

Asymmetric aldol reaction of isatins with acetone in the presence of terpene amino alcohols

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General information

The NMR ¹H spectra were recorded on a Bruker Avance 300 spectrometer (300.17 MHz) in CDCl₃ (and drop of DMSO-*d*₆). Compounds on TLC plates were detected by UV-absorbance and color reactions with a solution of 3% vanillin in ethanol and iodine. Alfa Aesar silica gel (0.06–0.2 mm) and neutral alumina from Acros were used for column chromatography. The *ee* values of the aldol products were determined by HPLC (Chiralpak AD-H chiral column, (Daicel Corporation), 4.6 mm × 250 mm, particle size 5 μm, *n*-hexane / 2-propanol = 4: 1, 1 ml/min, λ = 254 nm). The optical rotation was measured on an automatic polarimeter Optical Activity PolAAR-3001 (England). Solvents were purified by standard methods. The organocatalysts **1-5** were obtained by known methods.¹ Isatin **6a** (98%) was purchased from Sigma Aldrich. 4,6-Dibromoisatin **6b** was synthesized by a Sandmeyer procedure.²

General procedure for the aldol reactions of isatin and 4,6-dibromoisatin with acetone

A solution of catalyst **1-5** (for catalyst loading see Tables 1) in acetone (0.15 ml) / water (0.14 mmol) mixture was added to a solution of isatin **6a** or **6b** (0.07 mmol and 0.09 mmol, respectively) in toluene (1.2 ml). The reaction mixture was stirred for specified time under the conditions given in Tables 1. The precipitate was filtered, washed with MePh (3 x 0.3 mL) and dried in air to afford pure compound **7**. The mother liquor was subjected to silica gel column chromatography (EtOAc / *n*-hexane = 3: 1) to afford additional fraction of compound **7**. The *ee* values of products **7a** and **7b** (mother liquors and precipitates) were determined by HPLC on a chiral column Chiralpak AD-H. The spectral data of compounds **7** corresponded with those described in the literature.³

References

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- (a) A. V. Malkov, M. A. Kabeshov, M. Bella, O. Kysilka, D. A. Malyshev, K. Pluháčková and P. Kočovský, *Org. Lett.*, 2007, **9**, 5473.

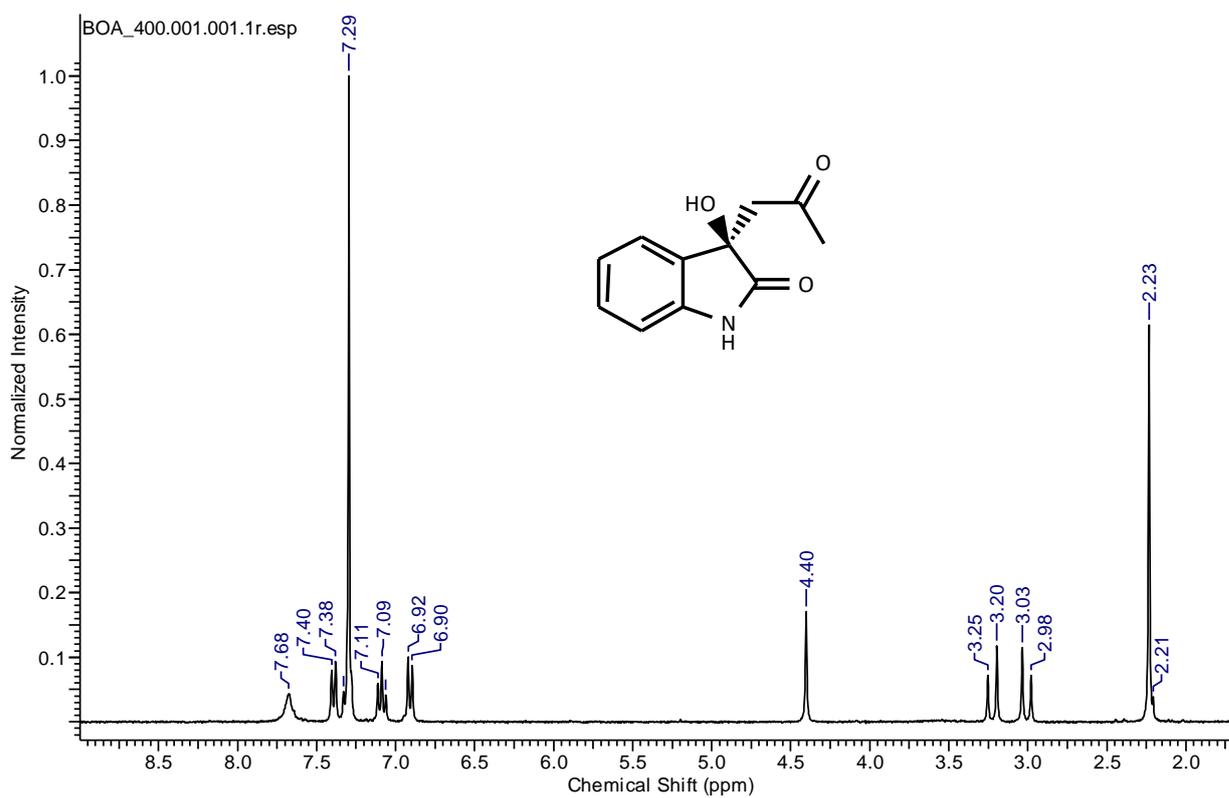


Figure S1 ^1H NMR spectra of aldol **7a**.

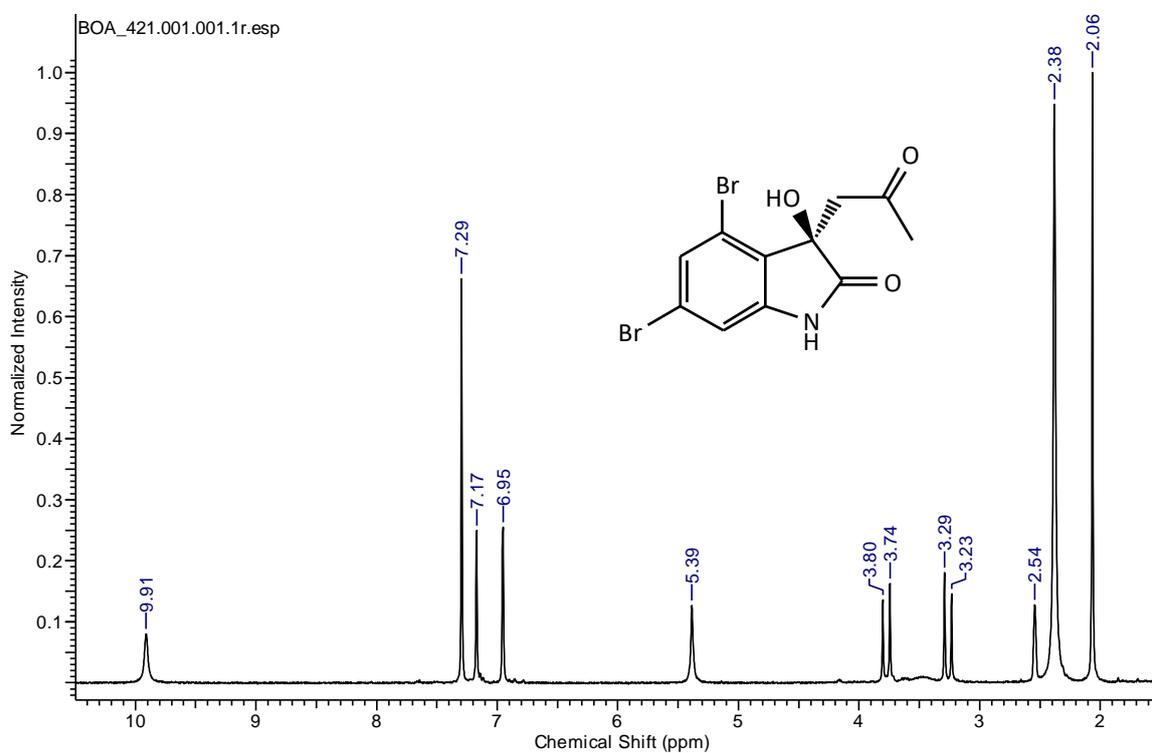


Figure S2 ^1H NMR spectra of aldol **7b** (Convolutamydine A).

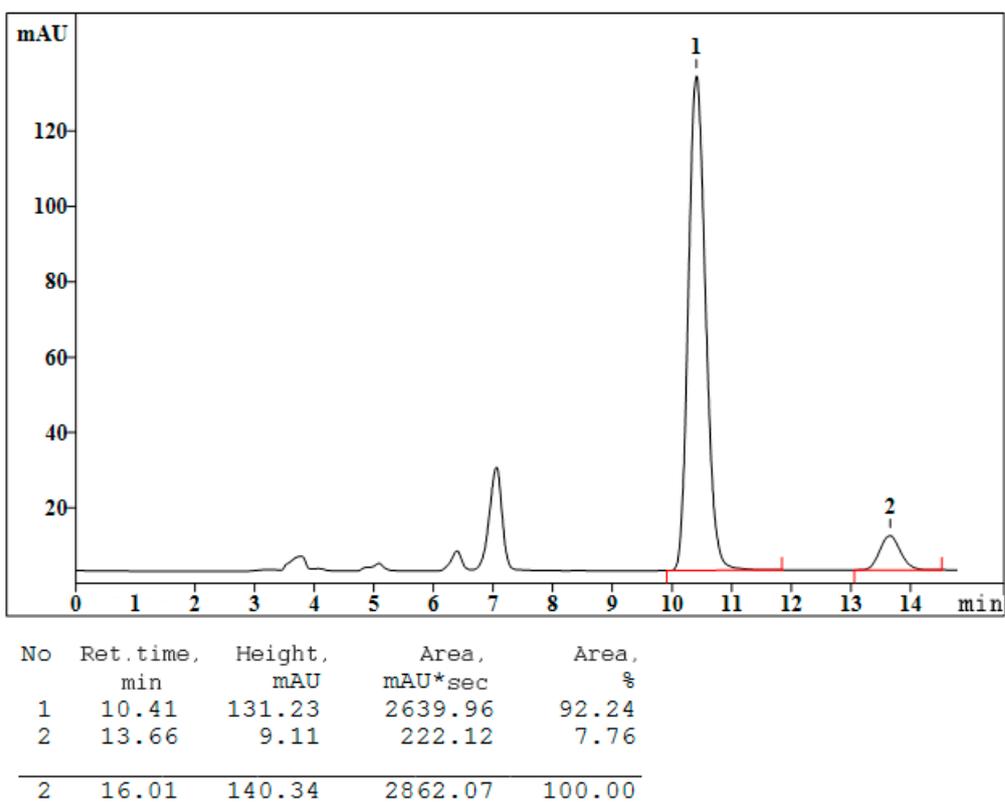


Figure S3 HPLC-chromatogram of aldol **7a** (Table 1, entry 1).

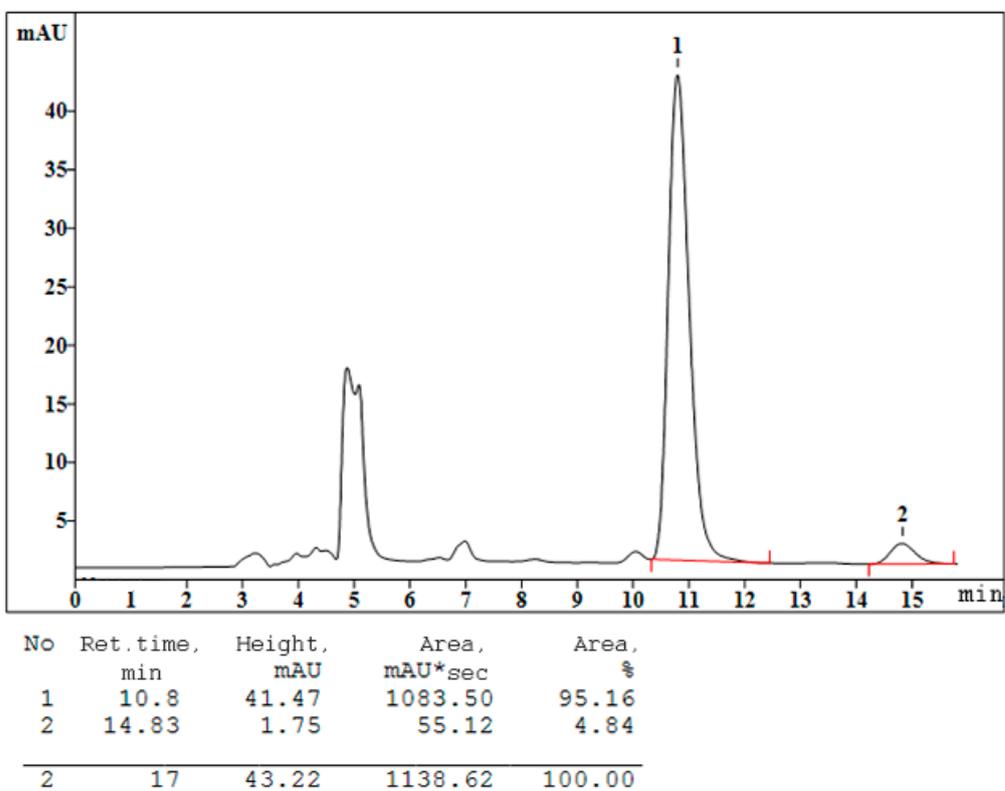


Figure S4 HPLC-chromatogram of aldol **7a** (Table 1, entry 4).

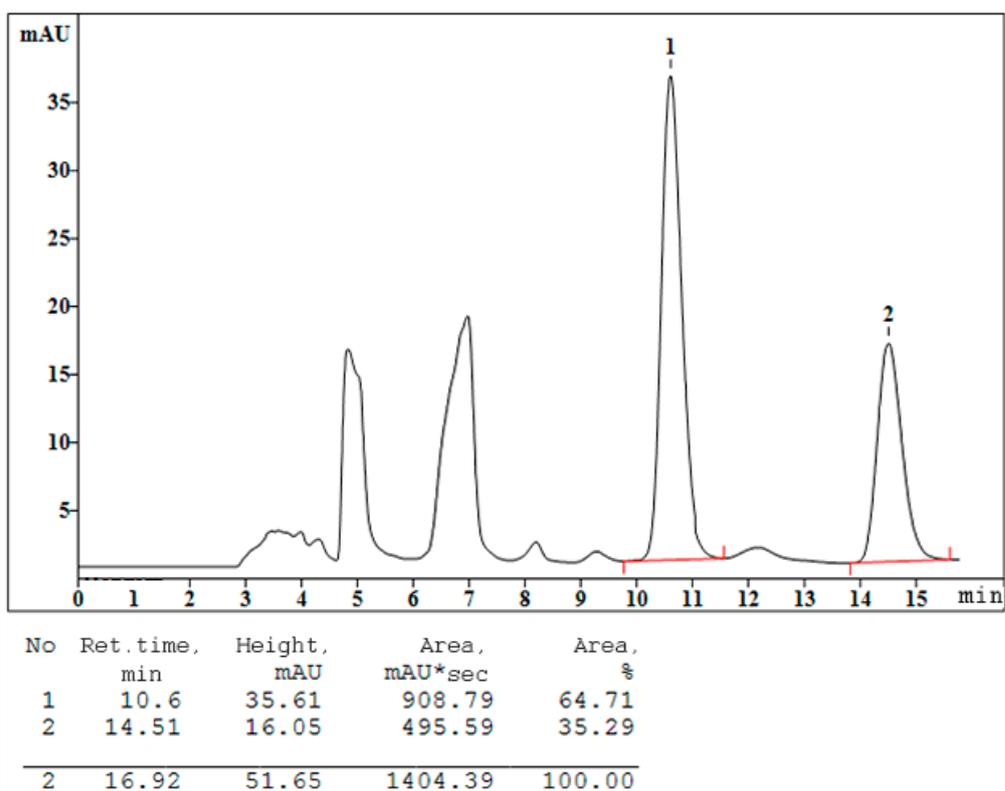


Figure S5 HPLC-chromatogram of aldol **7a** (sol.) (Table 1, entry 5).

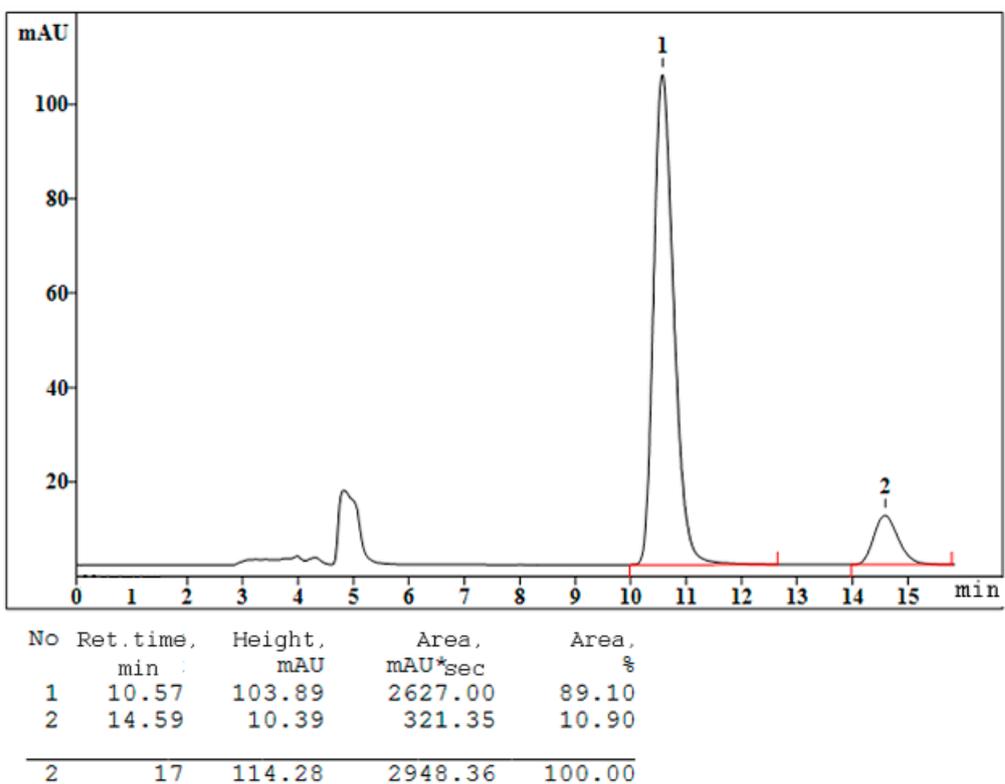


Figure S6 HPLC-chromatogram of aldol **7a** (prec.) (Table 1, entry 5).

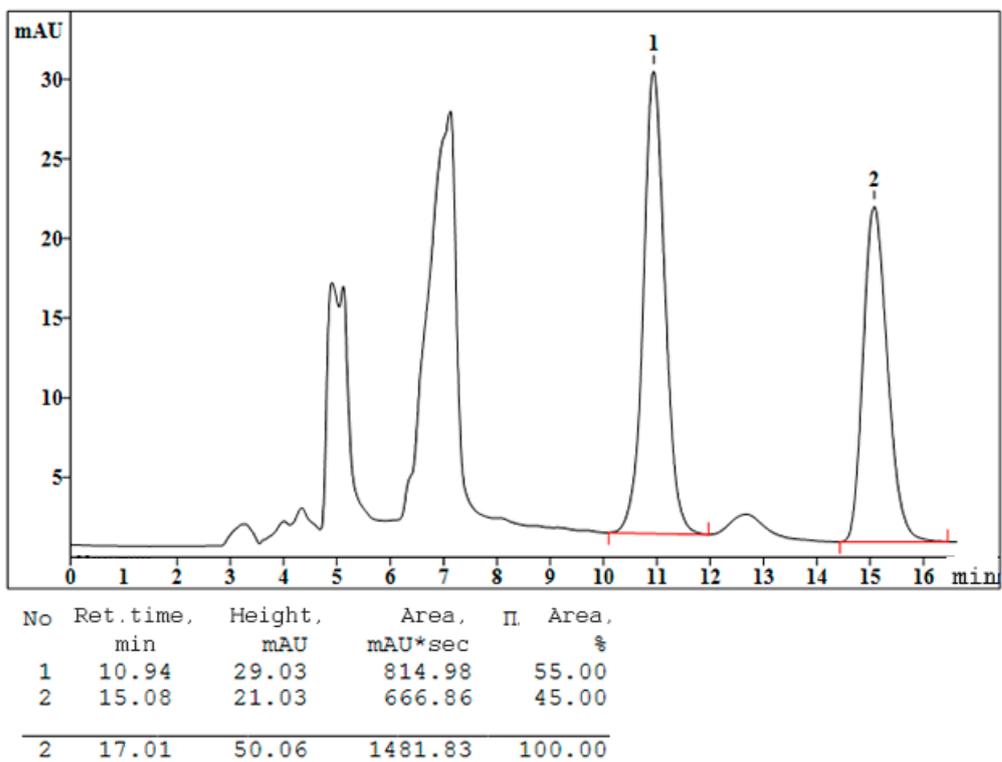


Figure S7 HPLC-chromatogram of aldol **7a** (sol.) (Table 1, entry 6).

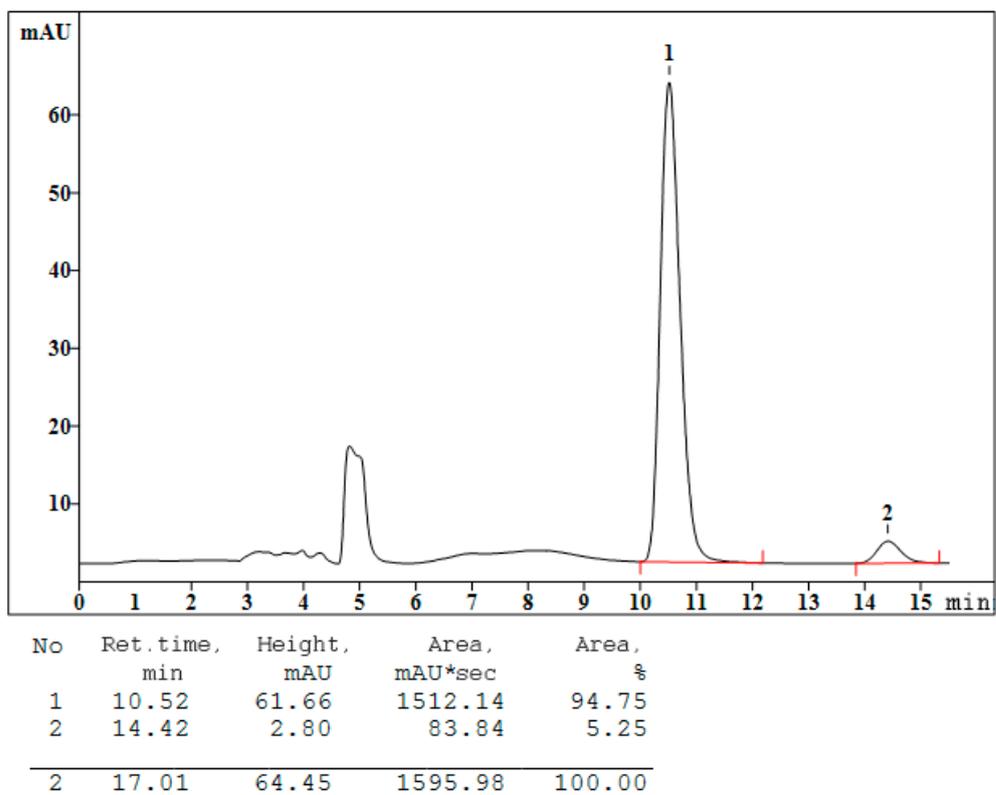


Figure S8 HPLC-chromatogram of aldol **7a** (prec.) (Table 1, entry 6).

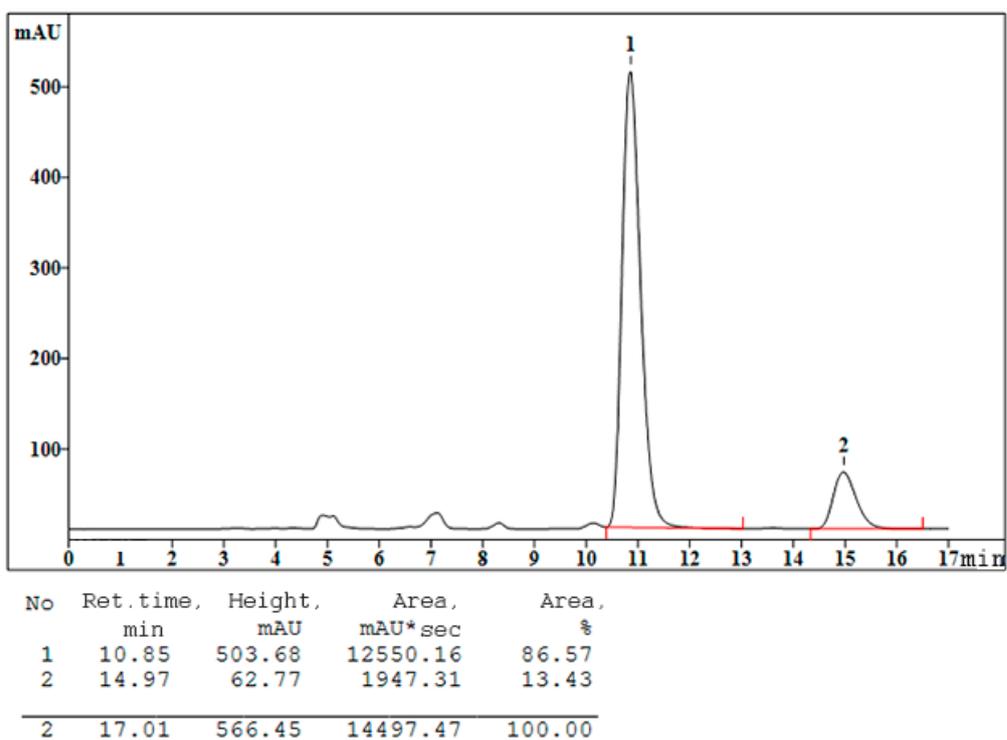


Figure S9 HPLC-chromatogram of aldol **7a** (sol.) (Table 1, entry 7).

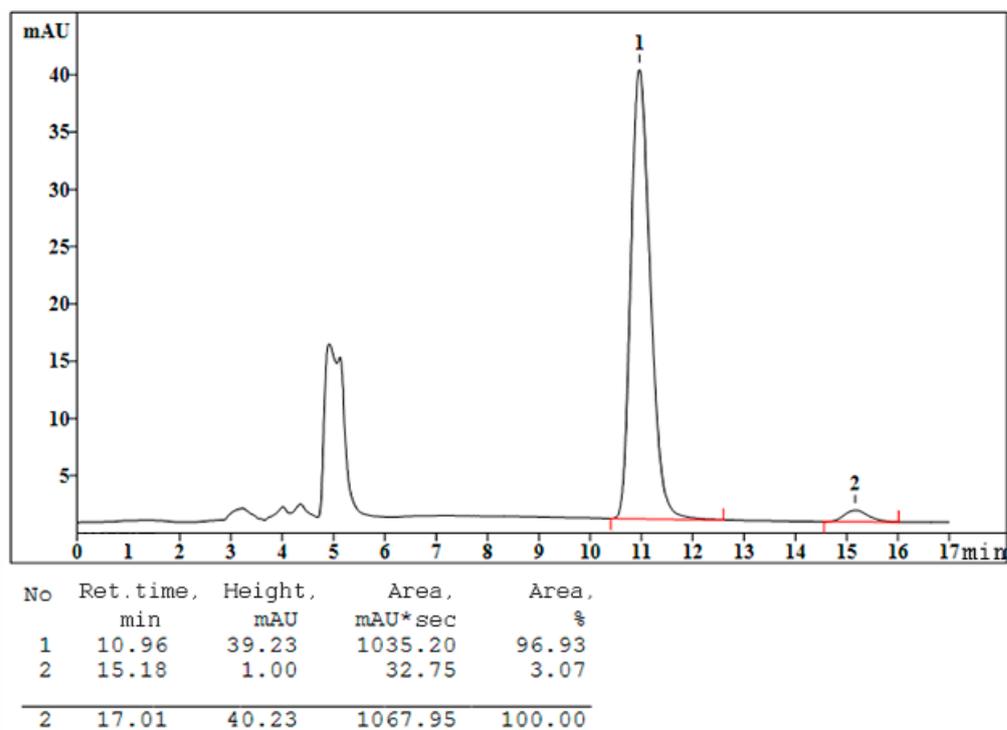


Figure S10 HPLC-chromatogram of aldol **7a** (prec.) (Table 1, entry 7).

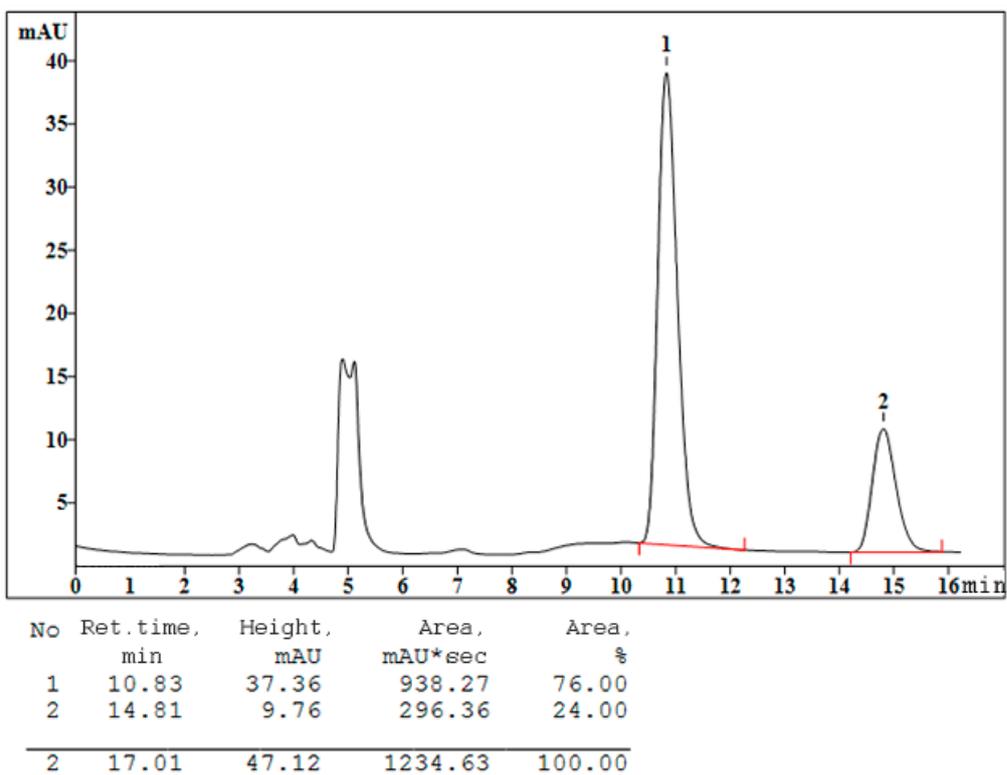


Figure S11 HPLC-chromatogram of aldol **7a** (sol.) (Table 1, entry 8).

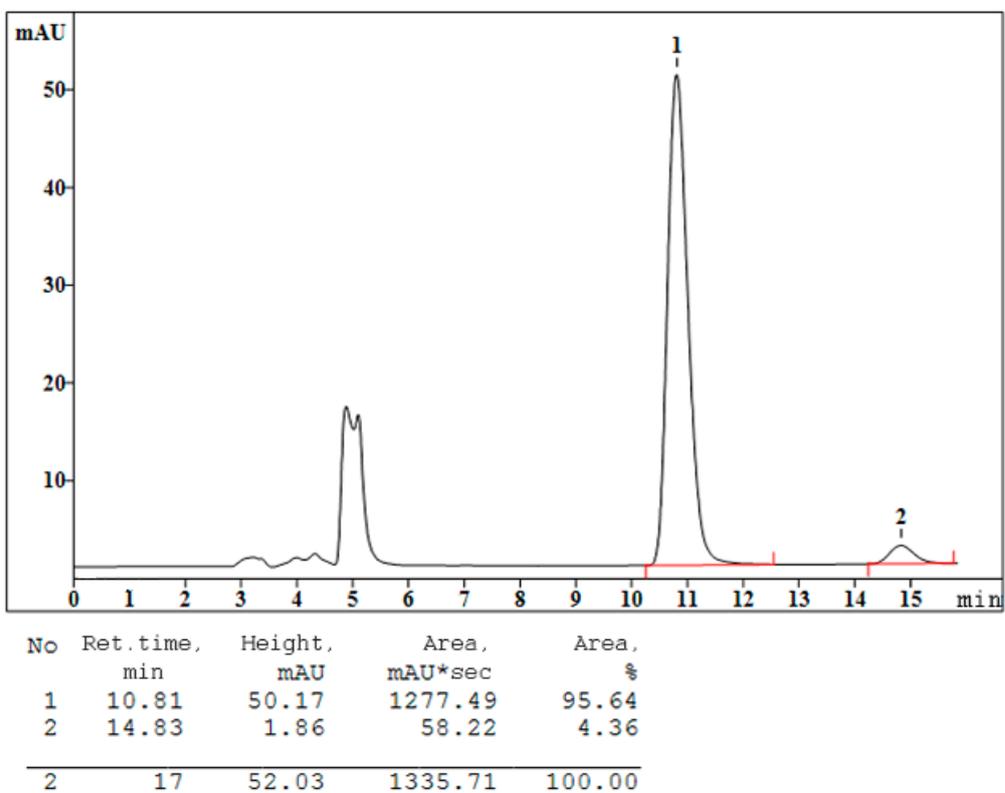


Figure S12 HPLC-chromatogram of aldol **7a** (prec.) (Table 1, entry 8).

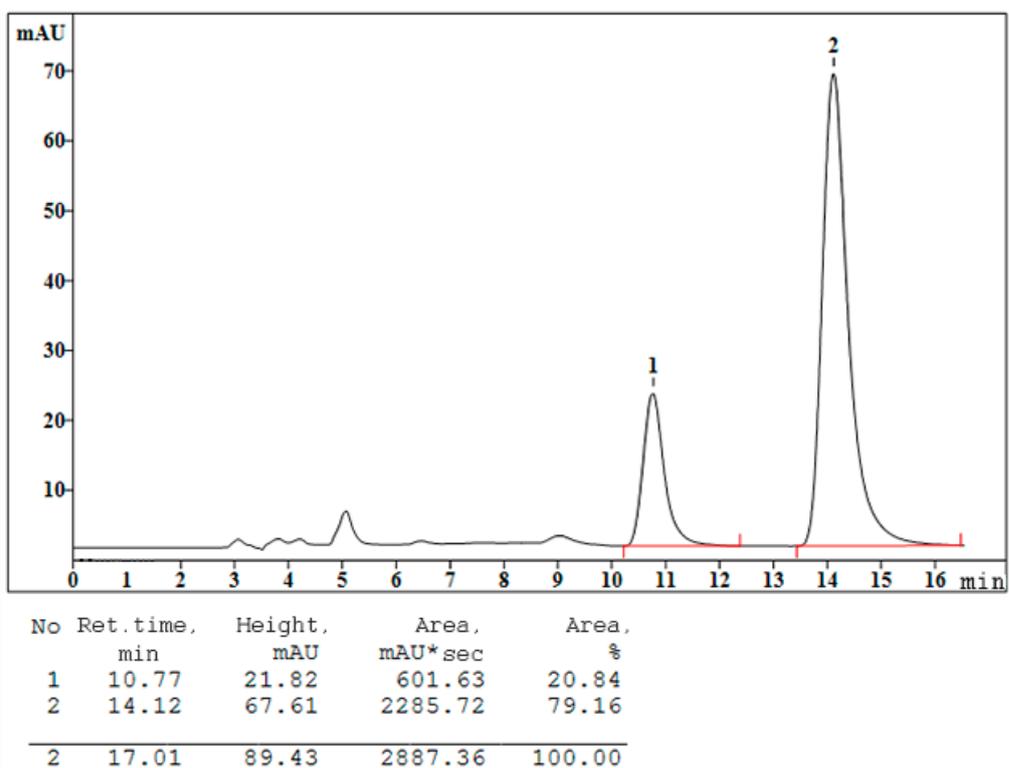


Figure S13 HPLC-chromatogram of aldol **7a** (sol.) (Table 1, entry 9).

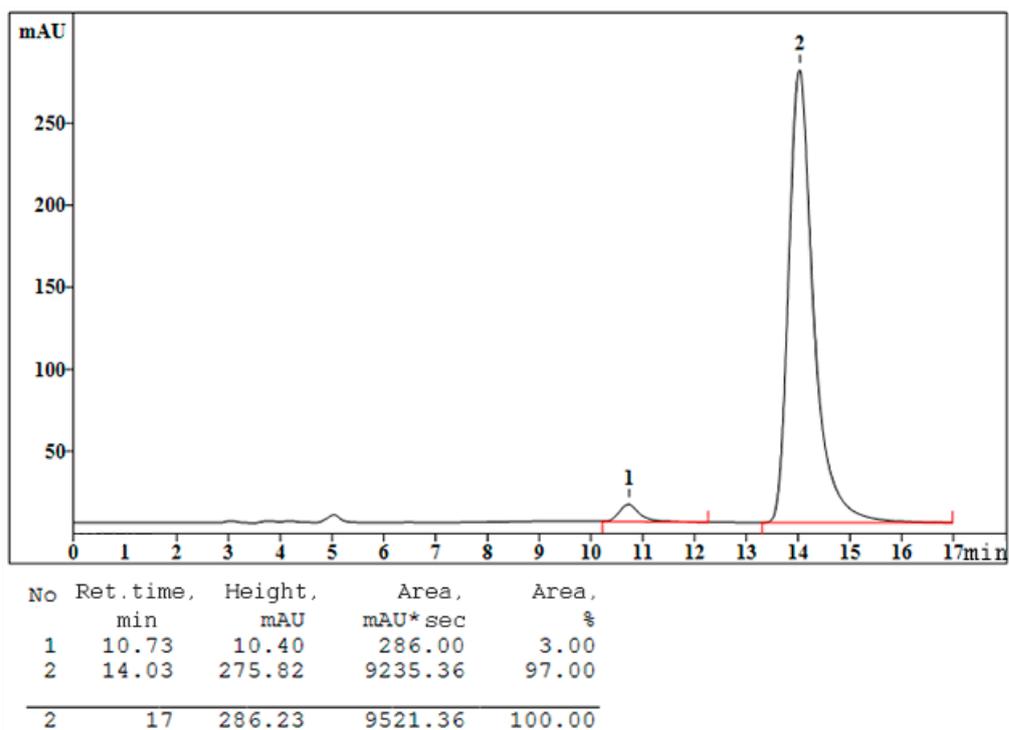


Figure S14 HPLC-chromatogram of aldol **7a** (prec.) (Table 1, entry 9).

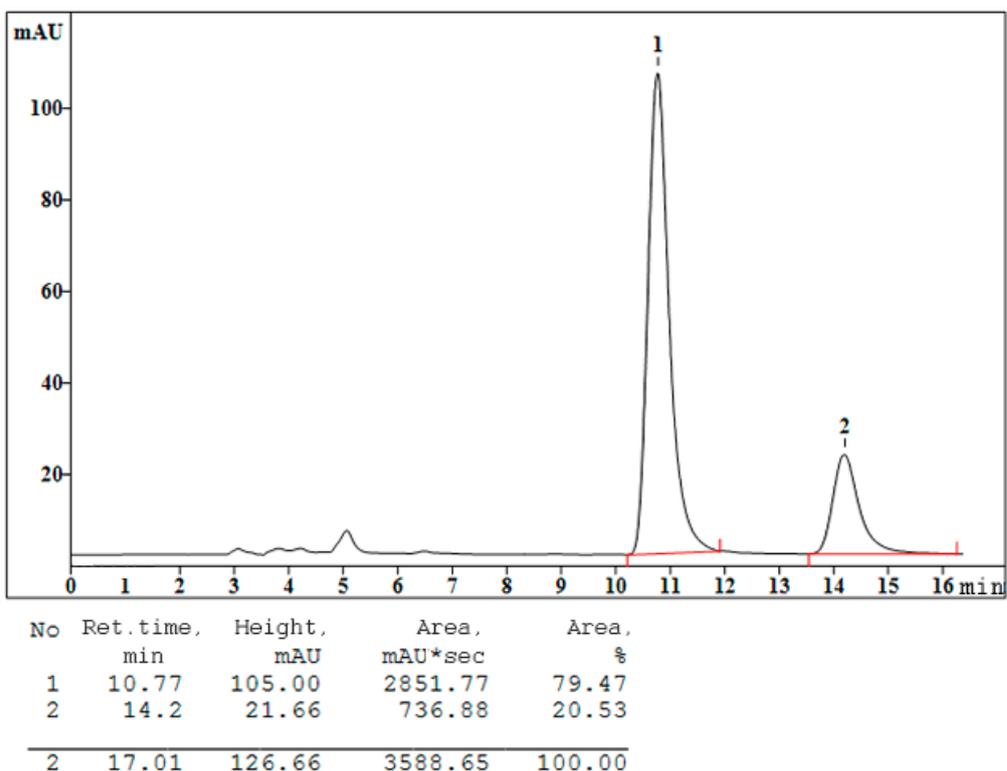


Figure S15 HPLC-chromatogram of aldol **7a** (liq.) (Table 1, entry 10).

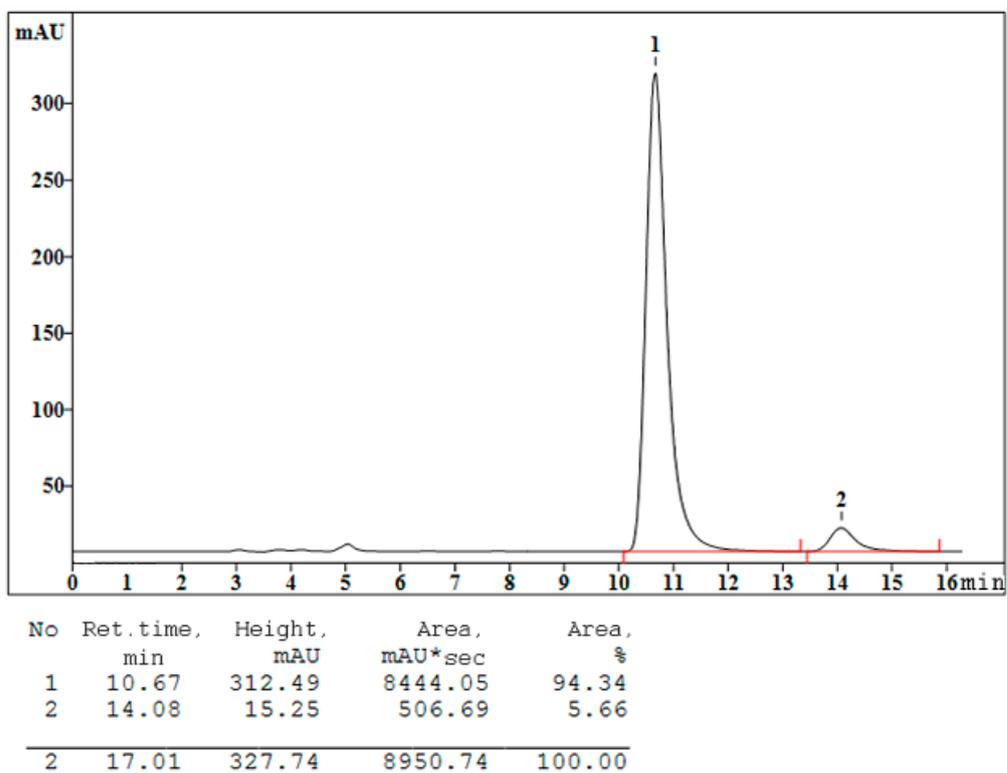


Figure S16 HPLC-chromatogram of aldol **7a** (prec.) (Table 1, entry 10).

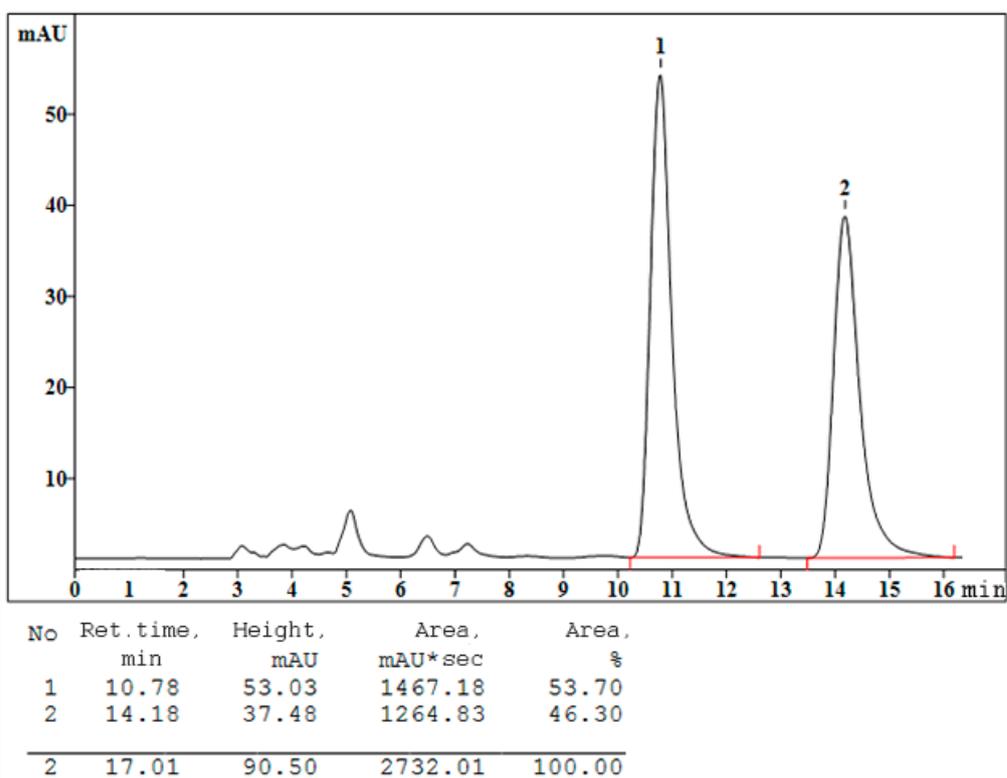


Figure S17 HPLC-chromatogram of aldol **7a** (sol.) (Table 1, entry 11).

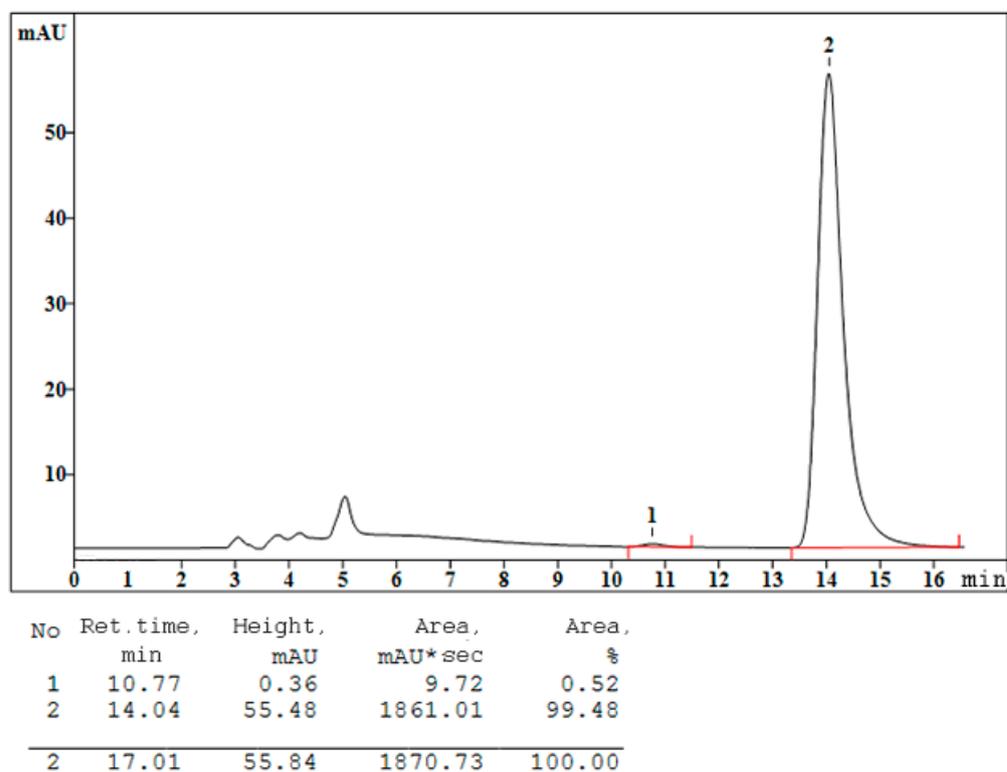


Figure S18 HPLC-chromatogram of aldol **7a** (prec.) (Table 1, entry 11).

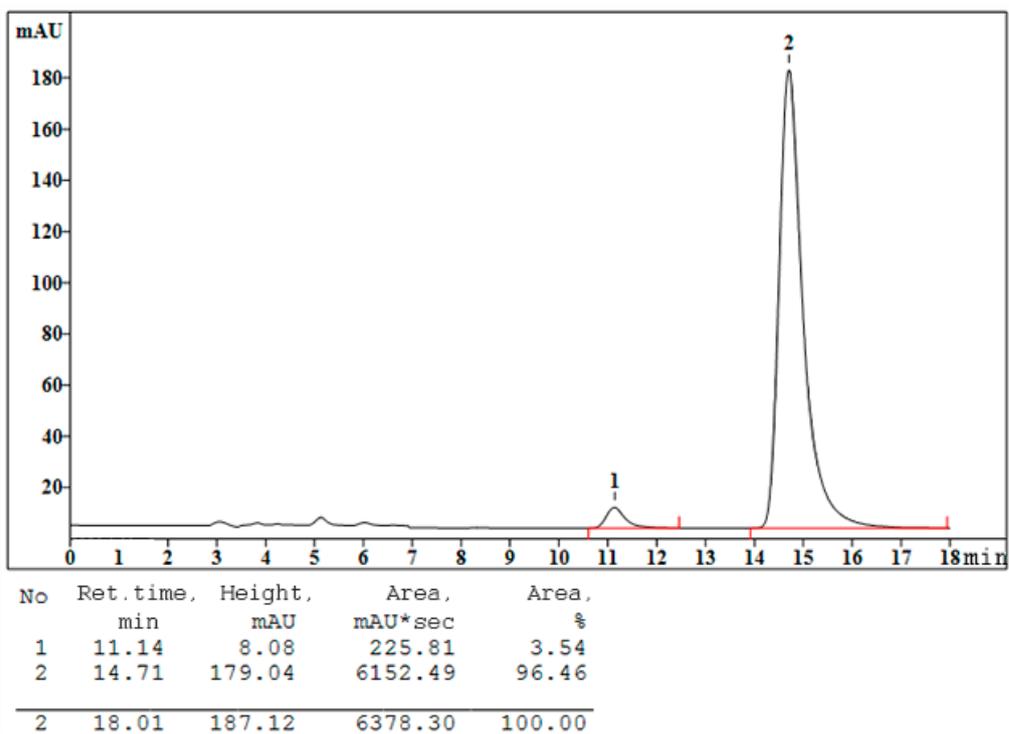


Figure S19 HPLC-chromatogram of aldol **7a** (sol.) (Table 1, entry 12).

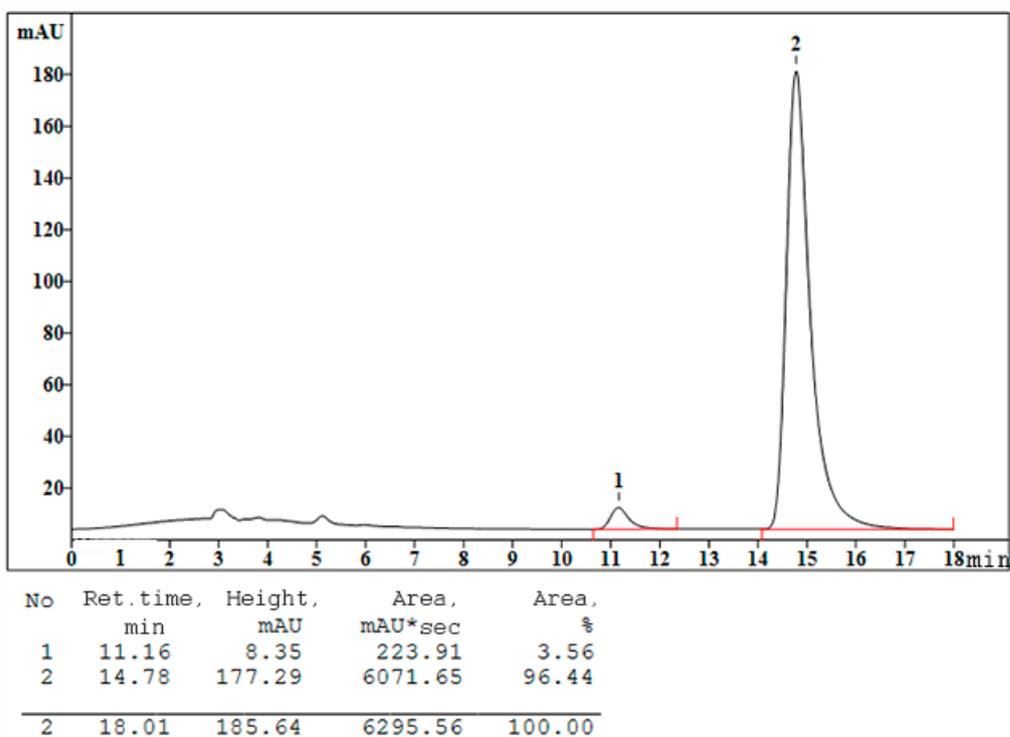


Figure S20 HPLC-chromatogram of aldol **7a** (prec.) (Table 1, entry 12).

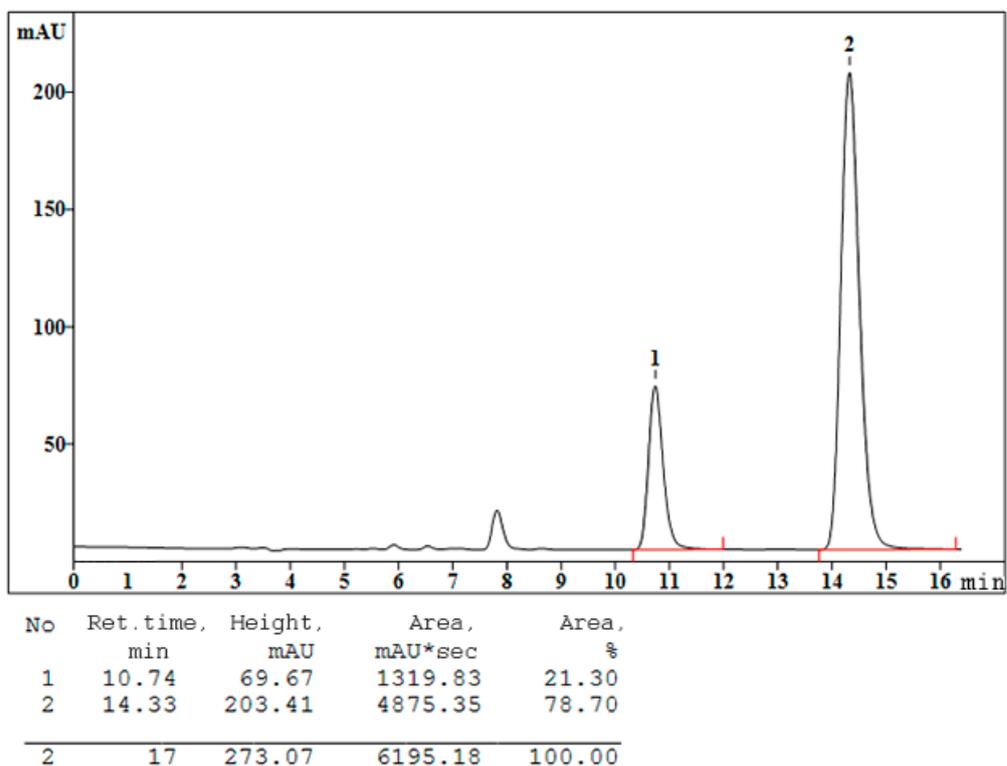


Figure S21 HPLC-chromatogram of aldol **7a** (sol.) (Table 1, entry 13).

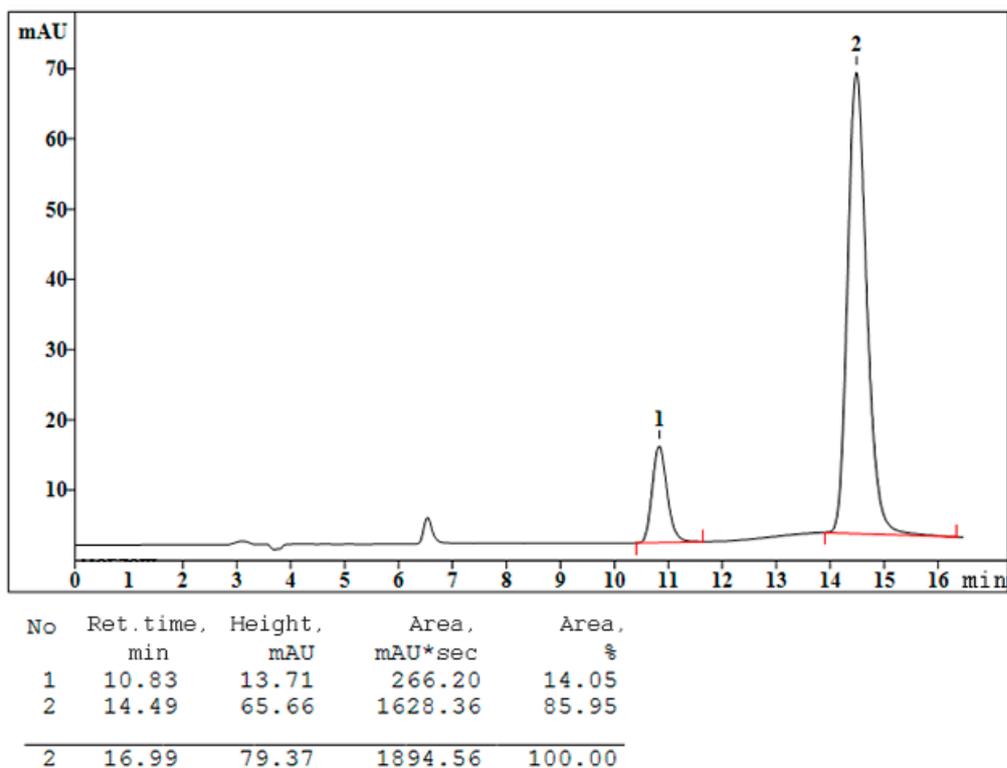


Figure S22 HPLC-chromatogram of aldol **7a** (prec.) (Table 1, entry 13).

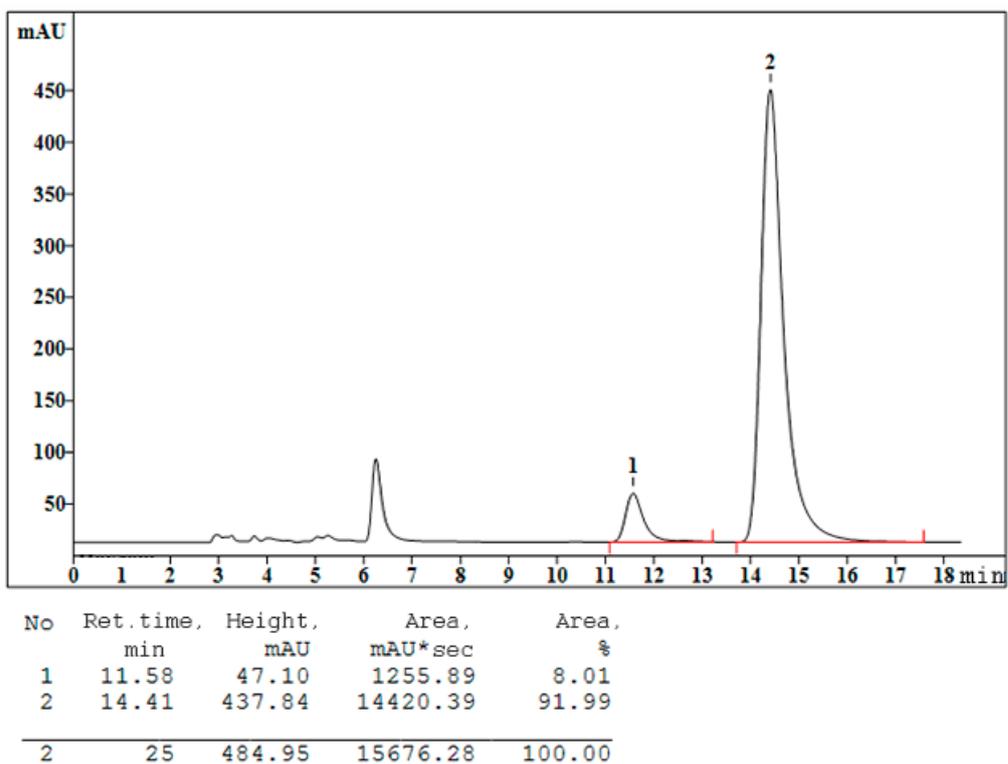


Figure S23 HPLC-chromatogram of aldol **7b** (sol.) (Table 1, entry 14).

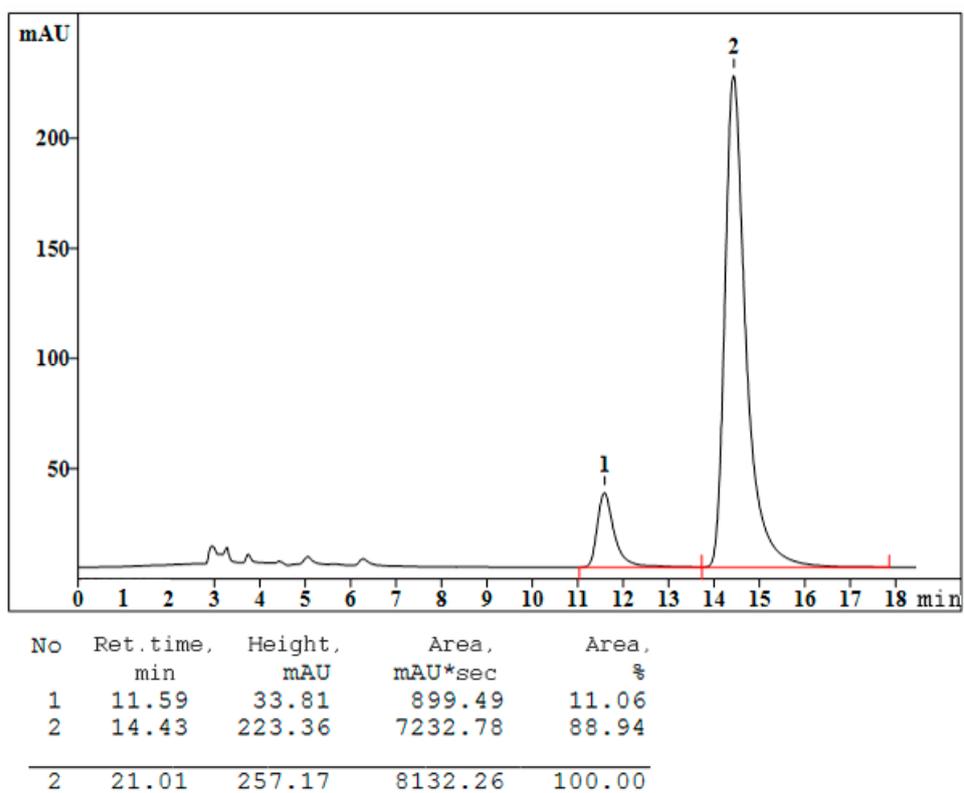


Figure S24 HPLC-chromatogram of aldol **7b** (prec.) (Table 1, entry 14).

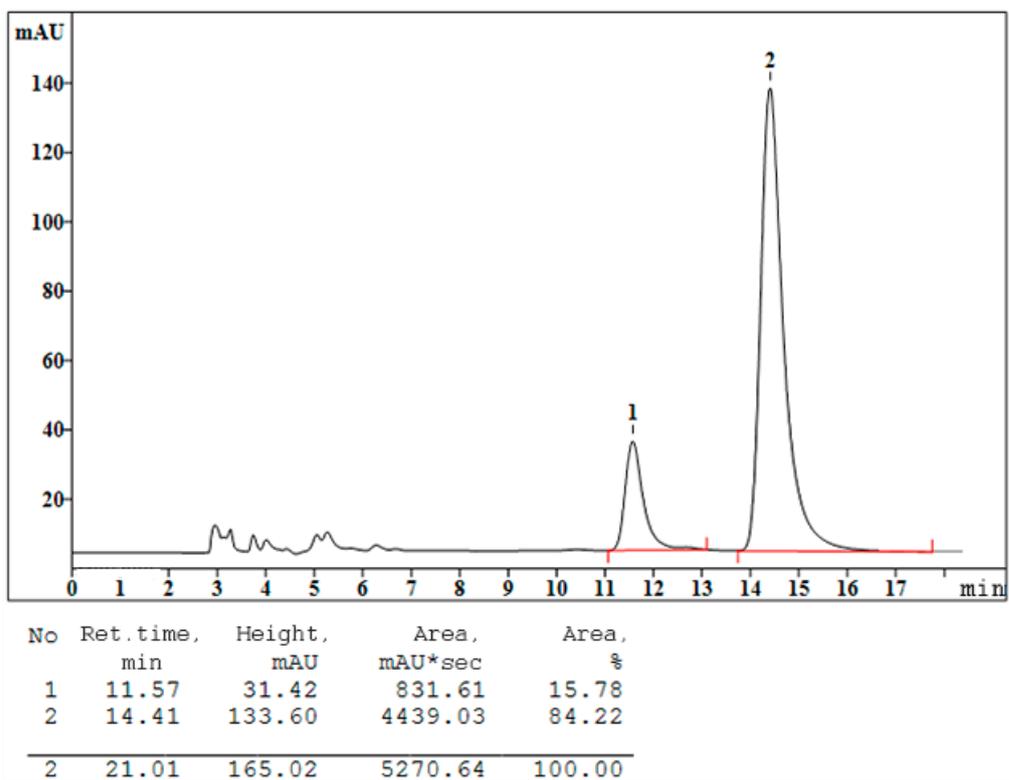


Figure S25 HPLC-chromatogram of aldol **7b** (liq.) (Table 1, entry 15).

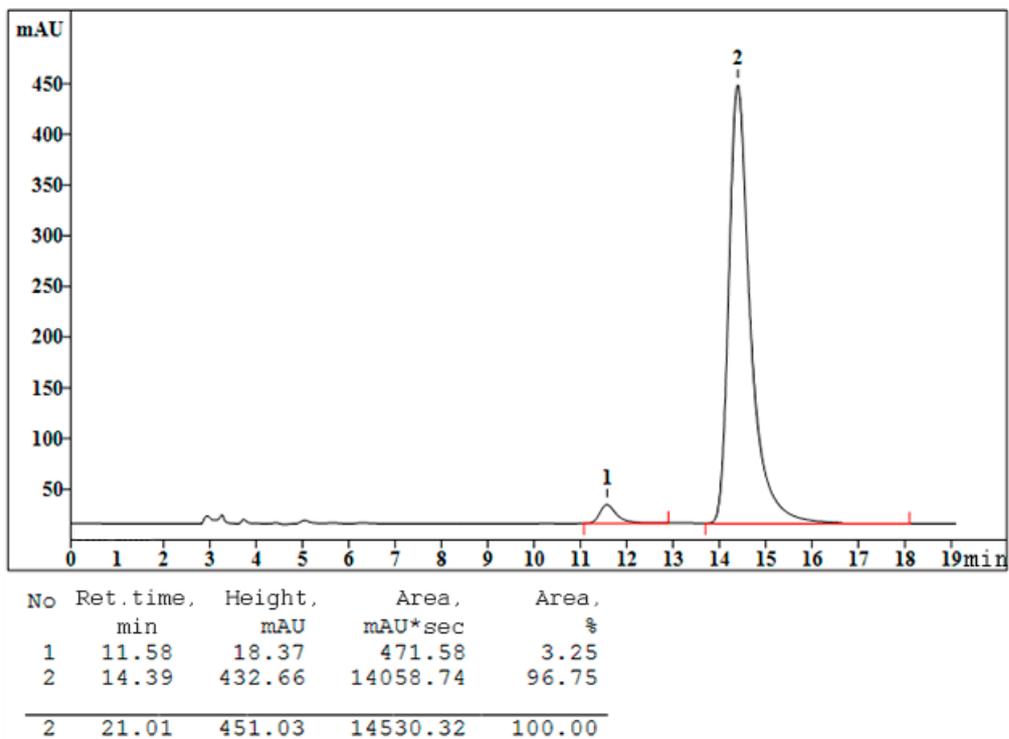


Figure S26 HPLC-chromatogram of aldol **7b** (prec.) (Table 1, entry 15).