

## SUPPLEMENTARY INFORMATION FOR JOURNAL OF CHEMICAL ECOLOGY

**INDIVIDUAL VARIATION IN ALKALOID CONTENT OF POISON FROGS OF MADAGASCAR (*Mantella*; MANTELLIDAE)**VALERIE C. CLARK<sup>\*1</sup>, VALÉRIE RAKOTOMALALA<sup>2</sup>, OLGA RAMILJAONA<sup>2</sup>, LEIF ABRELL<sup>3</sup>, and BRIAN L. FISHER<sup>4</sup><sup>1</sup>*Department of Chemistry and Chemical Biology, Cornell University, Ithaca, NY 14853;* <sup>2</sup>*Department of Animal Biology, University of Antananarivo, Madagascar, 101;* <sup>3</sup>*Department of Chemistry, University of Arizona, AZ 85721;* <sup>4</sup>*Department of Entomology, California Academy of Sciences, San Francisco, CA 94103.*<sup>\*</sup>To whom correspondence should be addressed: E-mail: [vcc4@cornell.edu](mailto:vcc4@cornell.edu)**Chromatograms of the 22 *Mantella* spp. individuals sampled from Ranomafana region in 2003, and of the two Daly Standards from Vato (December 1989, 10 combined skins) and Saha (January 1993, 17 combined skins).**

Partial chromatograms are shown to highlight only the minor and major alkaloids detected *via* GC-TOF-MS; for each sample, the EI Total Ion Current (TIC) chromatogram is shown above, and the CI (with NH<sub>3</sub>) TIC chromatogram is shown below. AMNH (AMNH 1683##) and UADBA (U#) deposition numbers, or TASEd live-released frog code (L#) are indicated and respective chromatograms ordered as in Table 1 of the manuscript.

***Mantella baroni* frogs from three localities of the Ranomafana National Park:** Vohiparara—Kidonavo Stream (includes a single *Mantella madagascariensis*); Sahavondronana-Ampitavarivo Stream/ Bridge of Namorona River; Vatoharanana—Ankovoka River. ***Mantella bernhardi*:** Ampasimpotsy village forest fragments.

**FIGURE LEGEND FORMAT:**

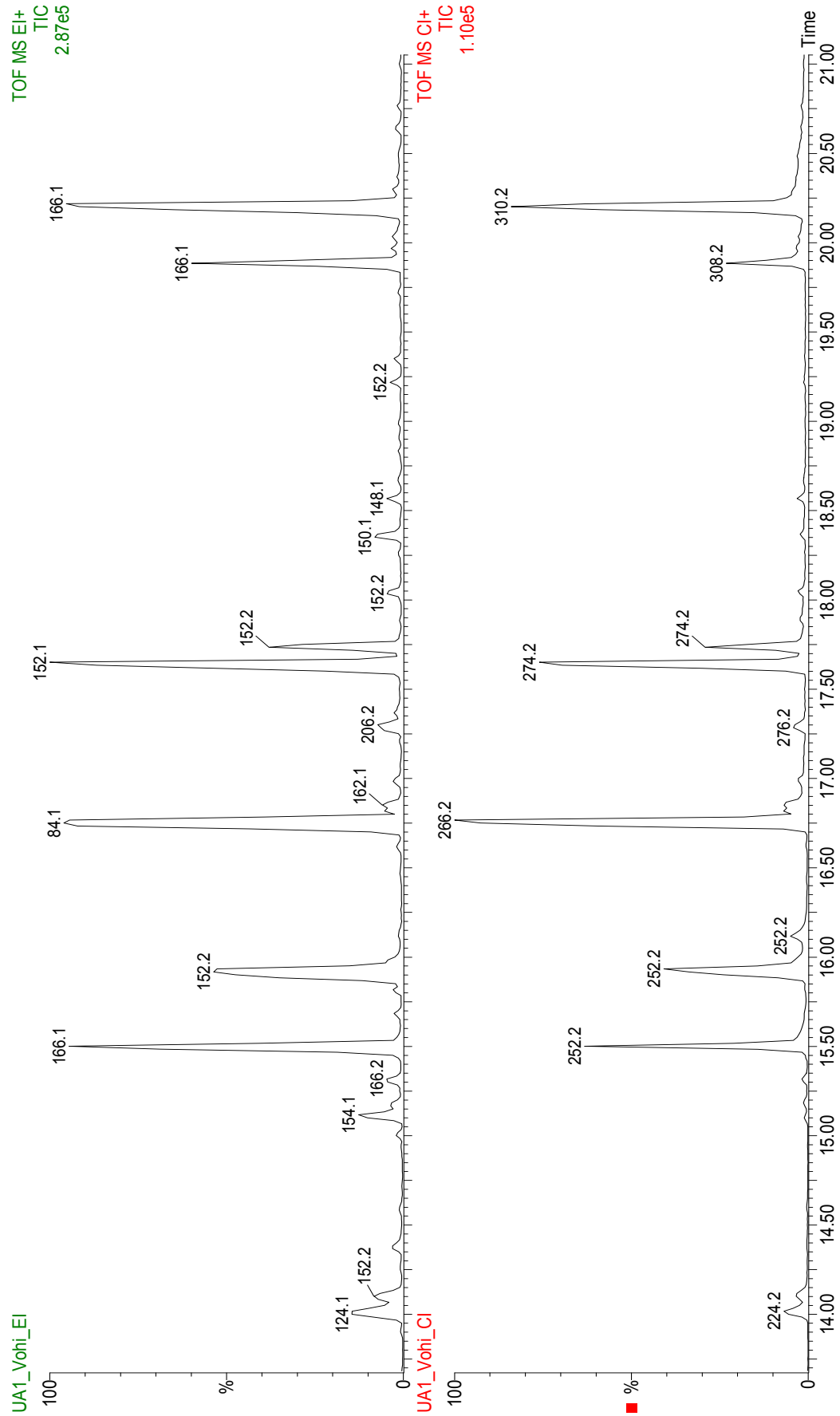
**S#.** *Mantella* frog species (abbreviated deposition number) from locality (AMNH field ##### if applicable).

**Major alkaloids:** relative abundance >70% in EI (In Table 1 as ‘ $\oplus$ ’)

**Minor alkaloids:** 10%< relative abundance <70% (In Table 1 as ‘ $\ominus$ ’)

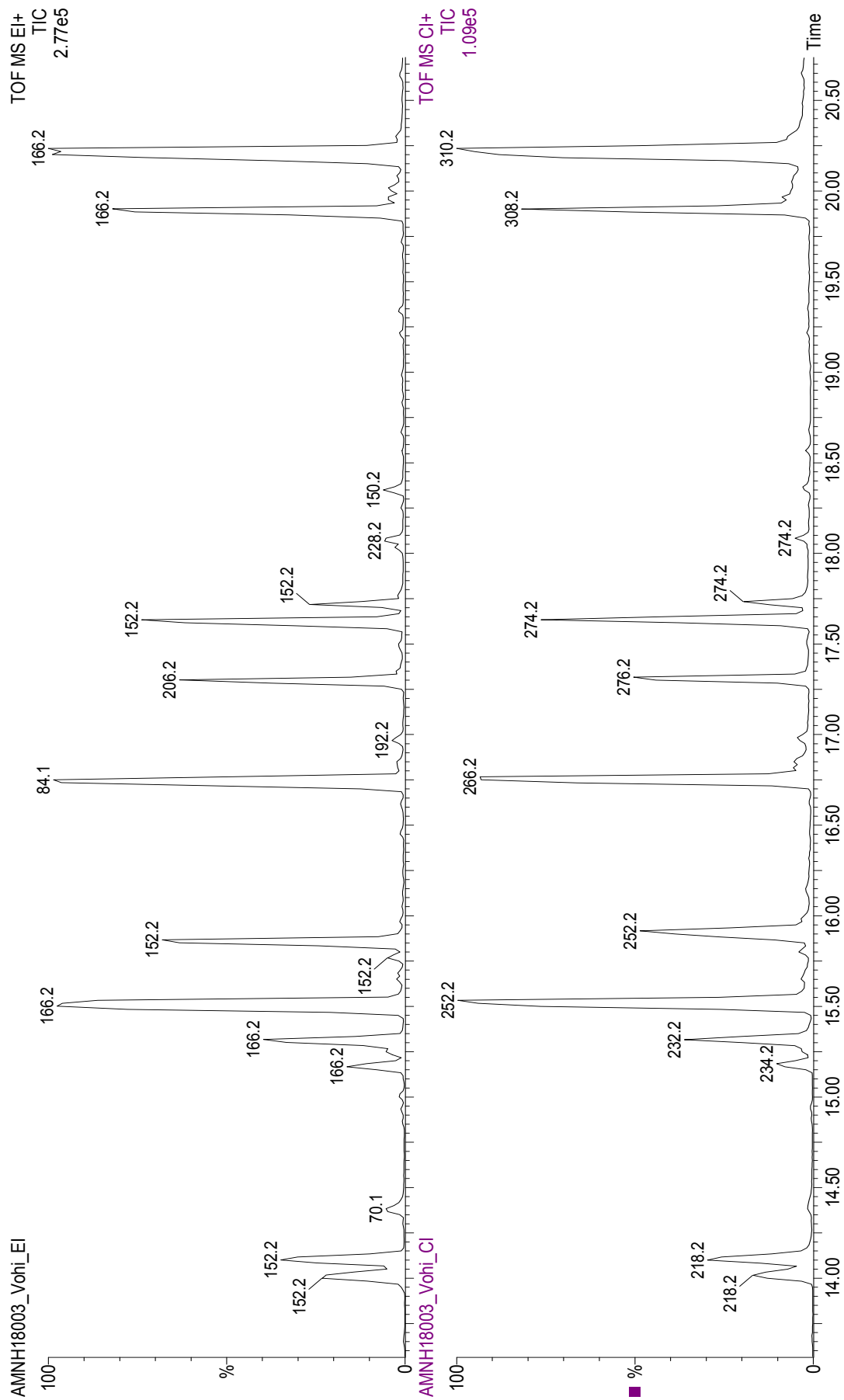
Note that Major and Minor alkaloids are listed as: **MW Code** (retention time in min):

**Numbers listed at tops of GC peaks are MS base peaks.** Some peaks are not accounted for, if they were unknown alkaloids or present as part of an unresolvable mixture; these as-yet unknown/unidentified compounds could be addressed in future publications.

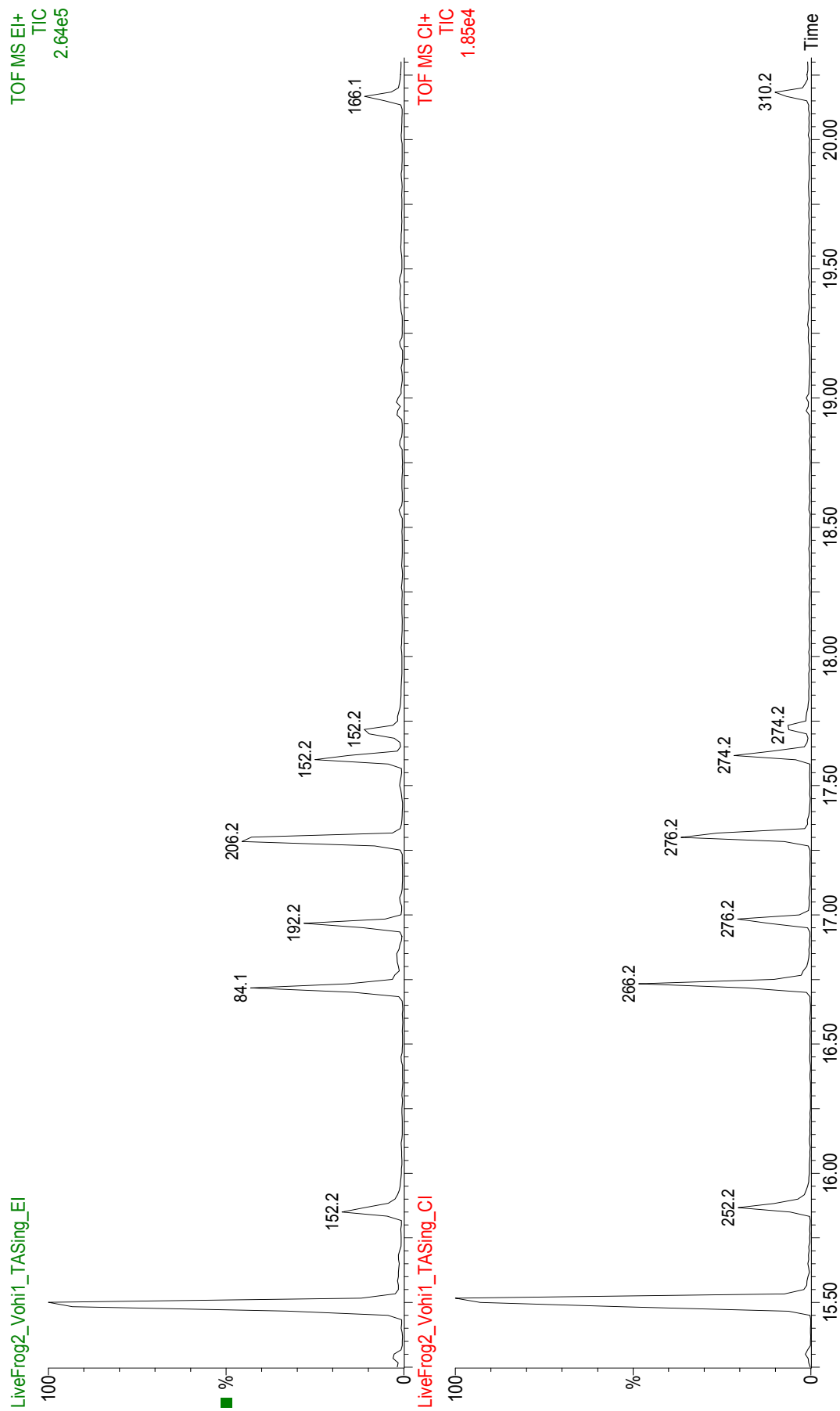


**S1. *M. baroni* frog 'U1' from Vohiparara 1.**  
**Major alkaloids: 251D (15.50), 265N (16.75), 273A (17.65), 309A (20.20).**  
**Minor alkaloids: 223H" (14.00), 251O (15.92), 293D (18.35), 307G (19.88).**

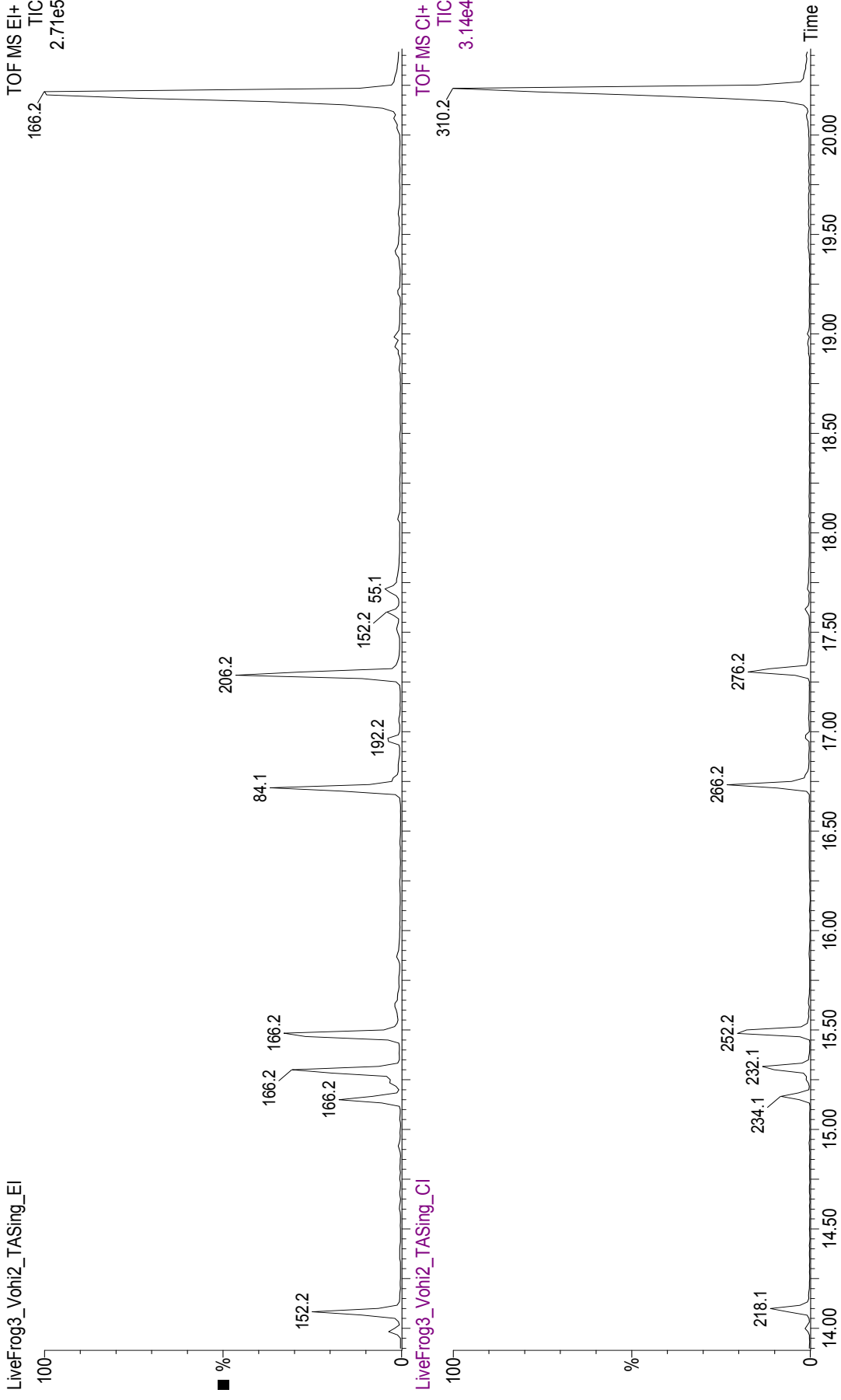




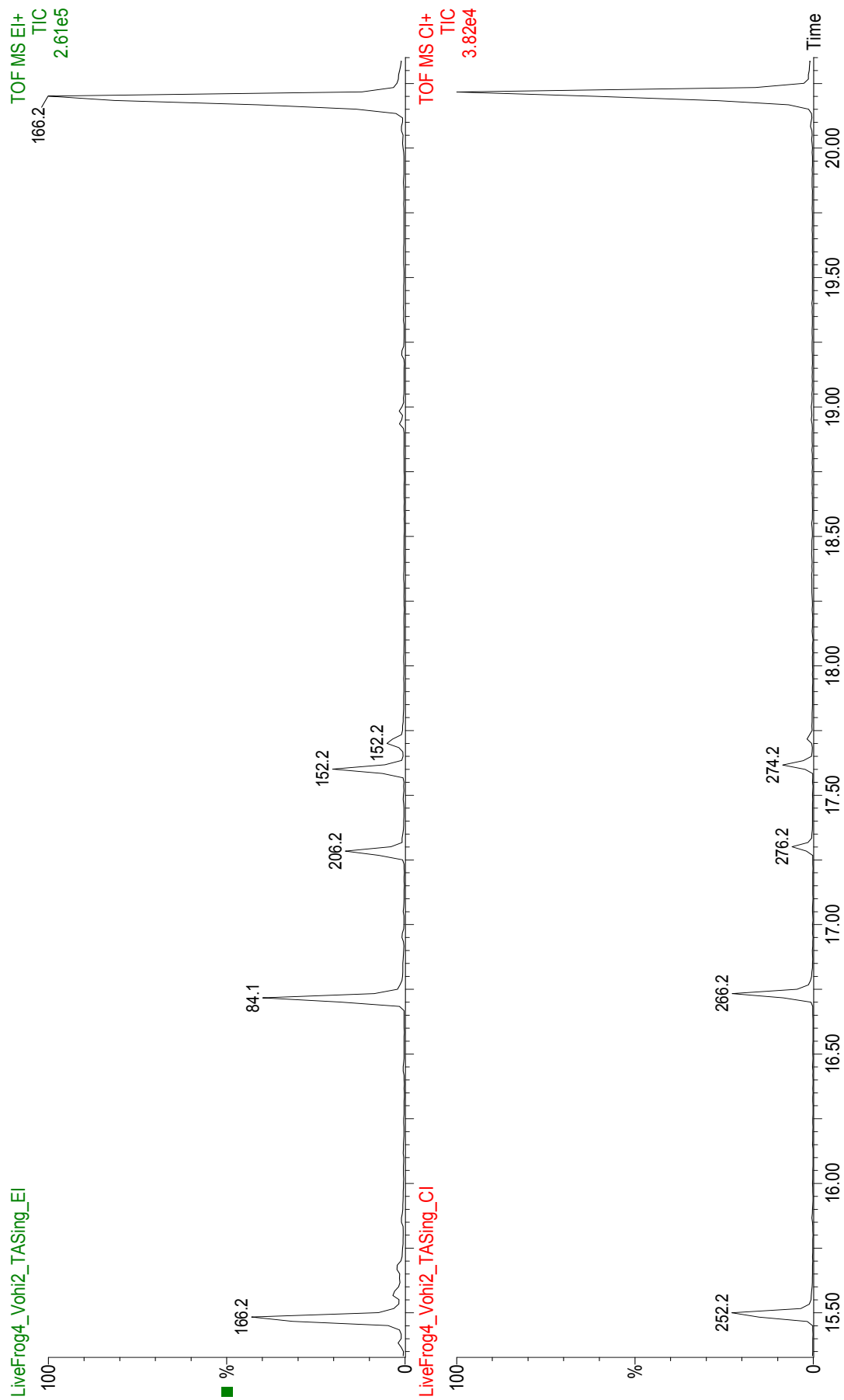
**S3. *M. baroni* frog '82' from Vohiparara 1 (AMNH field # 18003).**  
**Major alkaloids: 251D (15.50), 251O (15.87), 265N (16.75), 273A (17.64), 307G (19.90), 309A (20.20).**  
**Minor alkaloids: 217A (14.00), 217B (14.10), 233A (15.16), 231A (15.32), 275C' (17.30).**



**S4. *M. baroni* frog 'L2' from Vohiparara 1 (TASed frog released alive).**  
**Major alkaloids: 251D (15.47).**  
**Minor alkaloids: 251O (15.85), 265N (16.72), 275C (16.97), 275C' (17.28), 273A (17.60), 309A (20.17).**



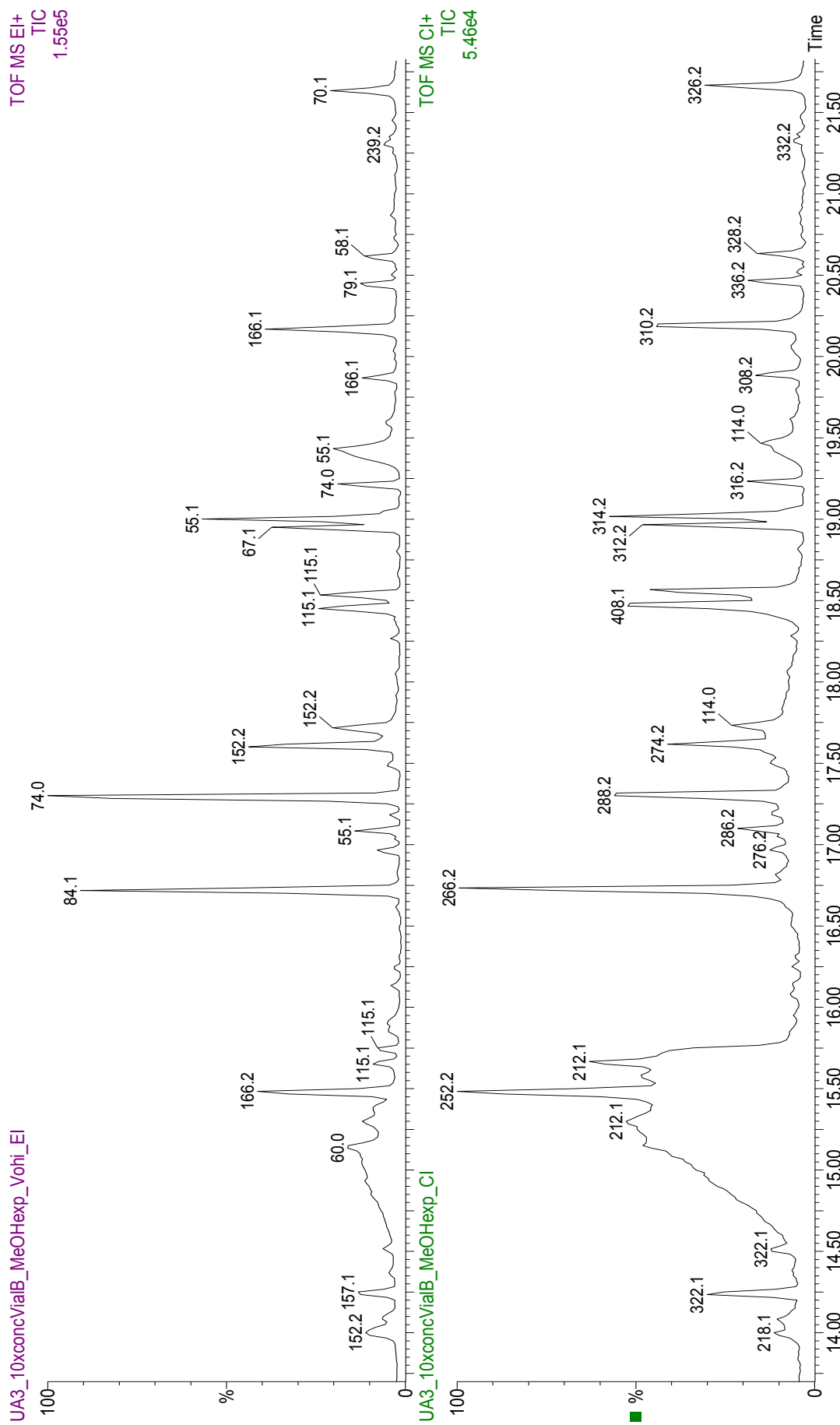
**S5. *M. baroni* frog 'L3' from Vohiparara 2 (TASed frog released alive).**  
**Major alkaloids: 309A (20.22).**  
**Minor alkaloids: 217B (14.10), 233A (15.15), 231A (15.30), 251D (15.48), 265N (16.72), 275C (16.97).**



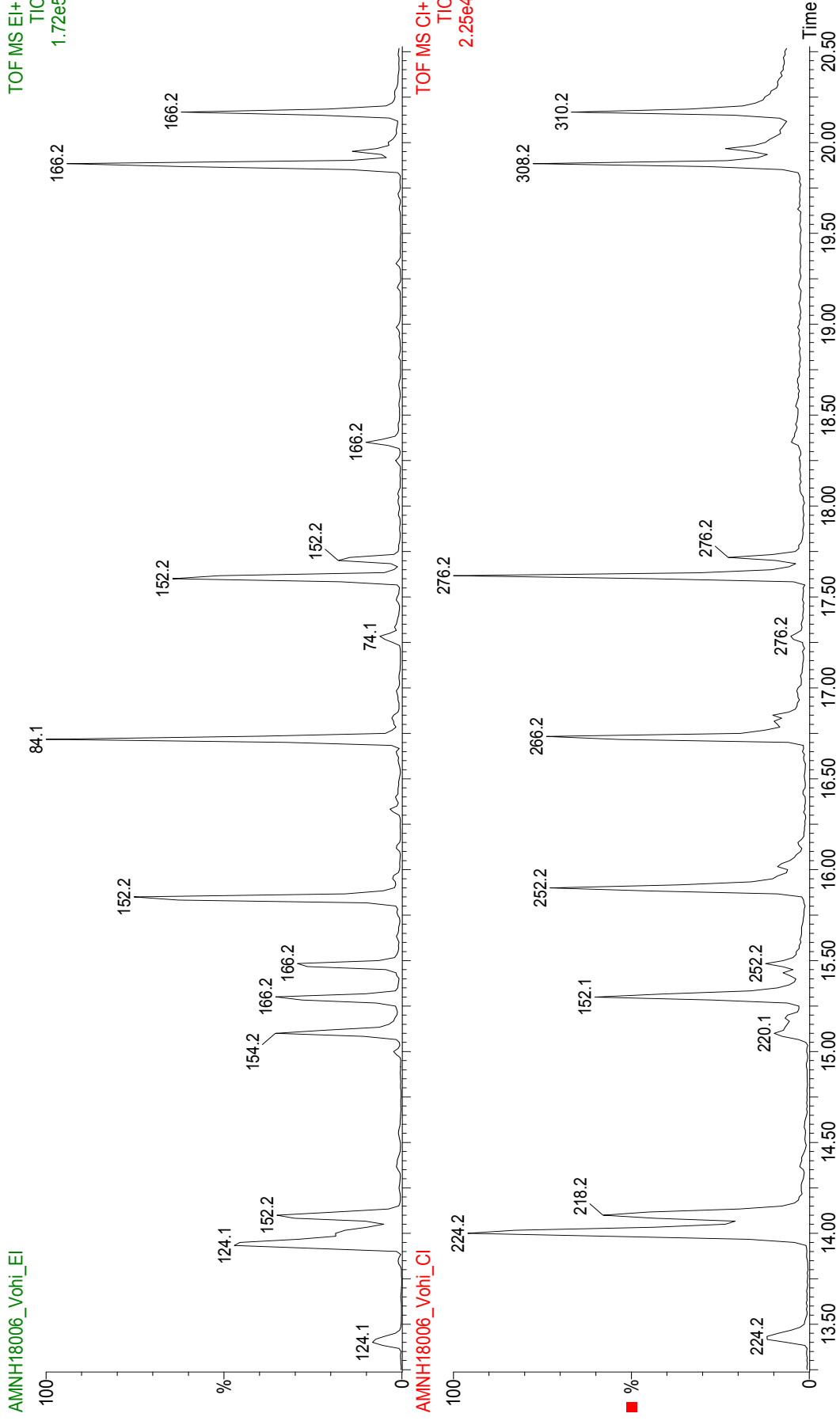
**S6. *M. baroni* frog 'L4' from Vohiparara 2 (TASed frog released alive).**

**Major alkaloids: 309A (20.20).**

**Minor alkaloids: 251D (15.48), 265N (16.72), 275C' (17.28), 273A (17.60).**



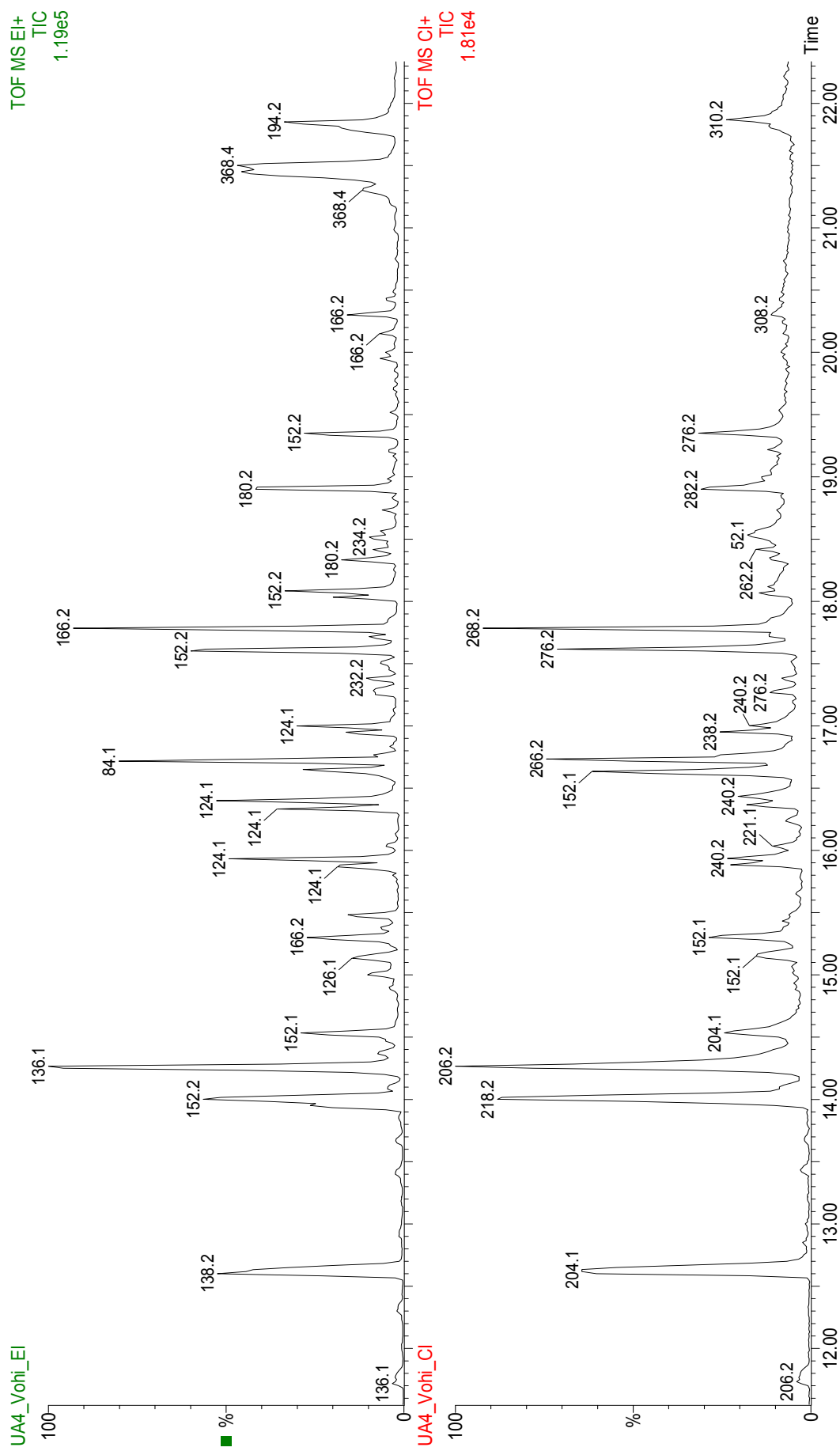
**S7. *M. baroni* frog 'U3' from Vohiparara 2 (Methanol extraction of an entire unskinned frog).**  
**Major alkaloids: 265N (16.72), 275C' (17.30).**  
**Minor alkaloids: 217A (14.00), 251D (15.50), 273A (17.60), 307G (19.88), 309A (20.17), 325A (21.64).**



**S8. *M. baroni* frog '83' from Vohiparara 2 (AMNH field # 18006).**

**Major alkaloids: 251O (15.87), 265N (16.72), 307G (19.88).**

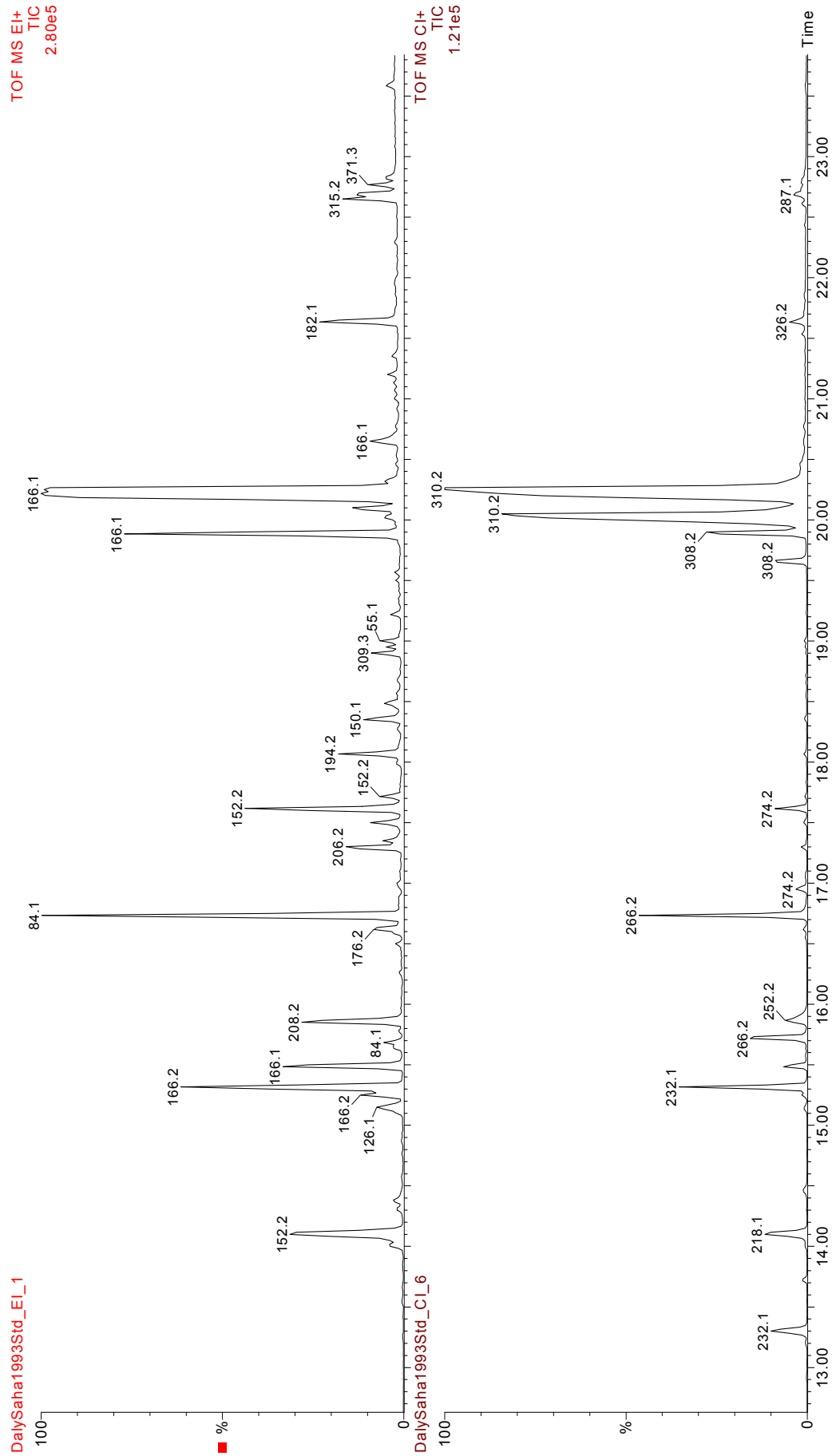
**Minor alkaloids: 223H" (13.93), 217A (14.03), 217B (14.10), 231A (15.31), 251D (15.48), 273A (17.62), 275E (17.70), 291G (18.35), 309A (20.17).**



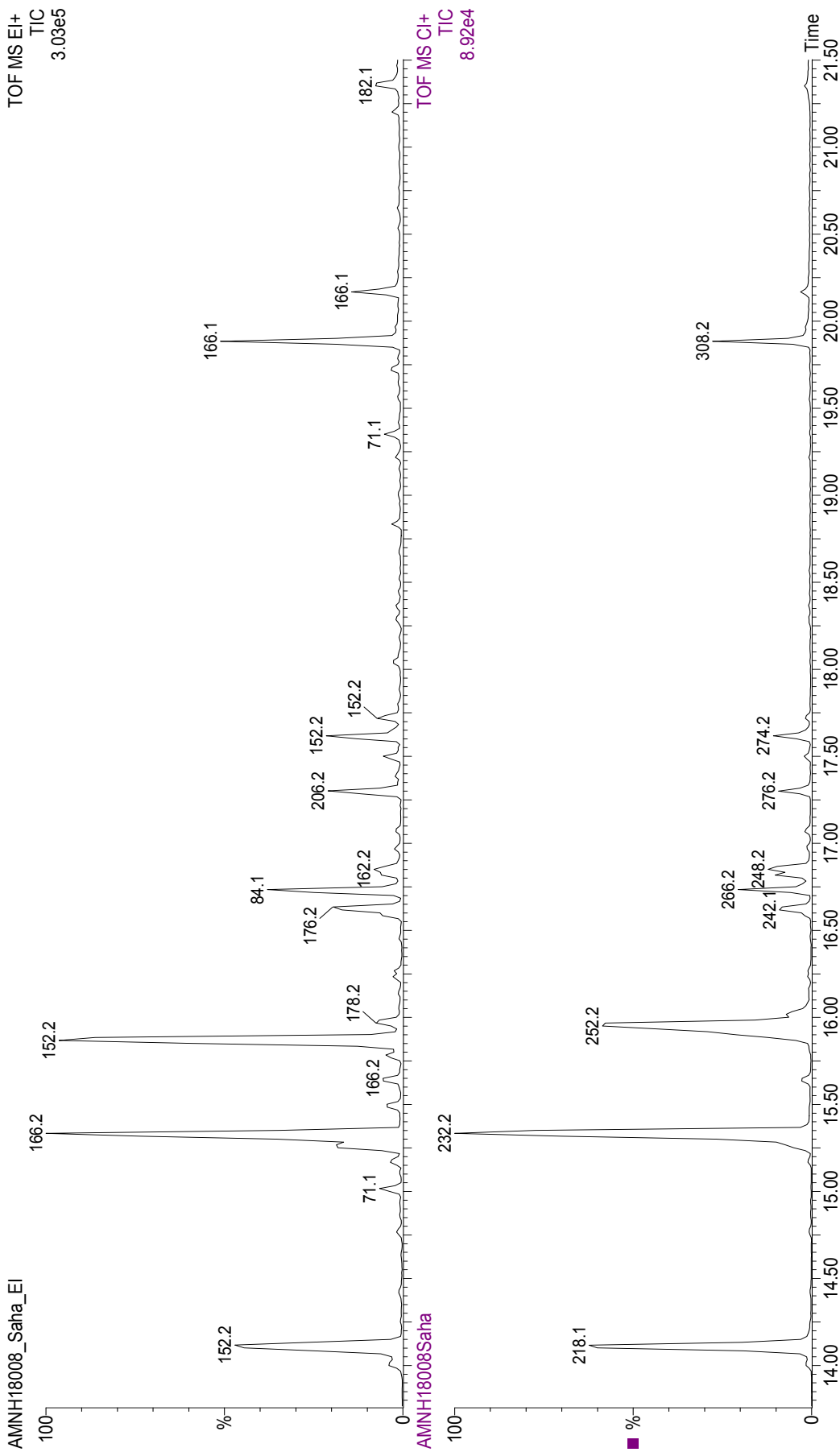
**S9. *Mantella madagascariensis* frog 'U4' from Vohiparara 2.**

**Major alkaloids: 265N (16.72), 267N (17.78).**

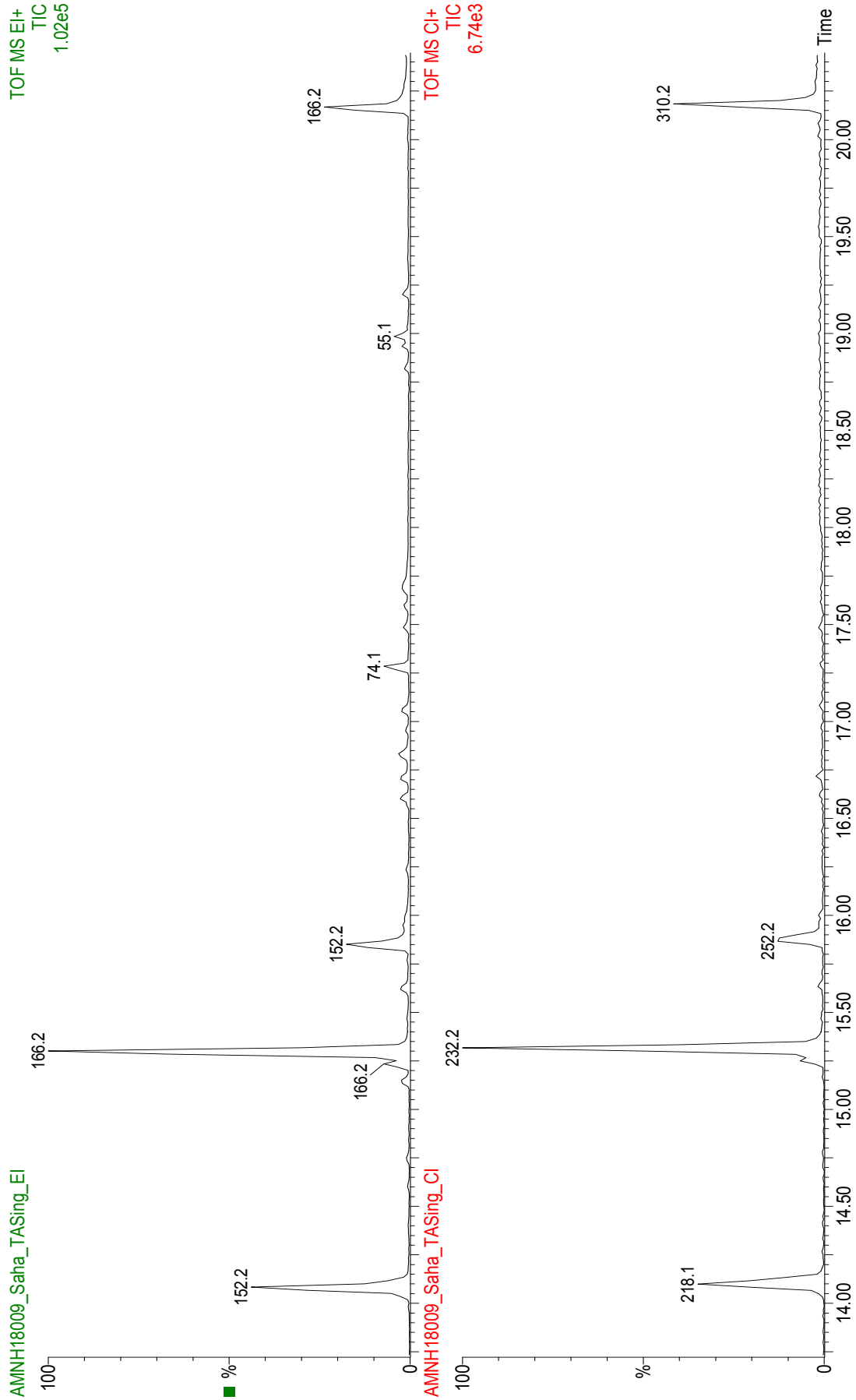
**Minor alkaloids: 203A (12.60), 205A (12.60), 217A (14.00), 223H'' (14.03), 217B (14.10), 236 (15.15), 236' (15.30), 251D (15.48), 237G (15.88), 239K (15.93), 237G' (16.33), 239K' (16.40), 222 (16.65), 275E (17.62), 307D (20.30).**



**S10. *M. baroni* frogs from Sahavondrona (January 1993, 17 combined skins; provided by John W. Daly)**  
**Major: 265N (16.73), 307A (19.88), 309A (20.22).**  
**Minor: 217B (14.10), 233A (15.25), 231A (15.32), 251D (15.48), 281G (17.35), 271F (17.50), 273A (17.62), 265F (18.07), 293D (18.35), 325A (21.63).**



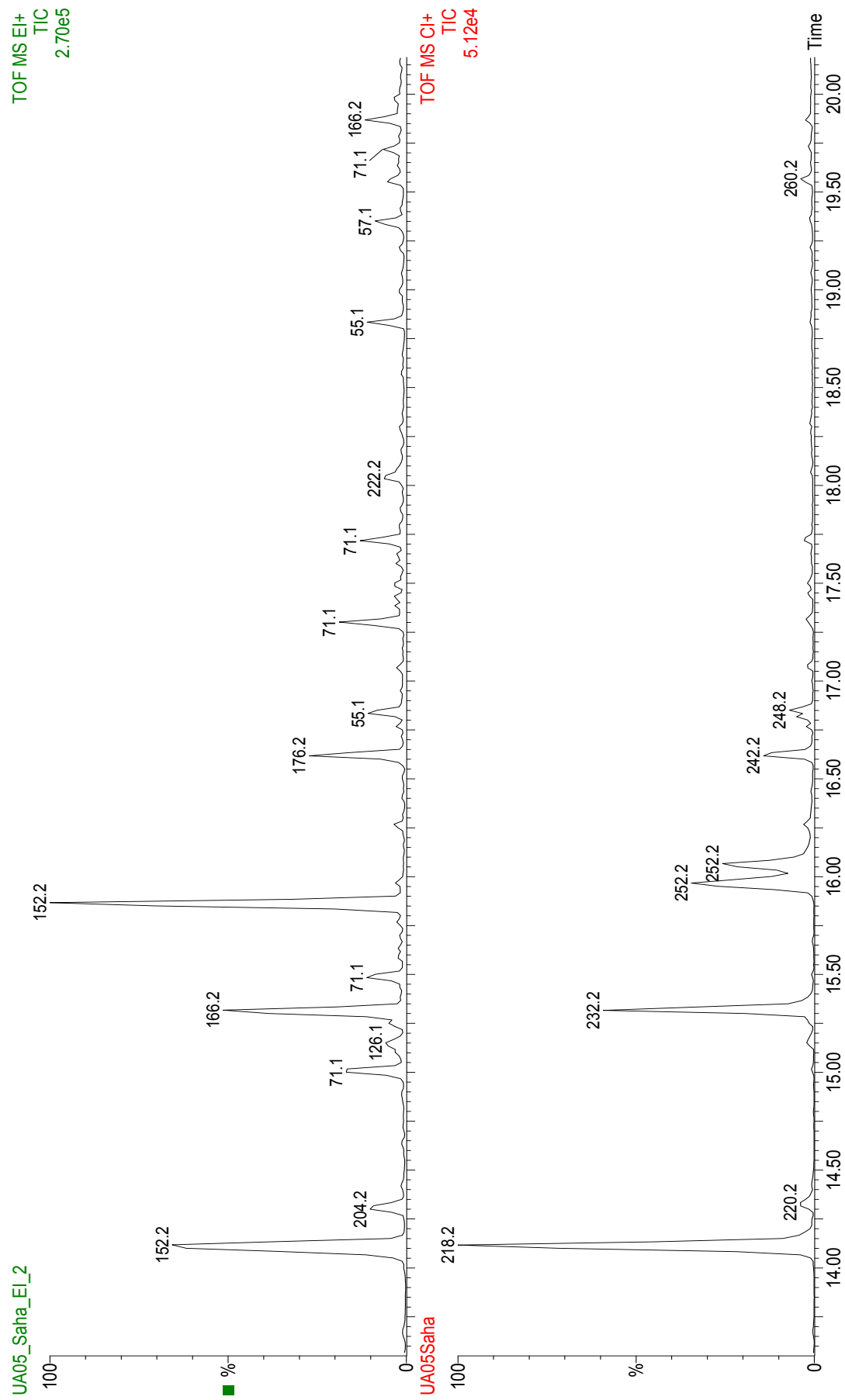
**S11. *M. baroni* frog '84' from Sahavondrona (AMNH field #18008)**  
**Major alkaloids: 231A (15.33), 251O (15.87).**  
**Minor alkaloids: 217B (14.10), 241F (16.63), 265N (16.73), 275C' (17.30), 273A (17.62), 307G (19.88), 309A (20.22).**



**S12. *M. baroni* frog '57' from Sahavondrona (AMNH field #18009)**

**Major alkaloids: 231A (15.30).**

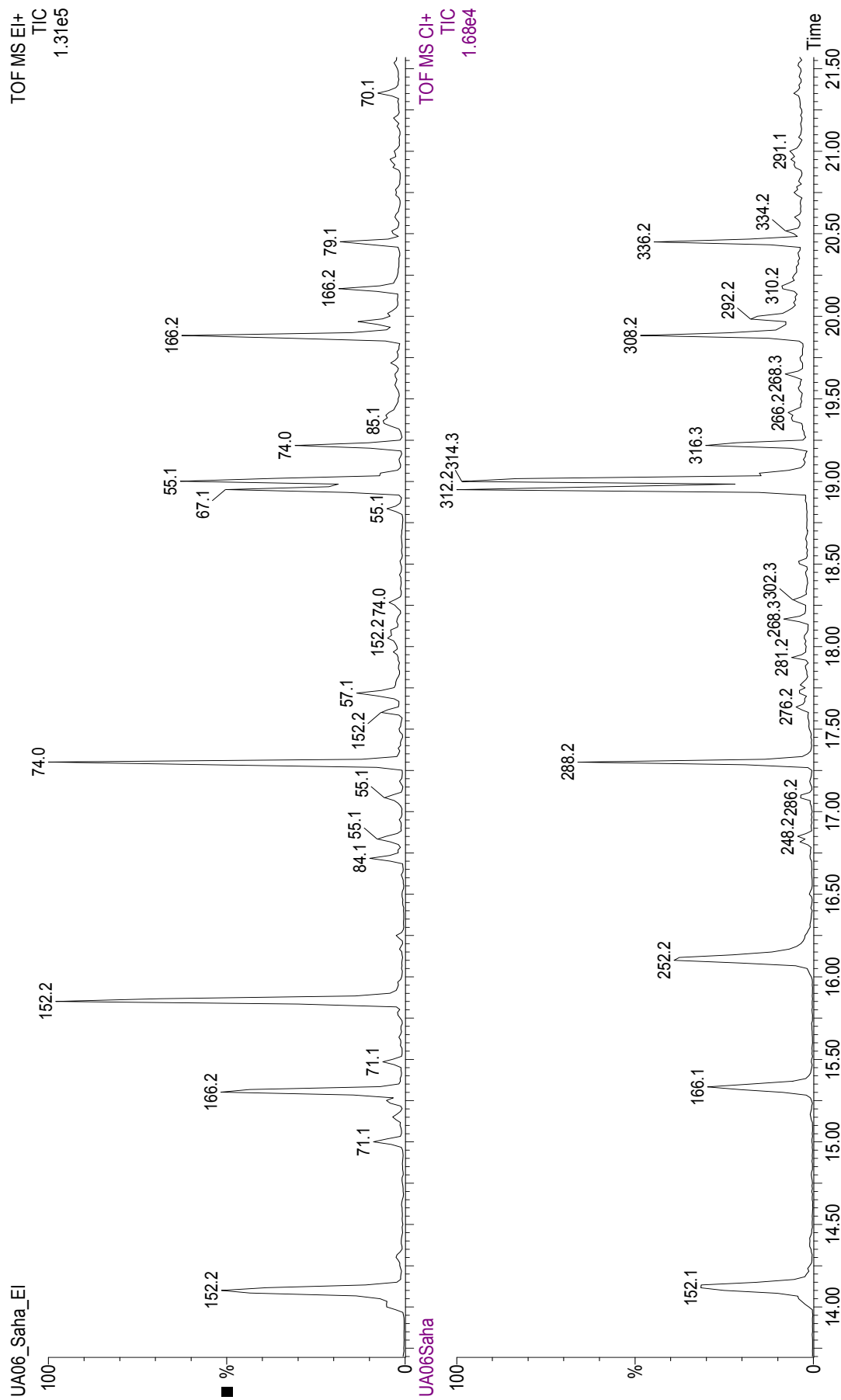
**Minor alkaloids: 217B (14.10), 251O (15.85), 309A (20.17).**



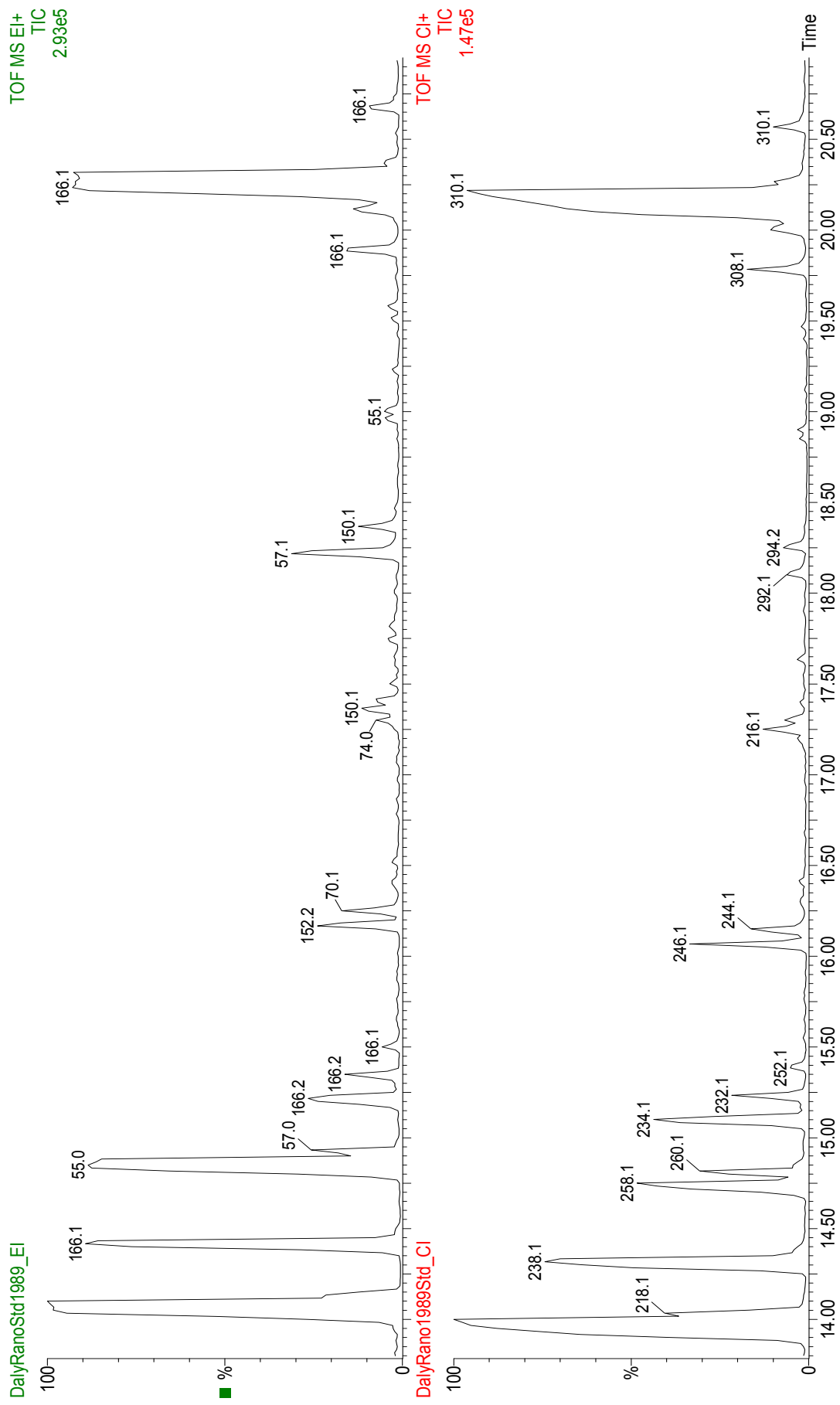
**S13. *M. baroni* frog 'U5' from Sahavondrona.**

**Major alkaloids: 251O (15.85).**

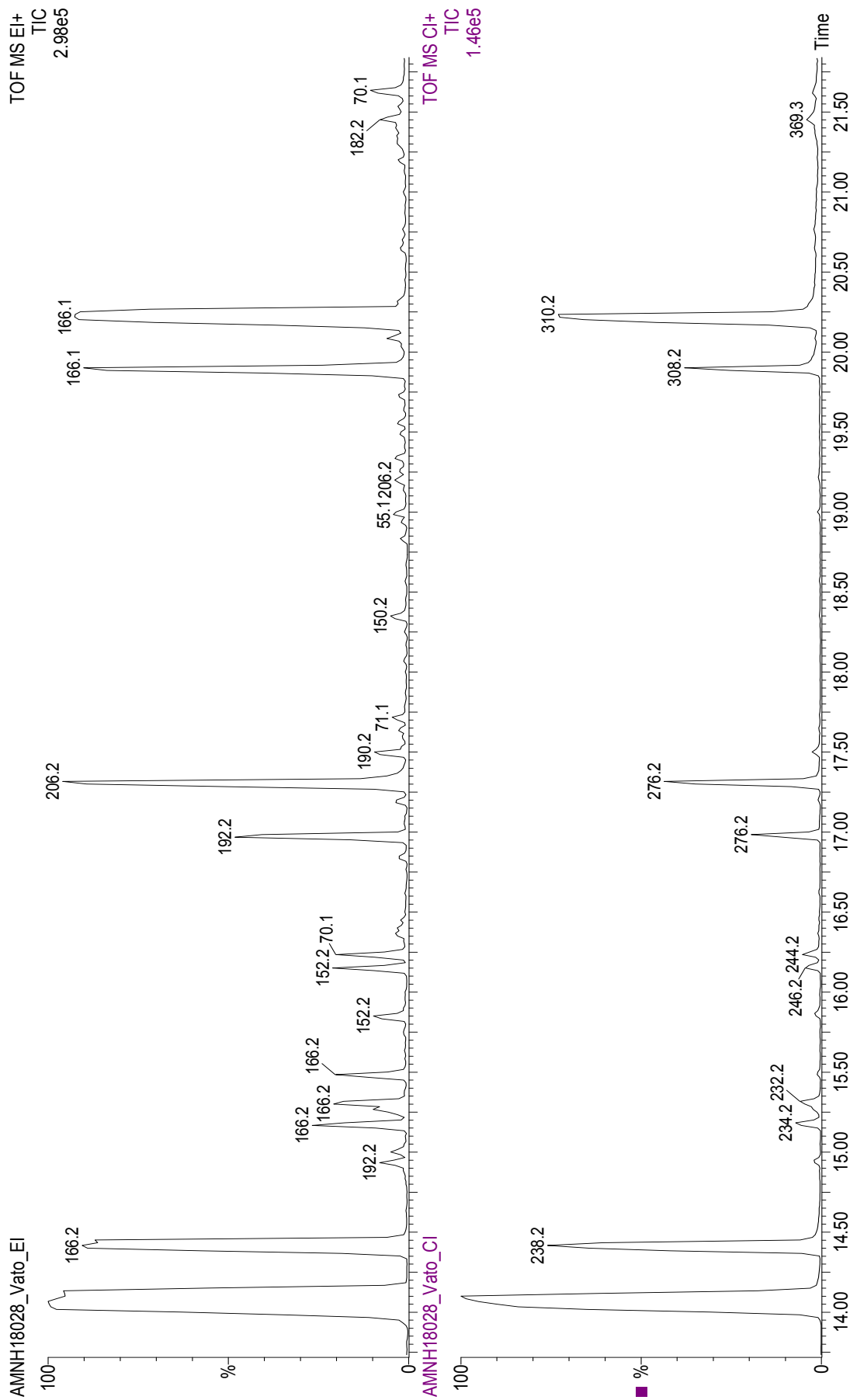
**Minor alkaloids: 217B (14.10), 231A (15.32), 241F (16.62), 307G (19.87).**



**S14. *M. baroni* frog 'U6' from Sahavondrona.**  
**Major alkaloids: 251O (15.85).**  
**Minor alkaloids: 217B (14.10), 231A (15.30), 265N (16.72), 307G (19.88), 309A (20.17).**



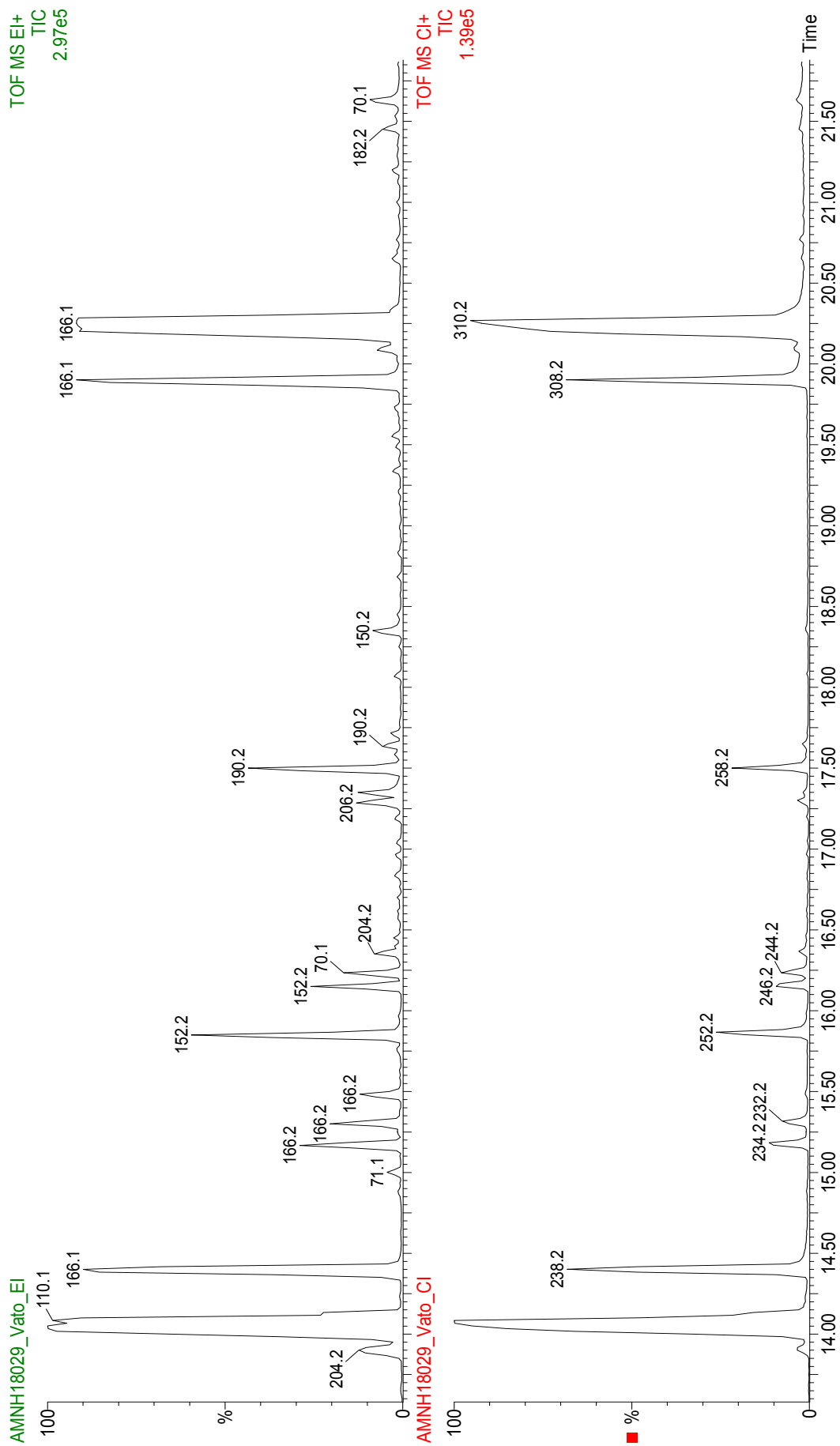
**S15. *M. baroni* frogs from Vatoharanana (December 1989, 10 combined skins; provided by John W. Daly).**  
**Major: 217A (14.00), 217B (14.10), 237A (14.42), 309A (20.23).**  
**Minor: 233A (15.22), 231A (15.33), 245C (16.17), 243D (16.25), 291E (18.47), 307G (19.88), 309C (20.68).**



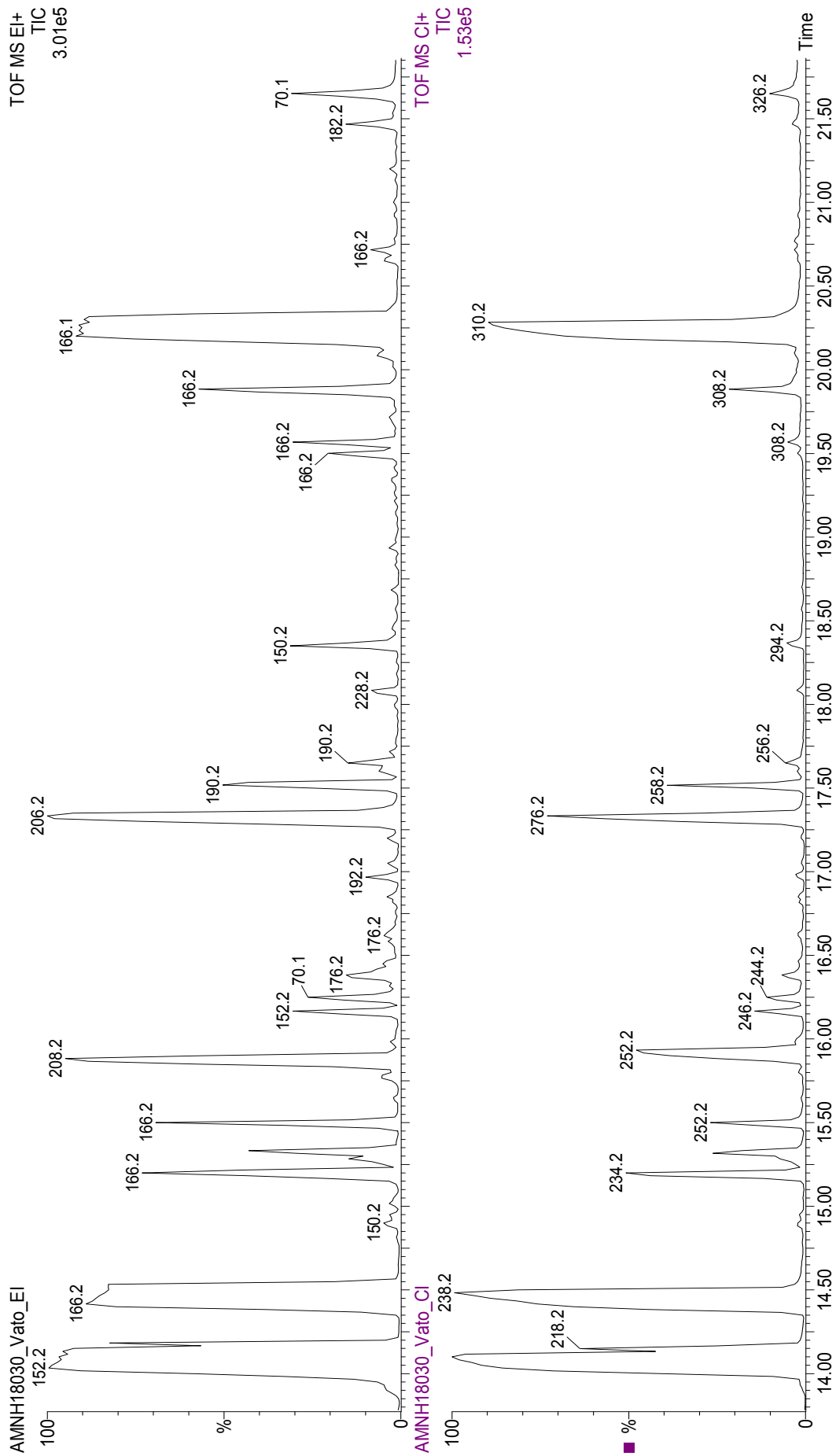
**S16. *M. baroni* frog '87' from Vatoharanana (AMNH field #18028).**

**Major: 217A (14.05), 217B (14.10), 237A (14.42), 307G (19.88), 309A (20.23).**

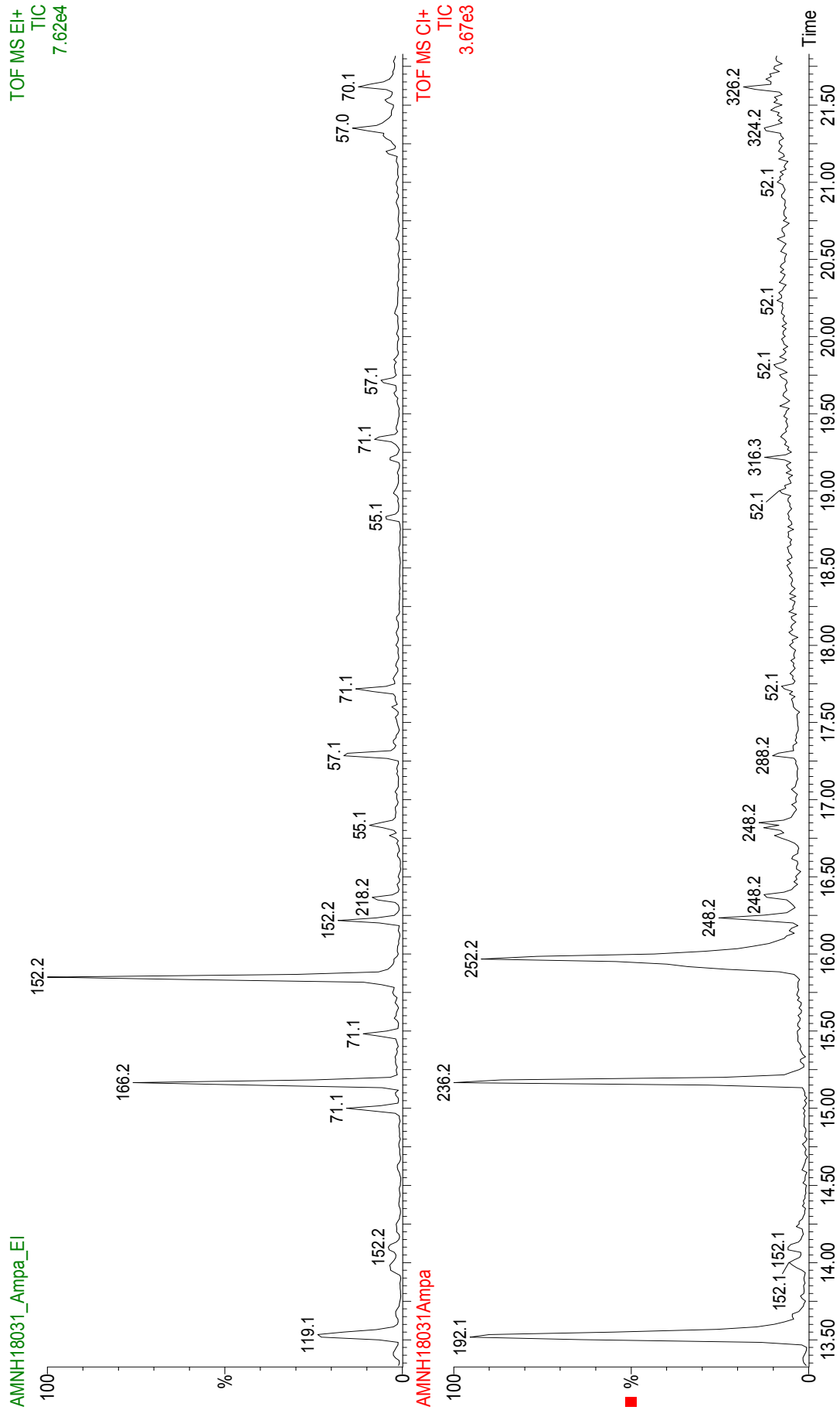
**Minor: 233A (15.17), 231A (15.30), 251D (15.48), 251O (15.85), 245C (16.17), 243D (16.24), 275C (16.97), 275C' (17.32), 325A (21.64).**



**S17. *M. baroni* frog '88' from Vatoharanana (AMNH field # 18029).**  
**Major: 217A (14.03), 217B (14.10), 237A (14.42).**  
**Minor: 233A (15.17), 231A (15.30), 251D (15.48), 245C (16.15), 243D (16.23), 275C' (17.29), 257D (17.50), 307G (19.90), 309A (20.25), 325A (21.64).**



**S18. *M. baroni* frog '89' from Vatoharanana (AMNH field # 18030).**  
**Major: 217A (14.03), 217B (14.18), 237A (14.42), 233A (15.20), 251D (15.50), 251O (15.88), 275C' (17.33).**  
**Minor: 231A (15.33), 245C (16.17), 243D (16.25), 275C (16.97), 257D (17.52), 255B (17.65), 293D (18.35), 307F'' (19.50), 307F''' (19.57), 307G (19.88), 309A (20.20), 323B (21.47), 325A (21.65).**

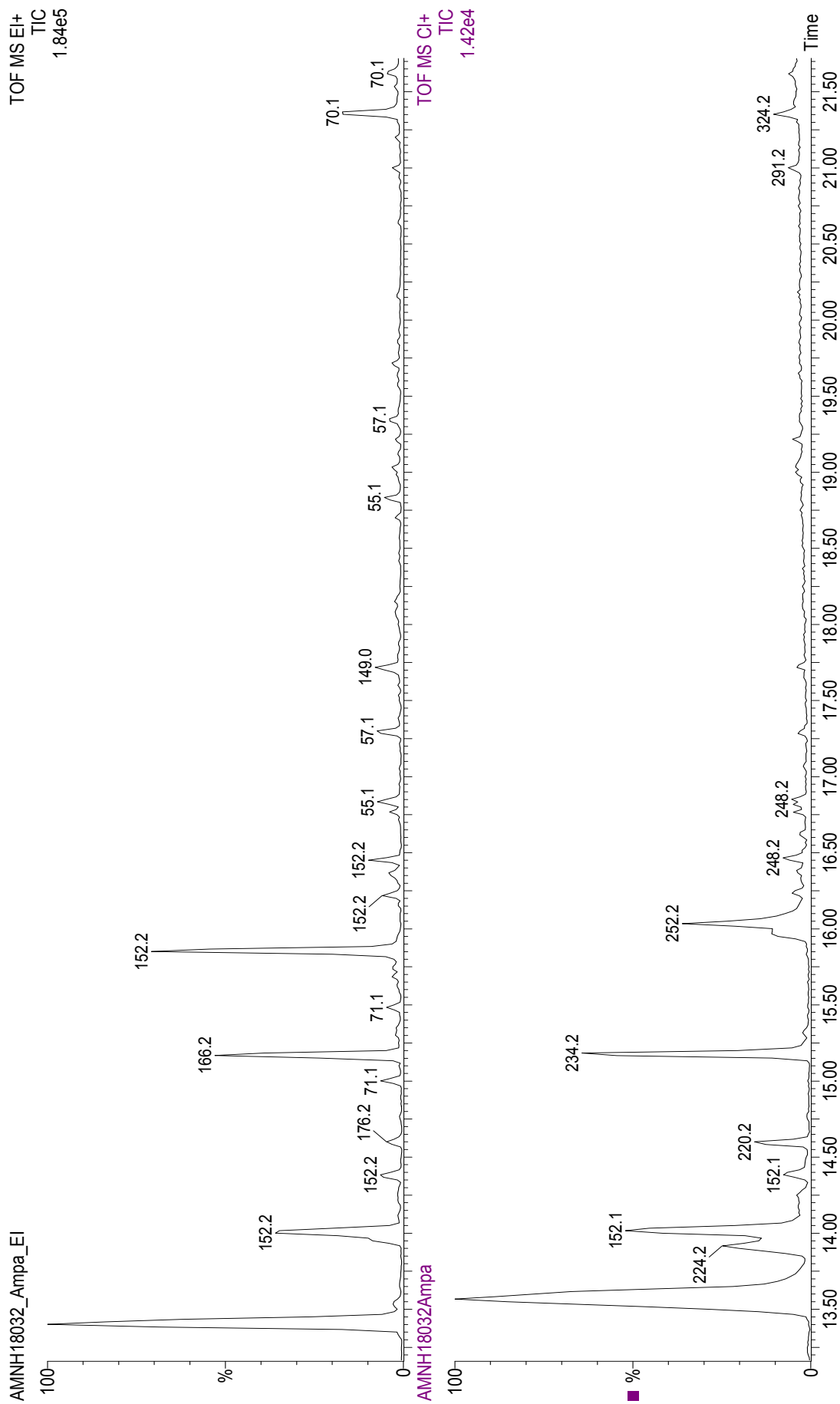


**S19. *M. bernhardi* frog '90' from Ampasimpotsy (AMNH field # 18031).**

**Major: 233A (15.18), 251O (15.85).**

**Minor: 245C (16.23), 323B (21.35), 325A (21.62).**

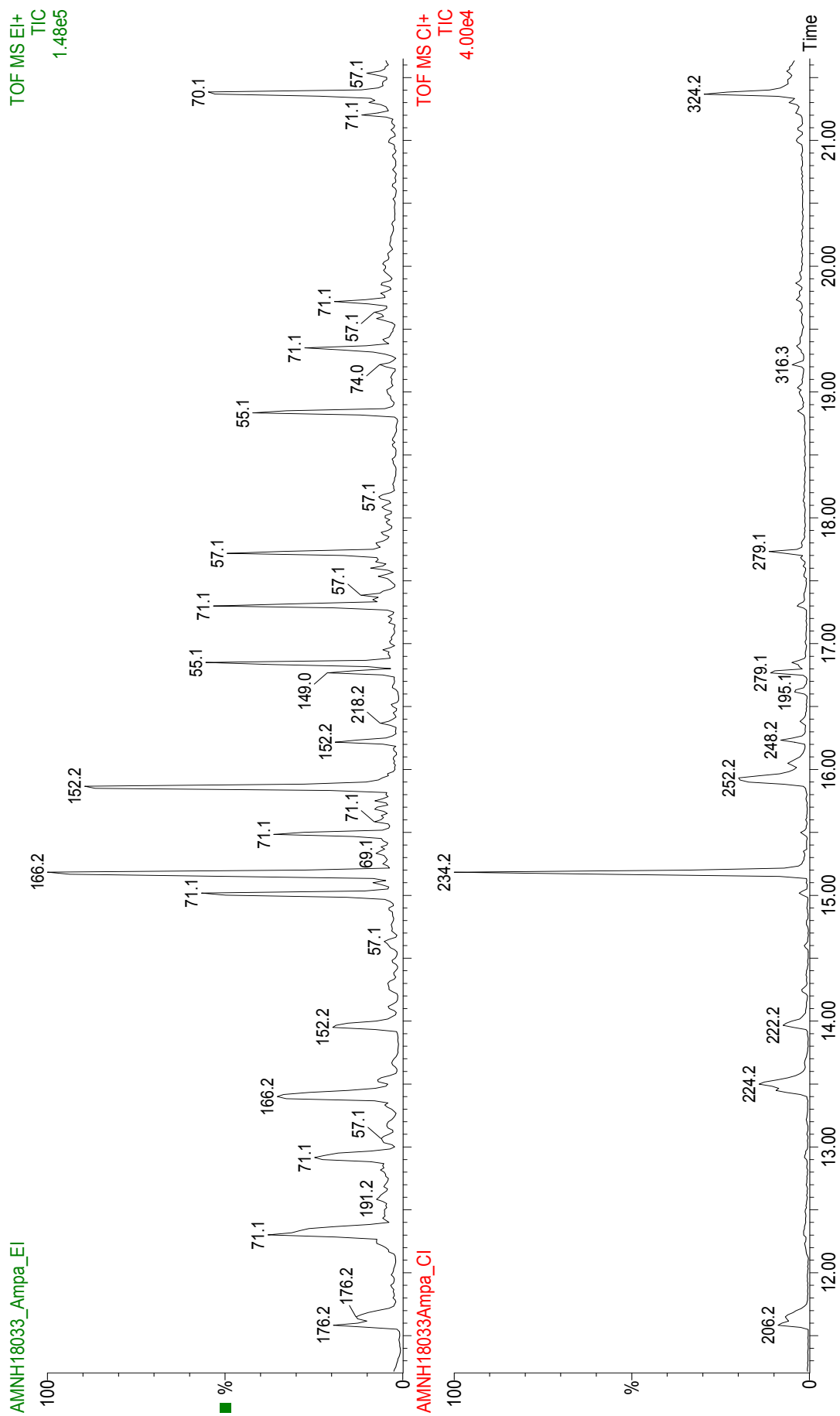
TOF MS EI+  
TIC  
1.84e5



S20. *M. bernhardi* frog '91' from Ampasimpotsy (AMNH field # 18032).

Major: 251O (15.85).

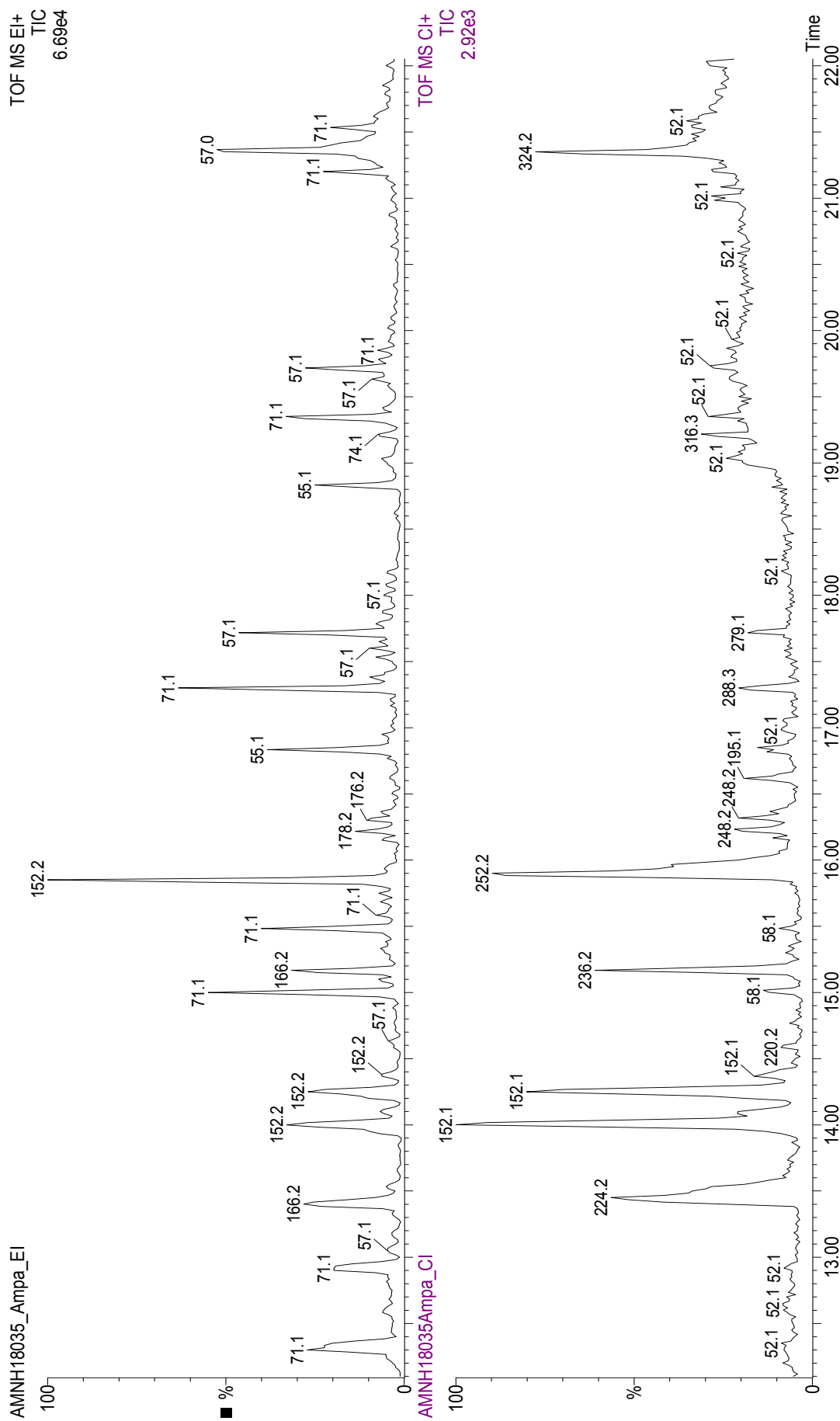
Minor: 223H" (13.98), 217A (14.00), 233A (15.17), 245C (16.23), 323B (21.34).



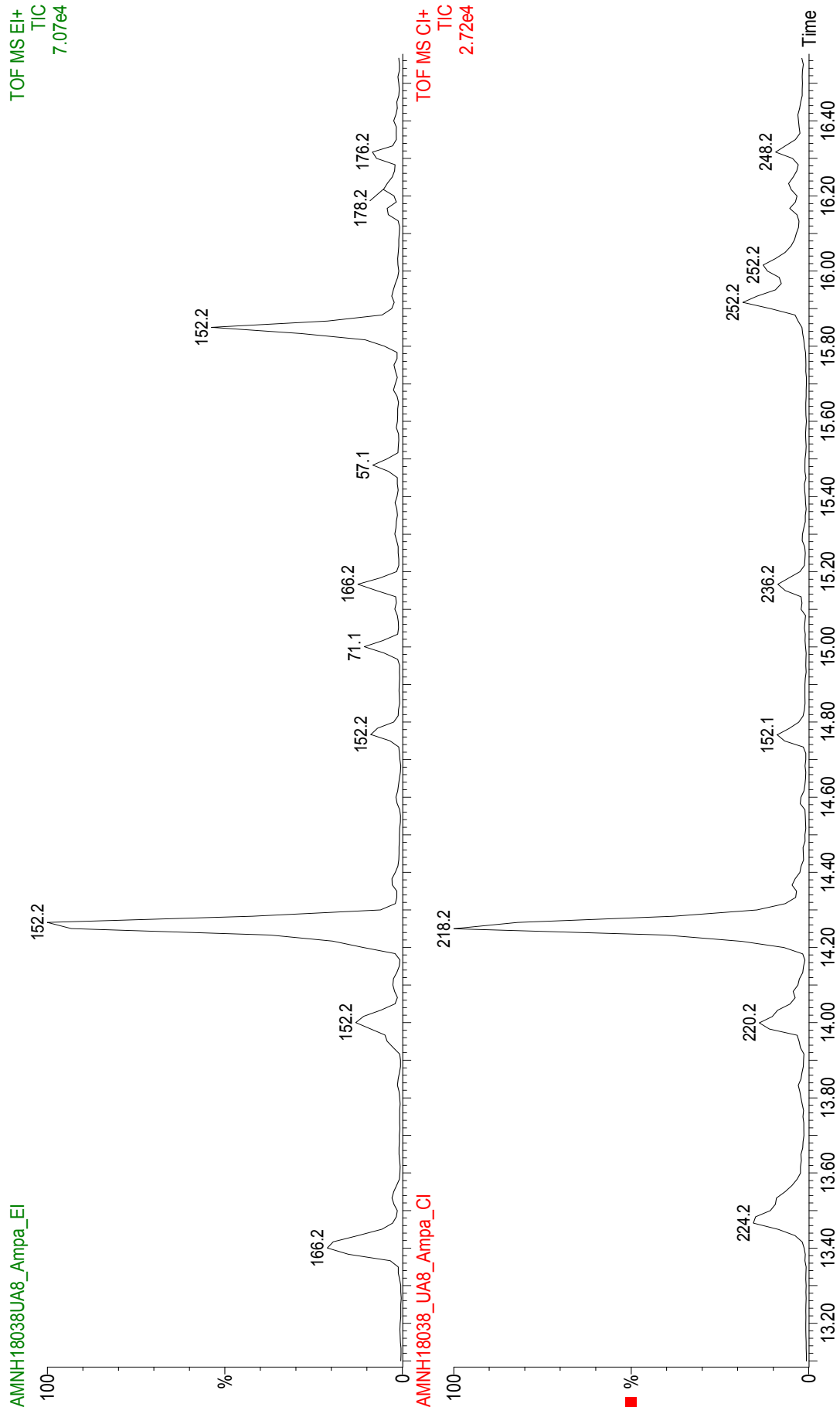
**S21. *M. bernhardi* frog '92' from Ampasimpotsy (AMNH field # 18033).**

**Major: 233A (15.18), 251O (15.87).**

**Minor: 223B (13.53), 219F and 221I (13.95), 245C (16.23), 323B (21.39).**



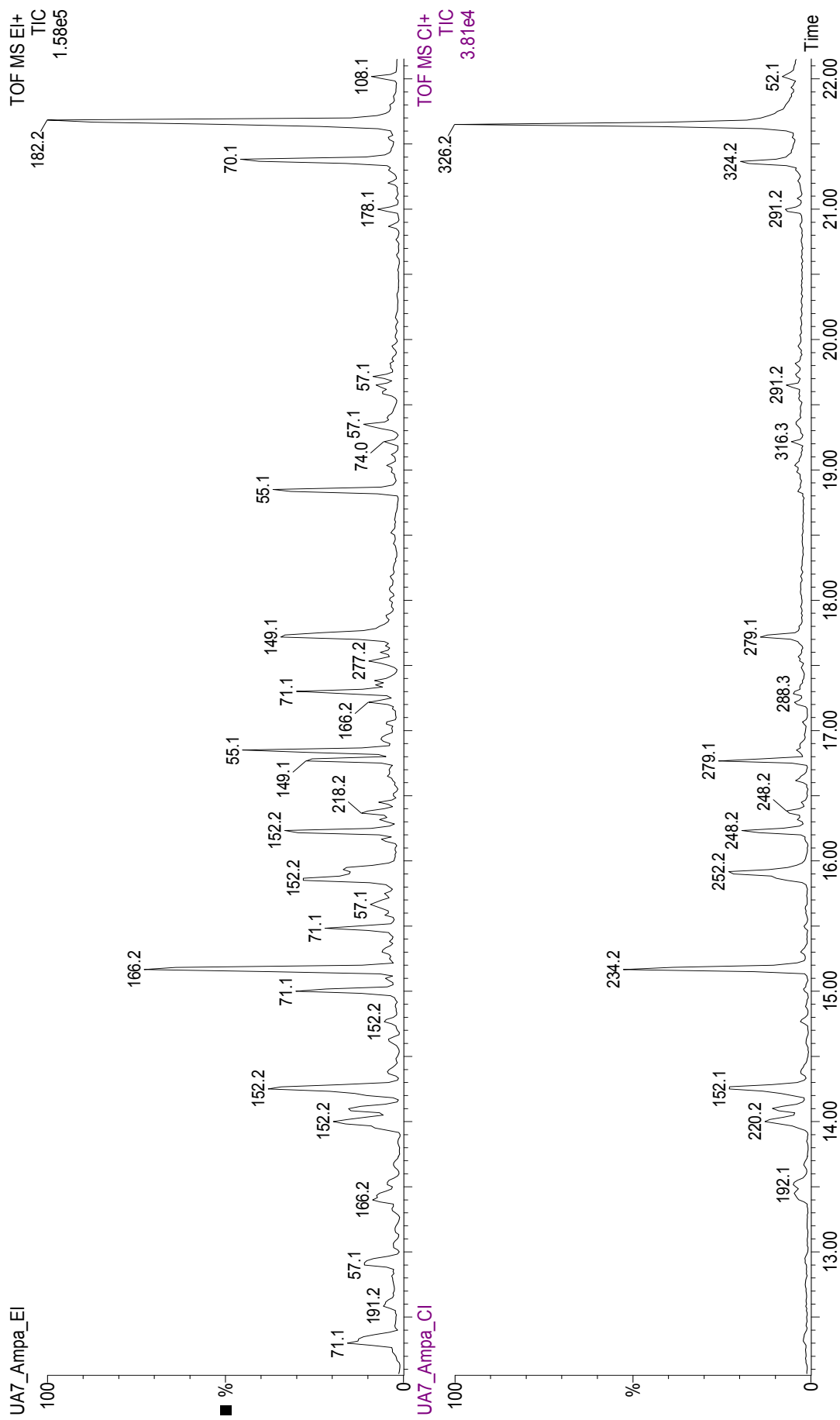
**S22. *M. bernhardi* frog '93' from Ampasimpotsy (AMNH field # 18035).**  
Major: 251O (15.85).  
Minor: 223B (13.40), 217A + 219F + 221I (14.00), 233A (15.17), 245B and 245C (16.22), 323B (21.37).



**S23. *M. bernhardi* frog 'U8' from Ampasimpotsy (AMNH field # 18038, deposited at UADBA).**

**Major: 217B' (14.27).**

**Minor: 223B (13.40), 217A + 219F + 221I (14.00), 233A (15.17), 251O (15.85).**



**S24. *M. bernhardi* frog 'U7' from Ampasimpotsy**  
**Major: 233A (15.17), 325A (21.68).**  
**Minor: 217A + 219F + 221I (14.00), 217B (14.10), 217B' (14.25), 251O (15.85), 245B + 245C + 247E (16.23), 323B (21.38).**