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Introduction

- Ketamine can either be administered as racemate or in its enantiomerically pure form as (S)-ketamine
- Recently rising seizures of illicit ketamine in its pure crystalline form or in or in combination with other drugs of abuse
- Growing interest in tracing its trafficking routes and origins
- **Aim:** Distinguishing between racemic and enantiomerically pure ketamine to differentiate between synthesis origins

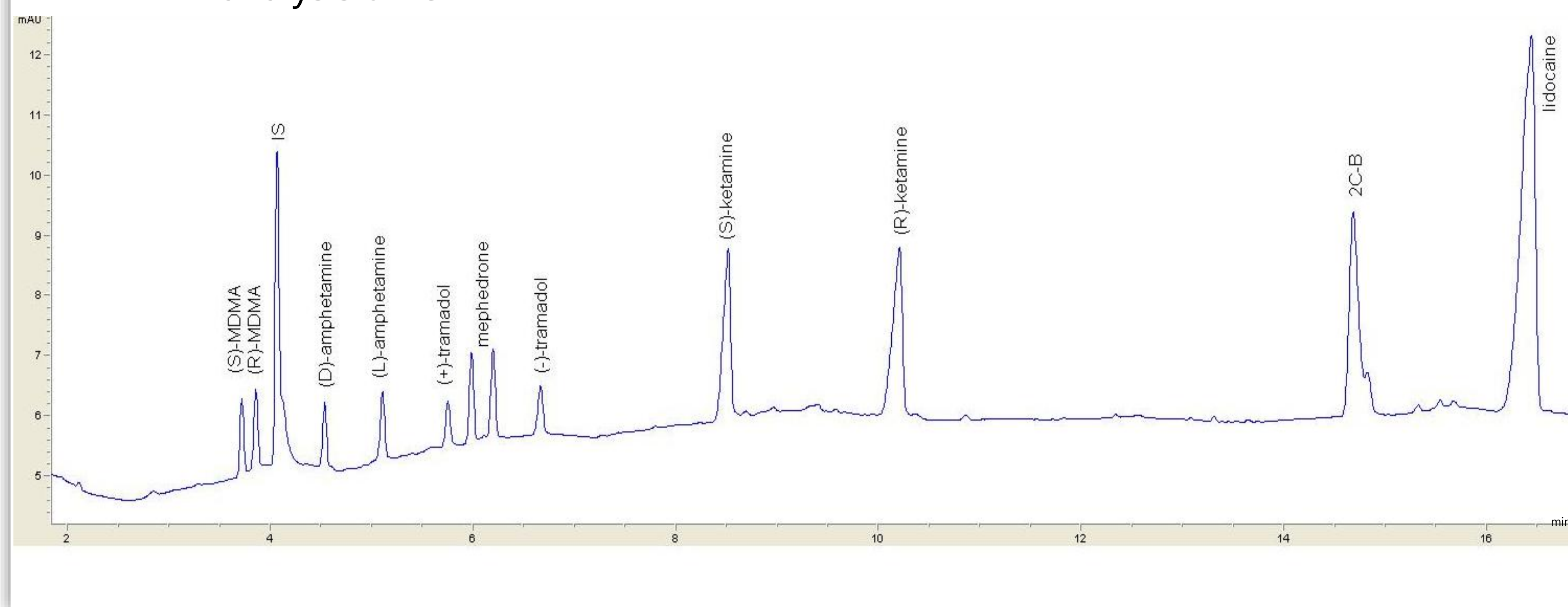
Pink cocaine



powdered mixture typically containing ketamine, MDMA, 2C-B, amphetamine and various other substances

Results

- Chiral separation of racemic compounds: ketamine, MDMA, amphetamine, tramadol, mephedrone
- Non-chiral compounds: lidocaine and 2C-B
- Enantiomeric resolution between 3.5 and 17
- 17 min analysis time

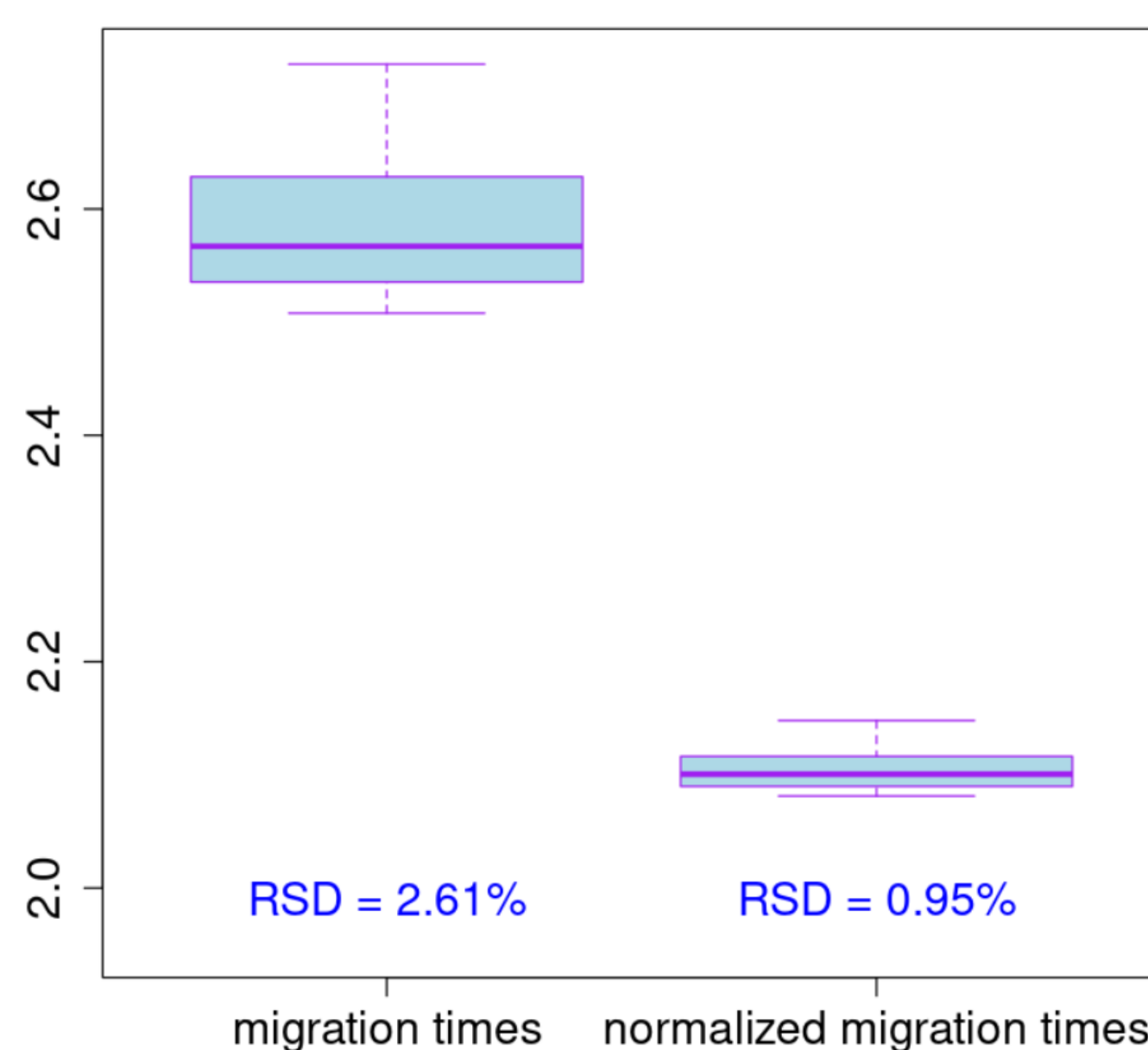


12.5 mM KH₂PO₄
12.5 mM H₃PO₄
2.5 % sulfated β-cyclodextrin
pH = 2.5

Capillary:
48 cm
39.5 cm (effective)
50 μm i.d.

-20 kV

Validation

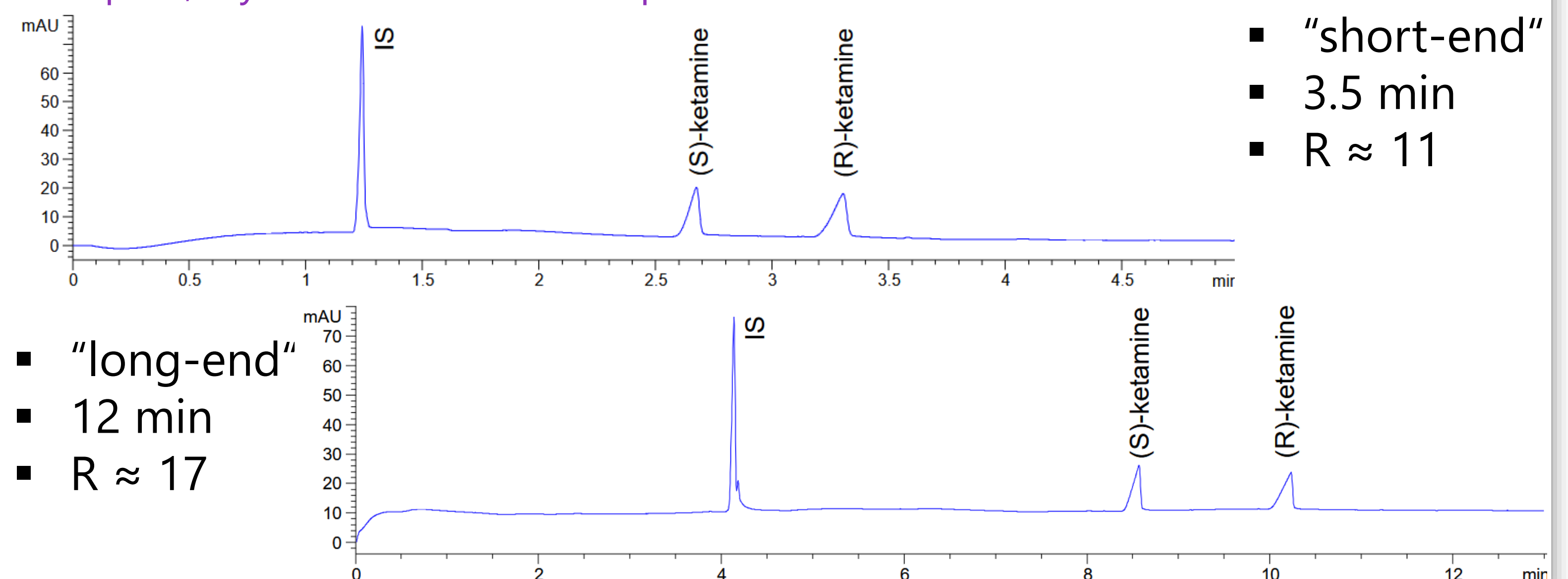


Problem: typically low repeatability in chiral CE
➤ Use of internal standard to improve RSD of migration times from 2.61 % to 0.95 %

LOD (S-ketamine) = 5 μg/ml
LOD (R-ketamine) = 20 μg/ml

"Short-end" vs. "long-end" injection

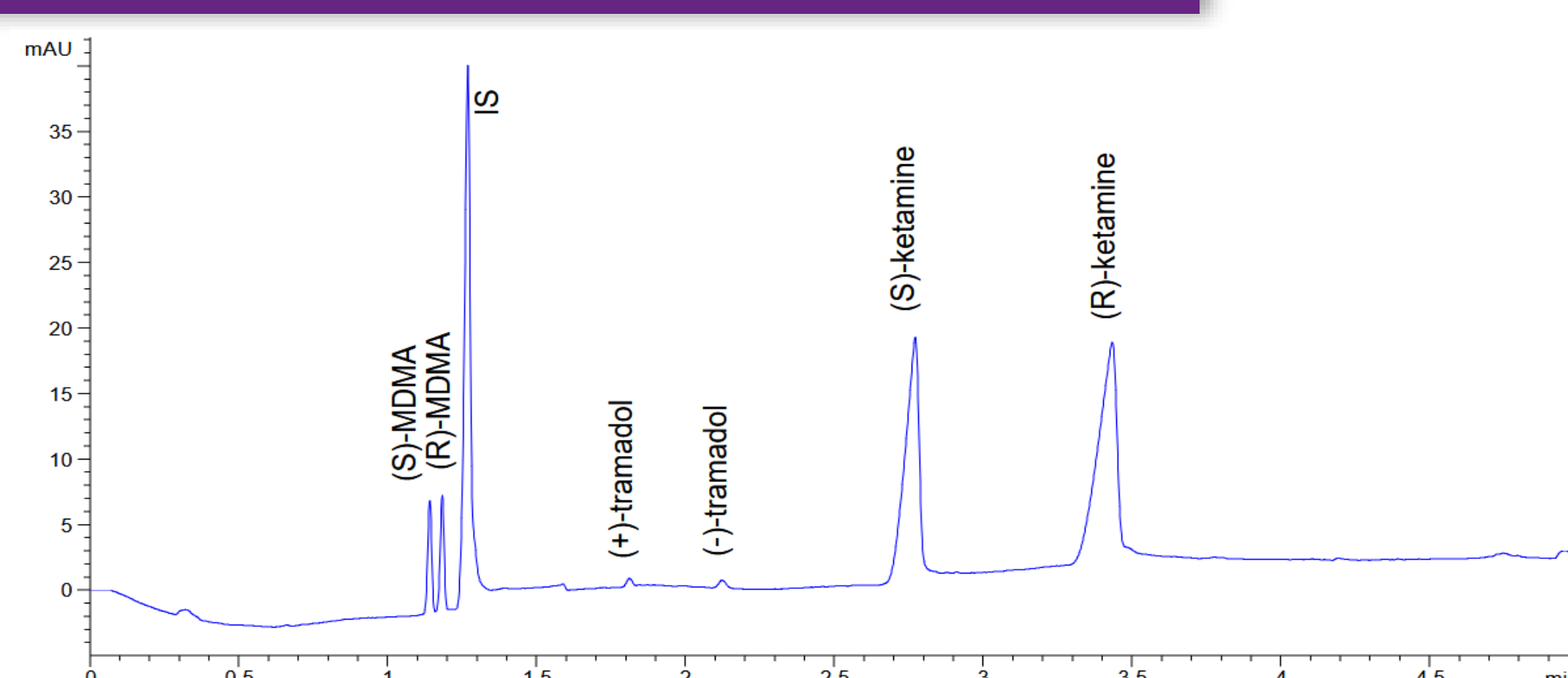
→ pure, crystalline ketamine samples



- "short-end"
- 3.5 min
- R ≈ 11

- "long-end"
- 12 min
- R ≈ 17

Case work samples



Analysis of **59 ketamine samples from police and customs seizures** including unadulterated ketamine samples and illicit preparations
➤ Consistently **racemic**

→ NMR result: 64.1% ketamine, 11.5% MDMA, 1.1% tramadol

Conclusion

- Use of the same buffer for ketamine in its pure form and in illicit preparations to ensure **time saving chiral analysis**
- Ketamine found in street samples and ketamine from large seizures are **consistently racemic**
- (S)-ketamine is likely only present in pharmaceutical products