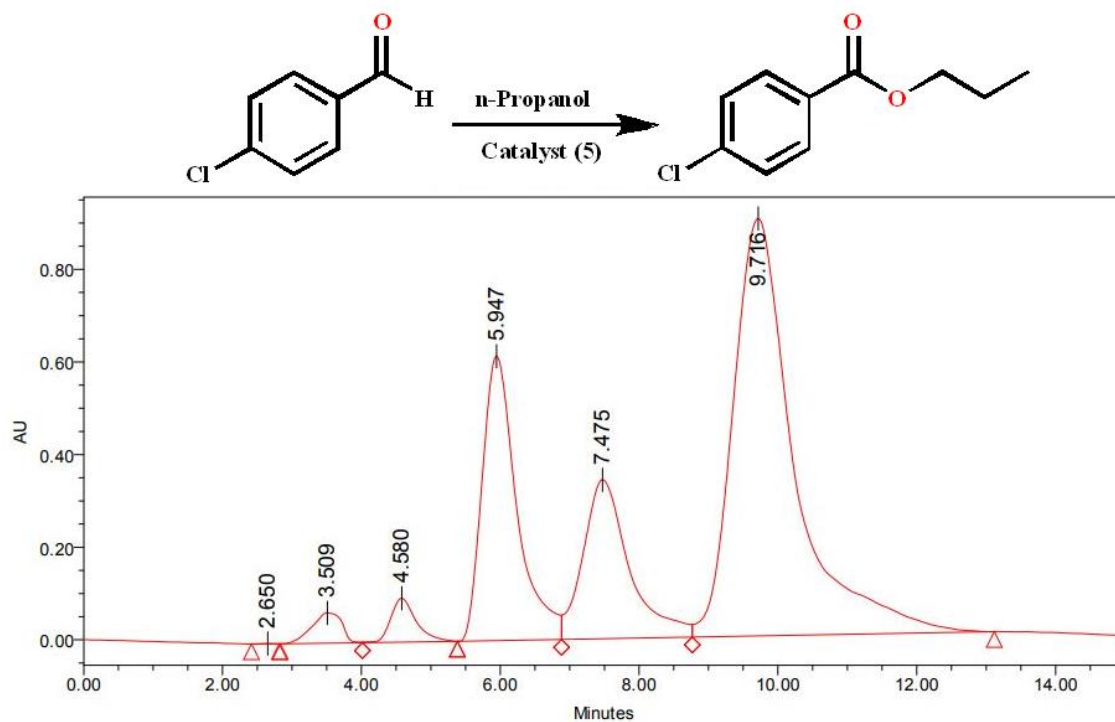


Figure A27: HPLC data for **5** catalysed esterification of p-chlorobenzaldehyde with n-propanol

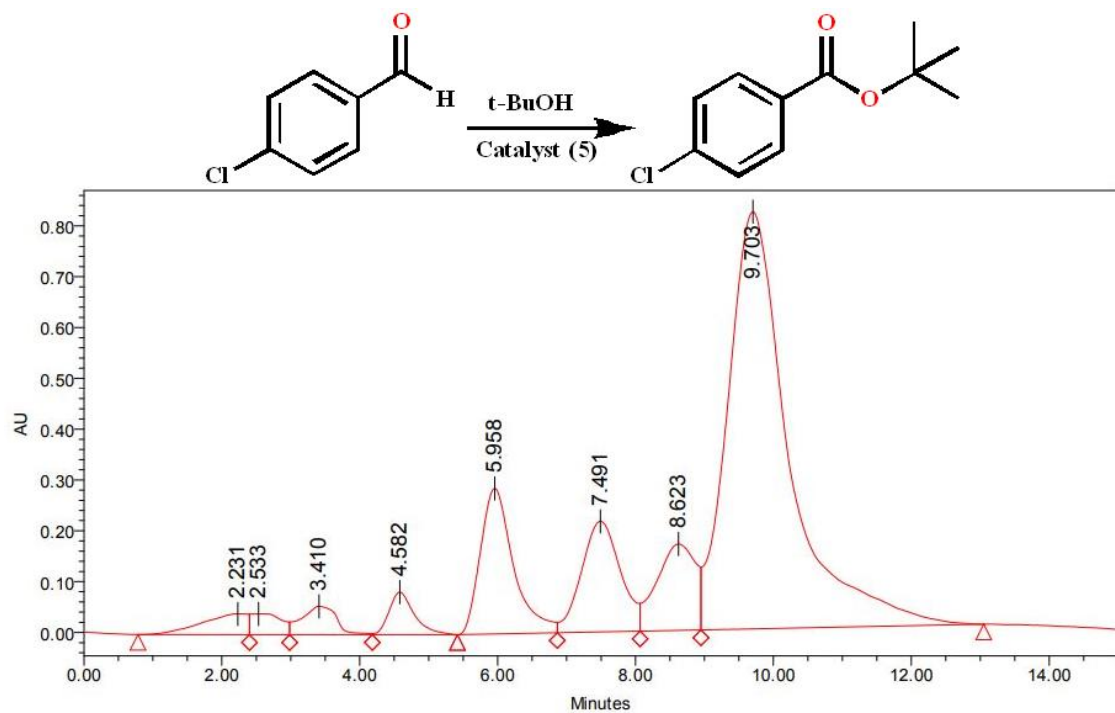


Figure A28: HPLC data for **5** catalysed esterification of p-chlorobenzaldehyde with *t*-BuOH



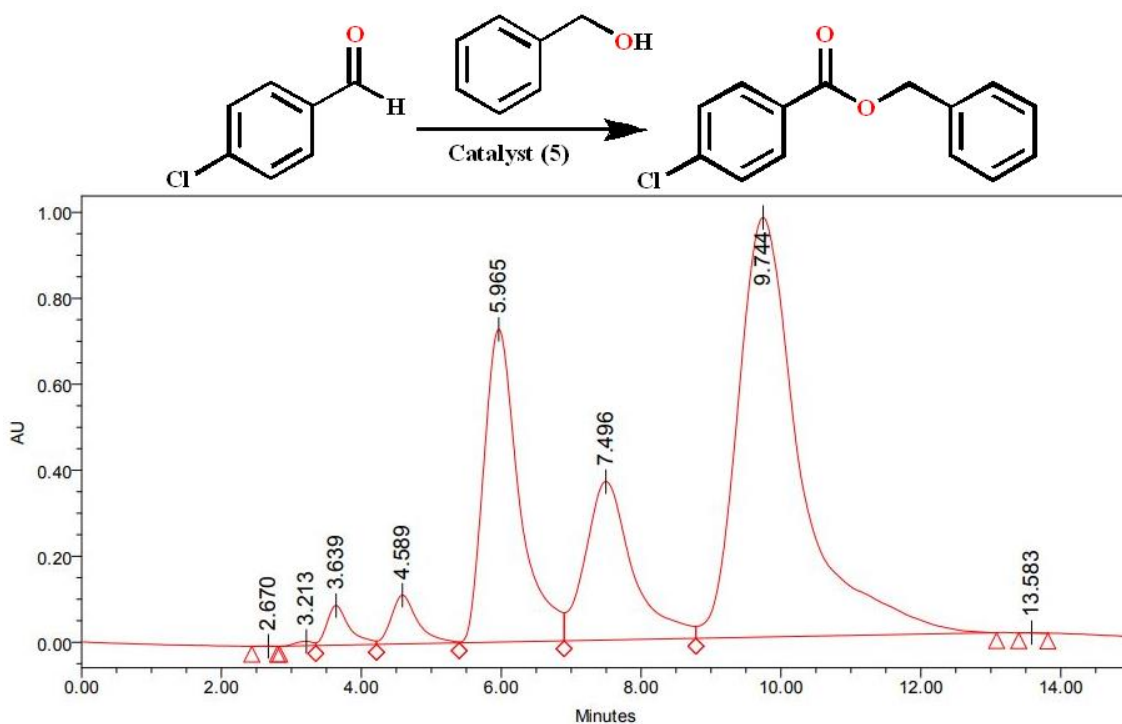


Figure A29: HPLC data for **5** catalysed esterification of p-chlorobenzaldehyde with benzyl alcohol

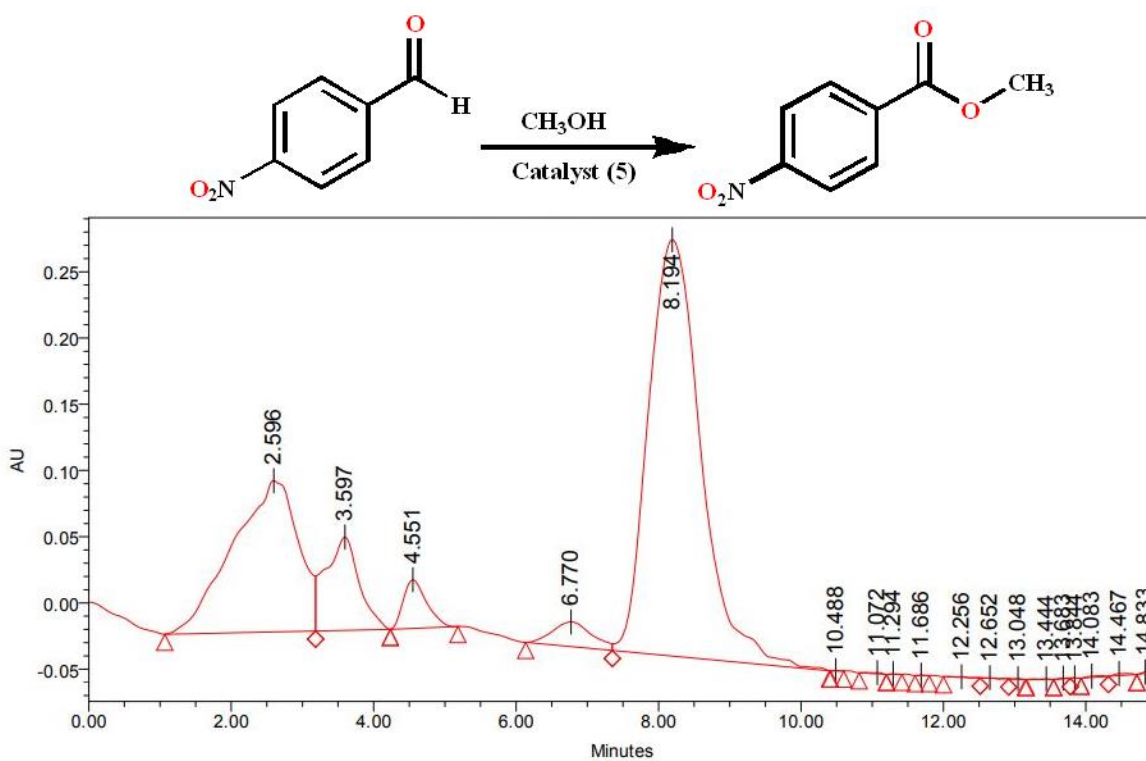


Figure A30: HPLC data for **5** catalysed esterification of p-nitrobenzaldehyde with methanol

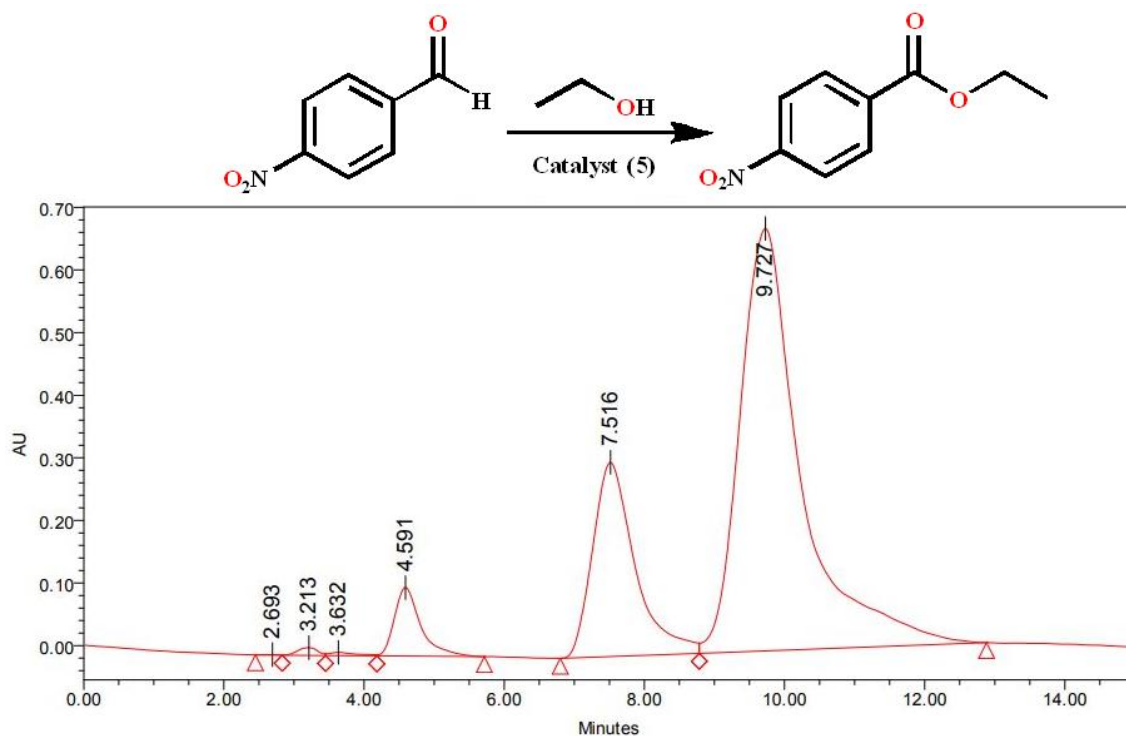


Figure A31: HPLC data for **5** catalysed esterification of p-nitrobenzaldehyde with ethanol

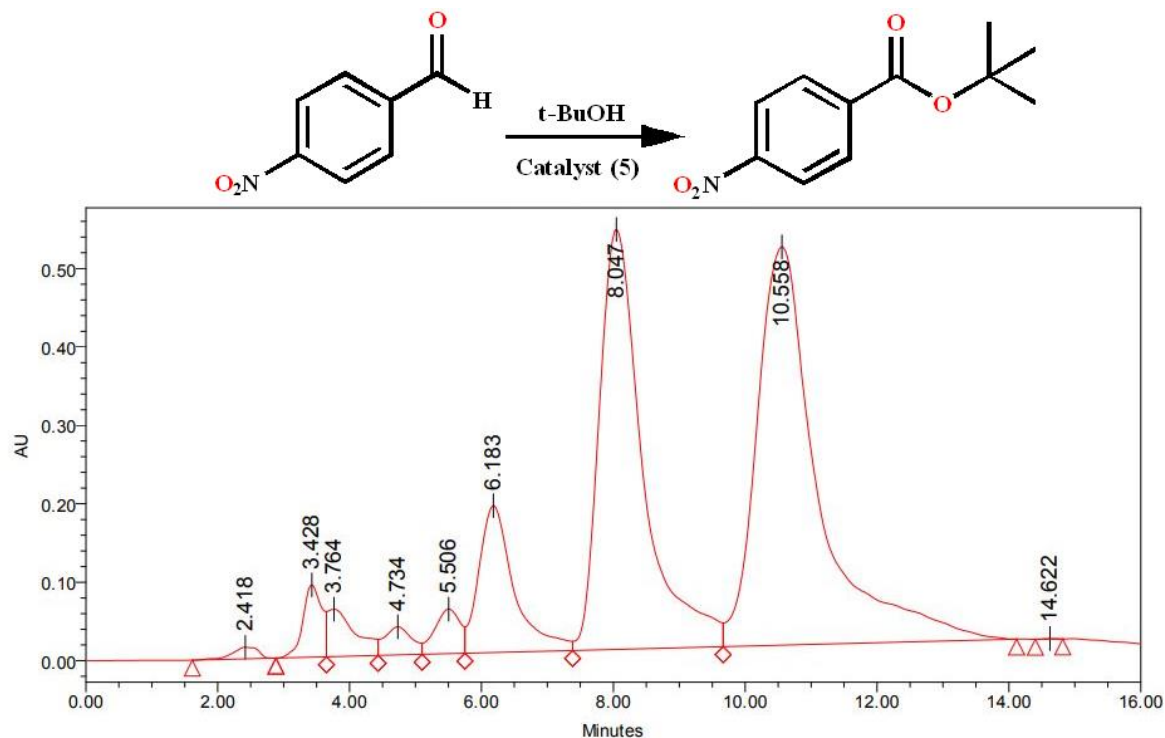


Figure A32: HPLC data for **5** catalysed esterification of p-nitrobenzaldehyde with t-BuOH

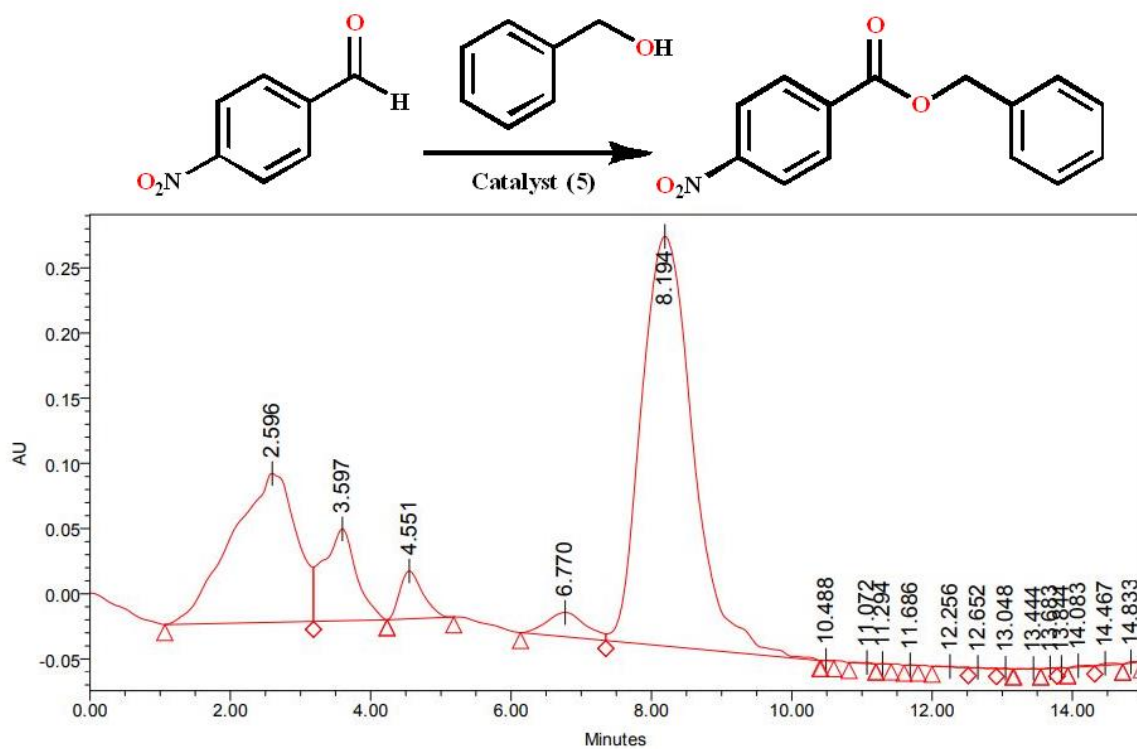


Figure A33: HPLC data for **5** catalysed esterification of p-nitrobenzaldehyde with benzyl alcohol

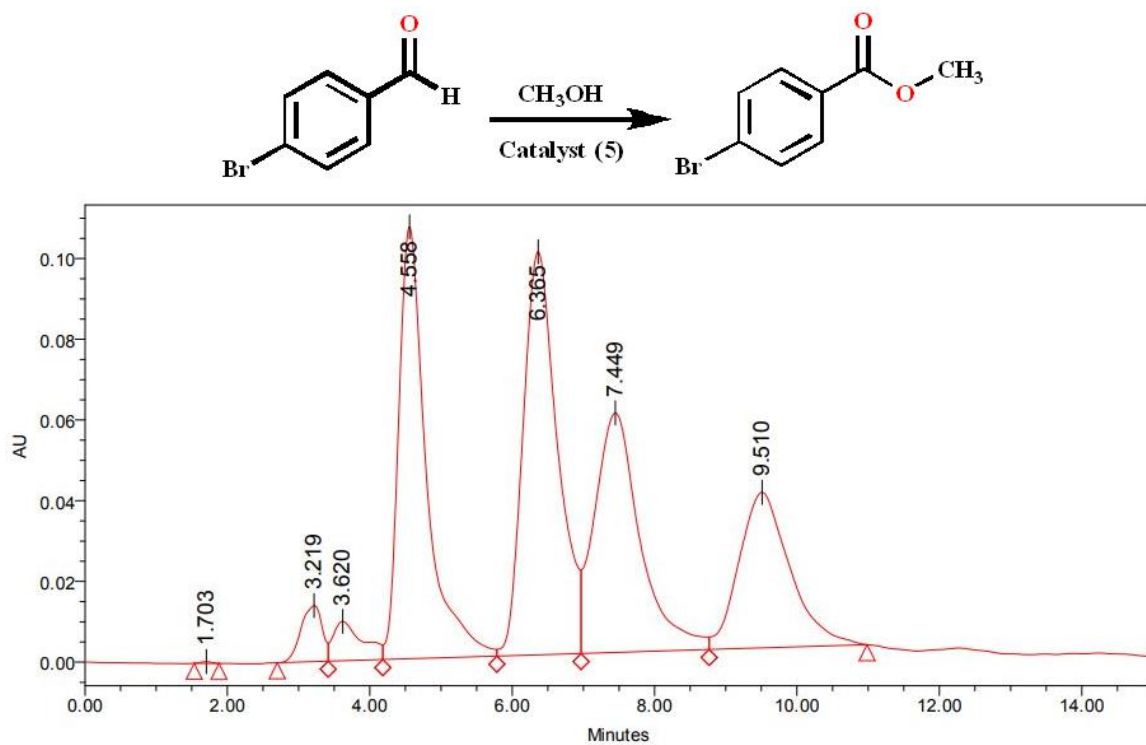


Figure A34: HPLC data for **5** catalysed esterification of p-bromobenzaldehyde with methanol

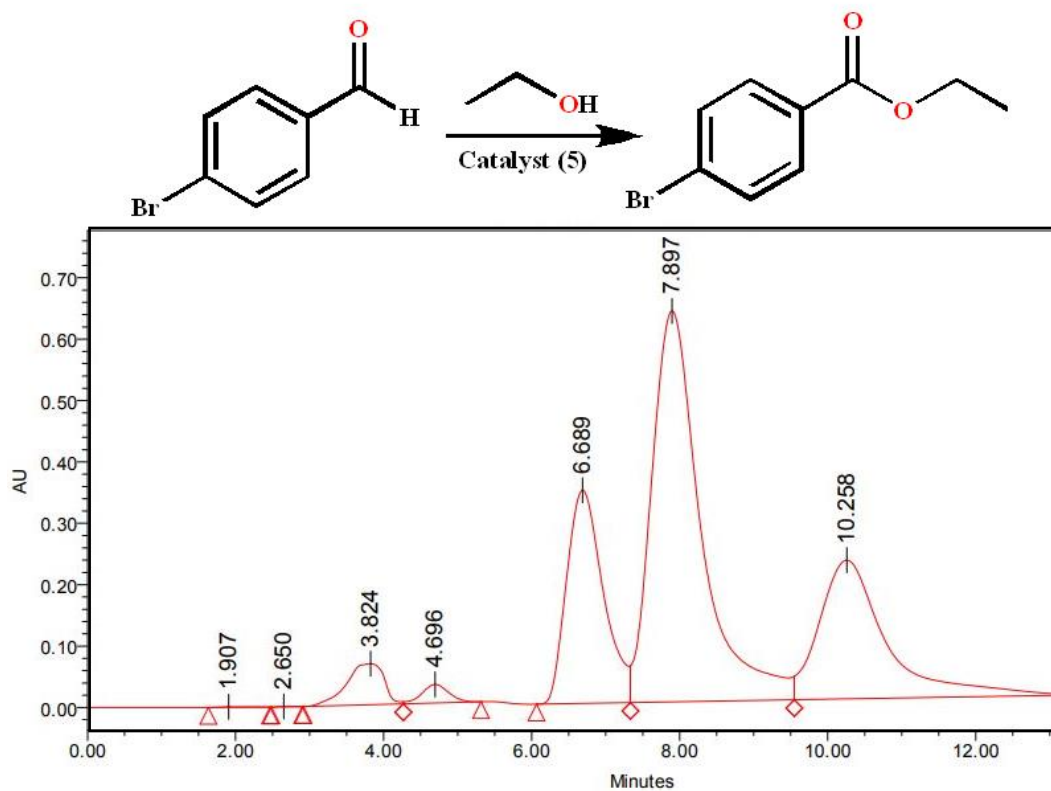


Figure A35: HPLC data for **5** catalysed esterification of p-bromobenzaldehyde with ethanol

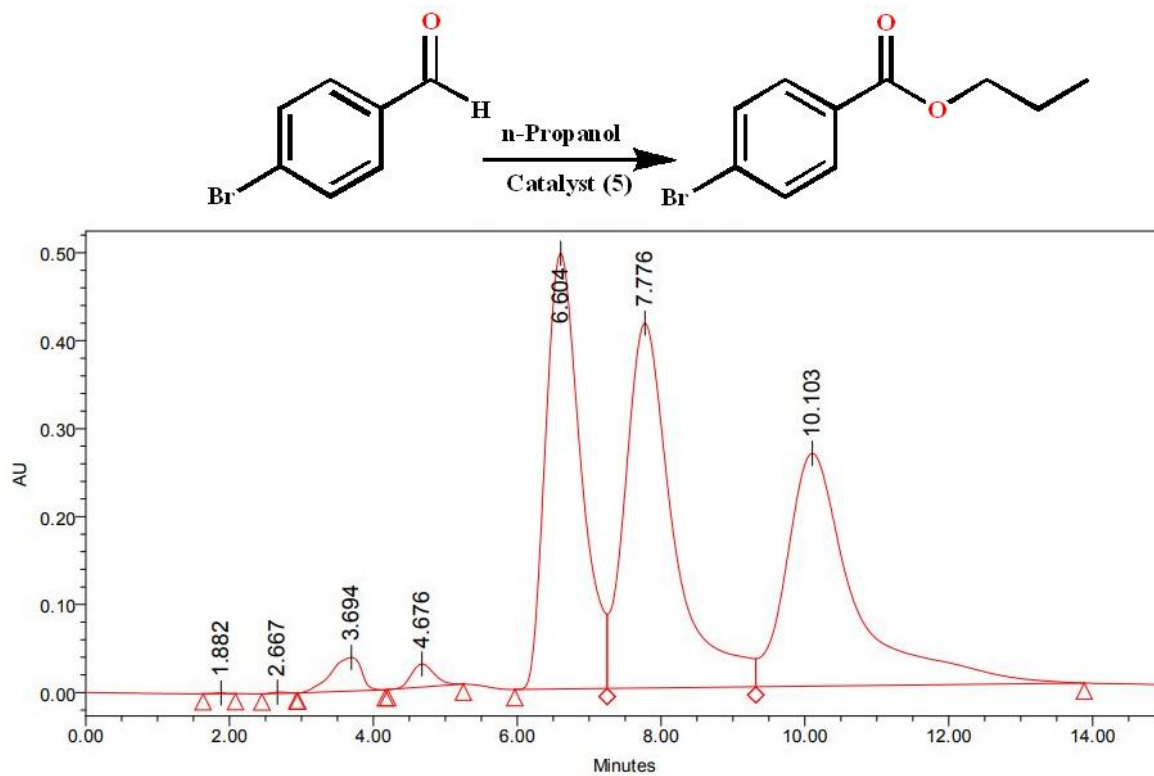


Figure A36: HPLC data for **5** catalysed esterification of p-bromobenzaldehyde with n-propanol

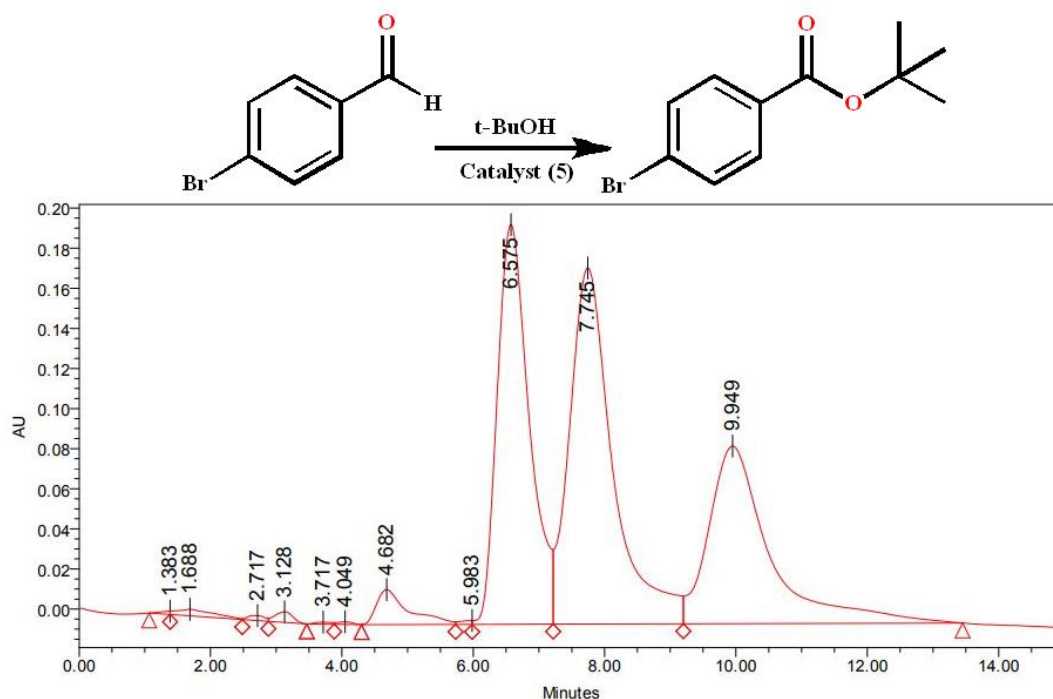


Figure A37: HPLC data for **5** catalysed esterification of p-bromobenzaldehyde with *t*-BuOH

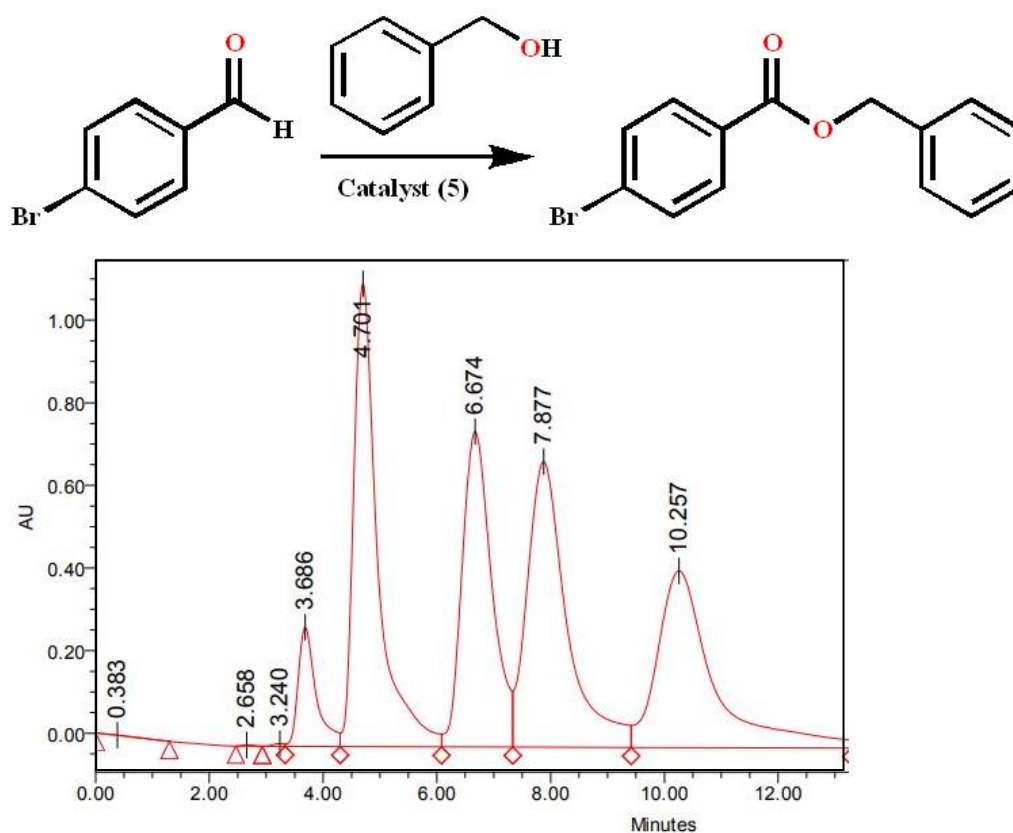


Figure A38: HPLC data for **5** catalysed esterification of p-bromobenzaldehyde with benzyl alcohol

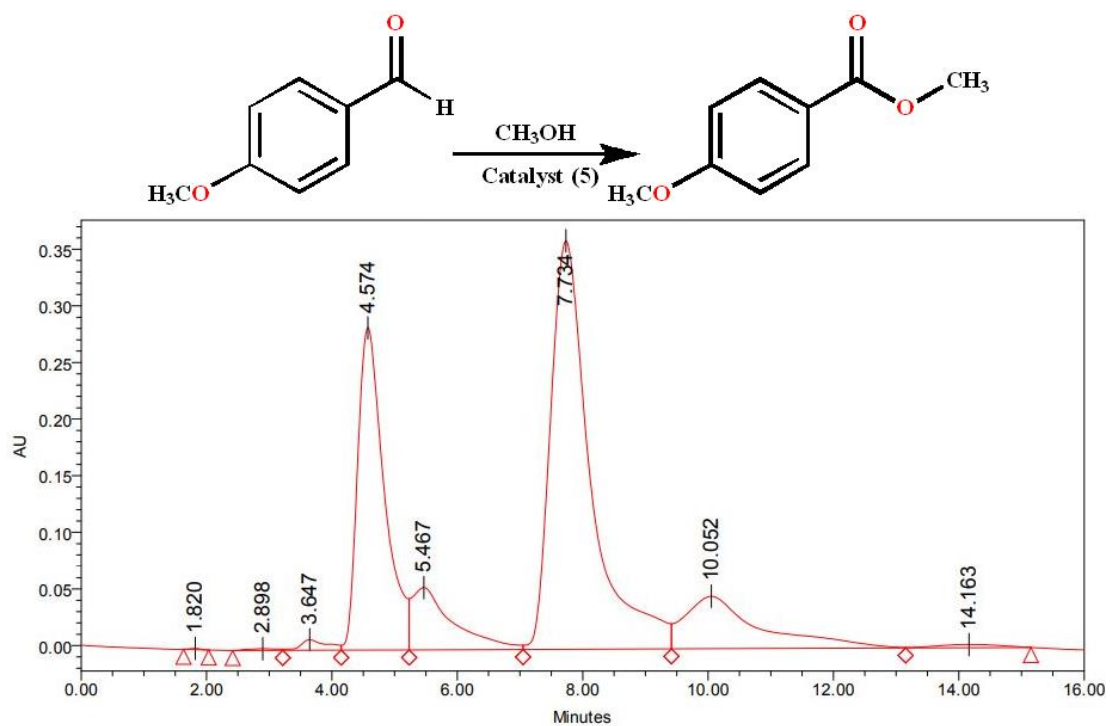


Figure A39: HPLC data for **5** catalysed esterification of p-methoxybenzaldehyde with methanol

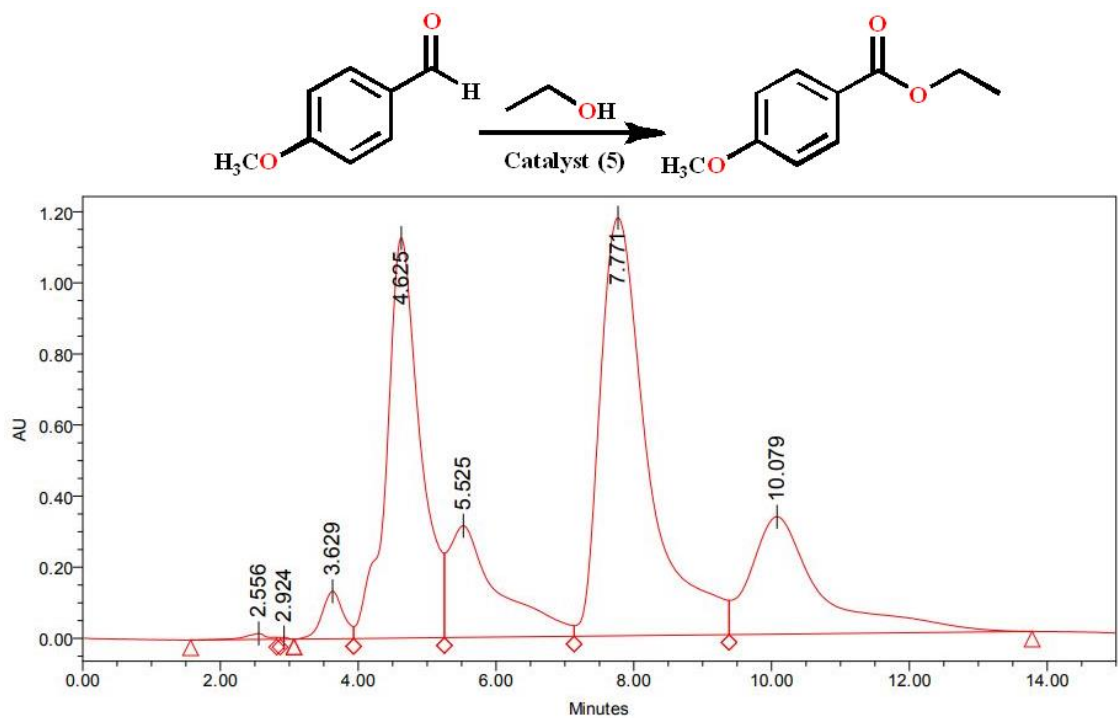


Figure A40: HPLC data for **5** catalysed esterification of p-methoxybenzaldehyde with ethanol



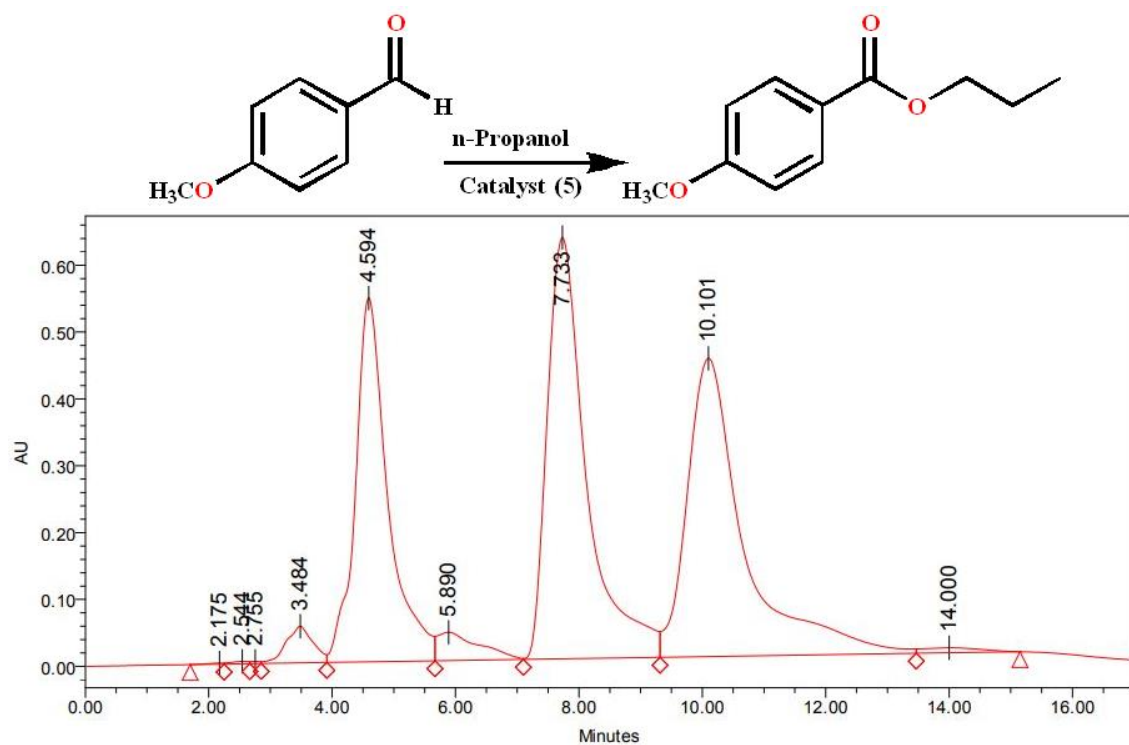


Figure A41: HPLC data for **5** catalysed esterification of p-methoxybenzaldehyde with n-propanol

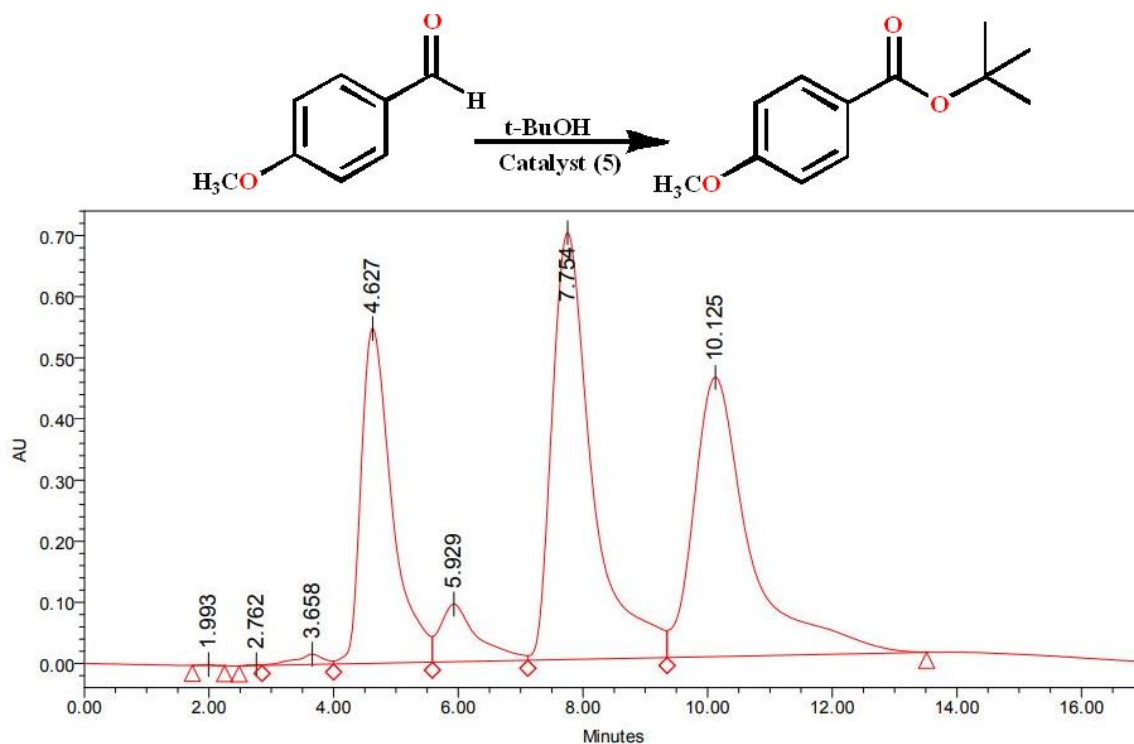


Figure A42: HPLC data for **5** catalysed esterification of p-methoxybenzaldehyde with t-BuOH

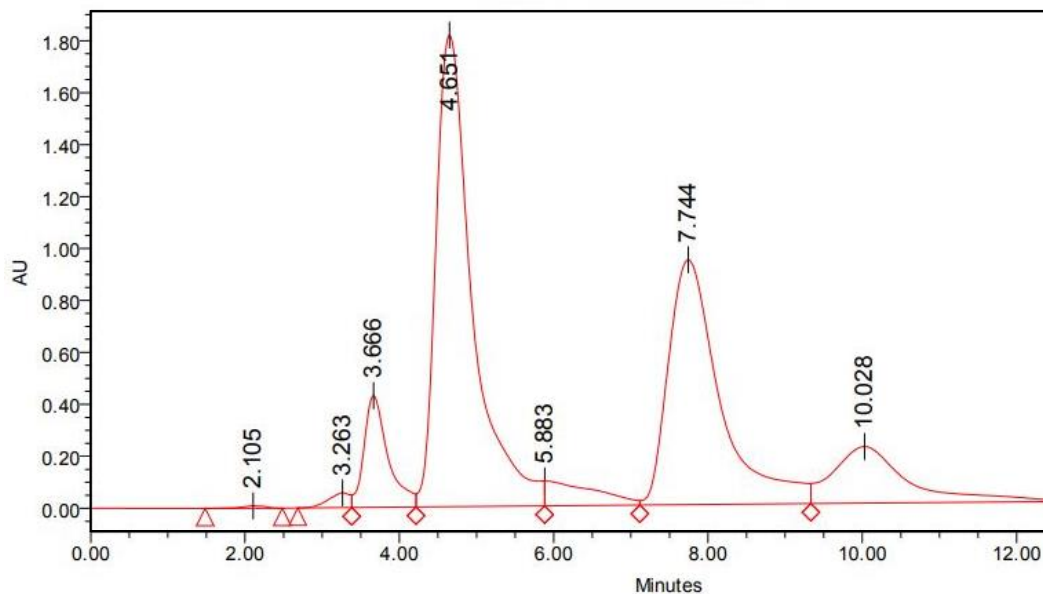
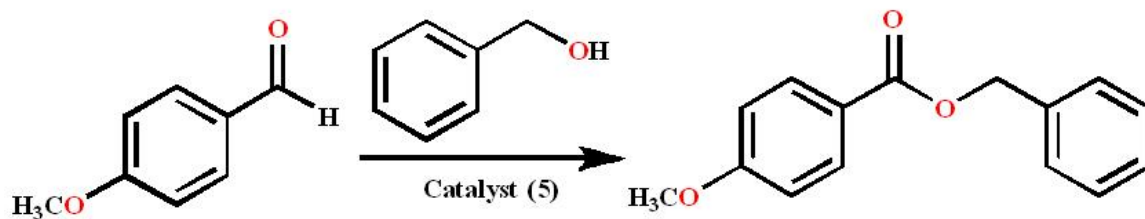


Figure A43: HPLC data for **5** catalysed esterification of p-methoxybenzaldehyde with benzyl alcohol

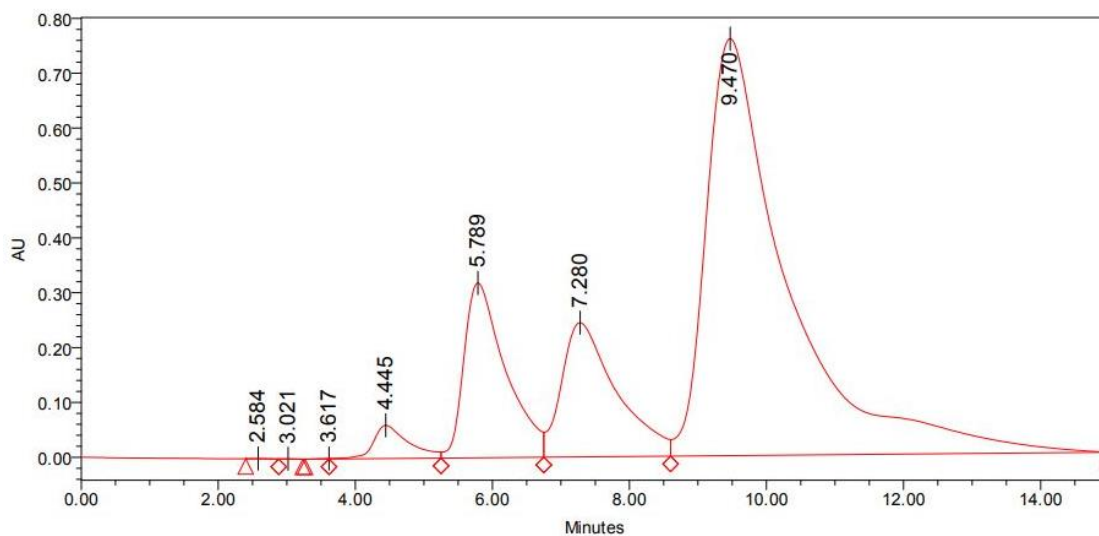
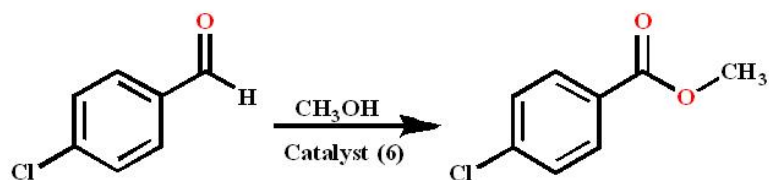


Figure A44: HPLC data for **6** catalysed esterification of p-chlorobenzaldehyde with methanol



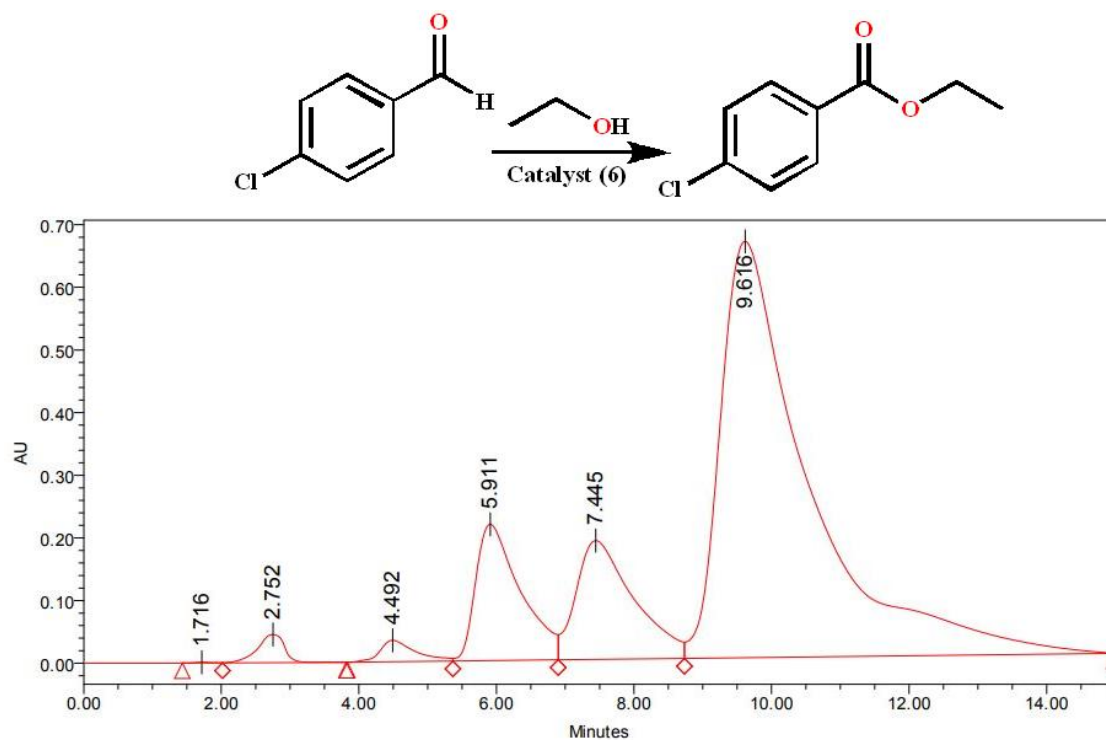


Figure A45: HPLC data for **6** catalysed esterification of p-chlorobenzaldehyde with ethanol

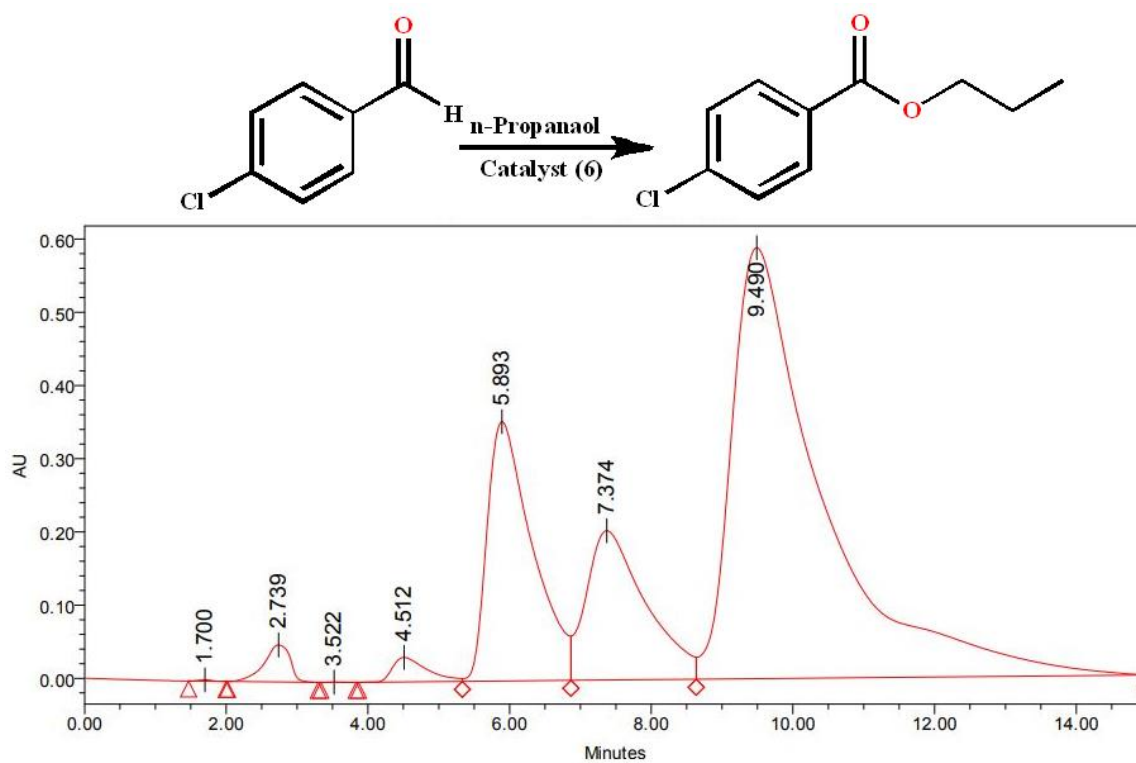


Figure A46: HPLC data for **6** catalysed esterification p-chlorobenzaldehyde with n-propanol

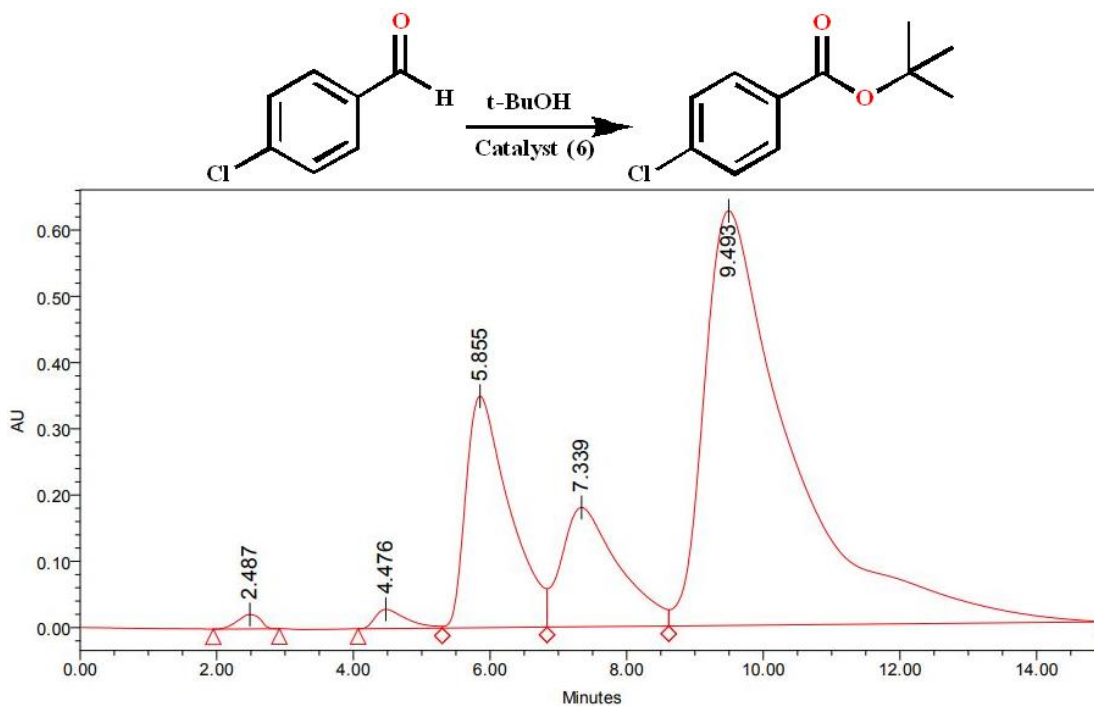


Figure A47: HPLC data for **6** catalysed esterification of *p*-chlorobenzaldehyde with *t*-BuOH

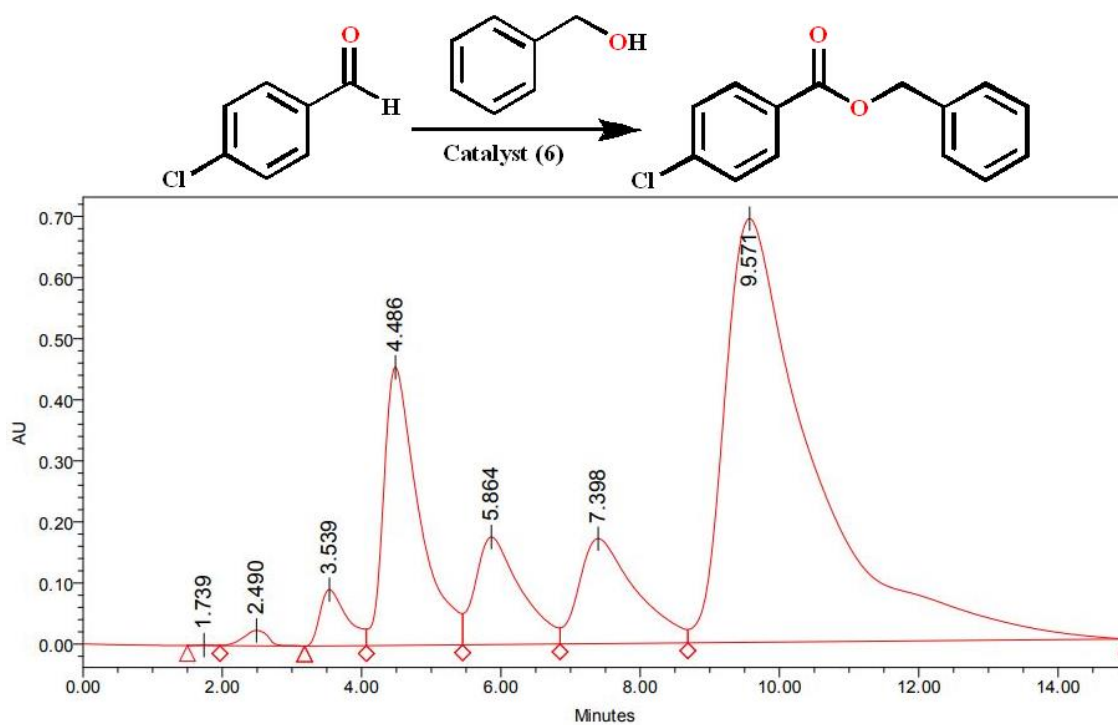


Figure A48: HPLC data for **6** catalysed esterification of *p*-chlorobenzaldehyde with benzyl alcohol

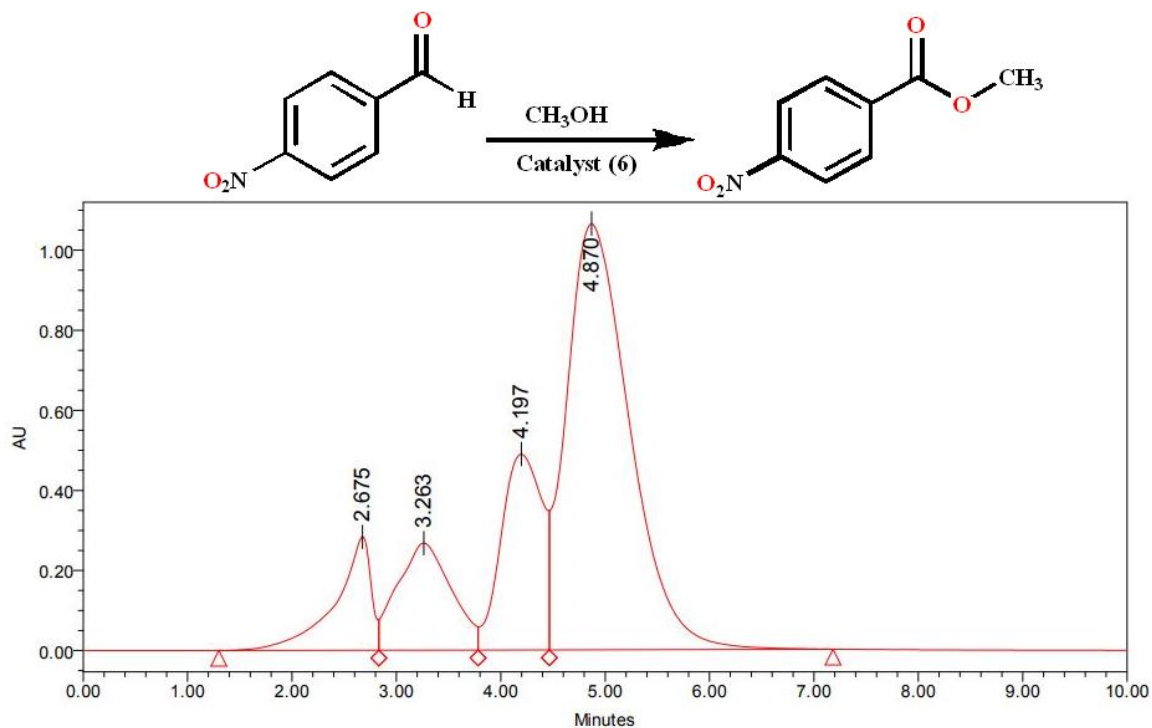


Figure A49: HPLC data for **6** catalysed esterification of p-nitrobenzaldehyde with methanol

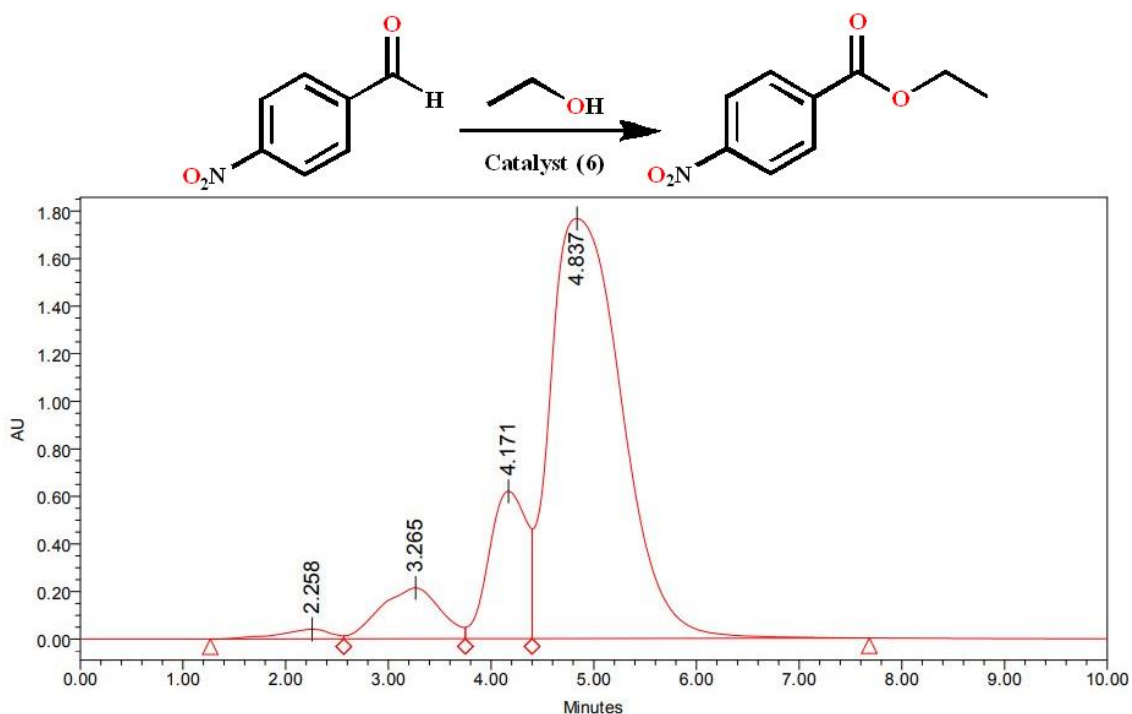


Figure A50: HPLC data for **6** catalysed esterification of p-nitrobenzaldehyde with ethanol

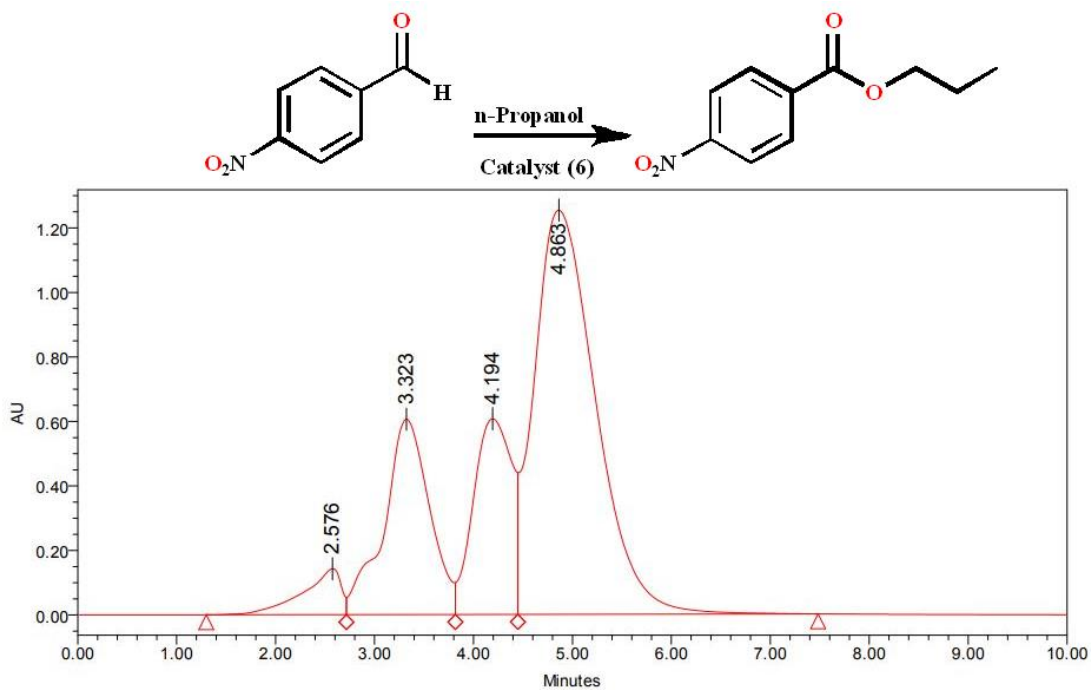


Figure A51: HPLC data for **6** catalysed esterification of p-nitrobenzaldehyde with n-propanol

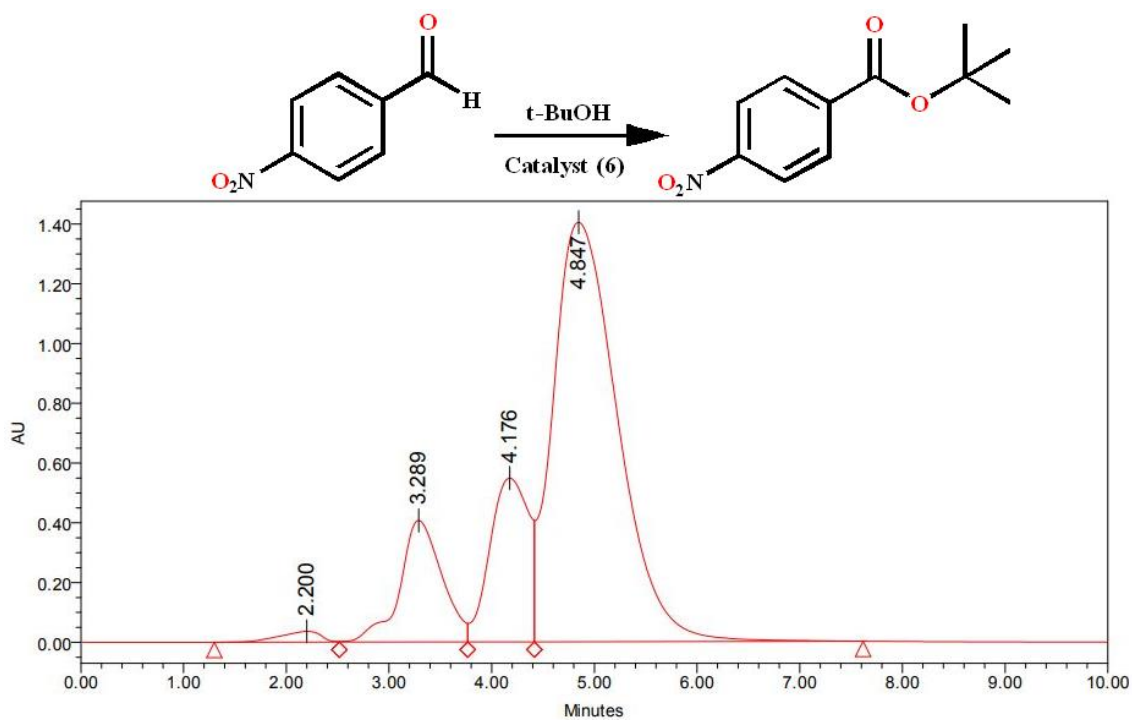


Figure A52: HPLC data for **6** catalysed esterification of p-nitrobenzaldehyde with *t*-BuOH

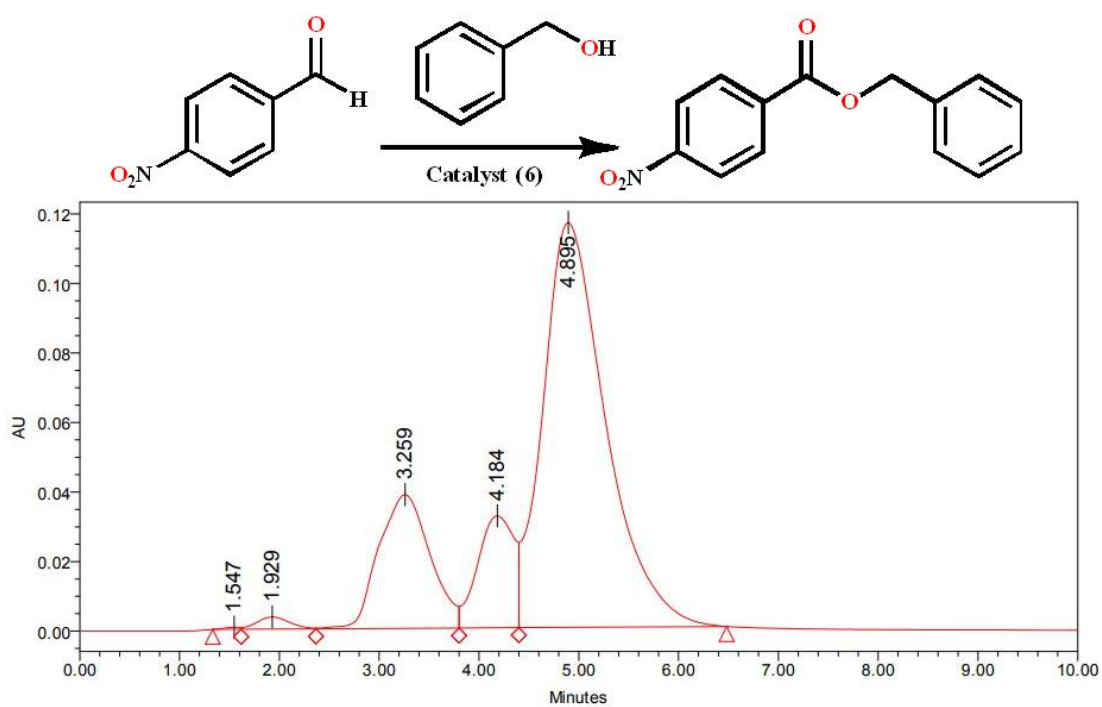


Figure A53: HPLC data for **6** catalysed esterification of p-nitrobenzaldehyde with benzyl alcohol

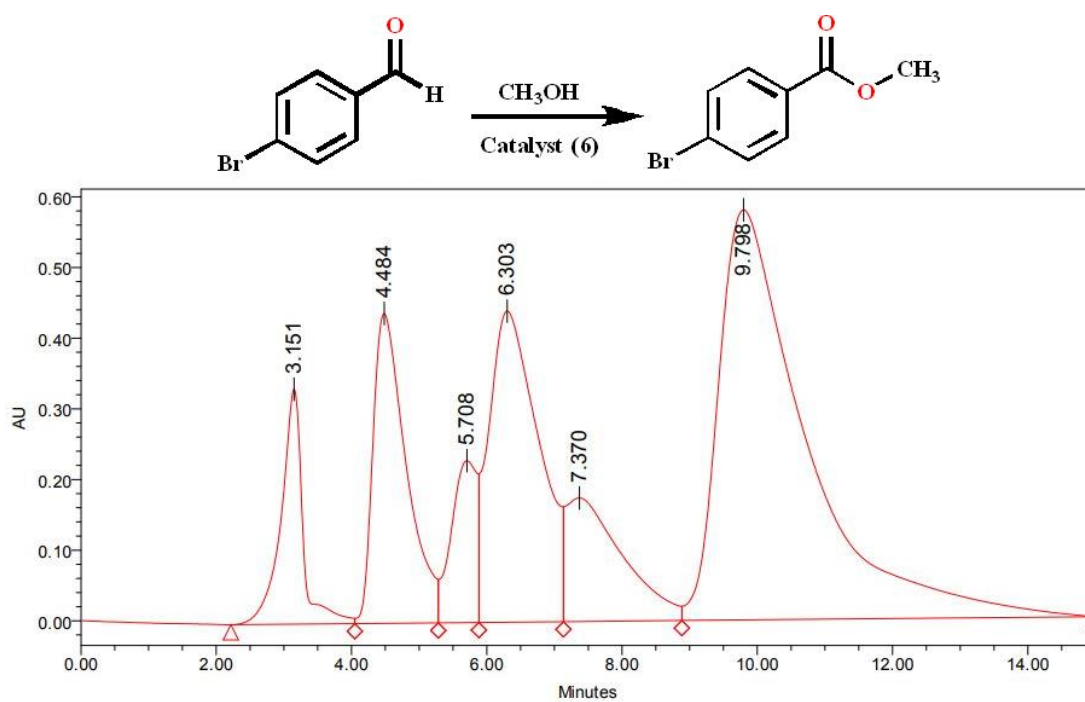


Figure A54: HPLC data for **6** catalysed esterification of p-bromobenzaldehyde with methanol

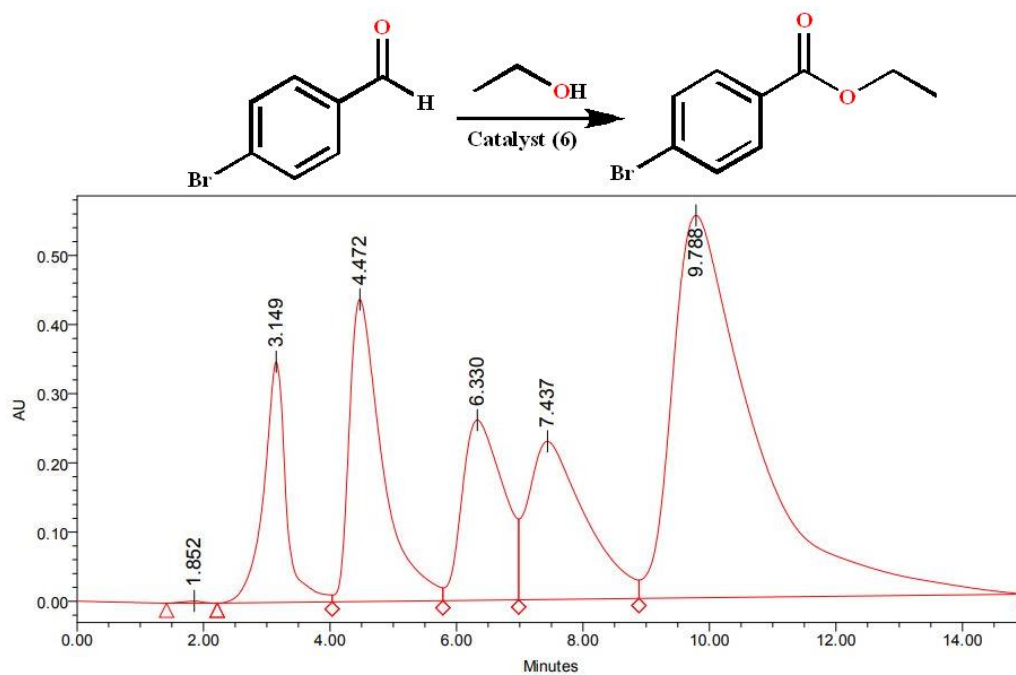


Figure A55: HPLC data for **6** catalysed esterification of p-bromobenzaldehyde with ethanol

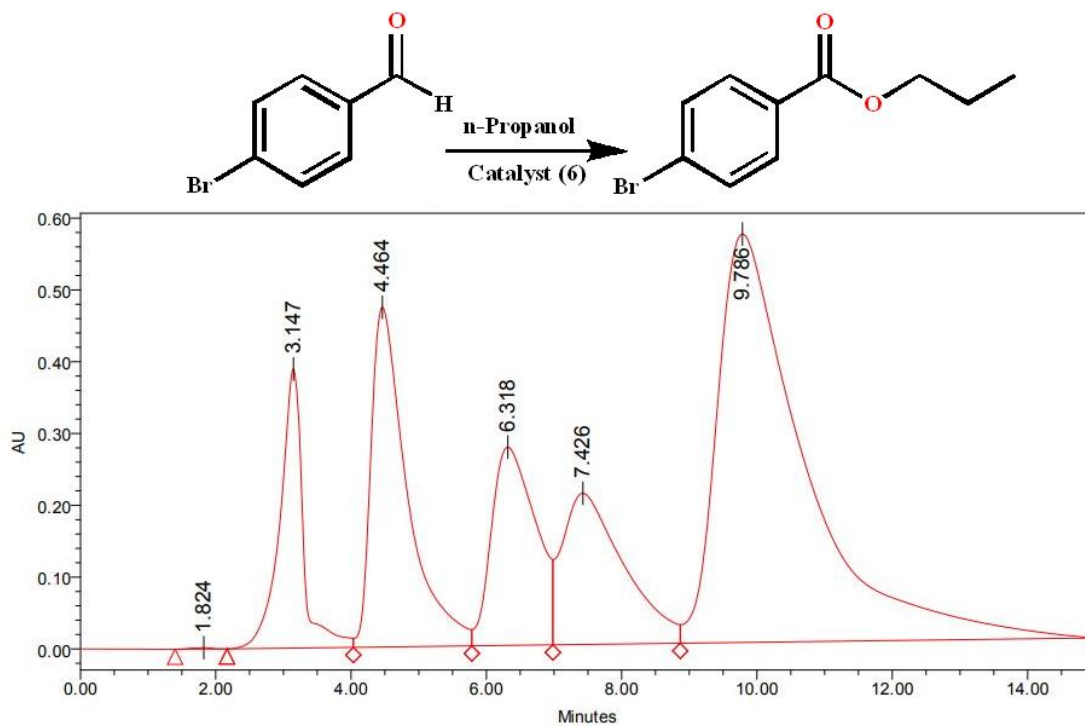


Figure A56: HPLC data for **6** catalysed esterification of p-bromobenzaldehyde with n-propanol

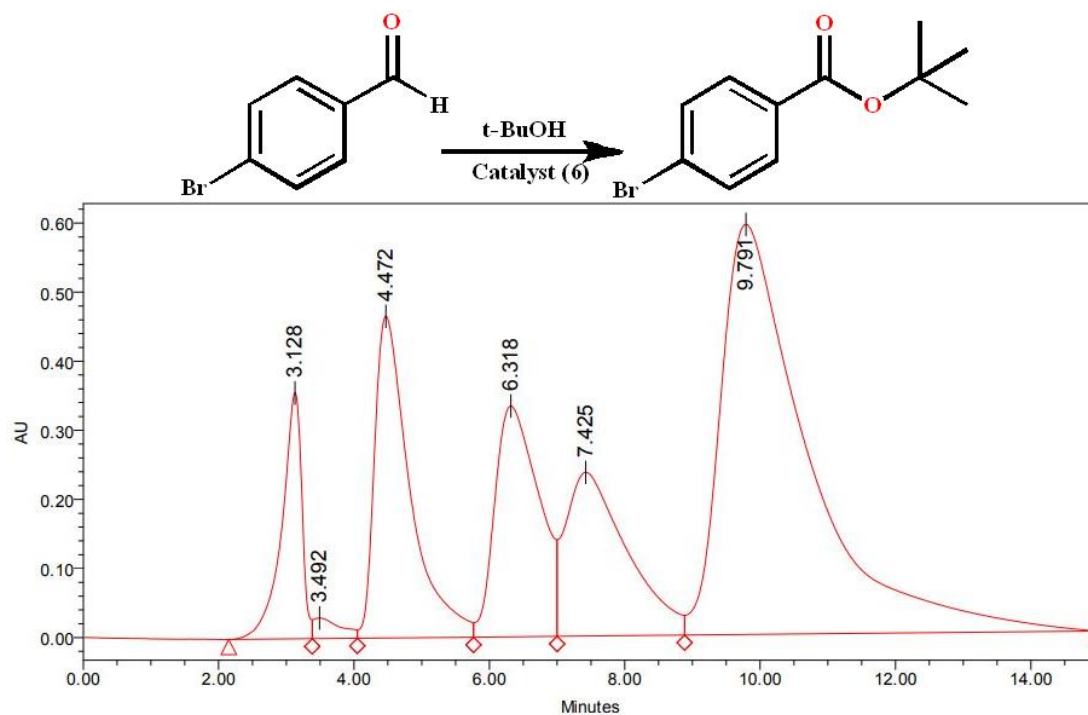


Figure A57: HPLC data for **6** catalysed esterification of p-bromobenzaldehyde with *t*-BuOH

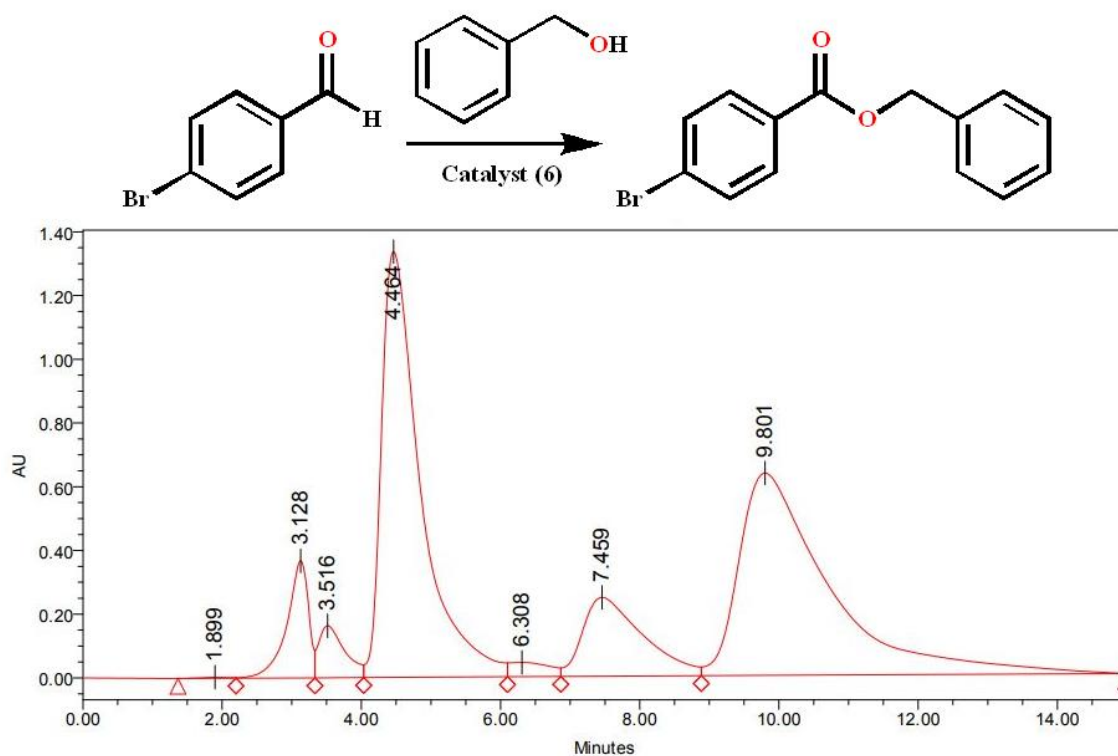


Figure A58: HPLC data for **6** catalysed esterification of p-bromobenzaldehyde with benzyl alcohol



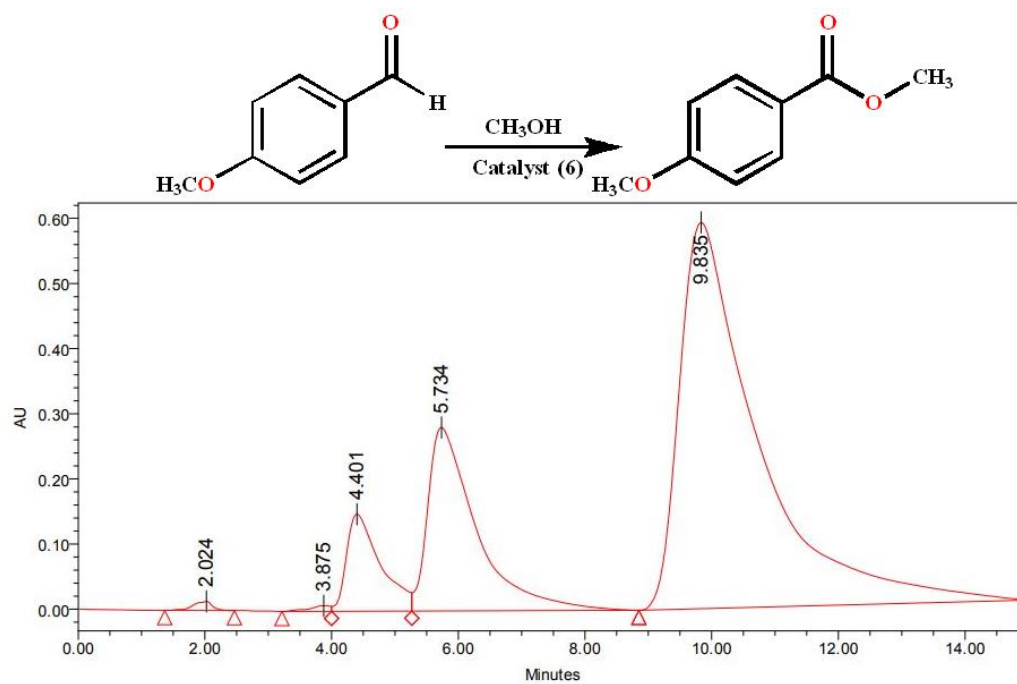


Figure A59: HPLC data for **6** catalysed esterification of p-methoxybenzaldehyde with methanol

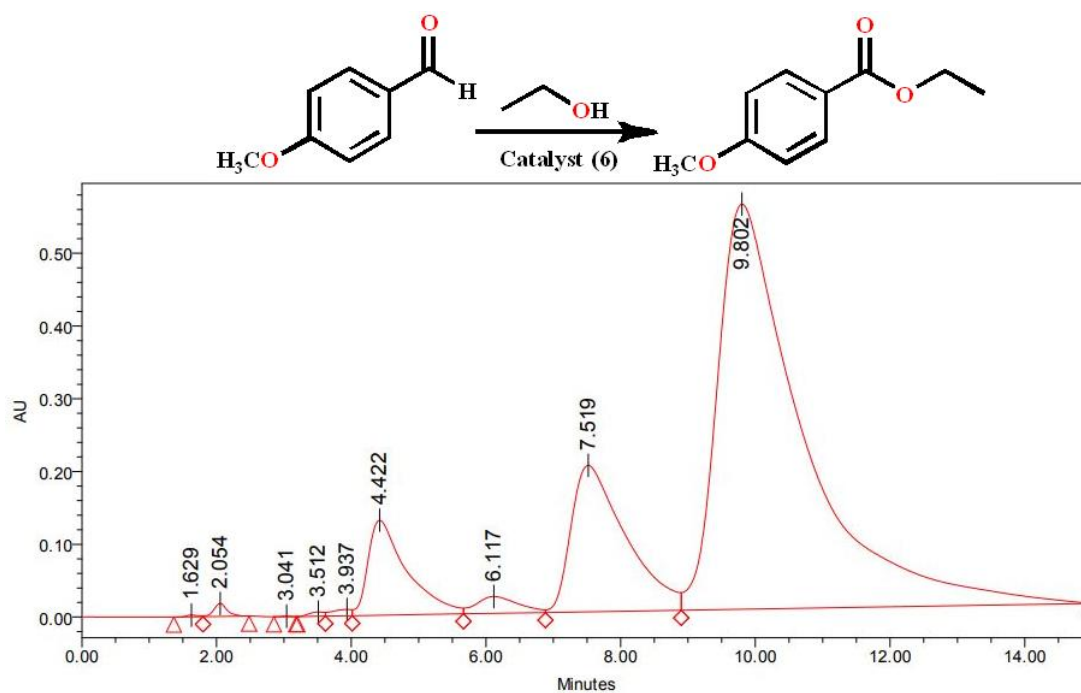


Figure A60: HPLC data for **6** catalysed esterification of p-methoxybenzaldehyde with ethanol



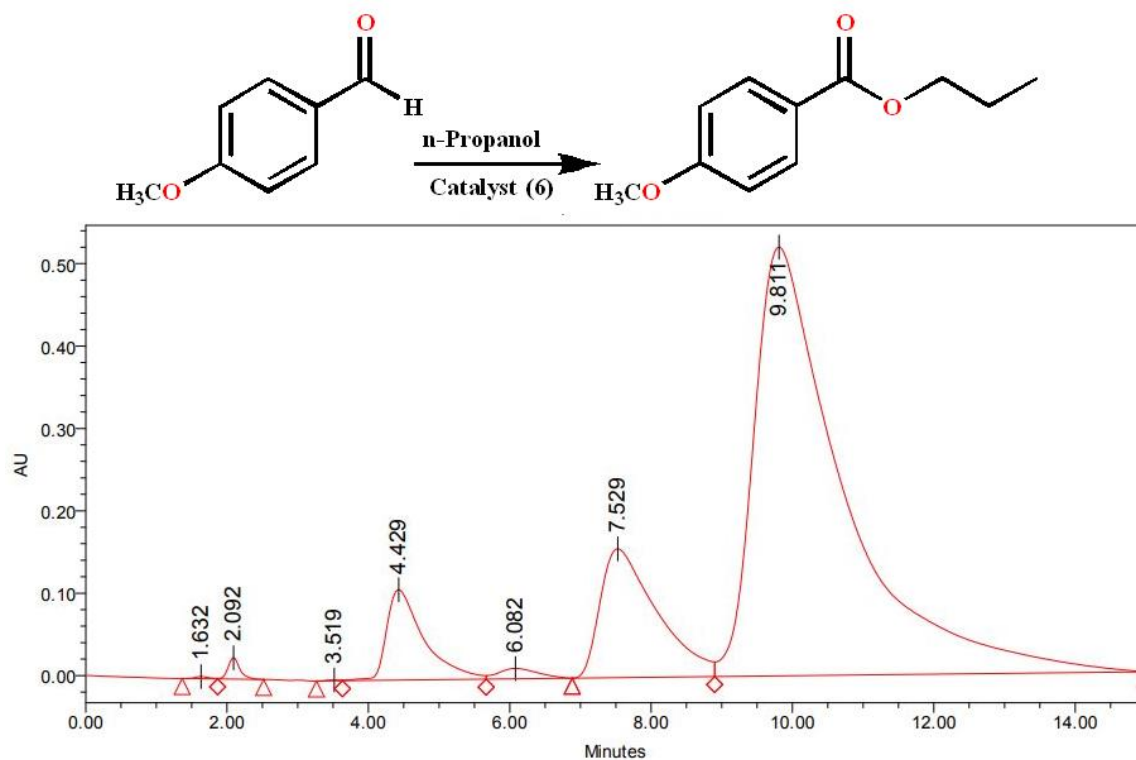


Figure A61: HPLC data for **6** catalysed esterification of p-methoxybenzaldehyde with n-propanol

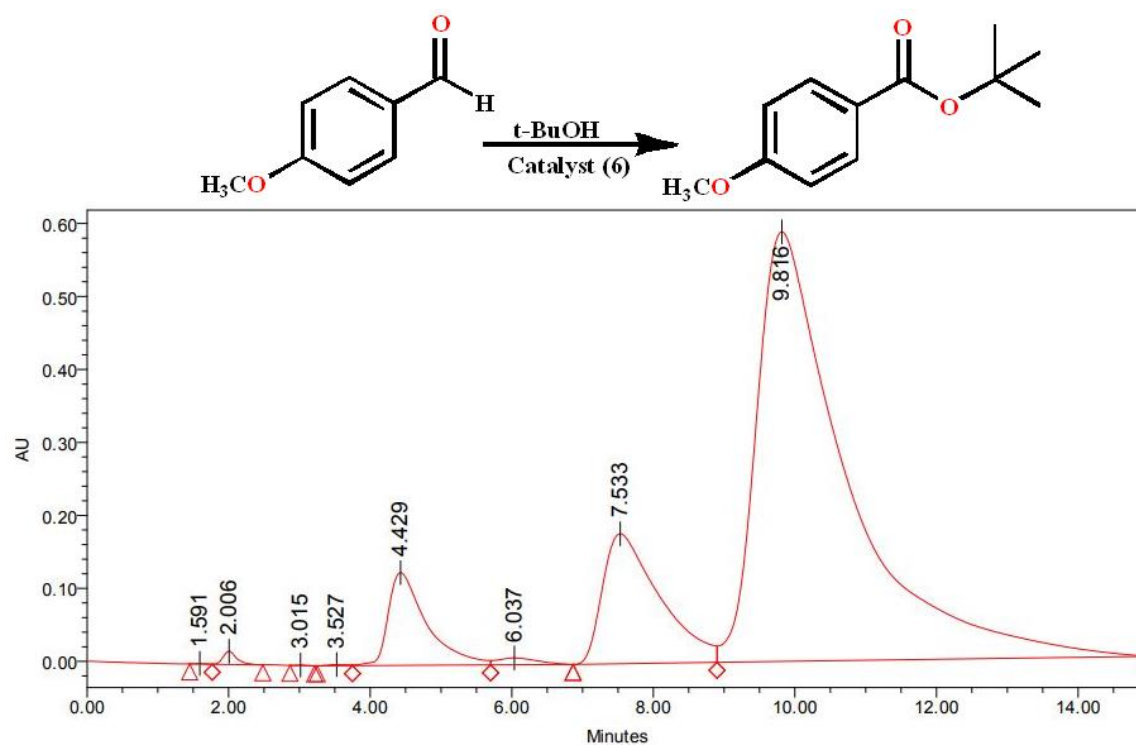


Figure A62: HPLC data for **6** catalysed esterification of p-methoxybenzaldehyde with *t*-BuOH

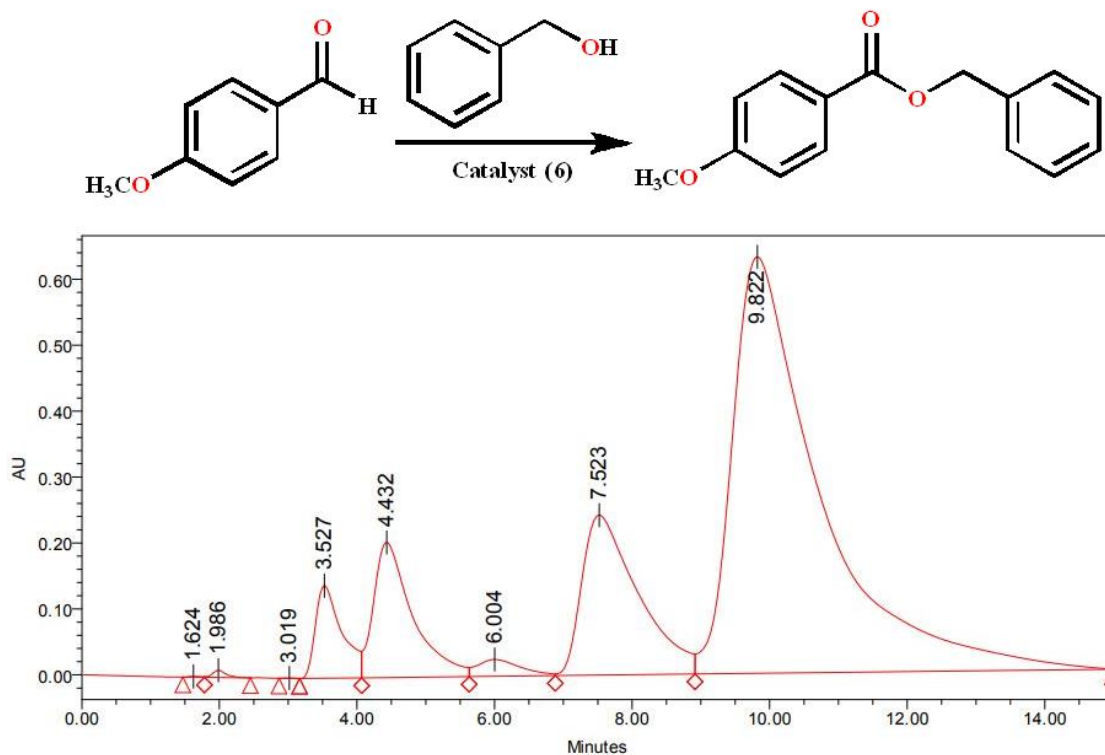


Figure A63: HPLC data for **6** catalysed esterification of p-methoxybenzaldehyde with benzyl alcohol

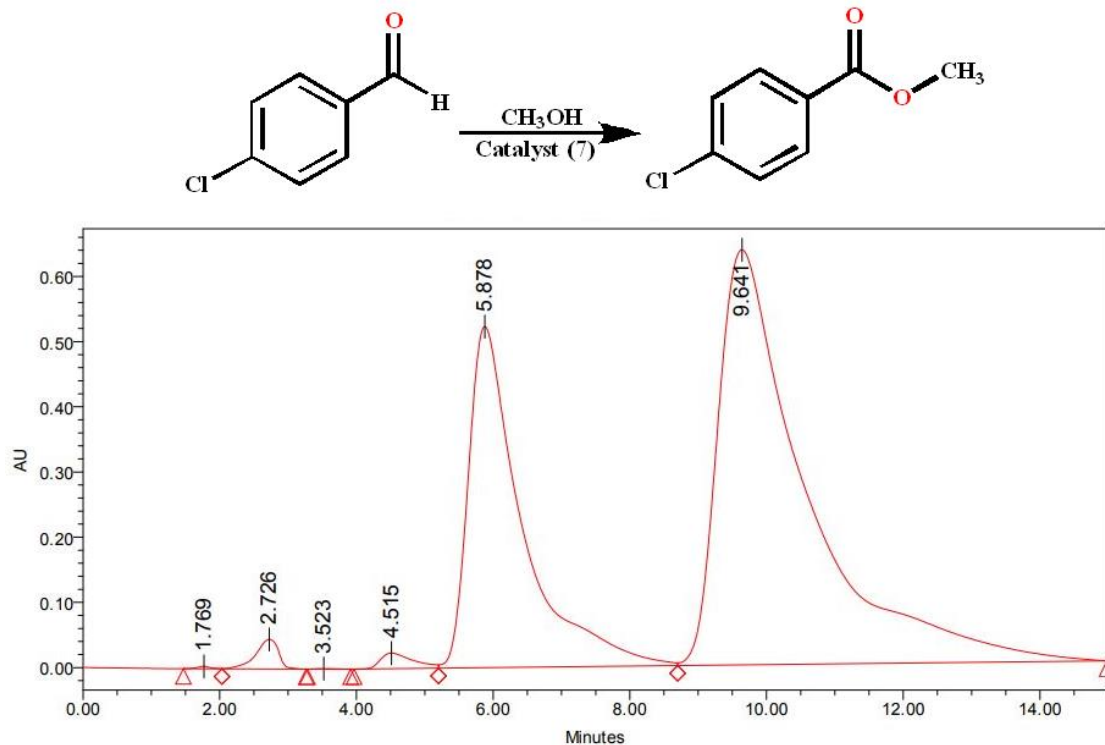


Figure A64: HPLC data for **7** catalysed esterification of p-chlorobenzaldehyde with methanol

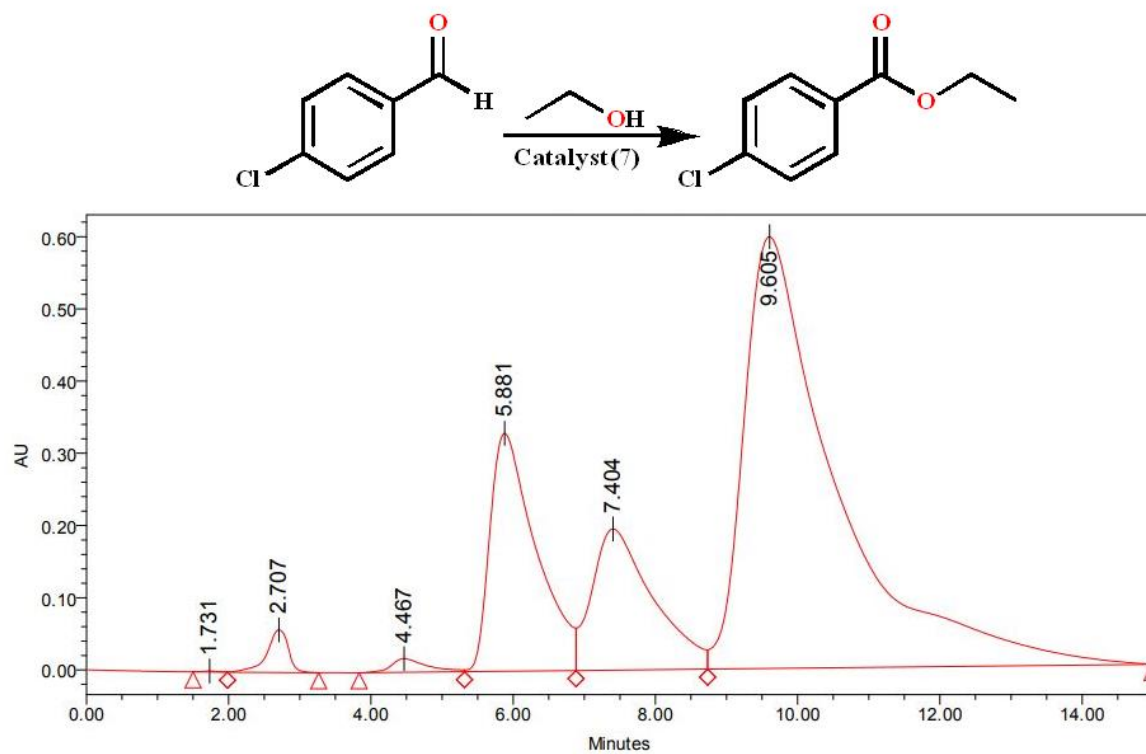


Figure A65: HPLC data for **7** catalysed esterification of p-chlorobenzaldehyde with ethanol

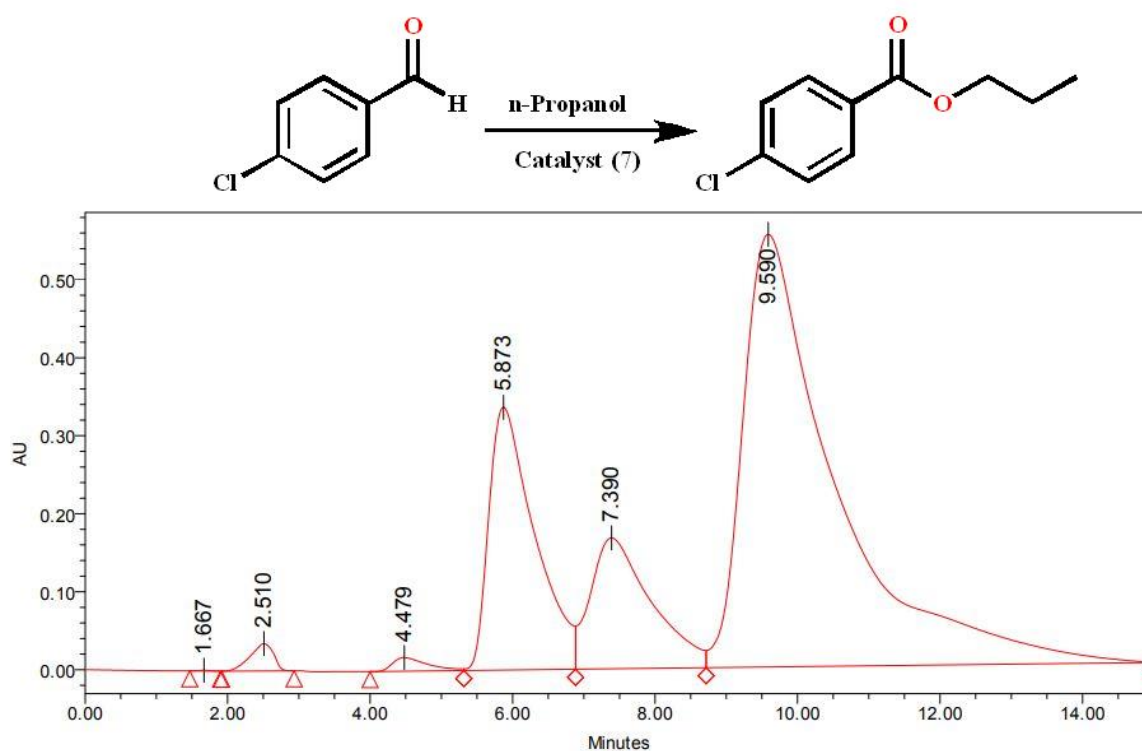


Figure A66: HPLC data for **7** catalysed esterification of p-chlorobenzaldehyde with n-propanol

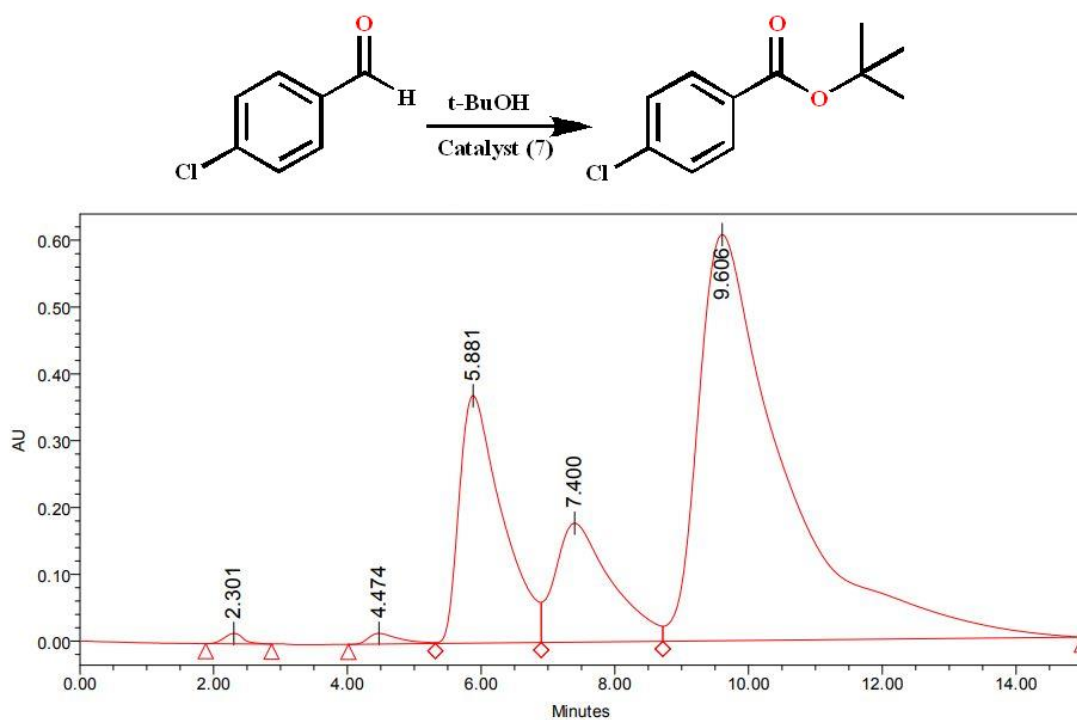


Figure A67: HPLC data for **7** catalysed esterification of *p*-chlorobenzaldehyde with *t*-BuOH

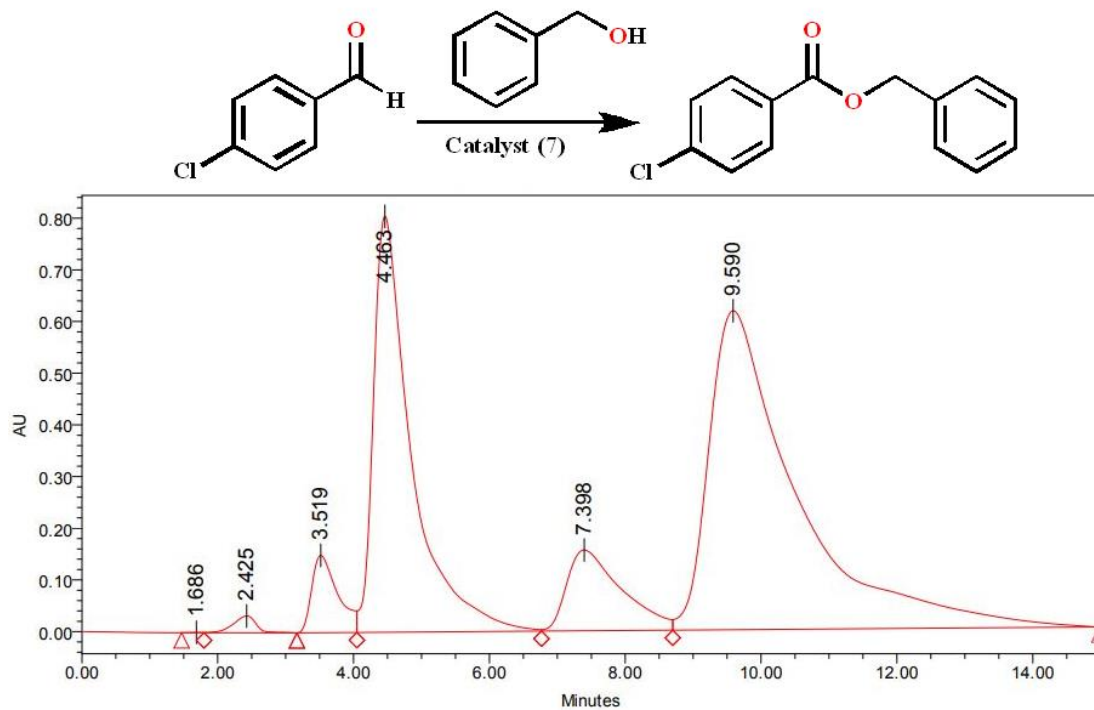


Figure A68: HPLC data for **7** catalysed esterification of *p*-chlorobenzaldehyde with benzyl alcohol

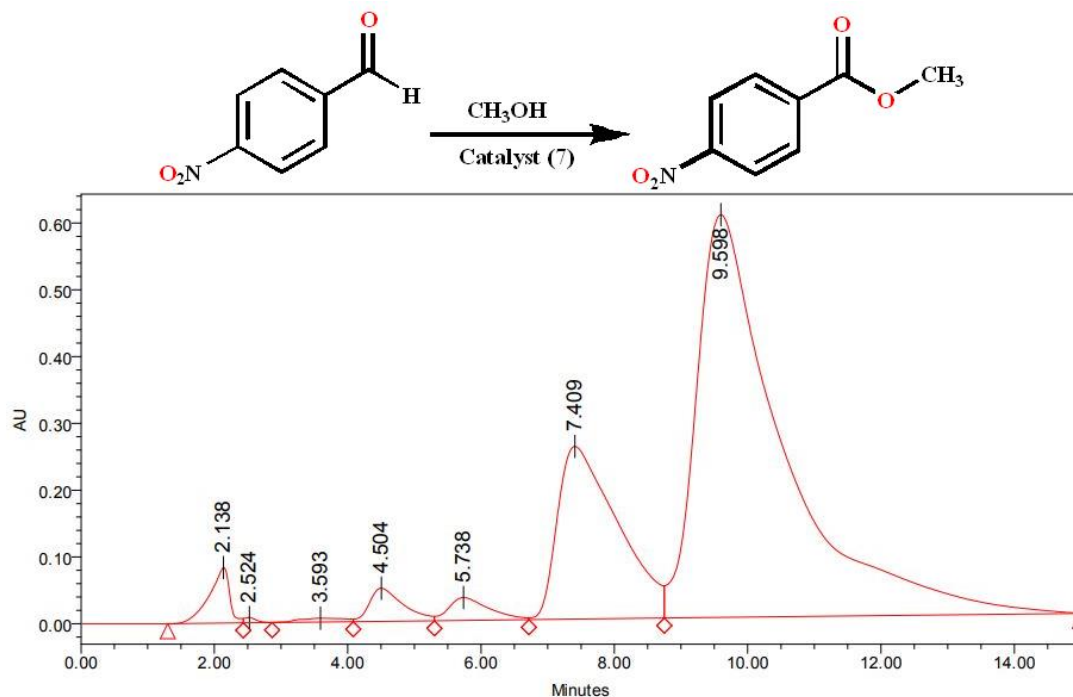


Figure A69: HPLC data for **7** catalysed esterification of p-nitrobenzaldehyde with methanol

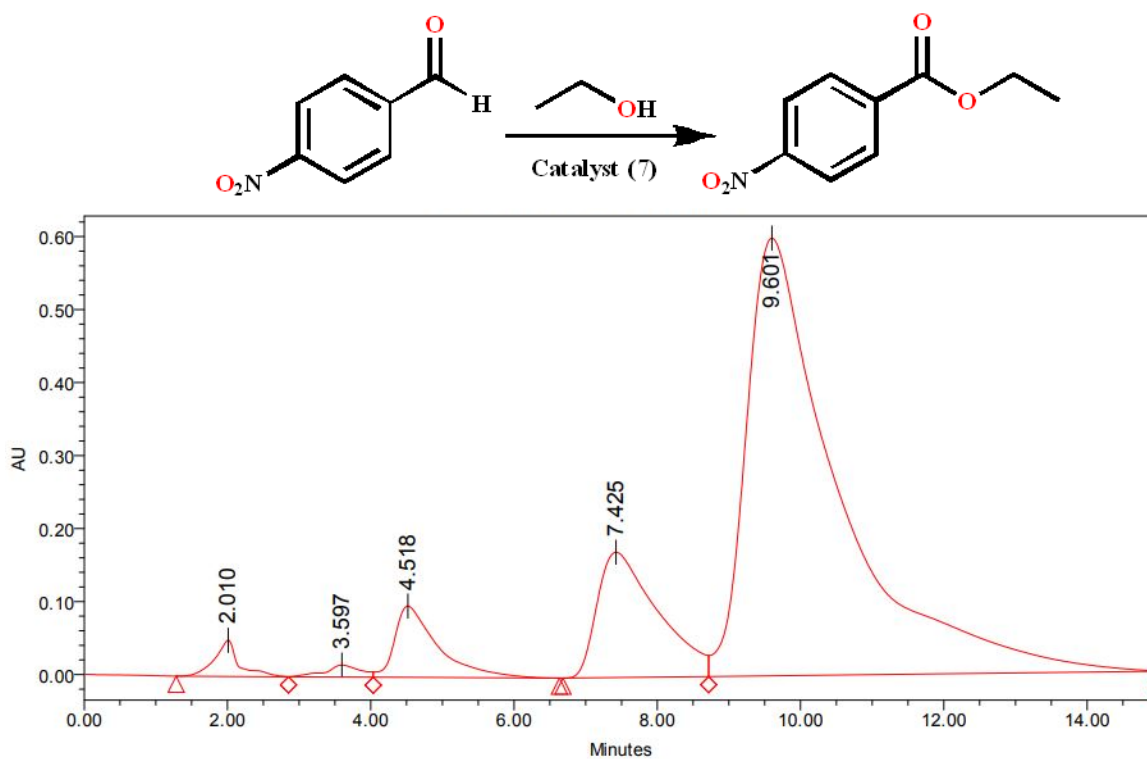


Figure A70: HPLC data for **7** catalysed esterification of p-nitrobenzaldehyde with ethanol

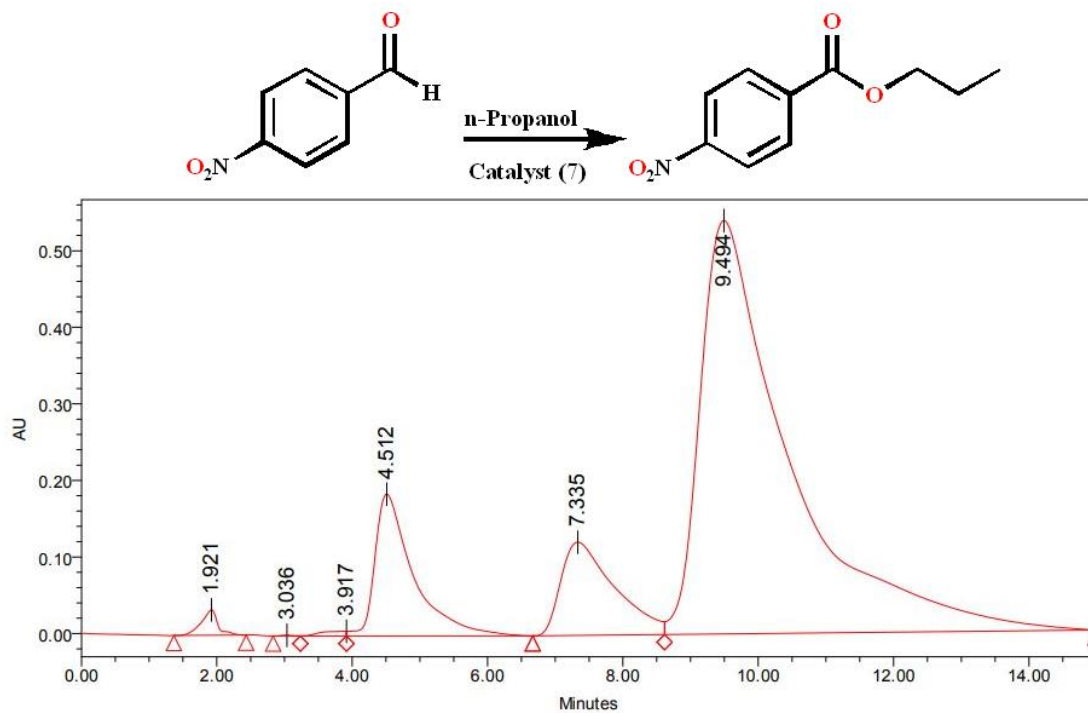


Figure A71: HPLC data for **7** catalysed esterification of p-nitrobenzaldehyde with n-propanol

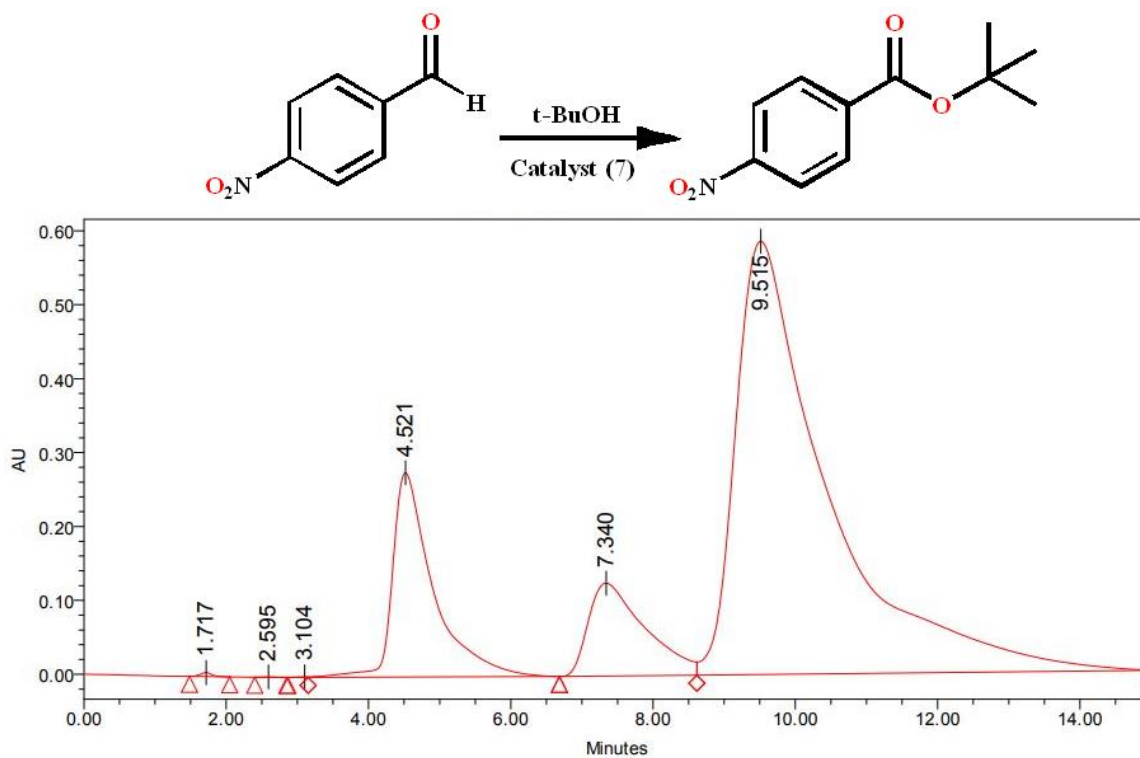


Figure A72: HPLC data for **7** catalysed esterification of p-nitrobenzaldehyde with t-BuOH

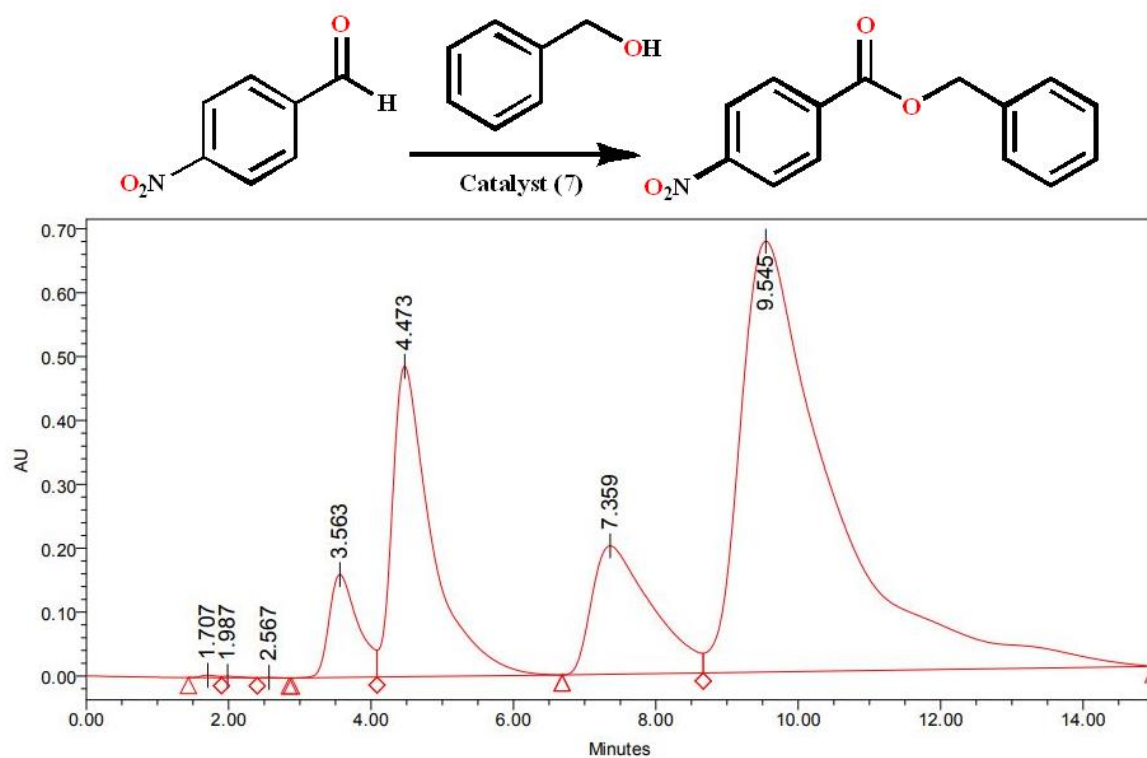


Figure A73: HPLC data for **7** catalysed esterification of p-nitrobenzaldehyde with benzyl alcohol

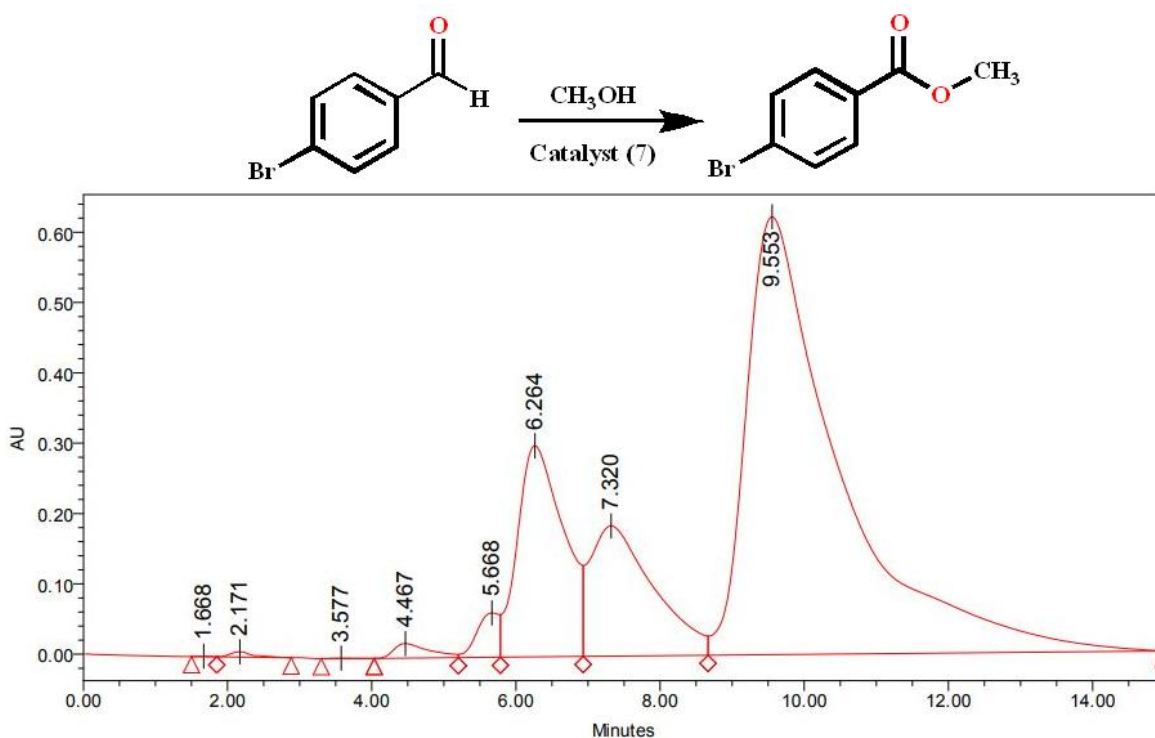


Figure A74: HPLC data for **7** catalysed esterification of p-bromobenzaldehyde with methanol



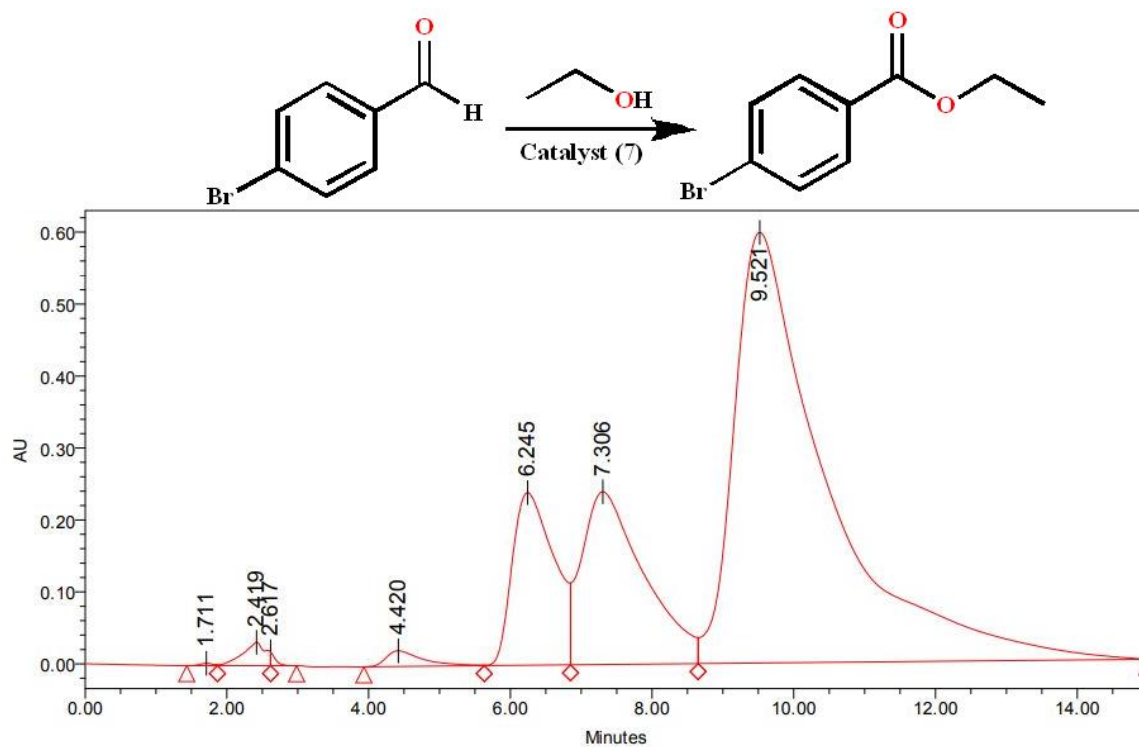


Figure A75: HPLC data for **7** catalysed esterification of p-bromobenzaldehyde with ethanol

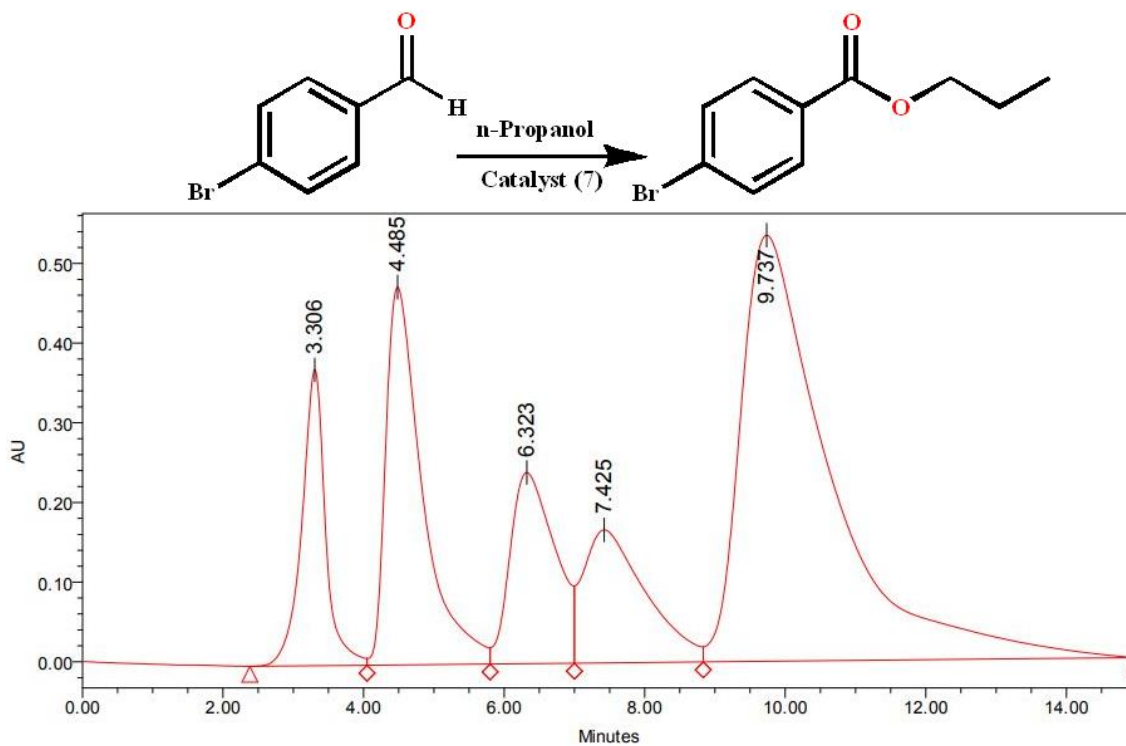


Figure A76: HPLC data for **7** catalysed esterification of p-bromobenzaldehyde with n-propanol



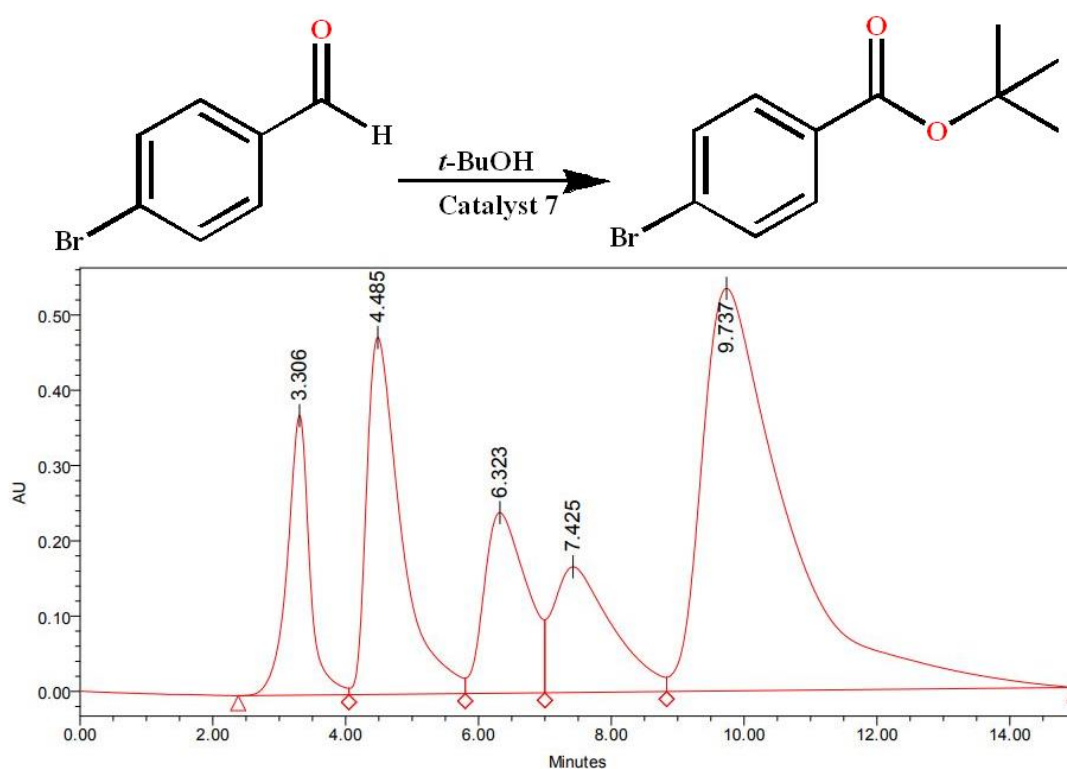


Figure A77: HPLC data for **7** catalysed esterification of p-bromobenzaldehyde with *t*-BuOH

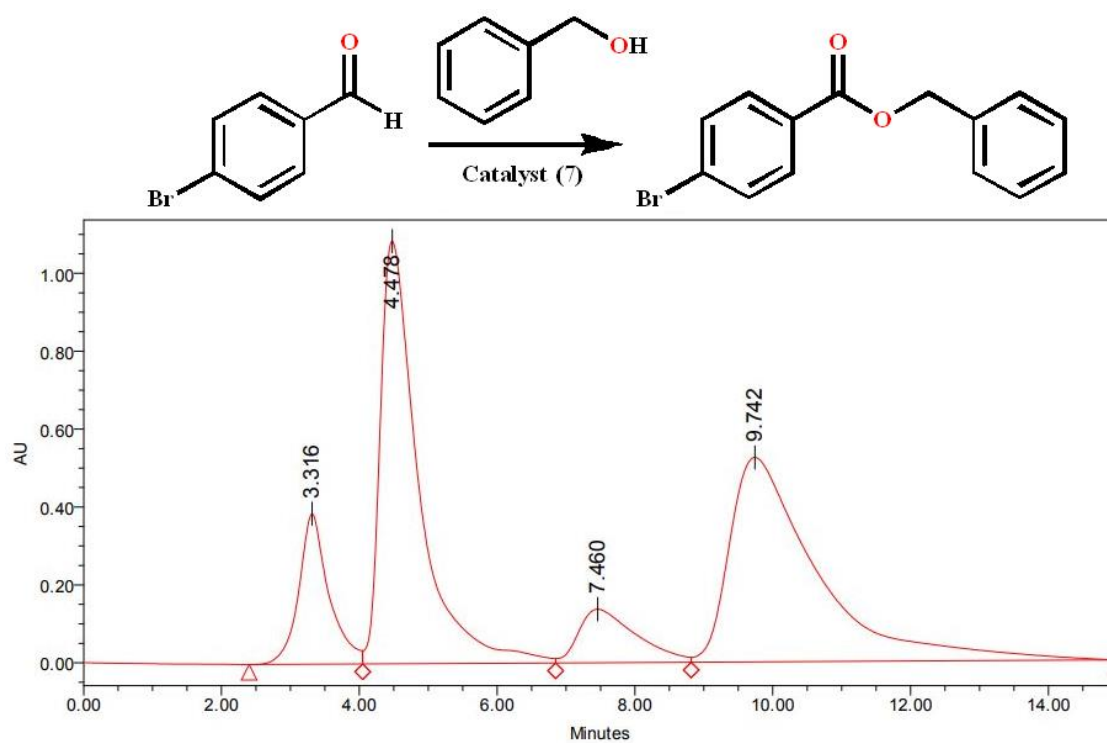


Figure A78: HPLC data for **7** catalysed esterification of p-bromobenzaldehyde with benzyl alcohol

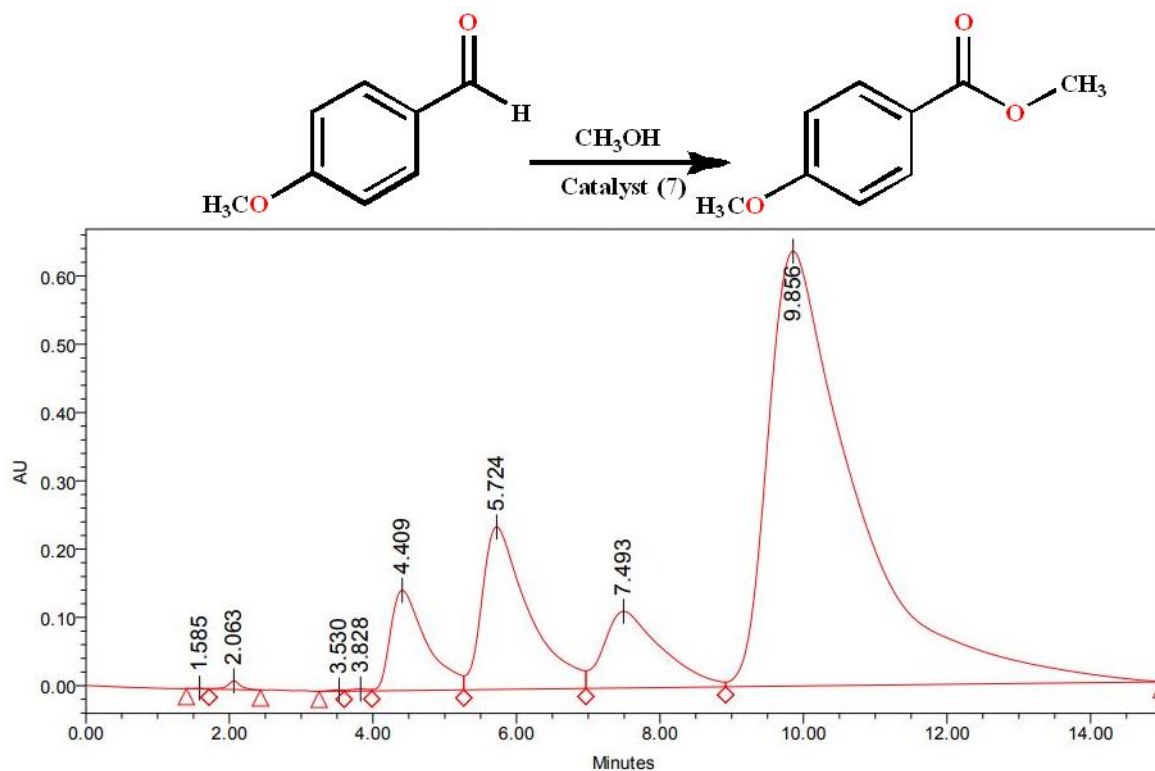


Figure A79: HPLC data for **7** catalysed esterification of p-methoxybenzaldehyde with methanol

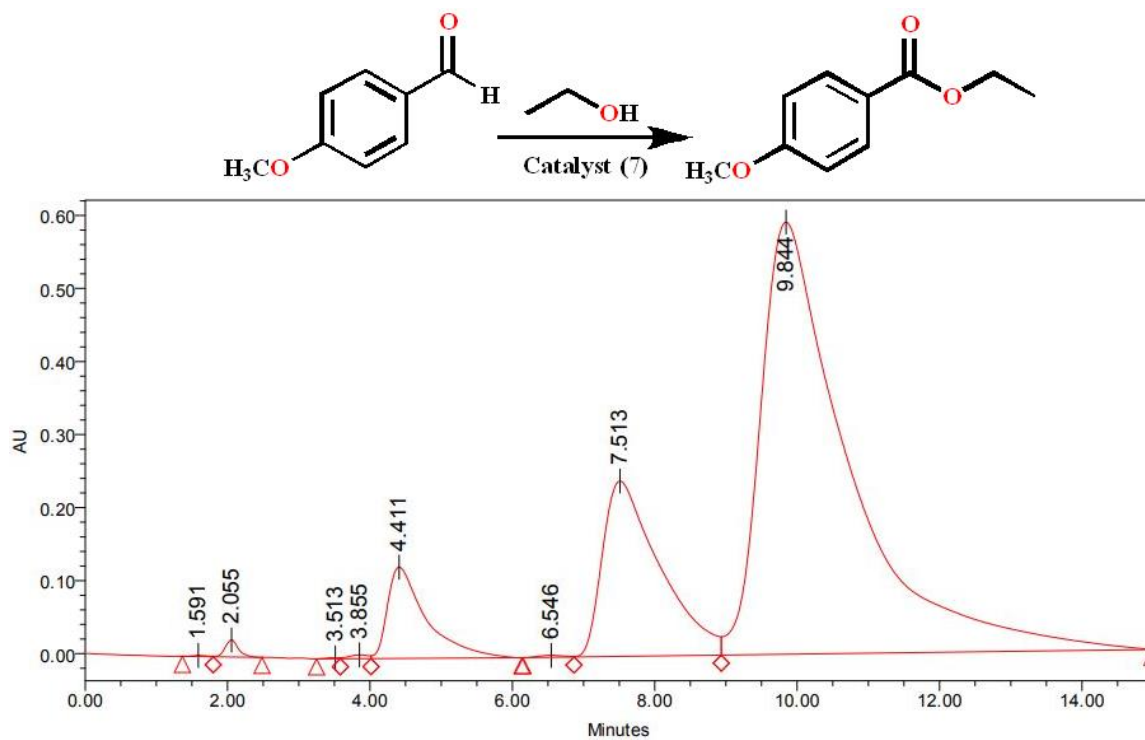


Figure A80: HPLC data for **7** catalysed esterification of p-methoxybenzaldehyde with ethanol

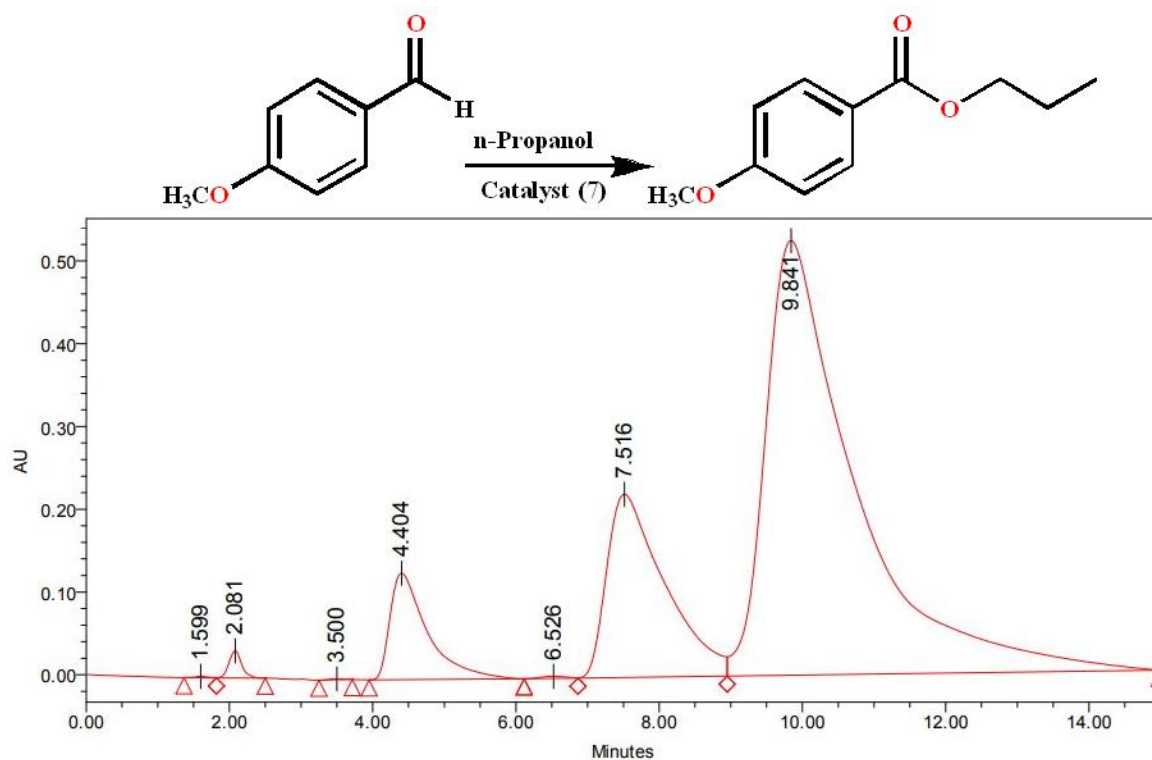


Figure A81: HPLC data for **7** catalysed esterification of p-methoxybenzaldehyde with n-propanol

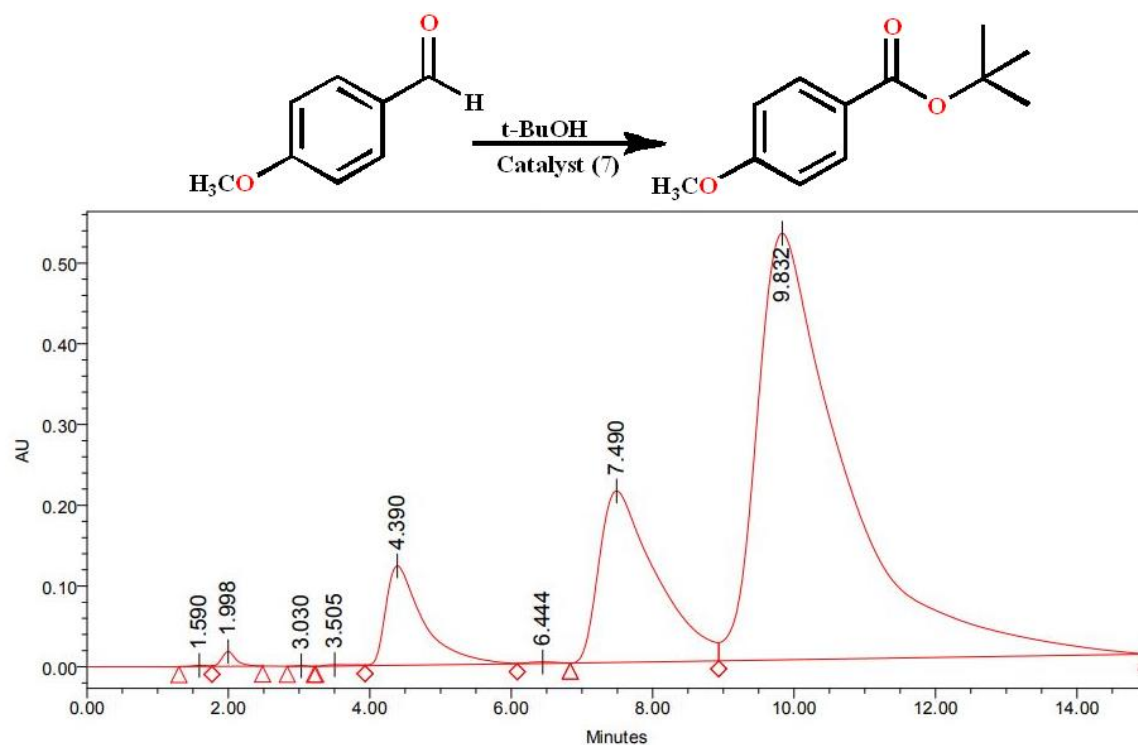


Figure A82: HPLC data for **7** catalysed esterification of p-methoxybenzaldehyde with t-BuOH

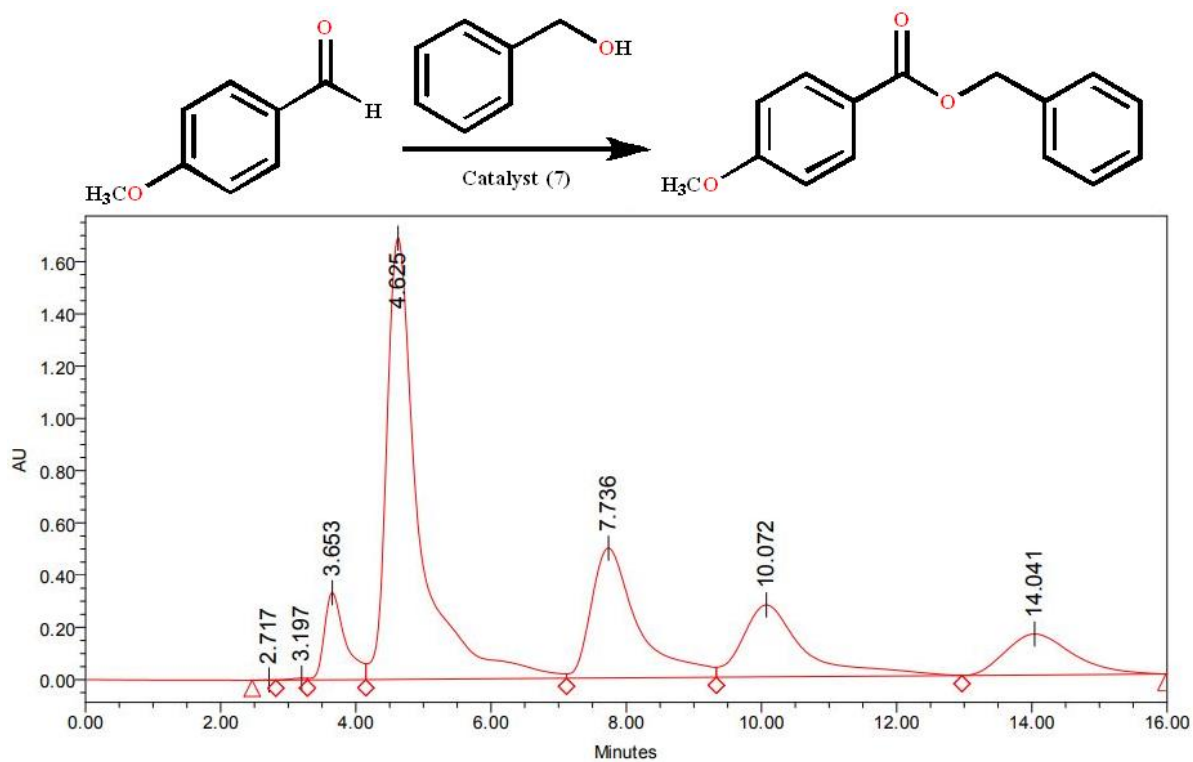


Figure A83: HPLC data for **7** catalysed esterification of p-methoxybenzaldehyde with benzyl alcohol

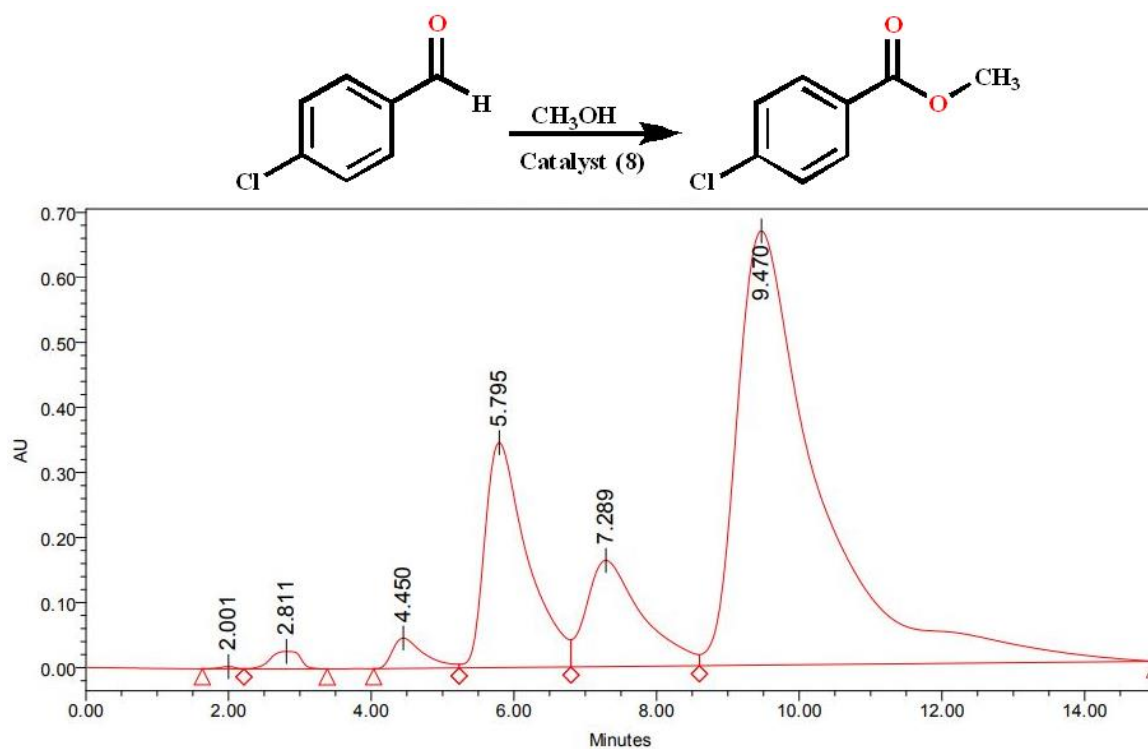


Figure A84: HPLC data for **8** catalysed esterification of p-chlorobenzaldehyde with methanol

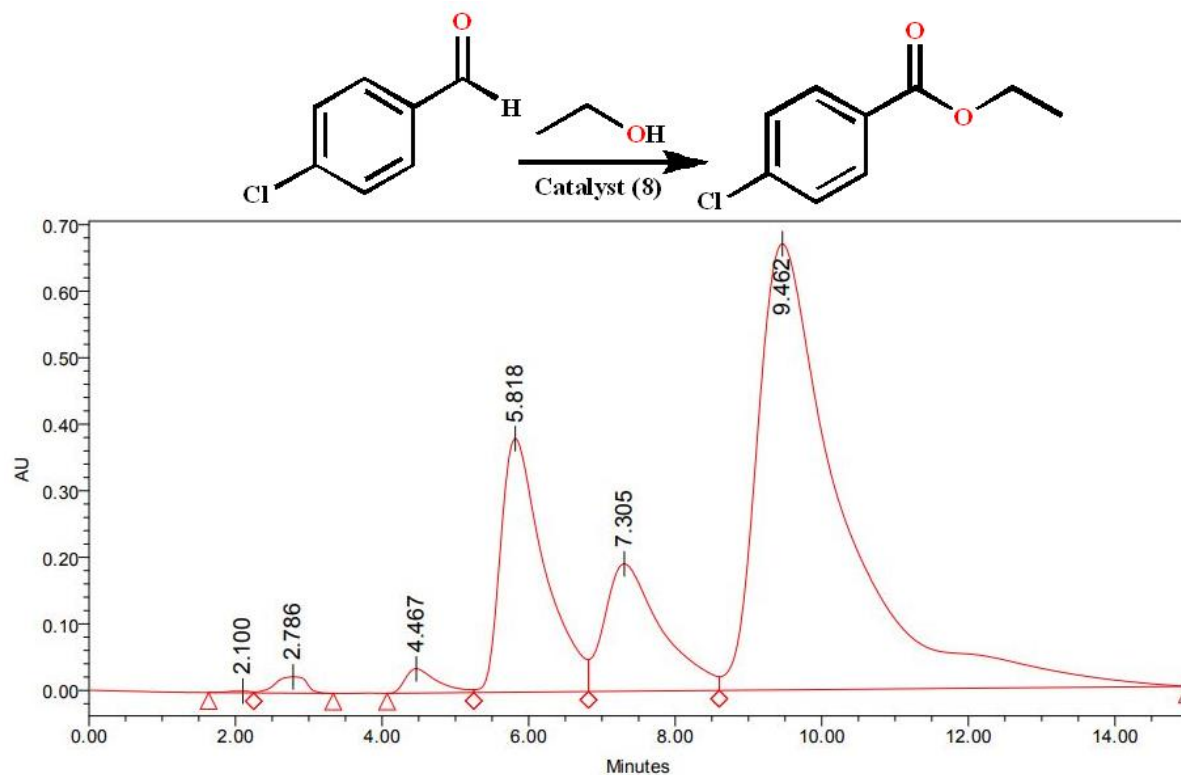


Figure A85: HPLC data for **8** catalysed esterification of p-chlorobenzaldehyde with ethanol

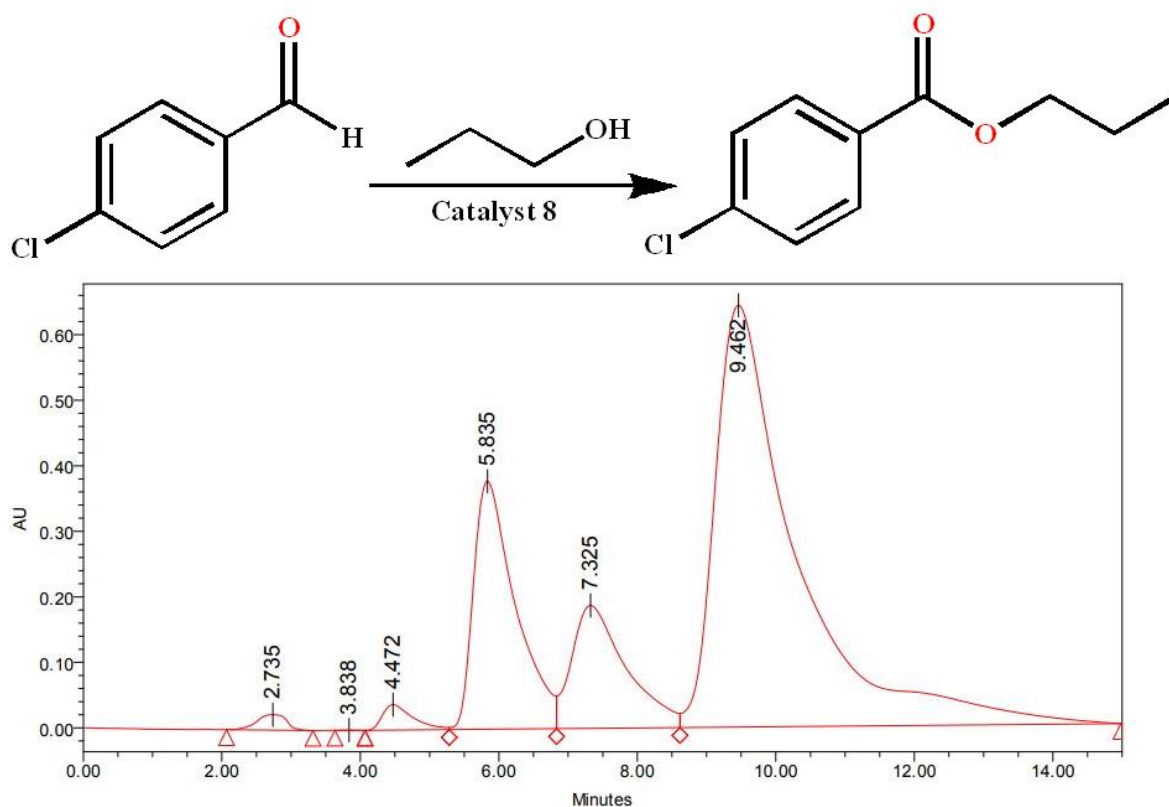


Figure A86: HPLC data for **8** catalysed esterification of p-chlorobenzaldehyde with n-propanol

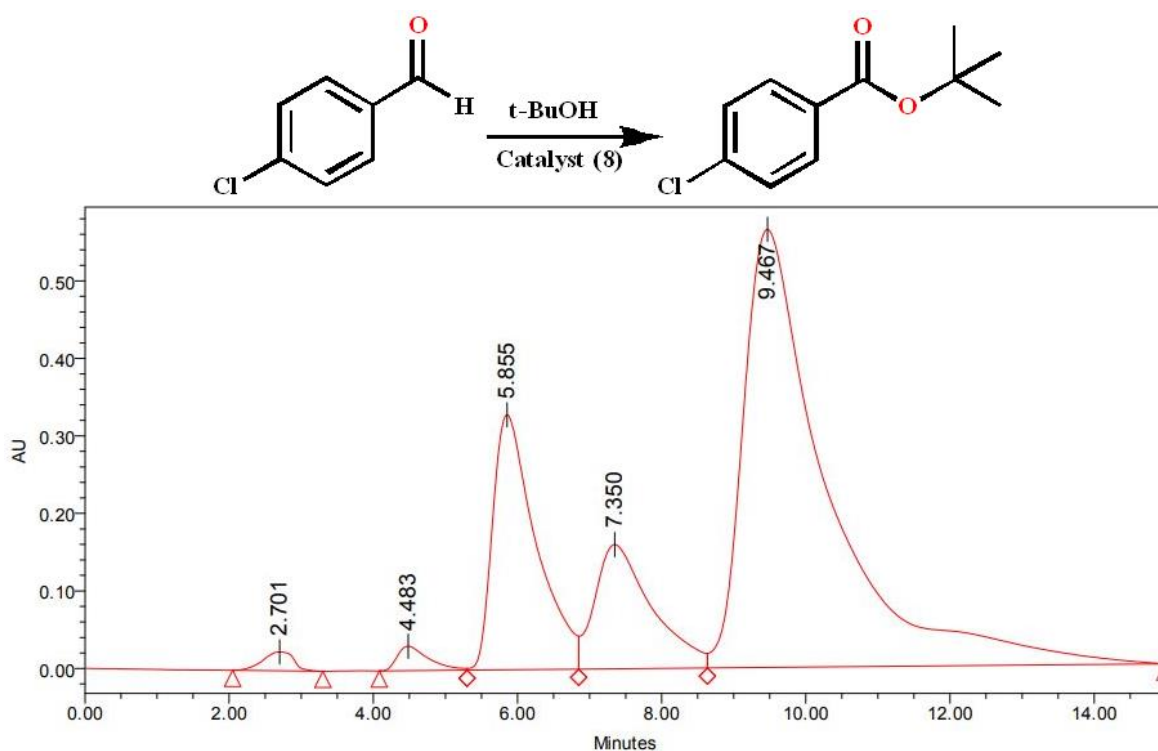


Figure A87: HPLC data for **8** catalysed esterification of p-chlorobenzaldehyde with *t*-BuOH

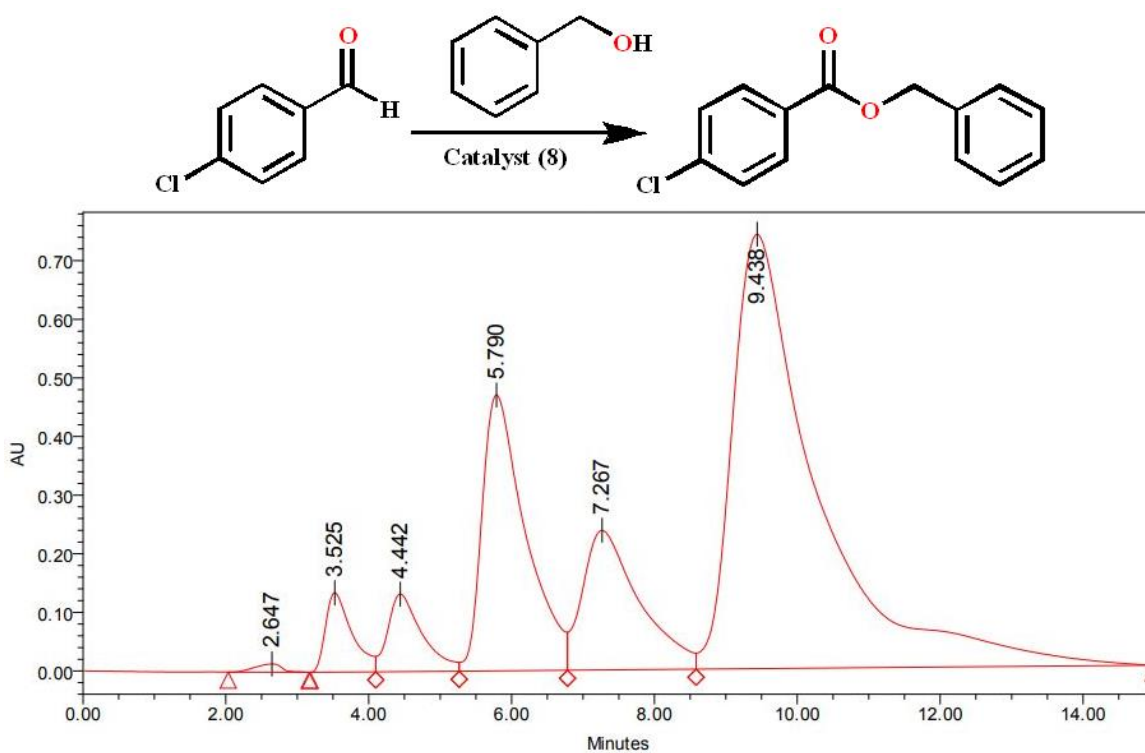


Figure A88: HPLC data for **8** catalysed esterification of p-chlorobenzaldehyde with benzyl alcohol

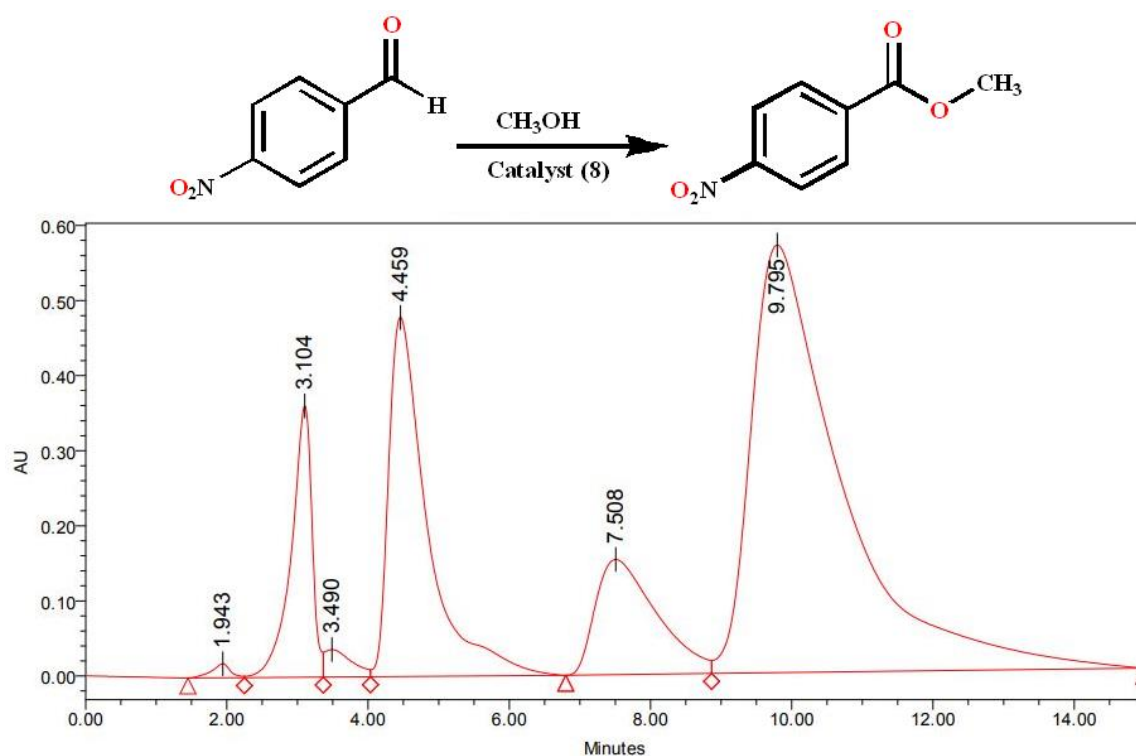


Figure A89: HPLC data for **8** catalysed esterification of p-nitrobenzaldehyde with methanol

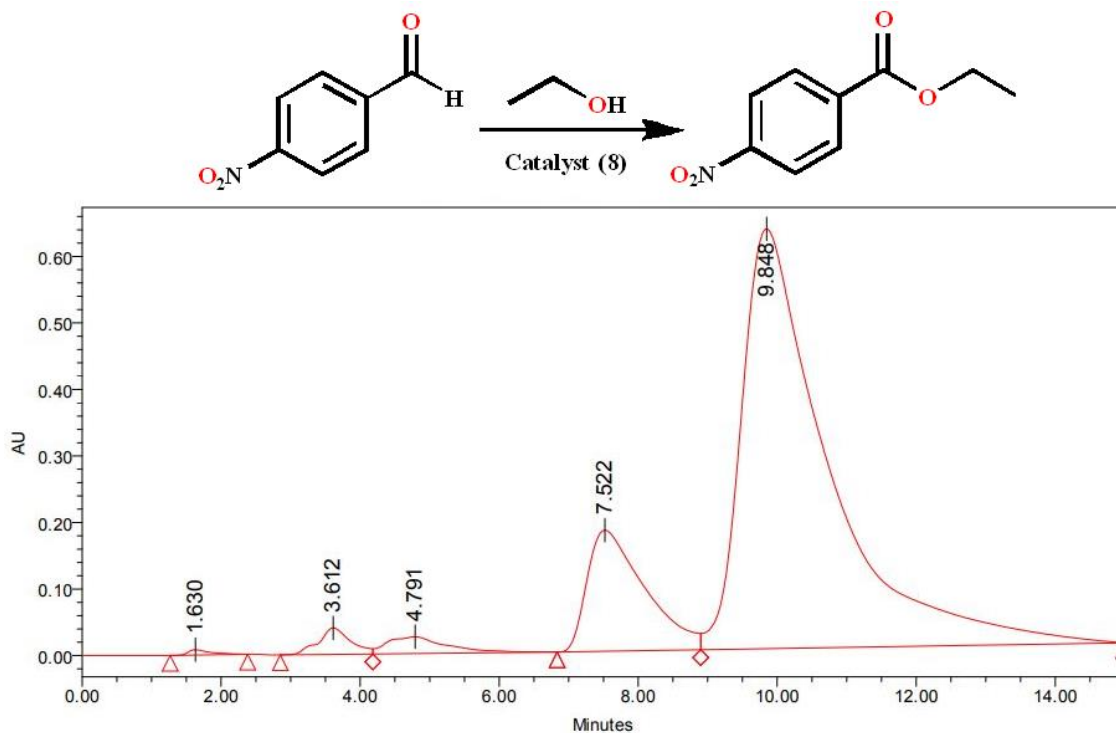


Figure A90: HPLC data for **8** catalysed esterification of p-nitrobenzaldehyde with ethanol



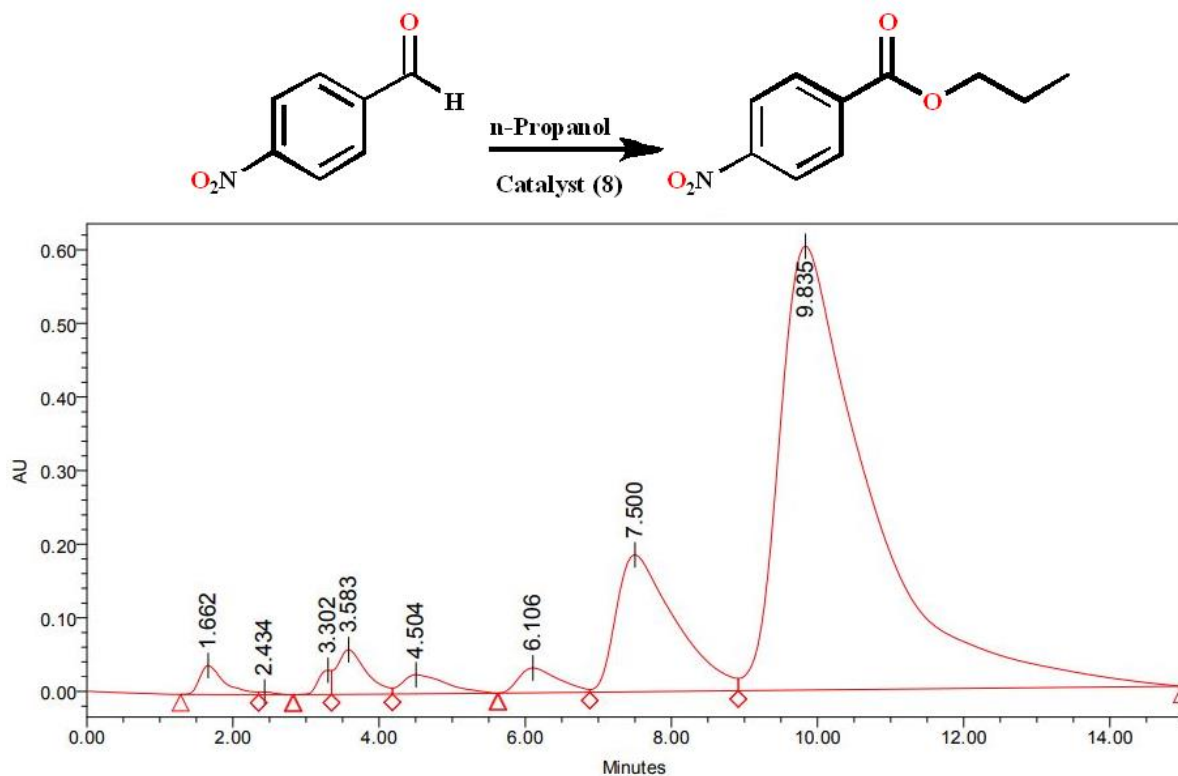


Figure A91: HPLC data for **8** catalysed esterification of p-nitrobenzaldehyde with n-propanol

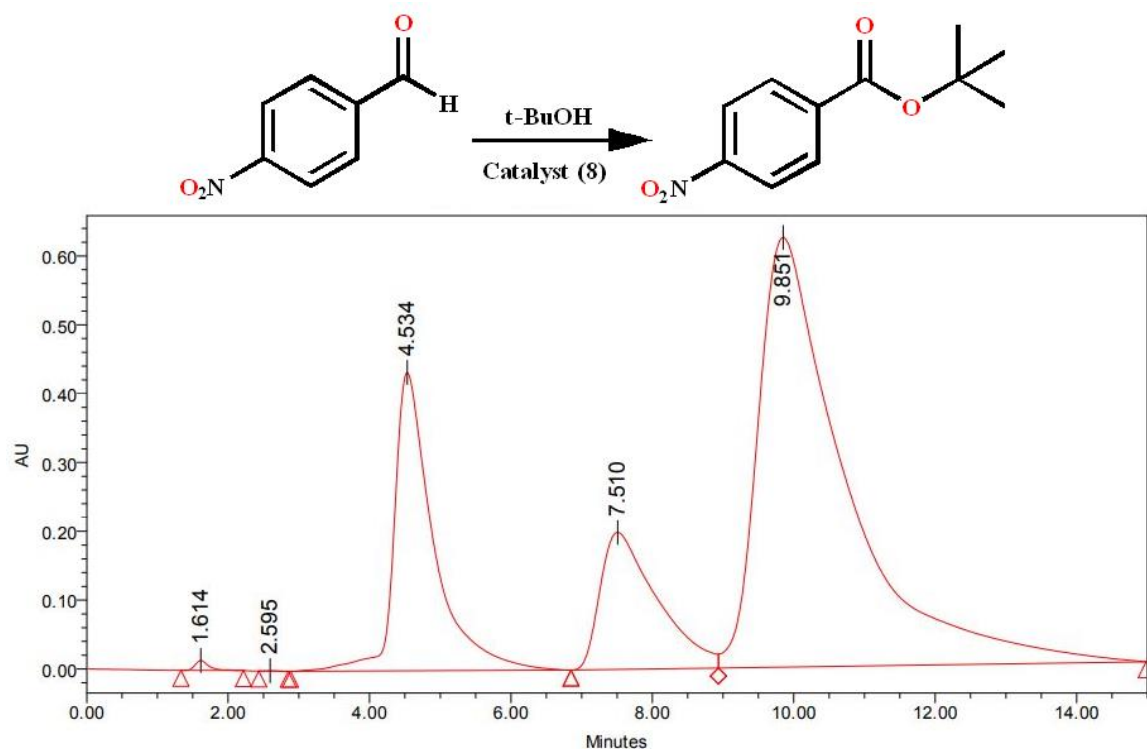


Figure A92: HPLC data for **8** catalysed esterification of p-nitrobenzaldehyde with t-BuOH



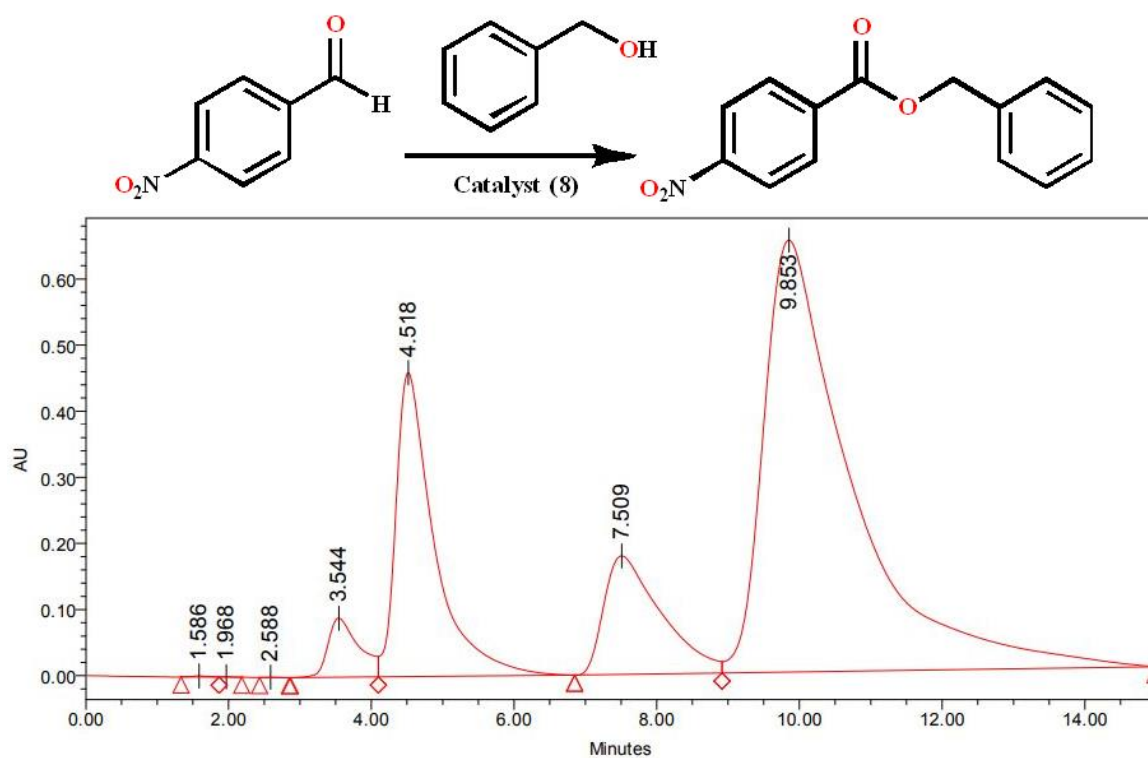


Figure A93: HPLC data for **8** catalysed esterification of p-nitrobenzaldehyde with benzyl alcohol

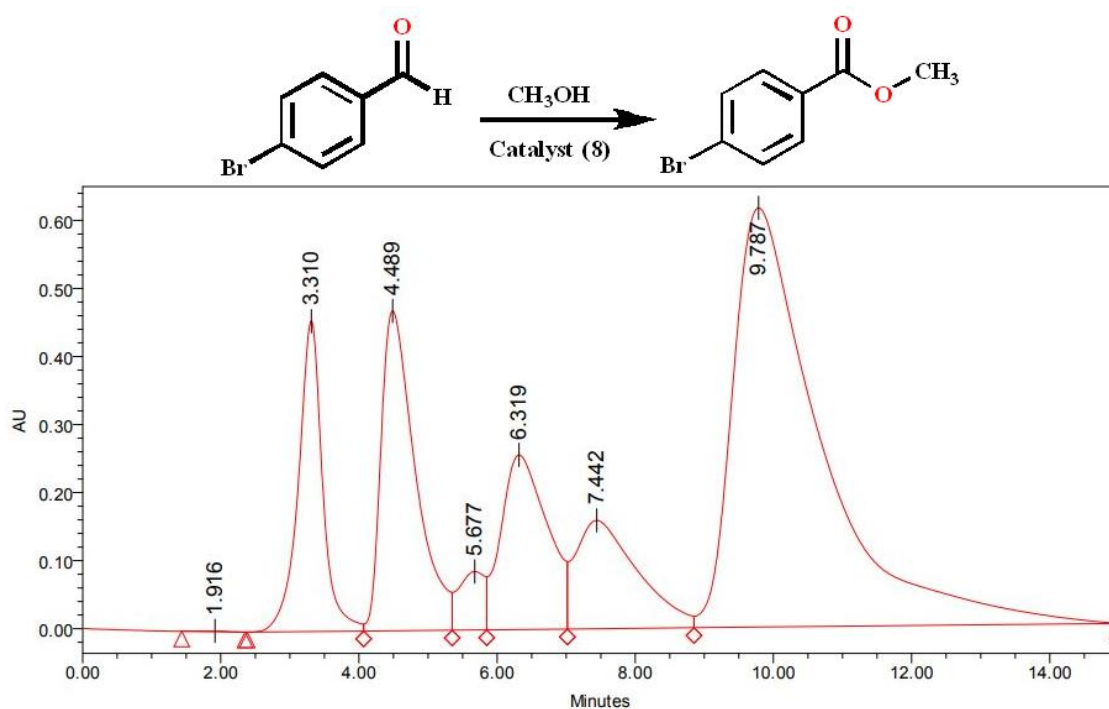


Figure A94: HPLC data for **8** catalysed esterification of p-bromobenzaldehyde with methanol

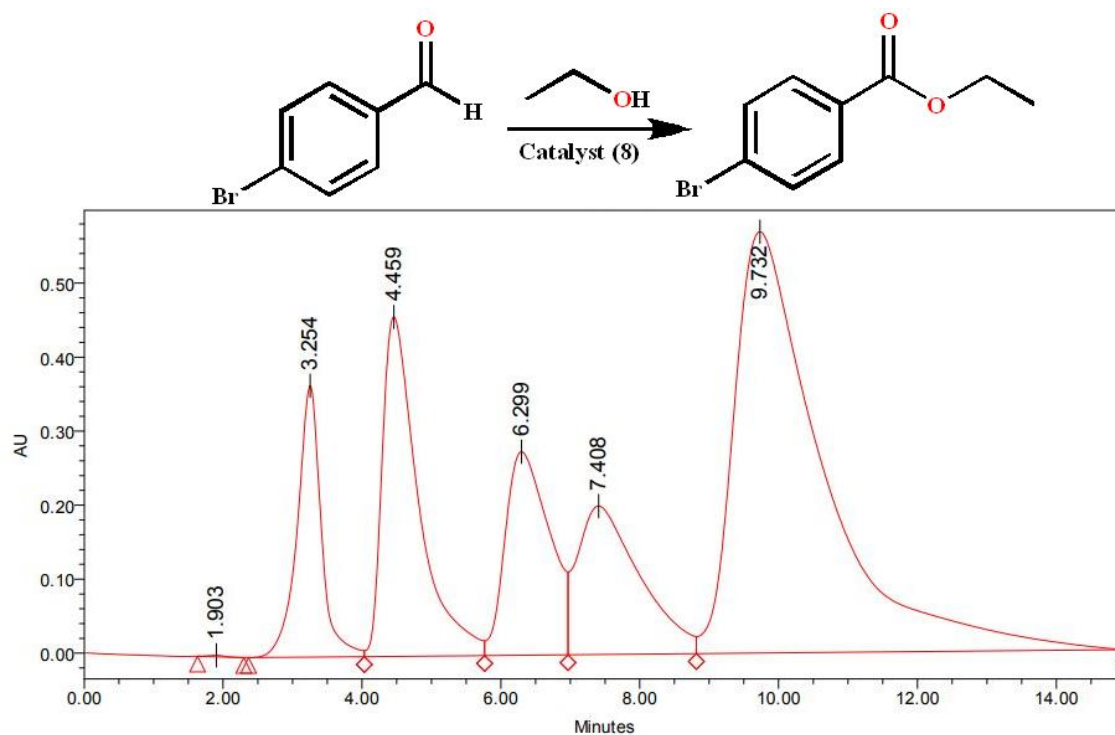


Figure A95: HPLC data for **8** catalysed esterification of p-bromobenzaldehyde with ethanol

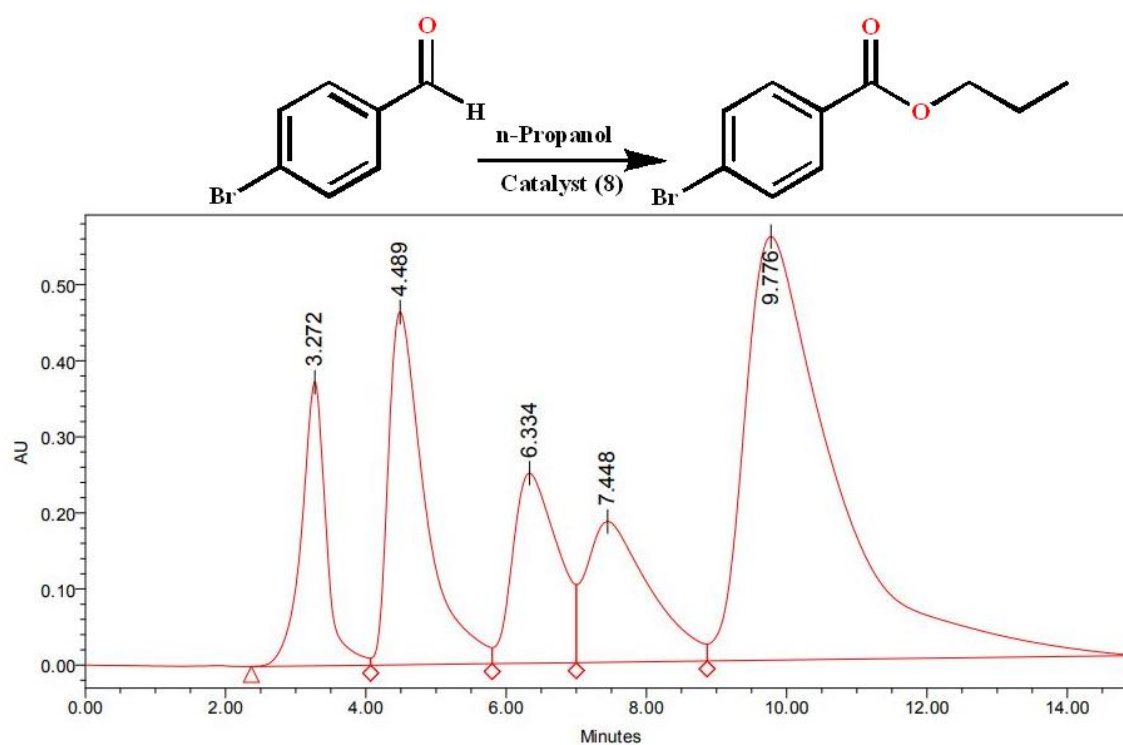


Figure A96: HPLC data for **8** catalysed esterification of p-bromobenzaldehyde with n-propanol

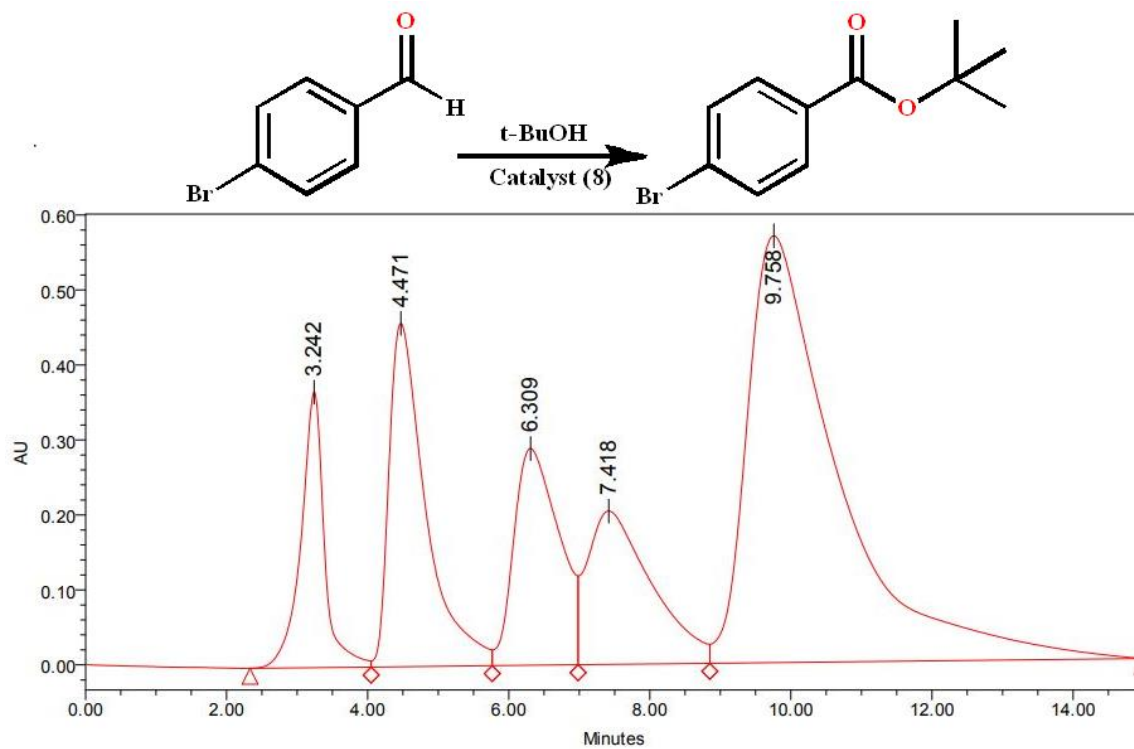


Figure A97: HPLC data for **8** catalysed esterification of *p*-bromobenzaldehyde with *t*-BuOH

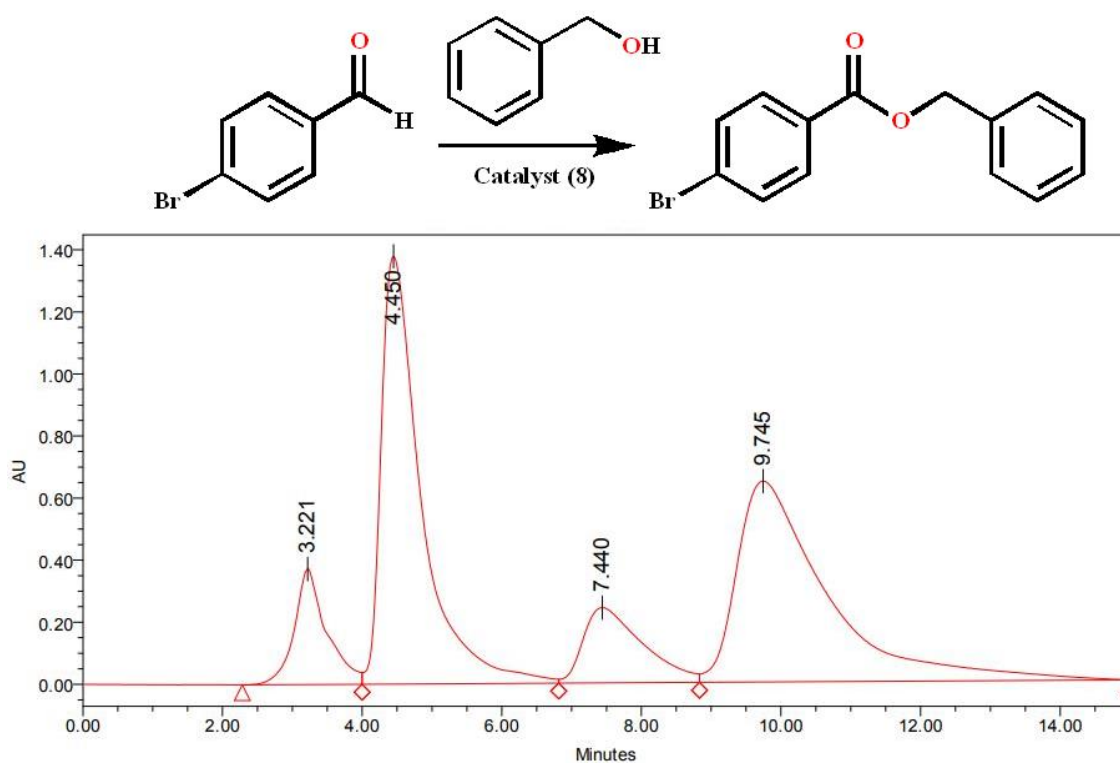


Figure A98: HPLC data for **8** catalysed esterification of *p*-bromobenzaldehyde with benzyl alcohol

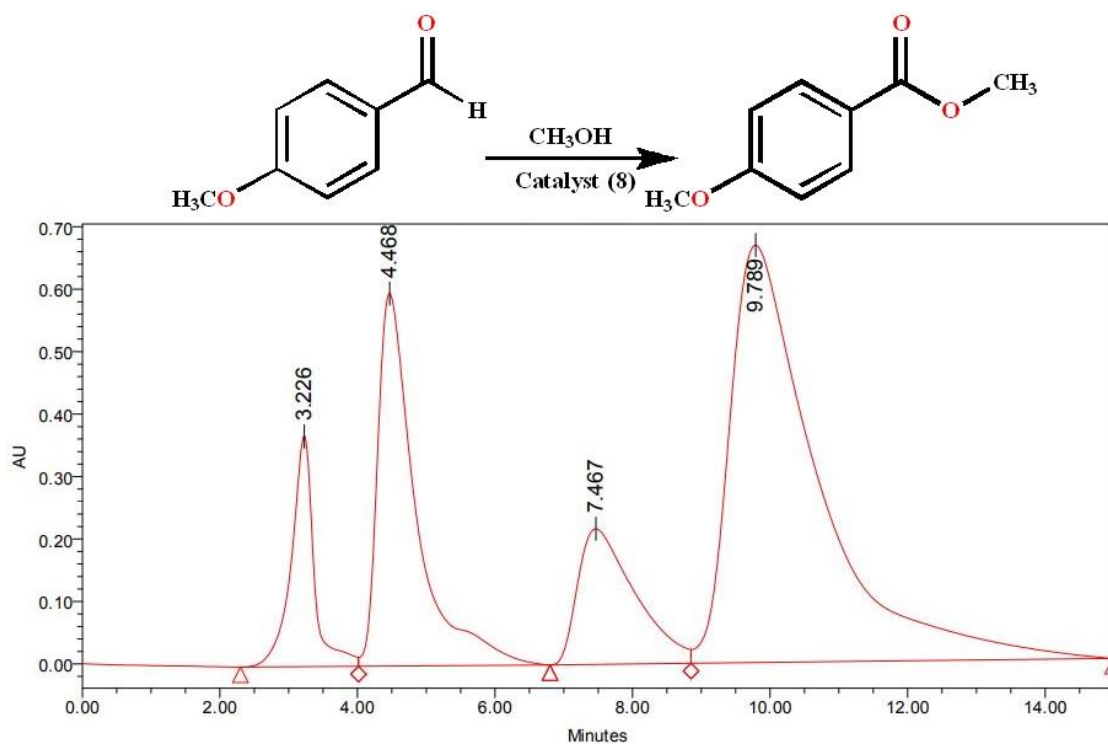


Figure A99: HPLC data for **8** catalysed esterification of p-methoxybenzaldehyde with methanol

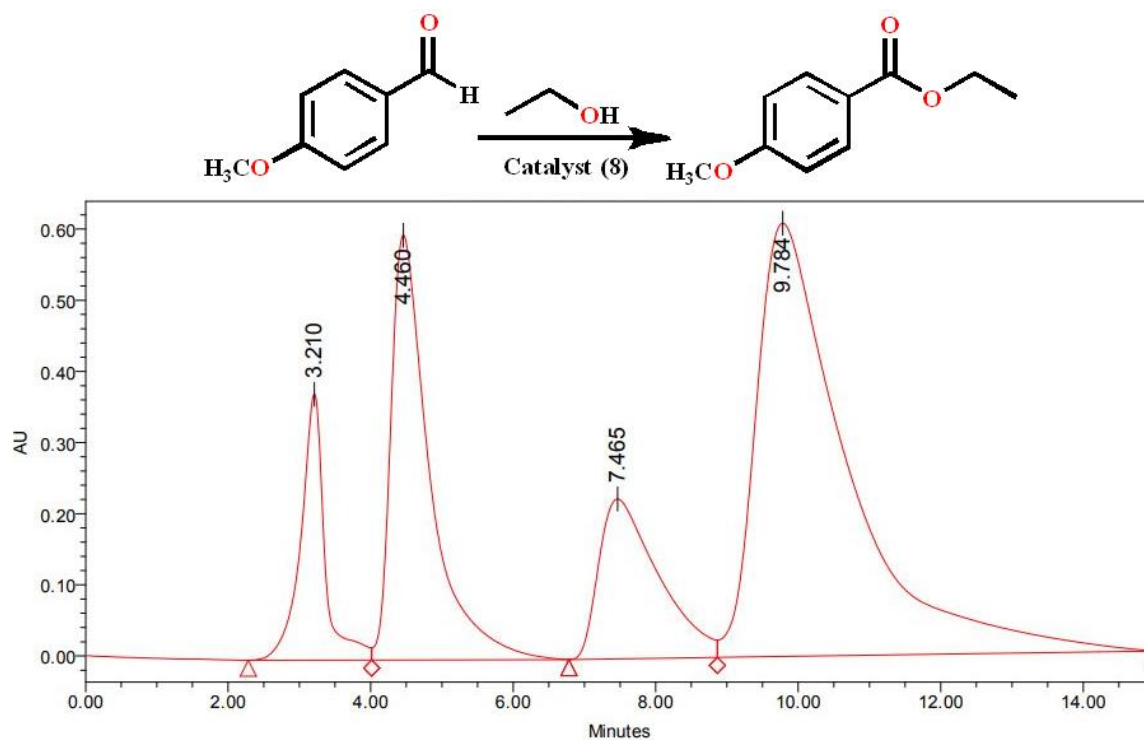


Figure A100: HPLC data for **8** catalysed esterification of p-methoxybenzaldehyde with ethanol

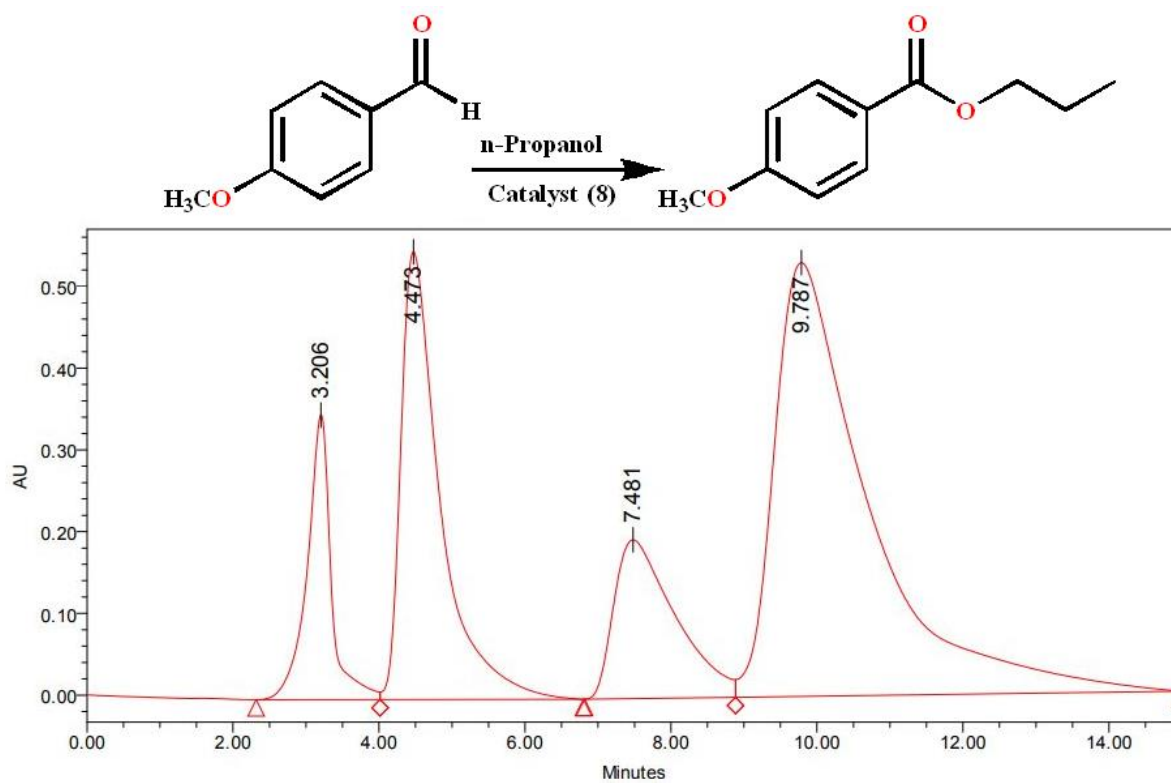


Figure A101: HPLC data for **8** catalysed esterification of p-methoxybenzaldehyde with n-propanol

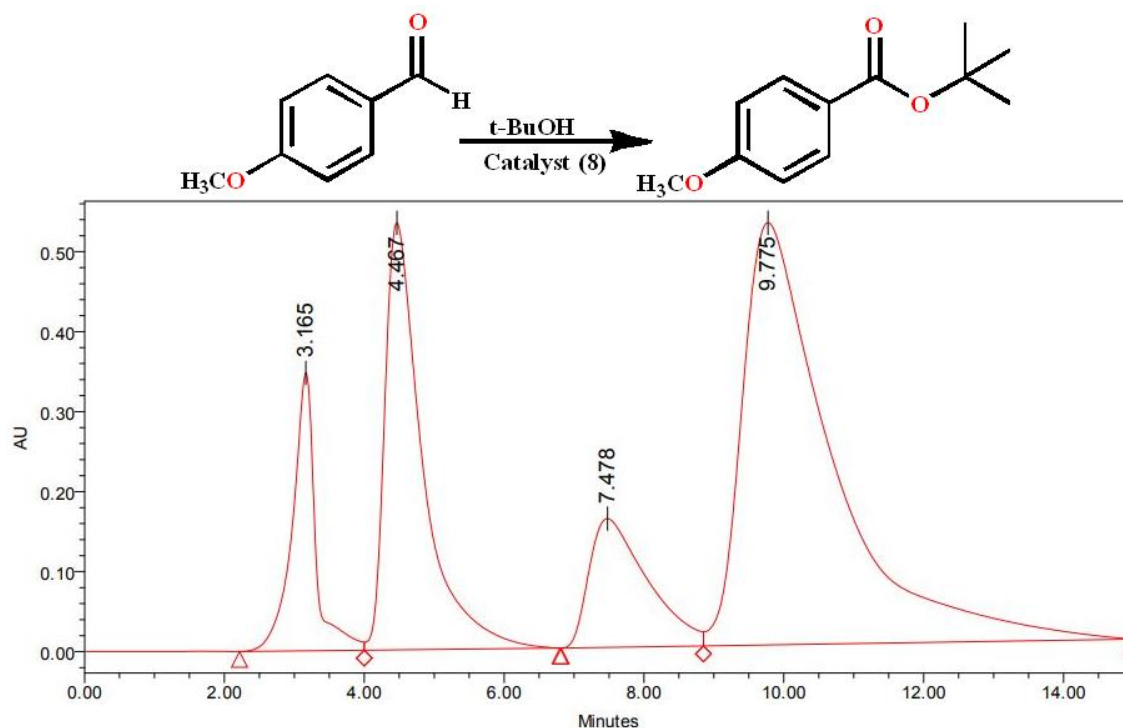


Figure A102: HPLC data for **8** catalysed esterification of p-methoxybenzaldehyde with *t*-BuOH

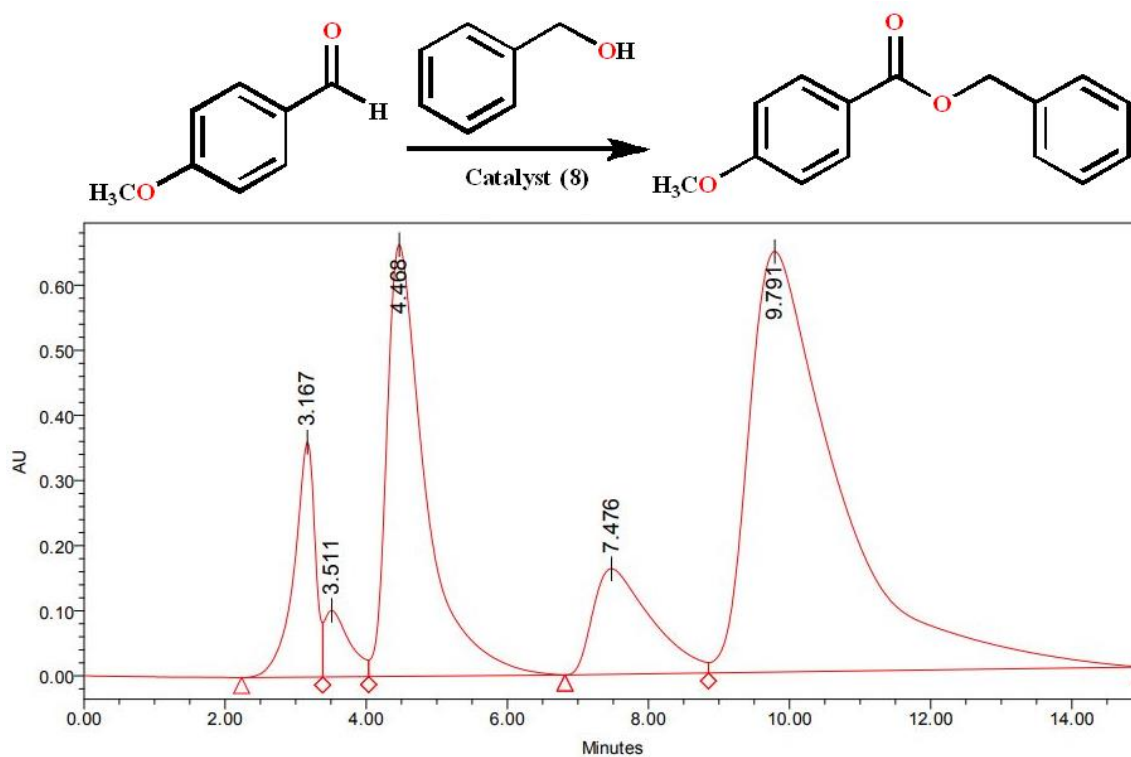


Figure A103: HPLC data for **8** catalysed esterification of p-methoxybenzaldehyde with benzyl alcohol

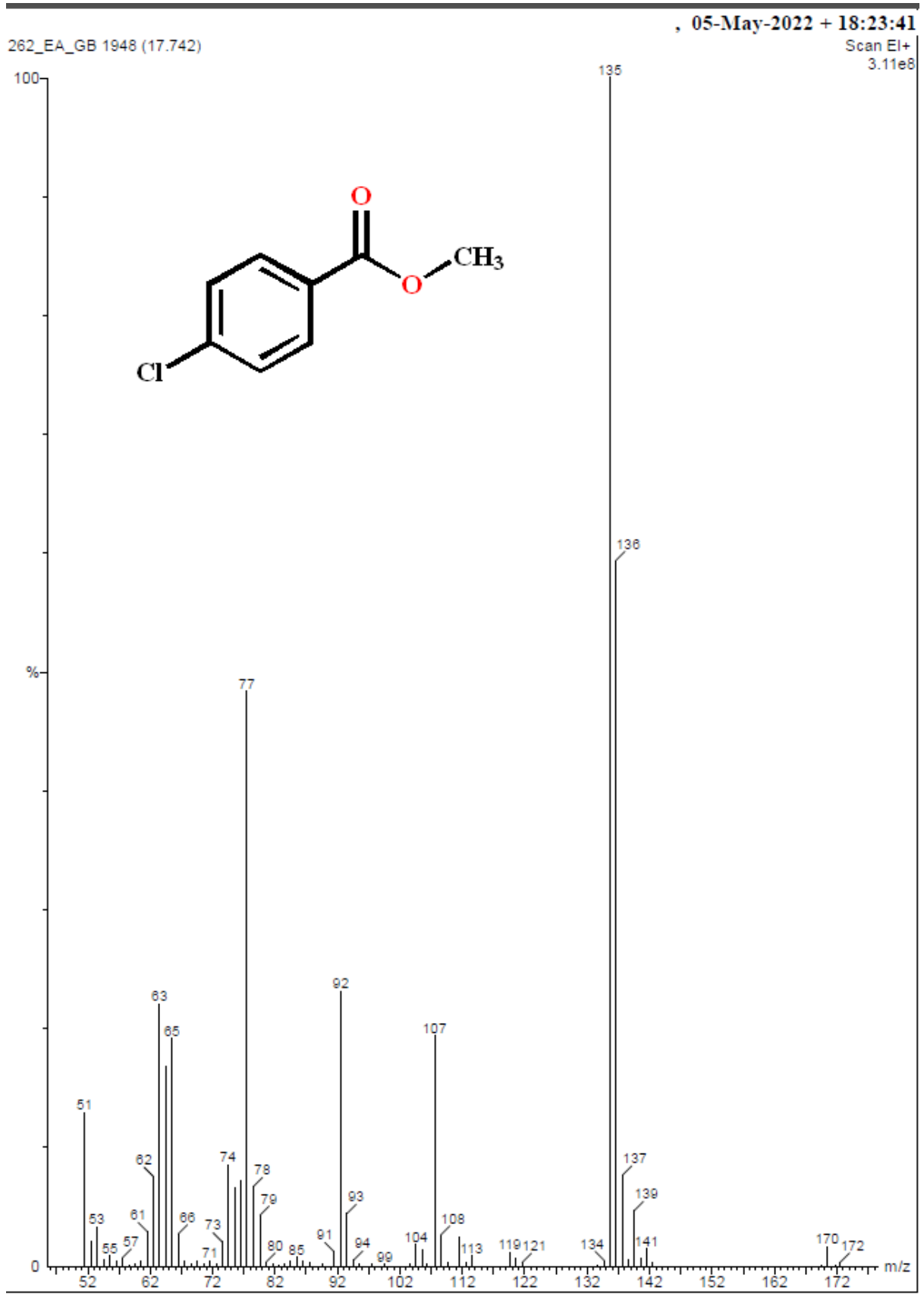


Figure A104: MS data of methyl 4-chlorobenzoate

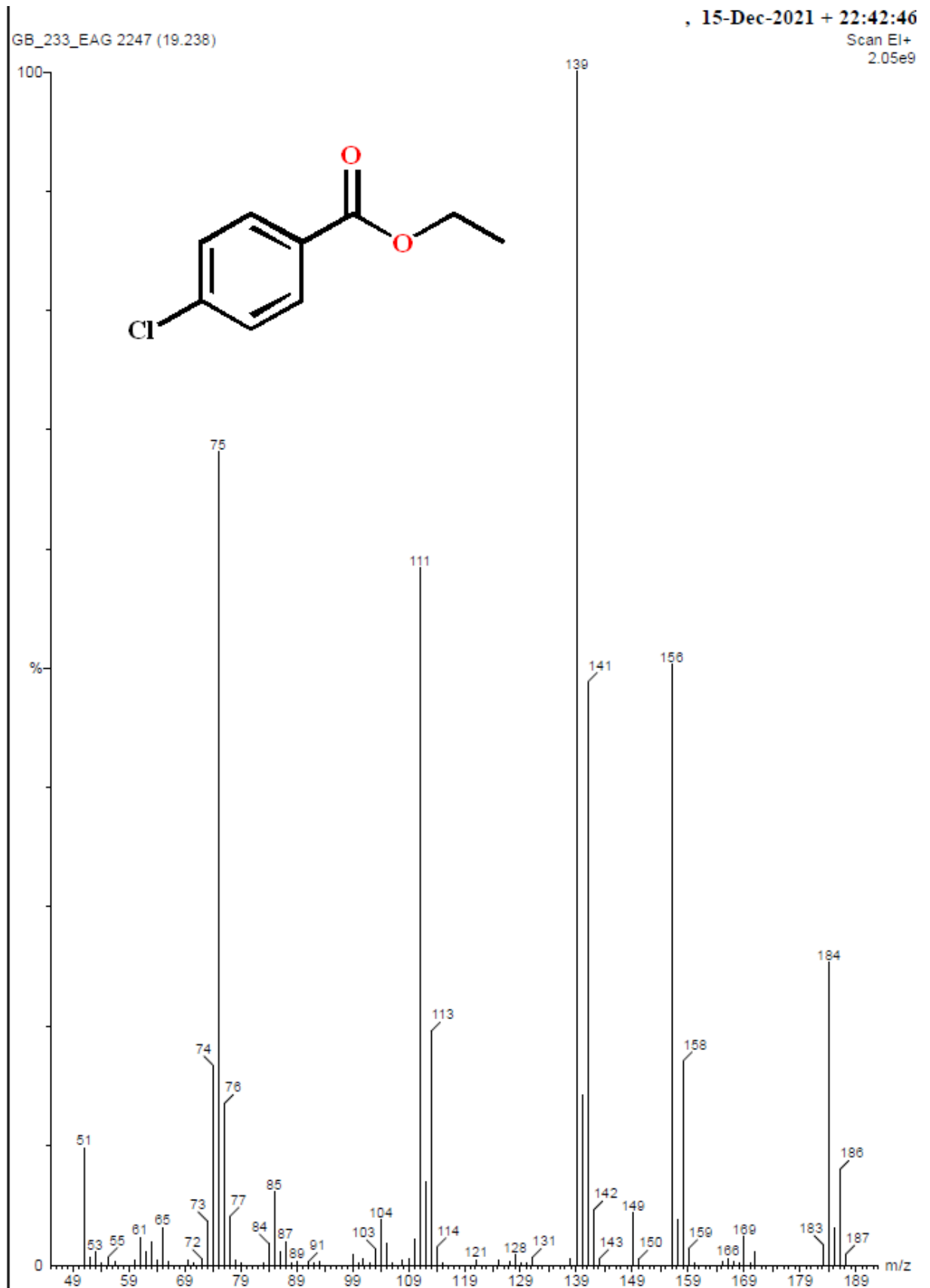


Figure A105: MS data of ethyl 4-chlorobenzoate





Figure A106: MS data of propyl 4-chlorobenzoate

, 15-Dec-2021 + 20:19:19

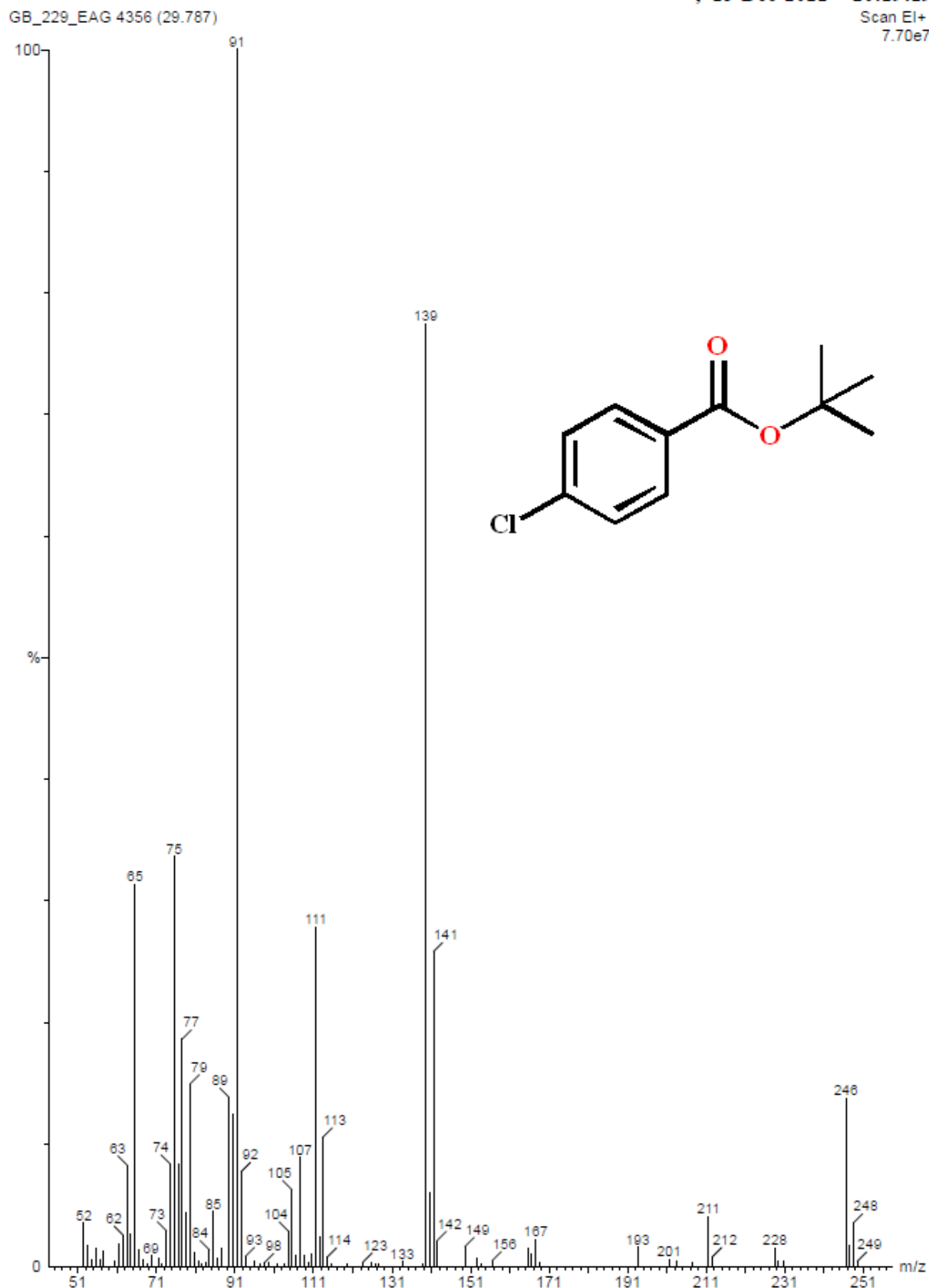
Scan EI+  
7.70e7Figure A107: MS data of *tert*-butyl 4-chlorobenzoate



Figure A108: MS data of benzyl 4-chlorobenzoate

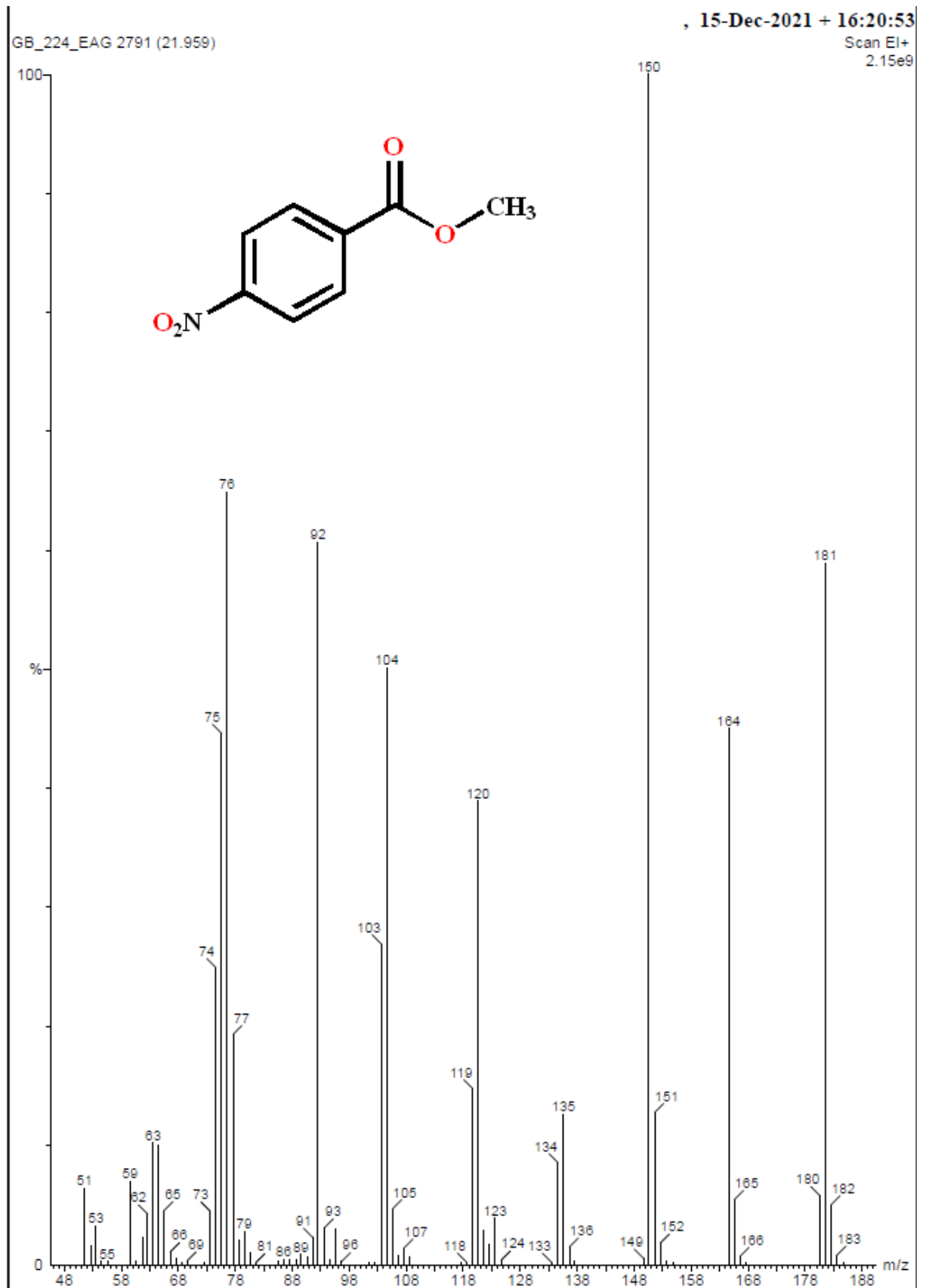


Figure A109: MS data of methyl 4-nitrobenzoate

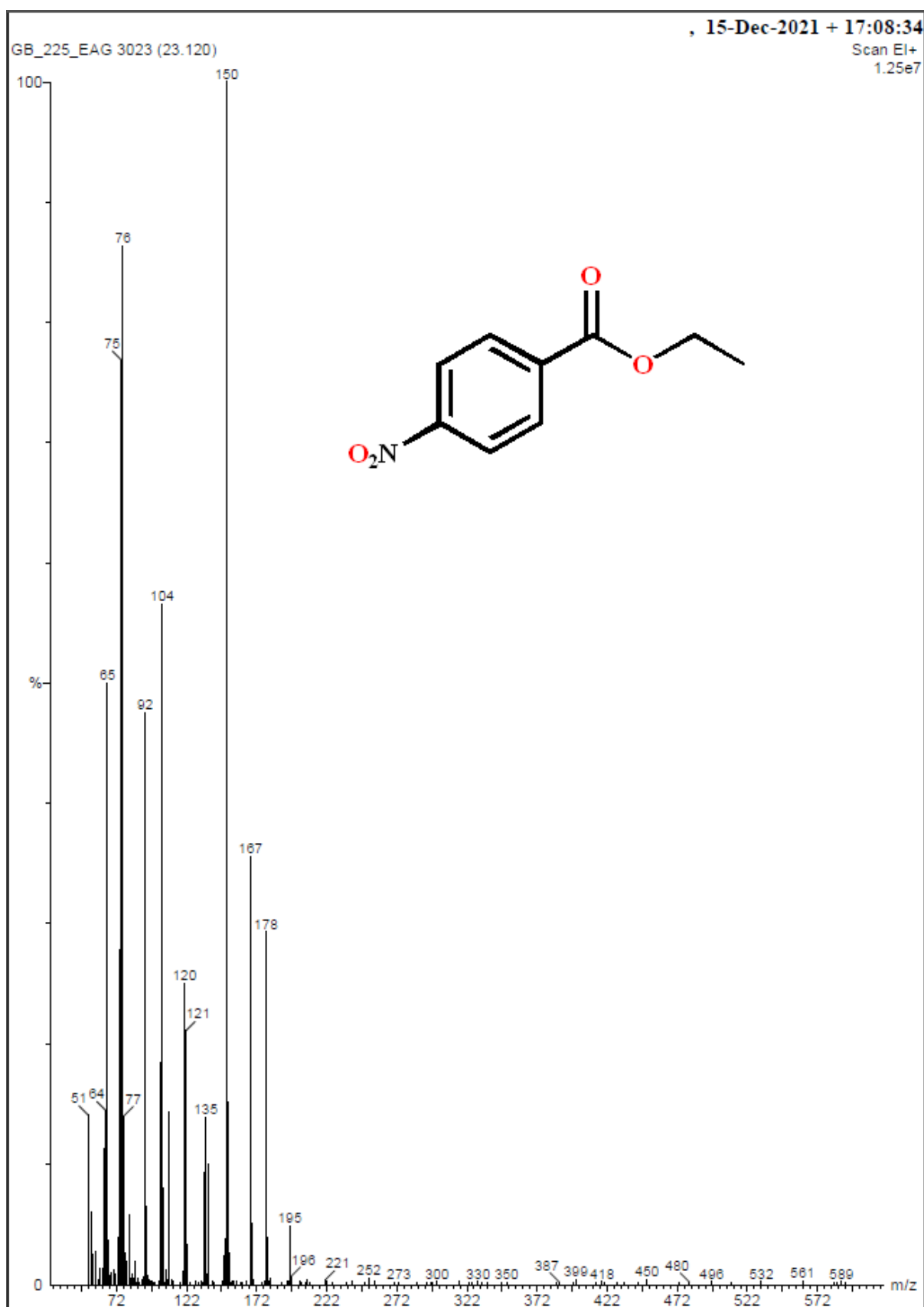


Figure A110: MS data of ethyl 4-nitrobenzoate

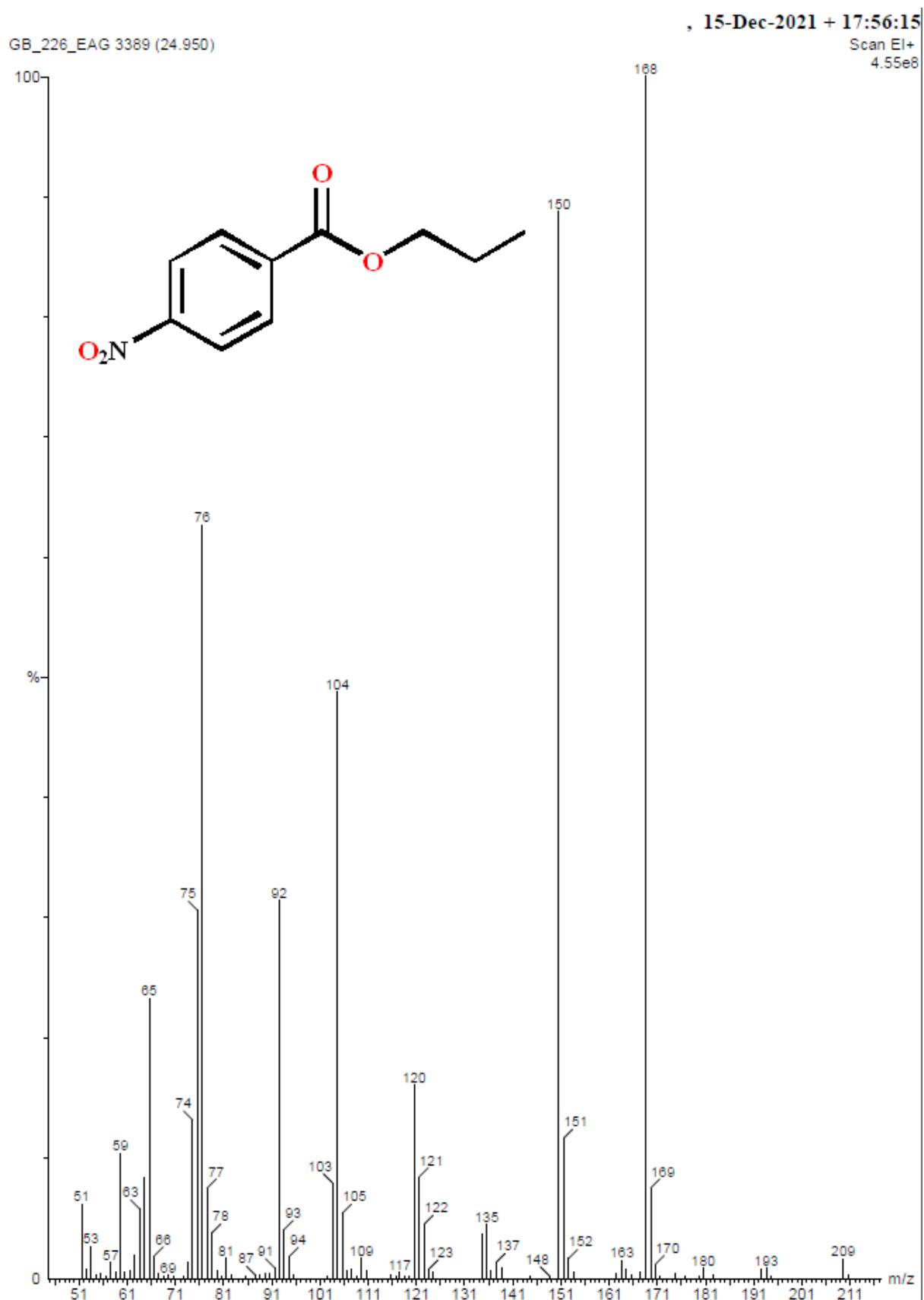


Figure A111: MS data of propyl 4-nitrobenzaldehyde

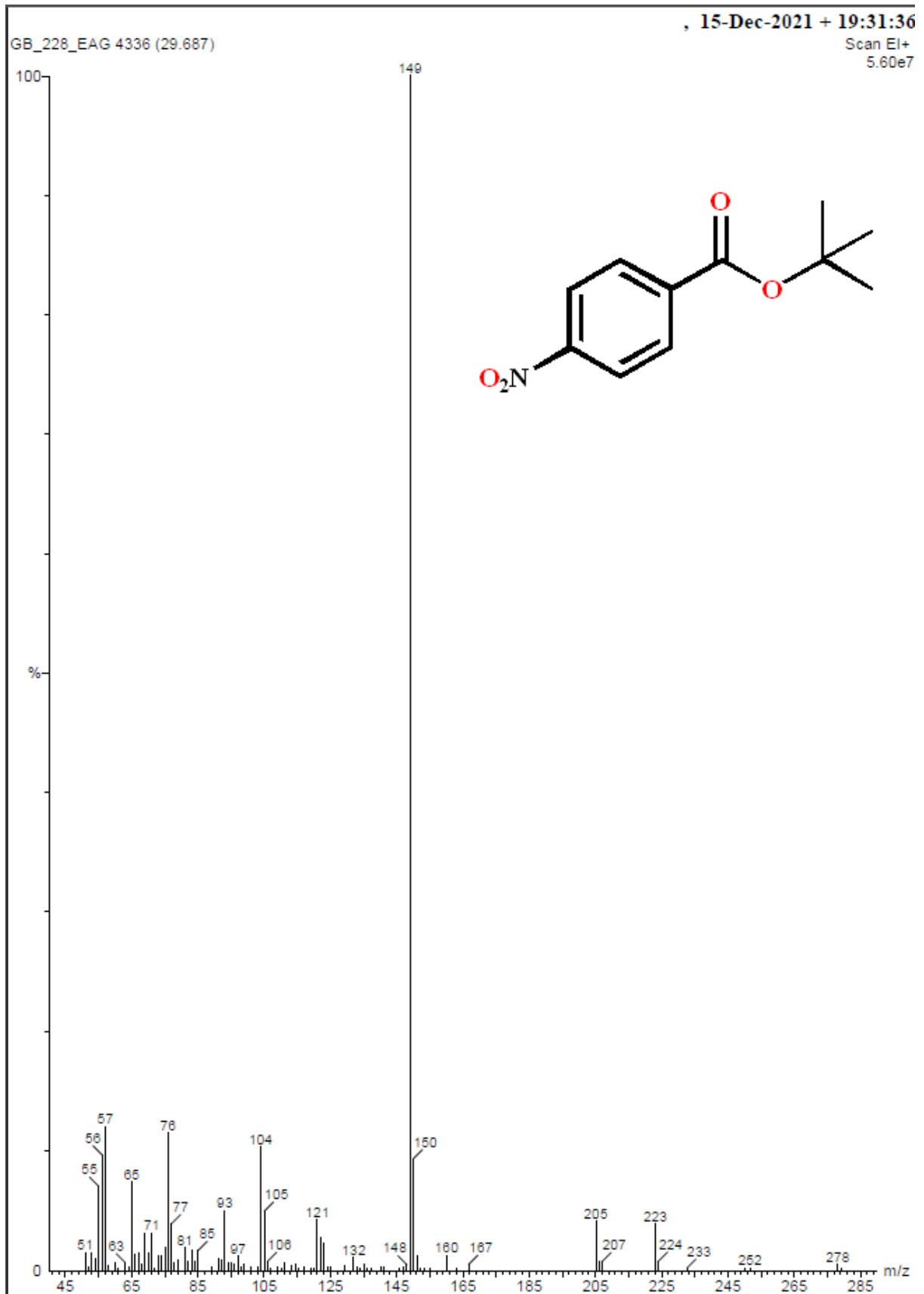


Figure A112: MS data of *tert*-butyl 4-nitrobenzoate

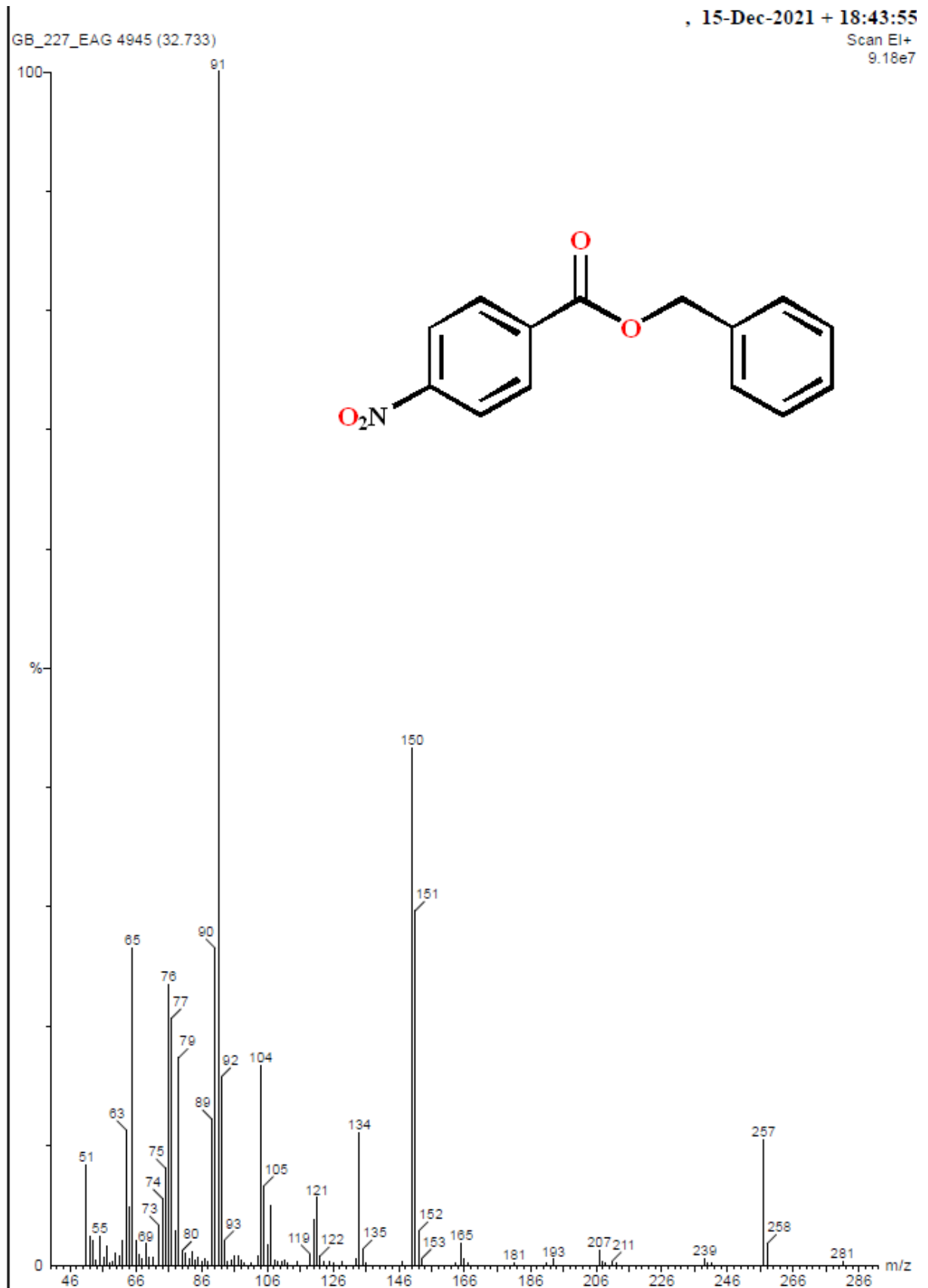


Figure A113: MS data of benzyl 4-chlorobenzoate



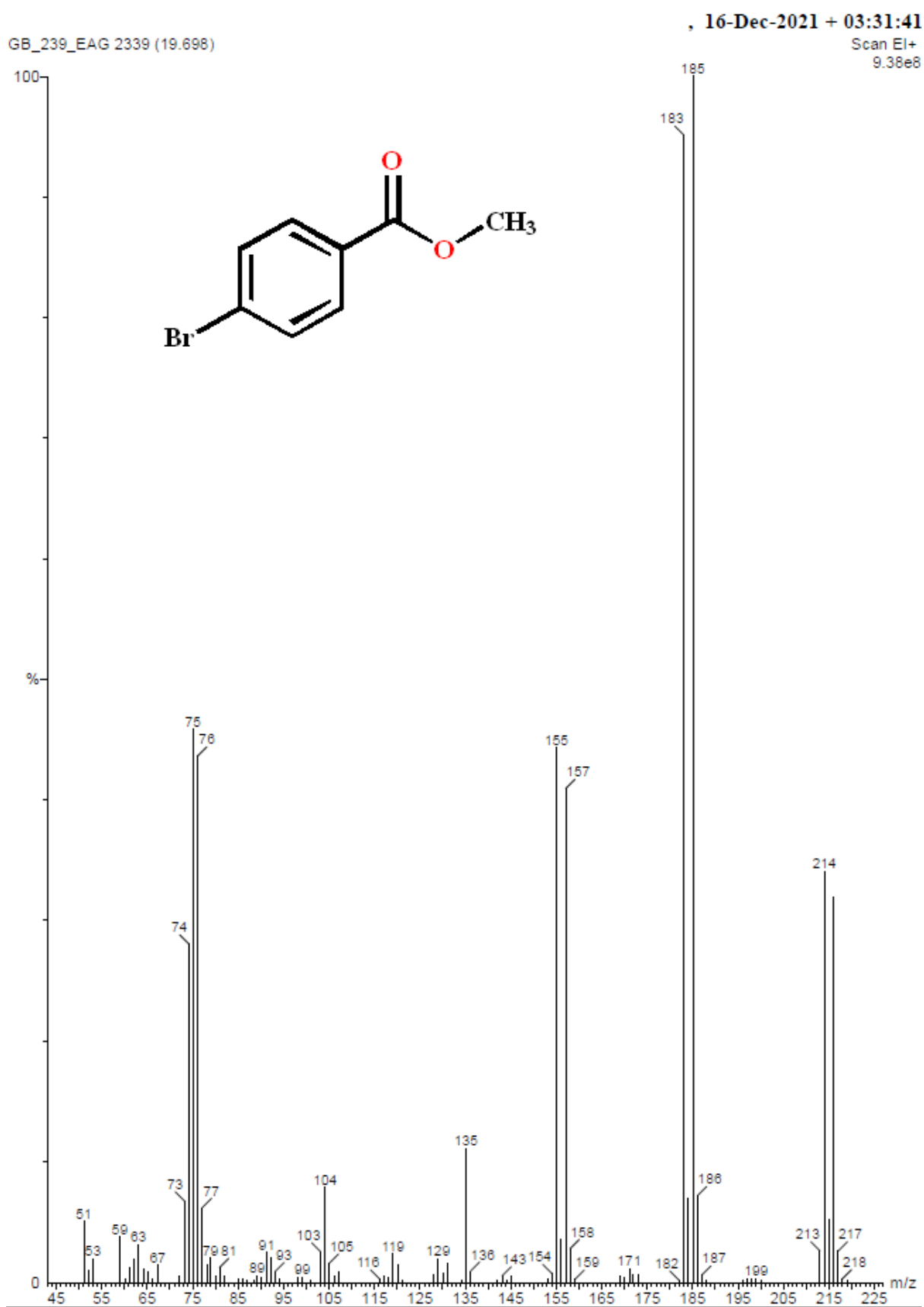


Figure A114: MS data of methyl 4-bromobenzoate

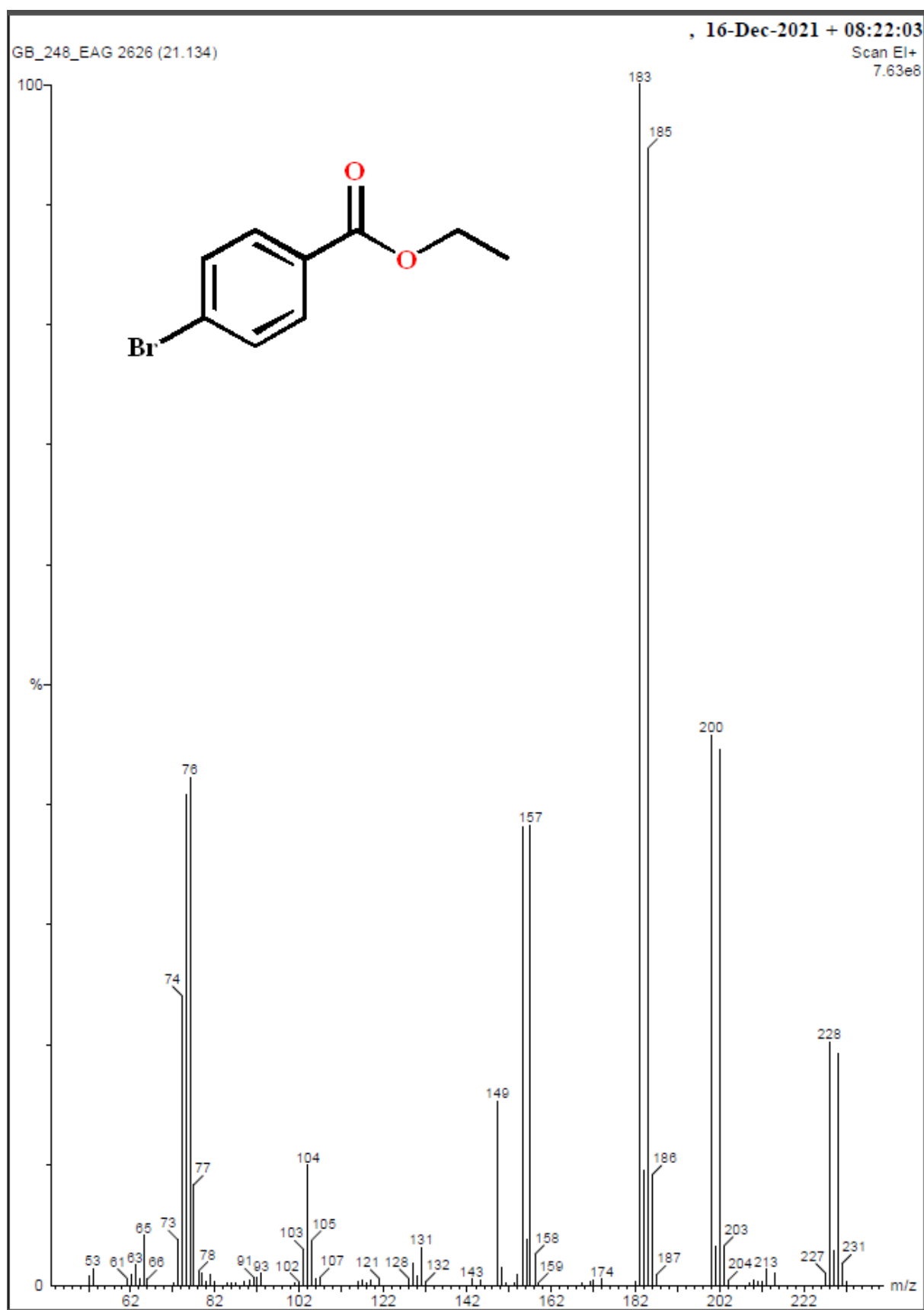


Figure A115: MS data of ethyl 4-bromobenzoate

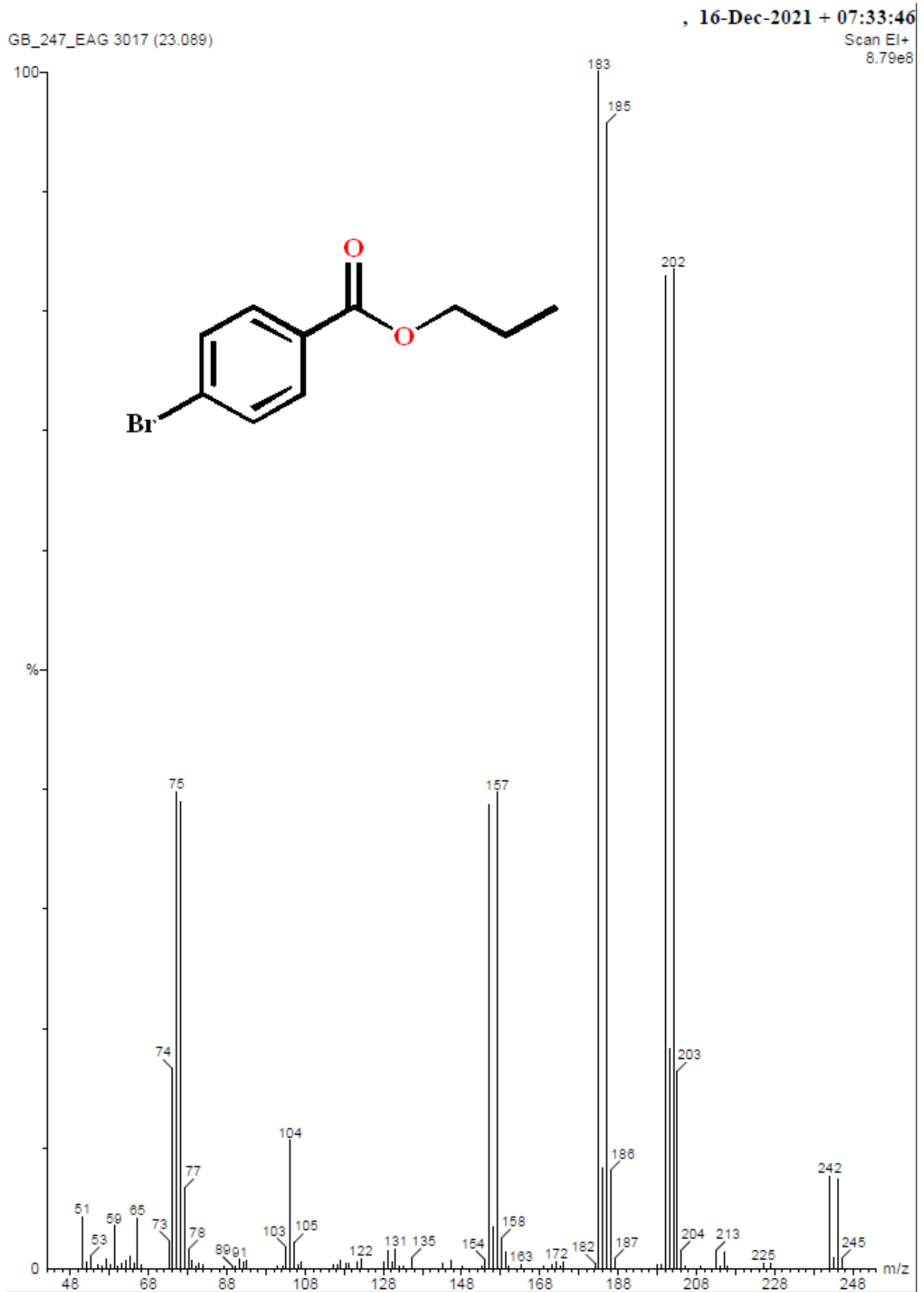
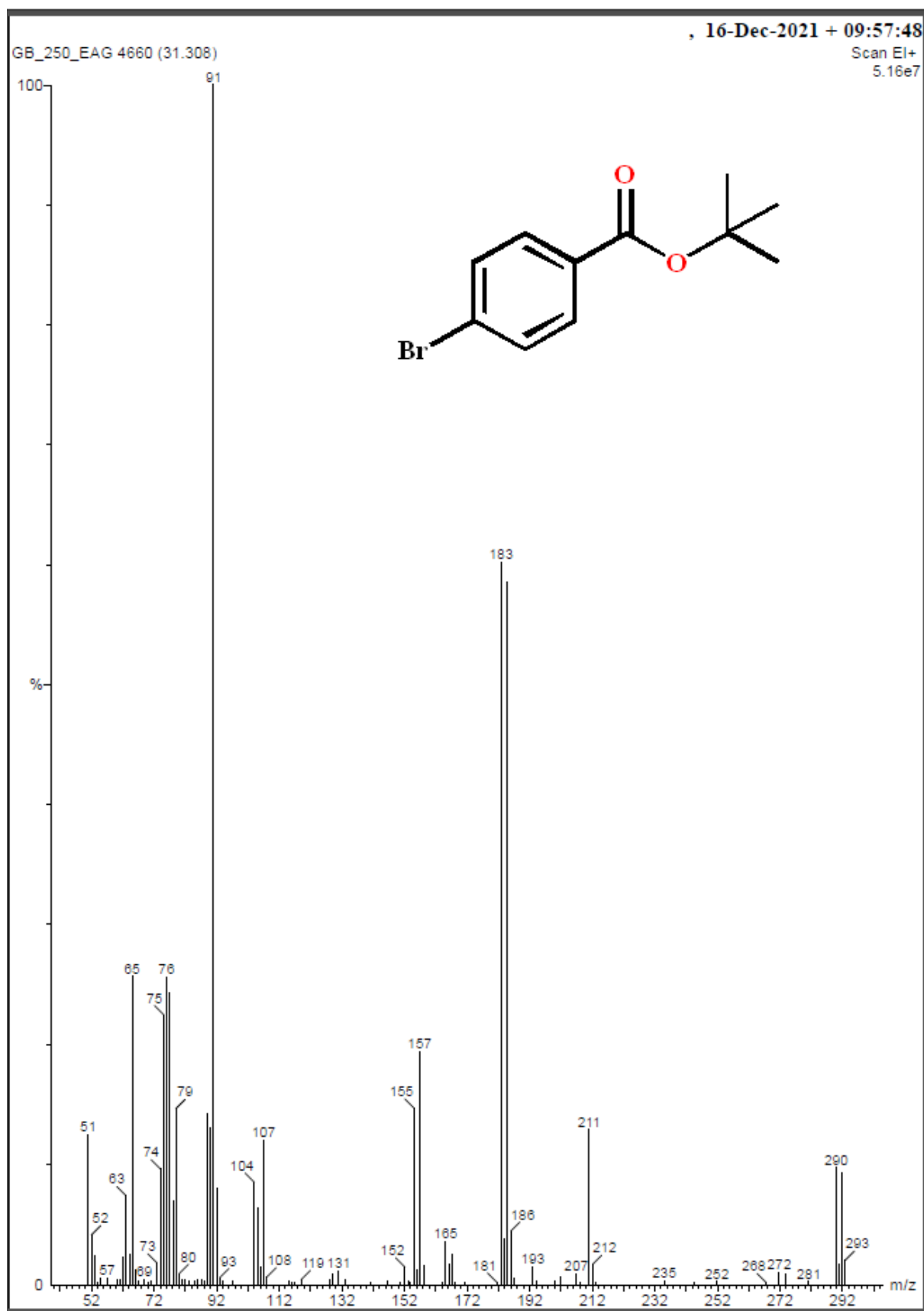


Figure A116: MS data of propyl 4-bromobenzoate

Figure A117: MS data of *tert*-butyl 4-bromobenzoate

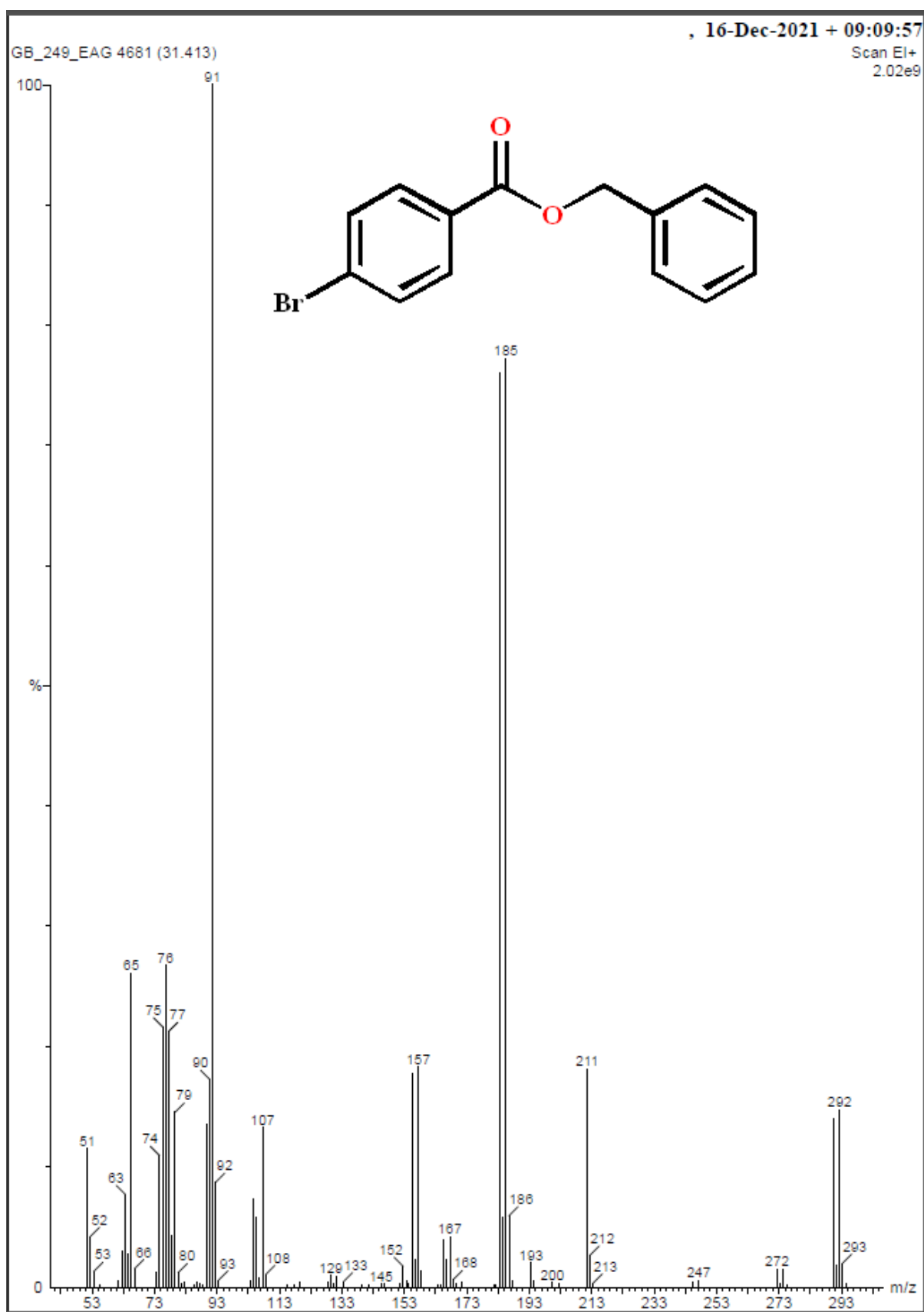


Figure A118: MS data of benzyl 4-bromobenzoate

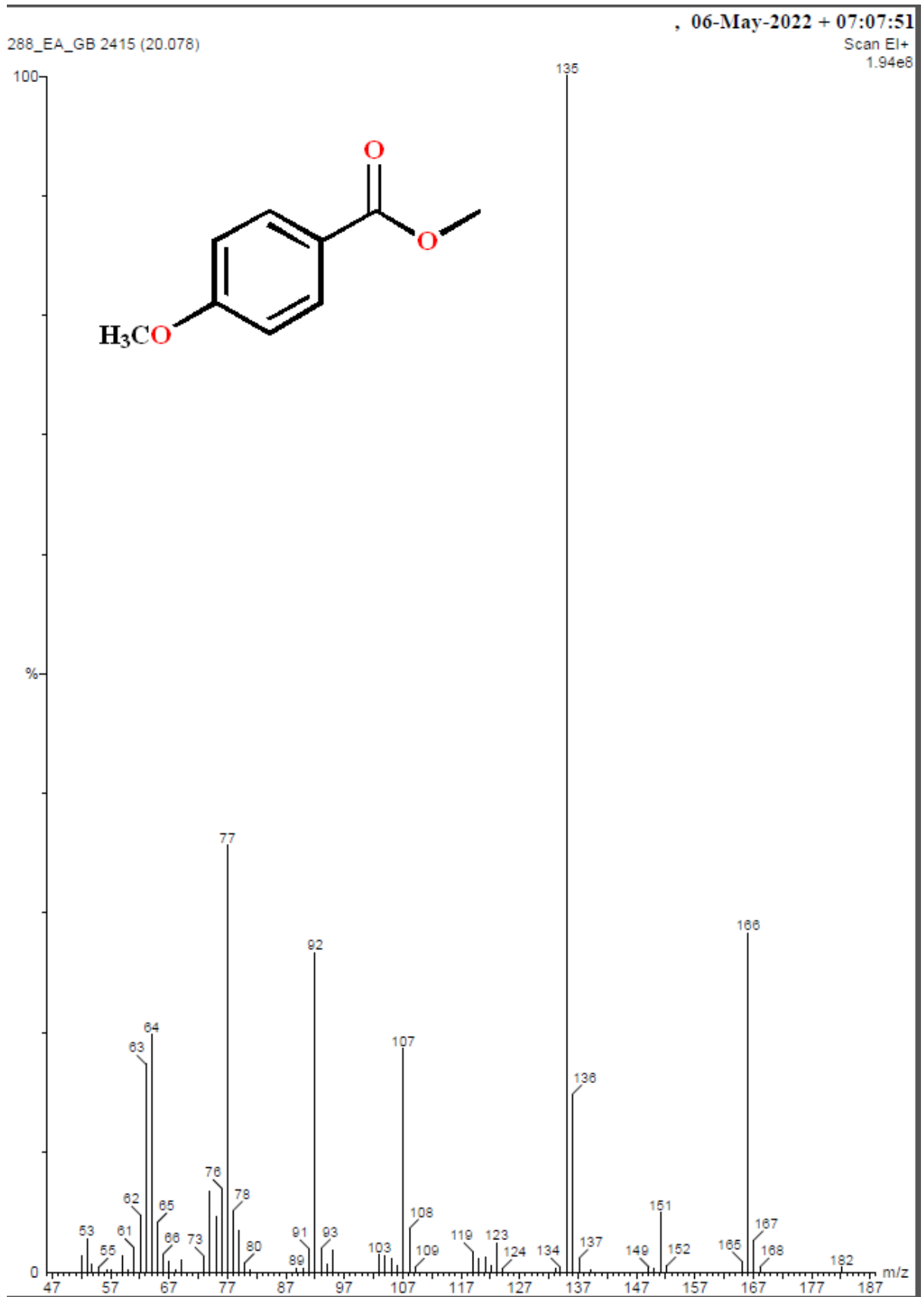


Figure A119: MS data of methyl 4-methoxybenzoate

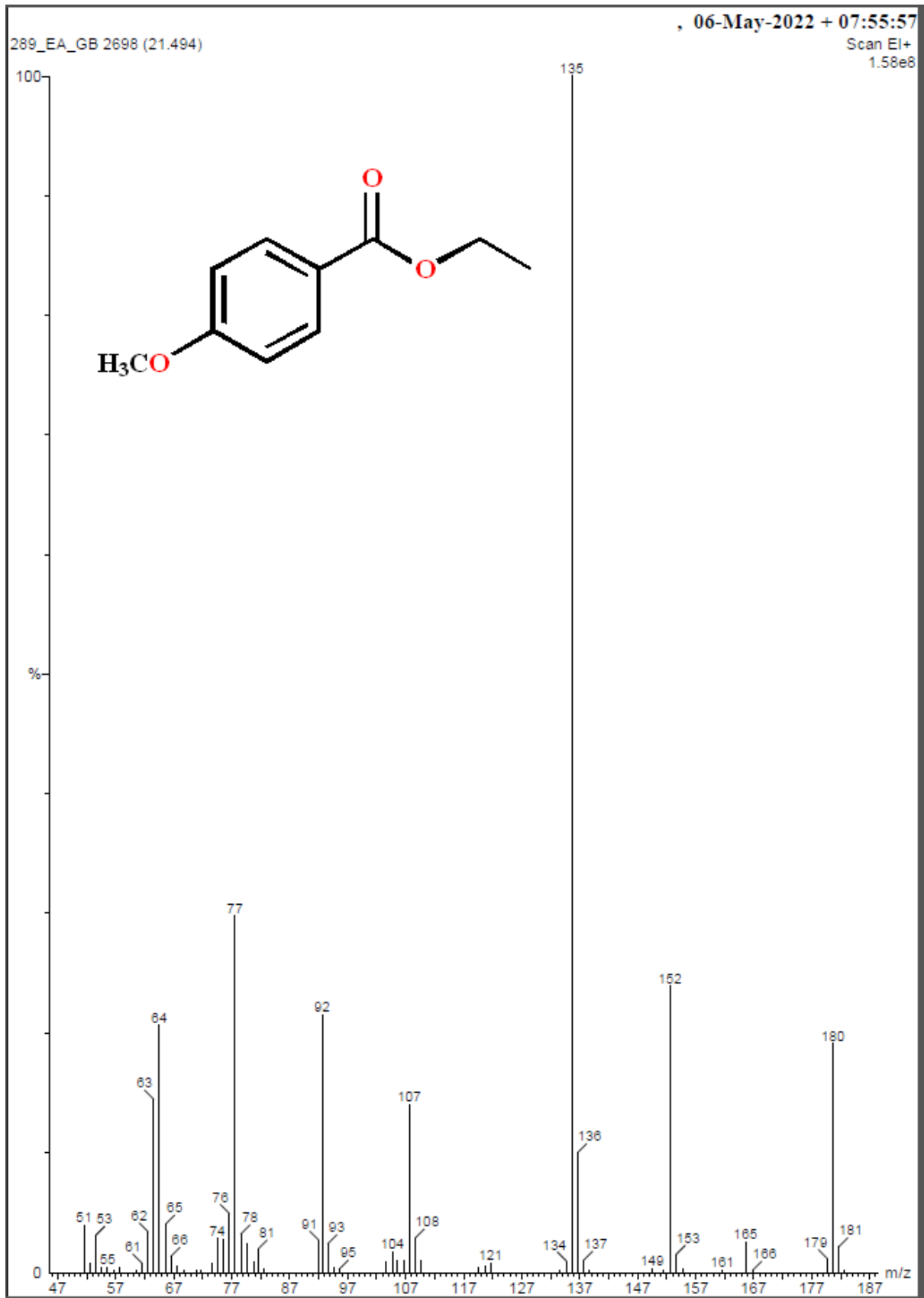


Figure A120: MS data of ethyl 4-methoxybenzoate

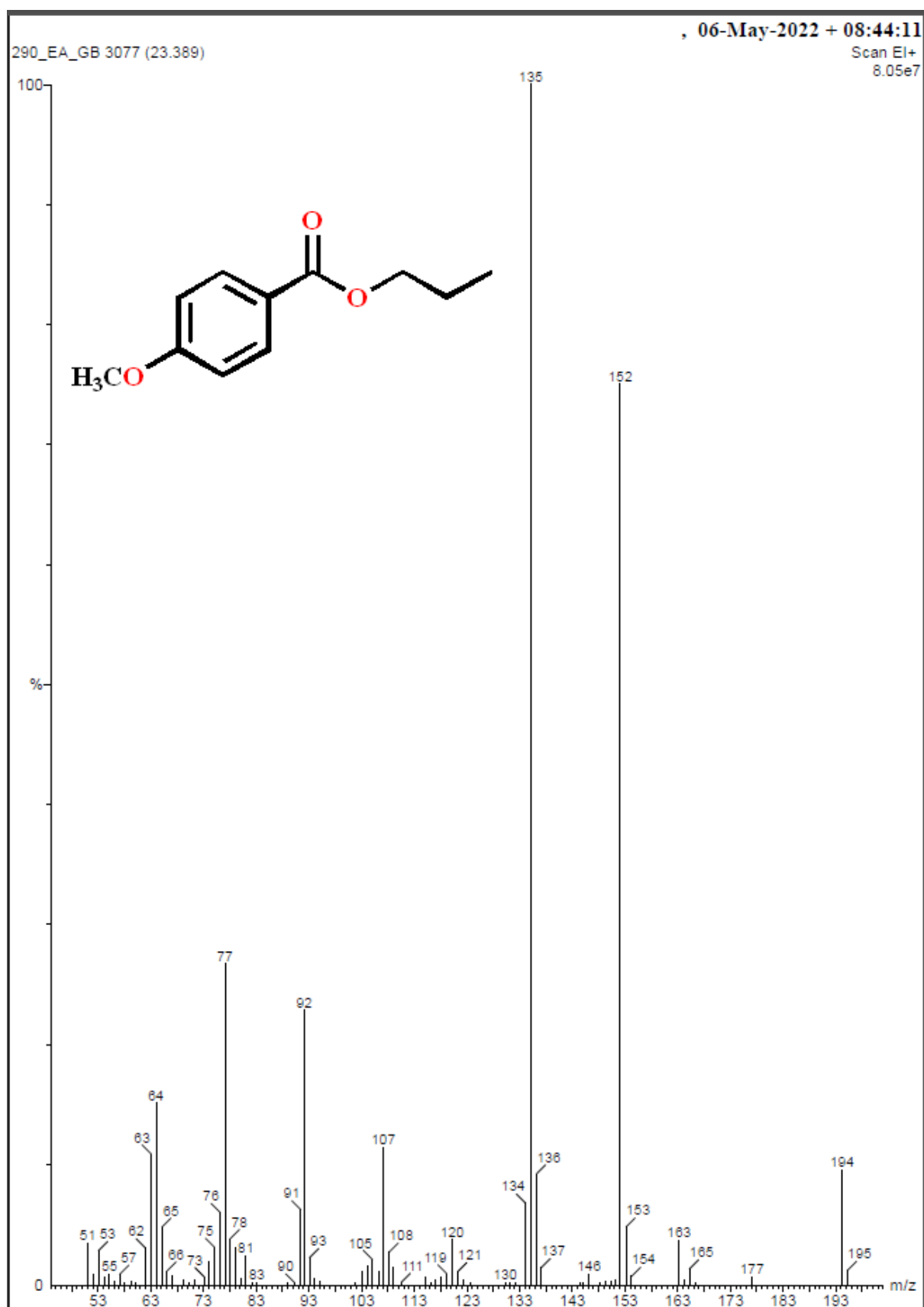


Figure A121: MS data of propyl 4-methoxybenzoate



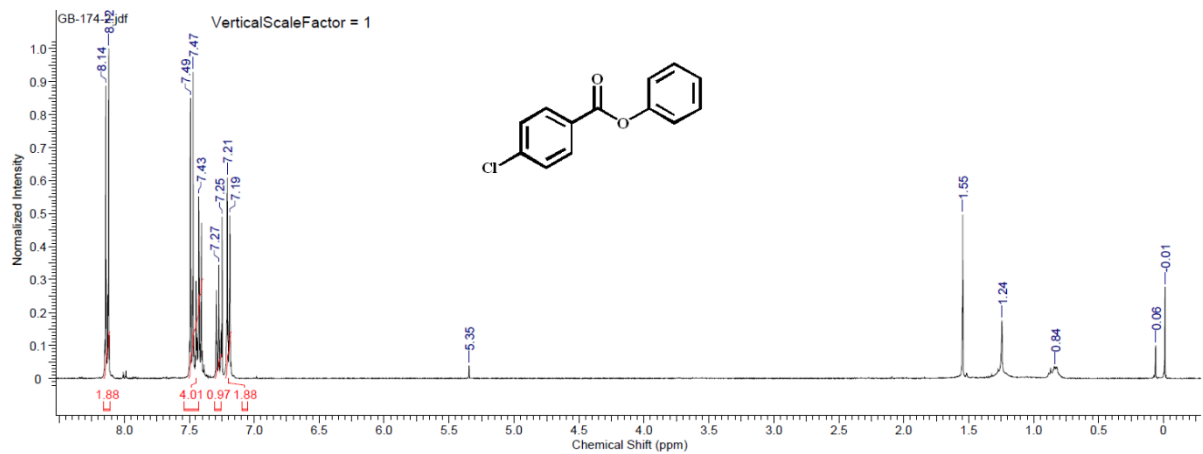


Figure A122:  $^1\text{H}$  NMR spectrum of phenyl 4-chlorobenzoate

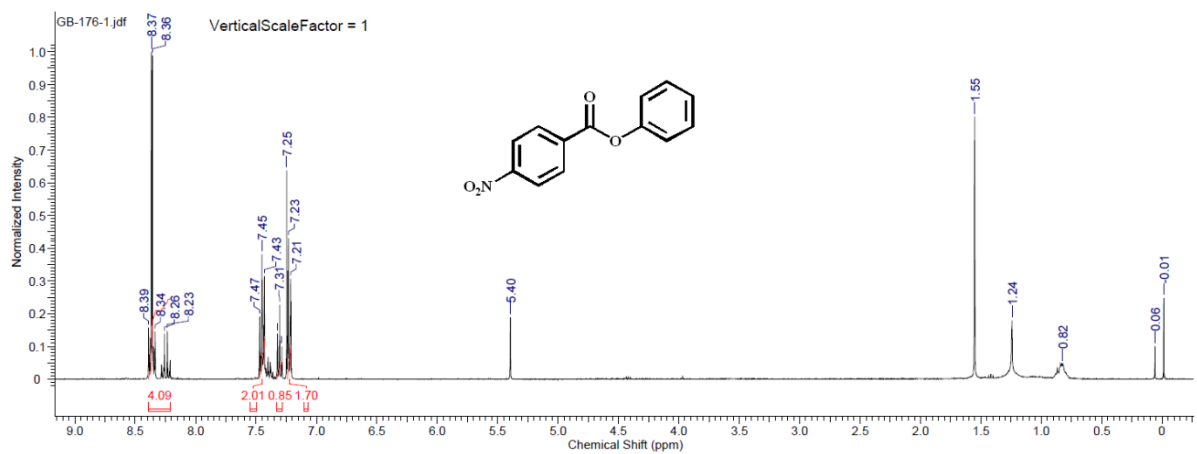


Figure A123:  $^1\text{H}$  NMR spectrum of phenyl 4-nitrobenzoate

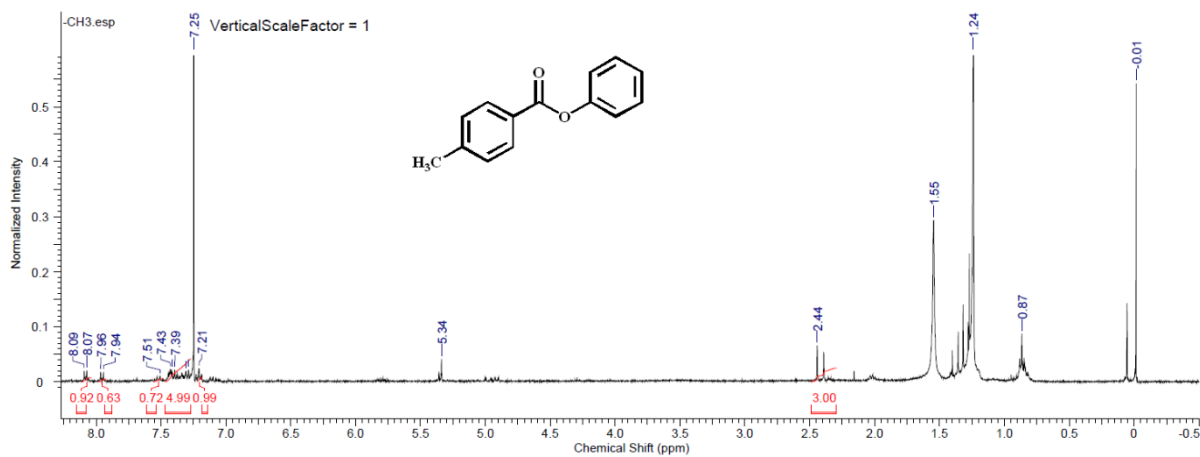


Figure A124:  $^1\text{H}$  NMR spectrum of phenyl 4-methylbenzoate

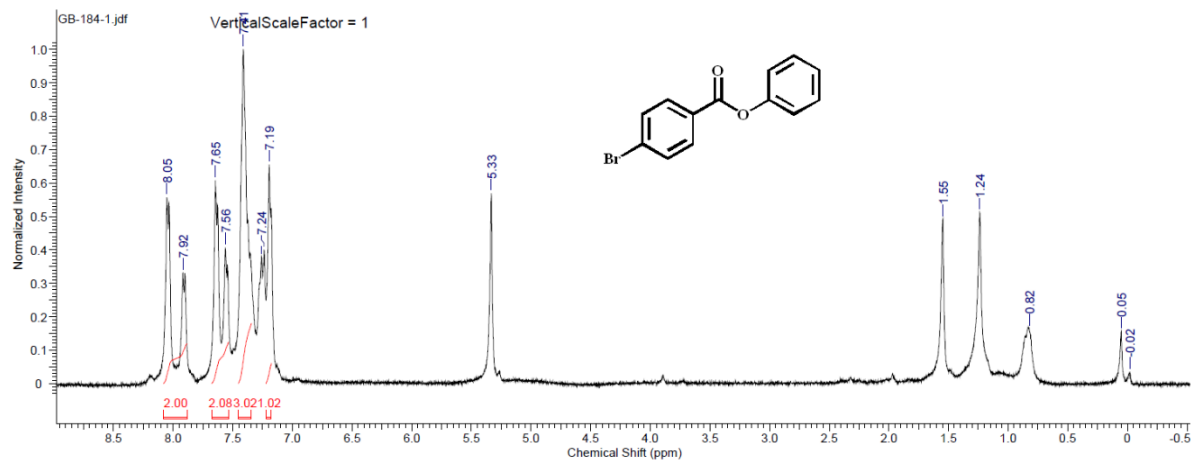


Figure A125:  $^1\text{H}$  NMR spectrum of phenyl 4-bromobenzoate

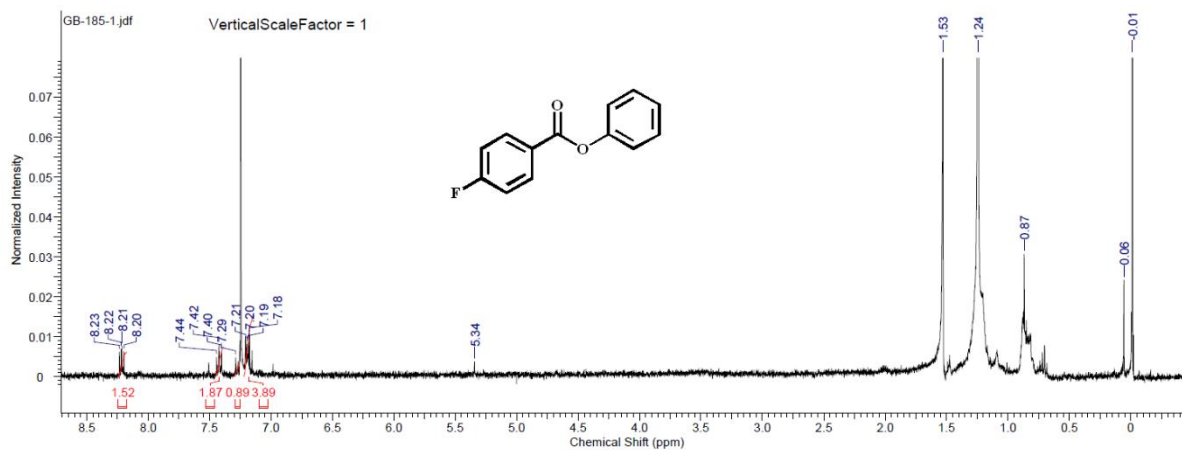


Figure A126:  $^1\text{H}$  NMR spectrum of phenyl 4-fluorobenzoate

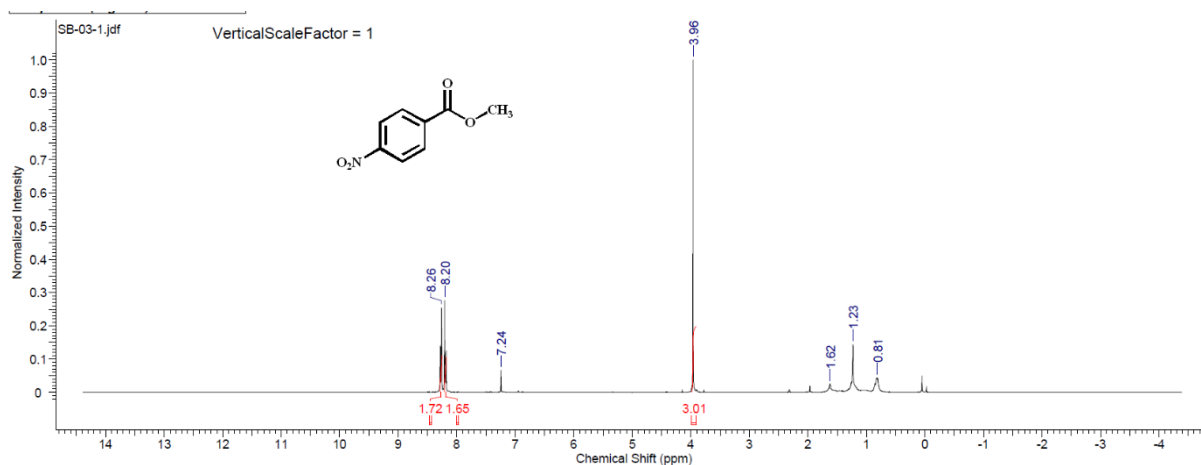


Figure A127:  $^1\text{H}$  NMR spectrum of methyl 4-nitrobenzoate

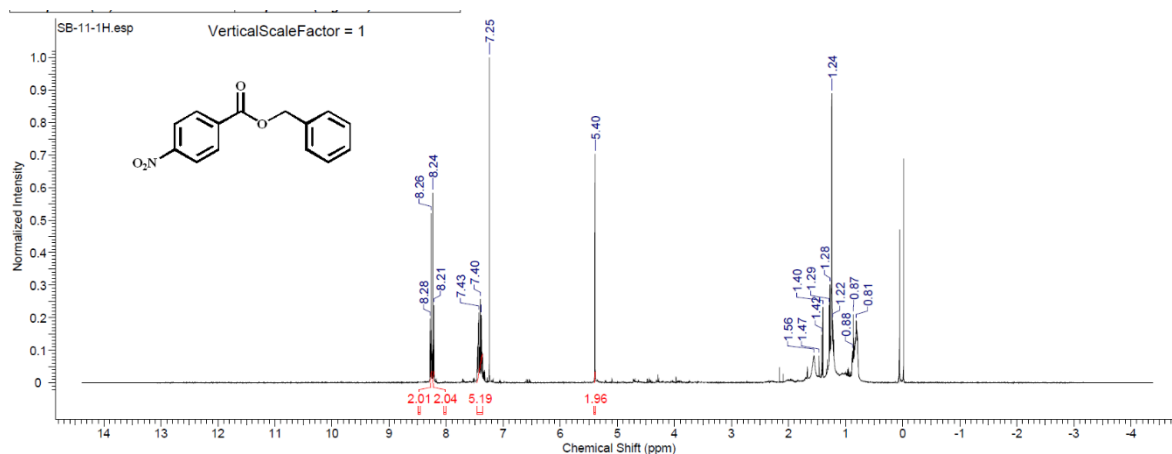


Figure A128:  $^1\text{H}$  NMR spectrum of benzyl 4-nitrobenzoate

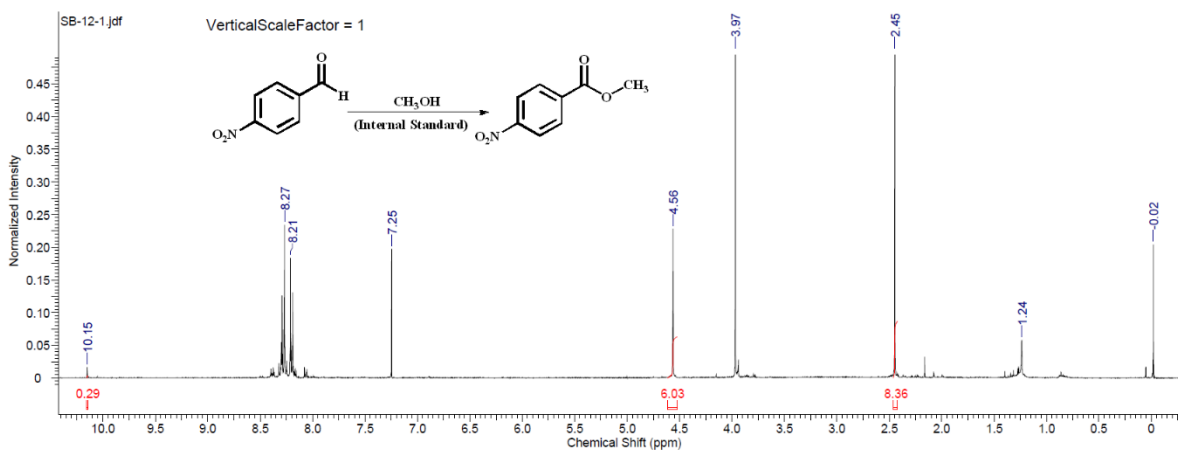


Figure A129:  $^1\text{H}$  NMR spectrum of esterification reaction of p-nitrobenzaldehyde with methanol using internal standard

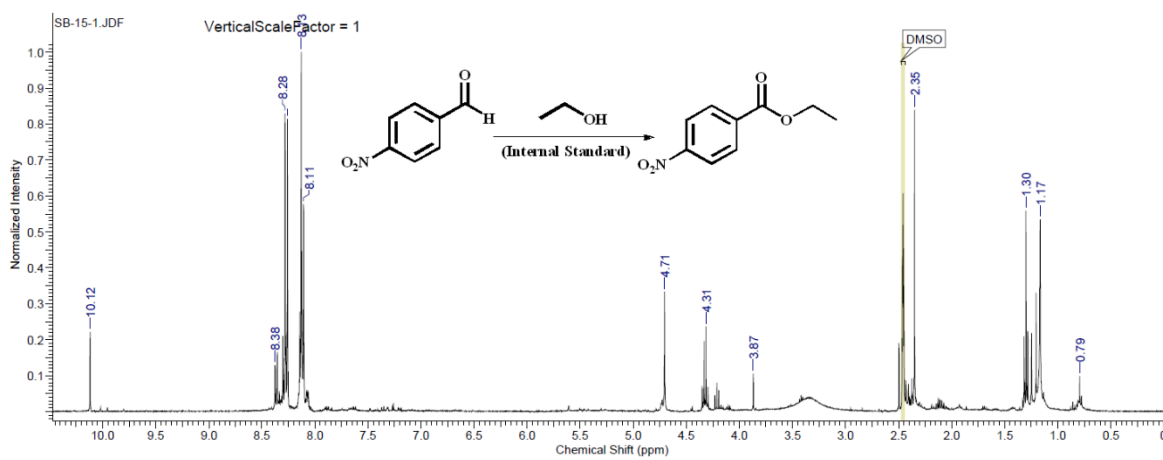


Figure A130:  $^1\text{H}$  NMR spectrum of esterification reaction of p-nitrobenzaldehyde with ethanol using internal standard

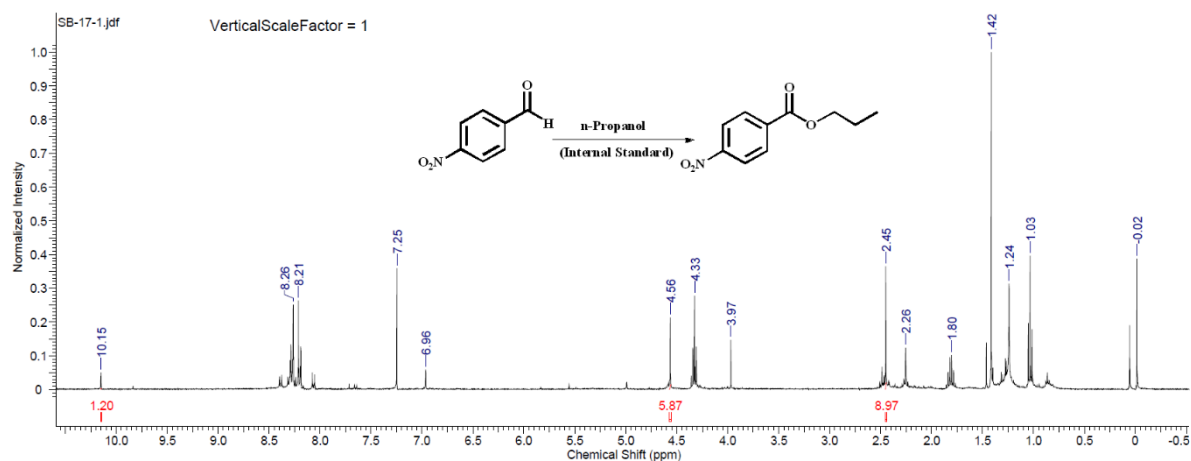


Figure A131:  $^1\text{H}$  NMR spectrum of esterification reaction of p-nitrobenzaldehyde with n-propanol using internal standard

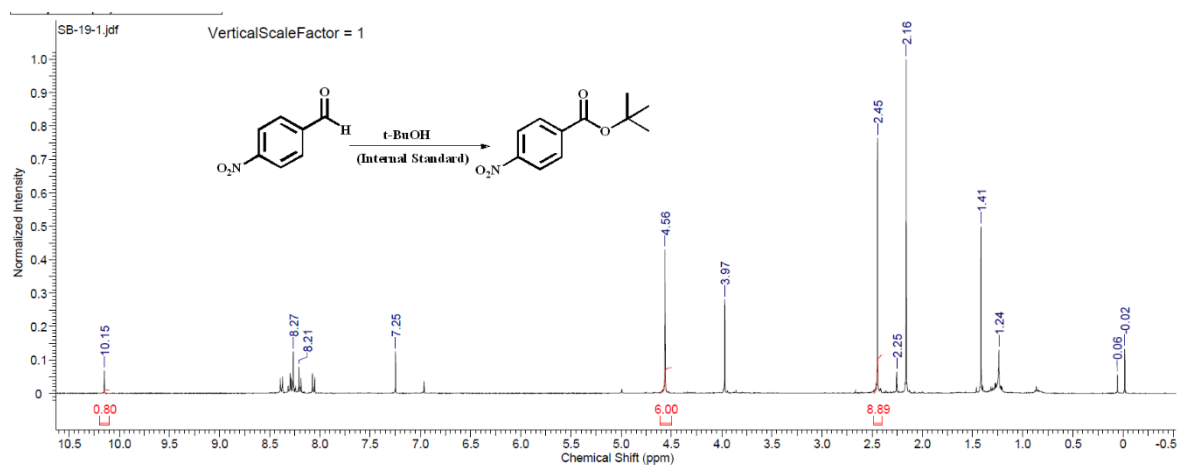


Figure A132:  $^1\text{H}$  NMR spectrum of esterification reaction of p-nitrobenzaldehyde with t-BuOH using internal standard