Mass Spectrometric Fingerprints of Organic Compounds in Sulfate-Rich Ice Grains: Implications for Europa Clipper

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Supplementary Information

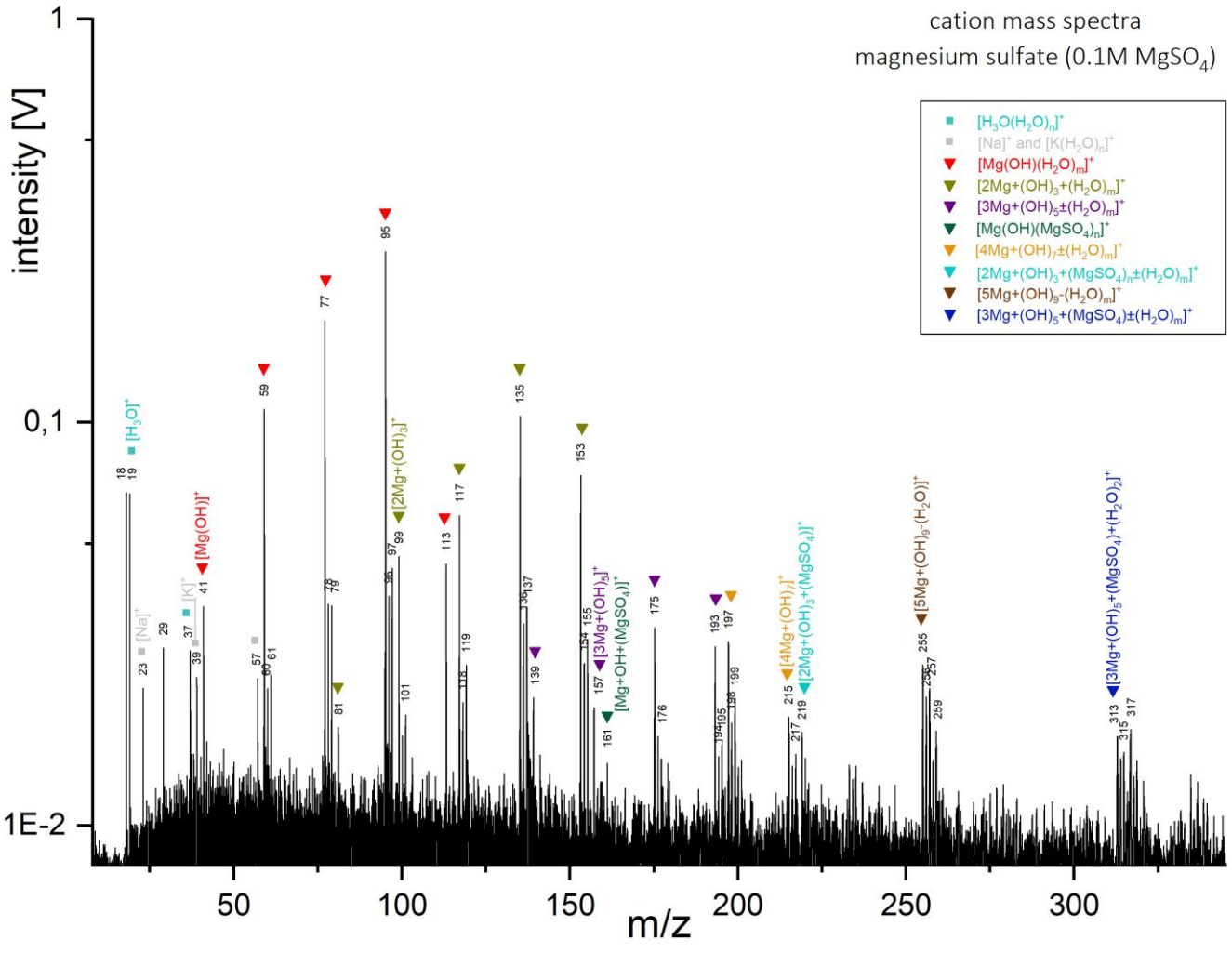

Figure S1. Baseline corrected cation mass spectrum of magnesium sulfate ($MgSO_4$) at a concentration of 0.1M, generated with a delay time of 5.0 µs.

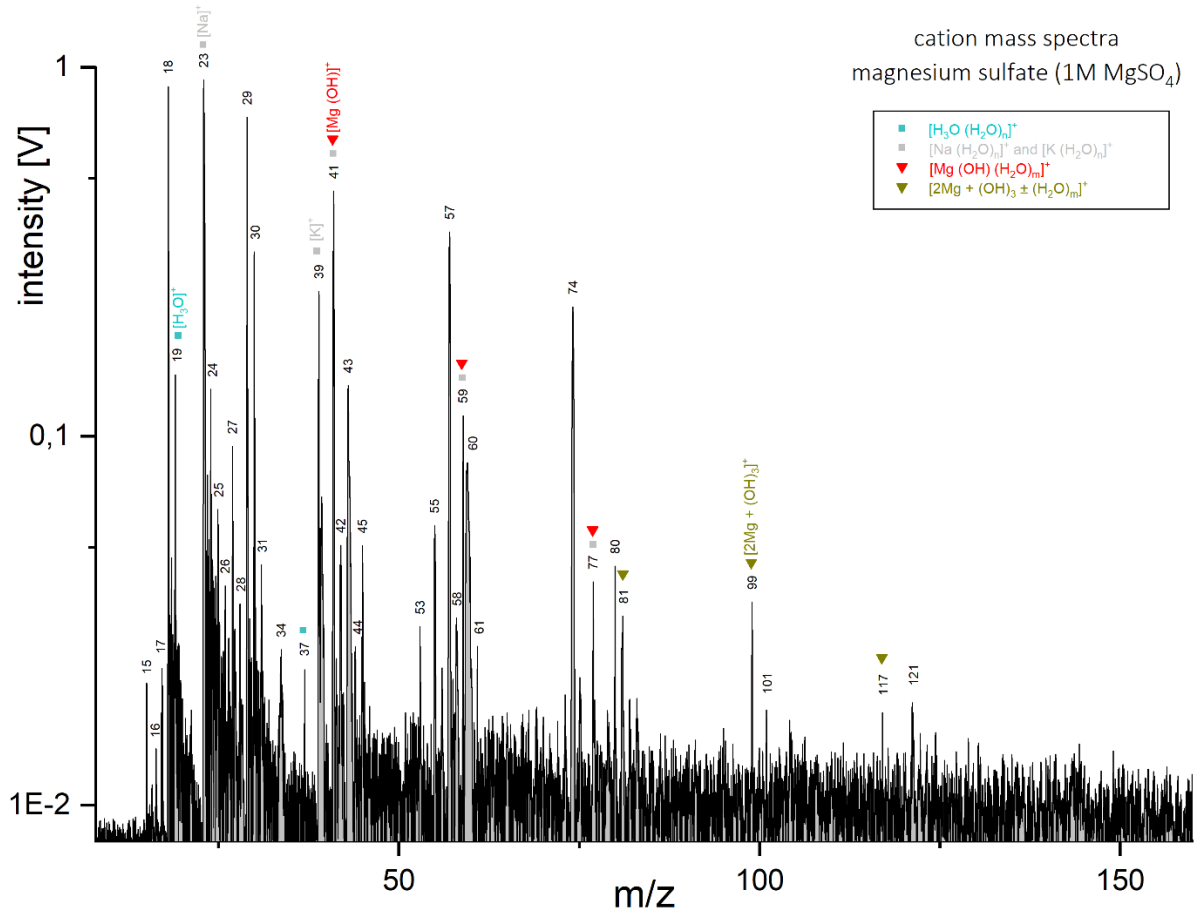

Figure S2. Baseline corrected cation mass spectrum of magnesium sulfate ($MgSO_4$) at a concentration of 1M, generated with a delay time of 6.0 µs.

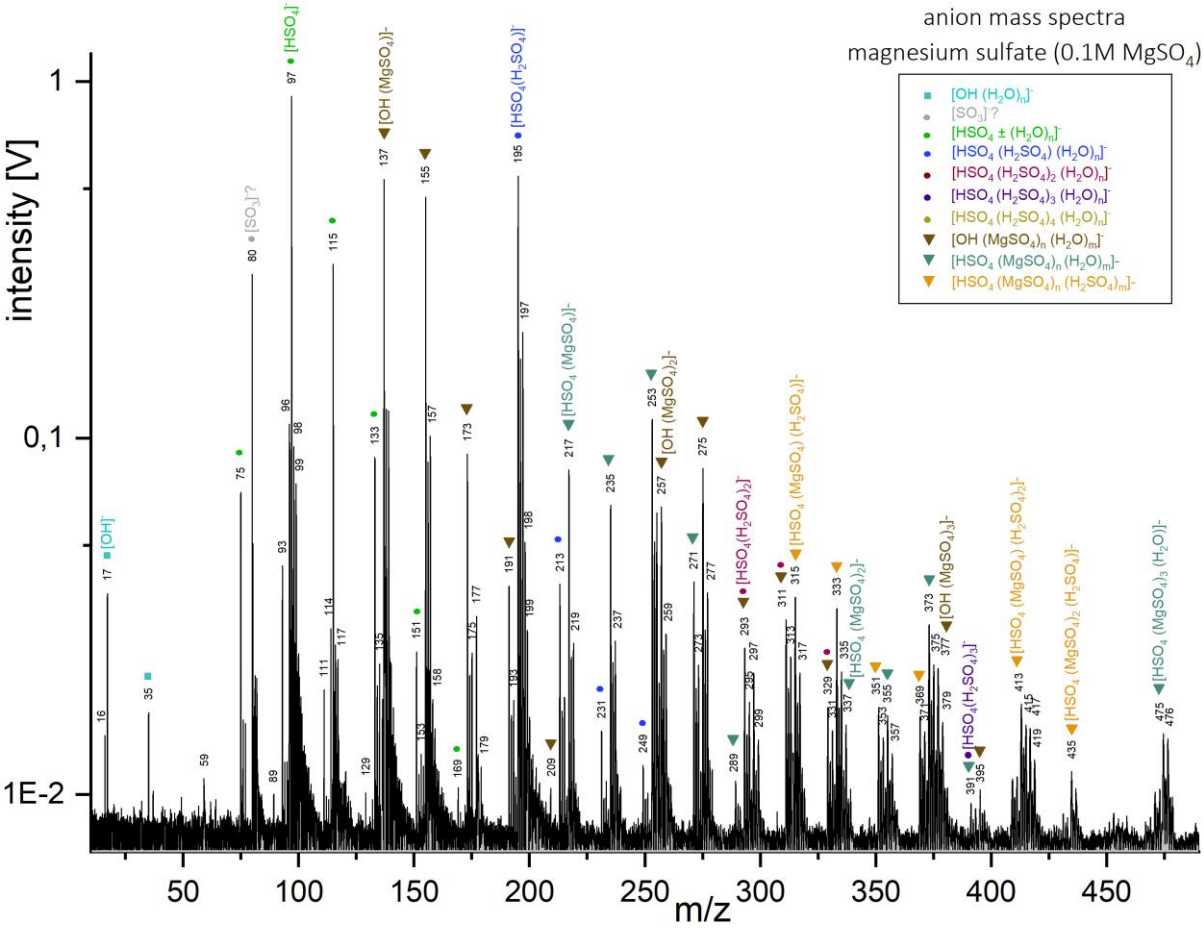

Figure S3. Baseline corrected anion mass spectrum of magnesium sulfate ($MgSO_4$) at a concentration of 0.1M, generated with a delay time of 6.0 µs.

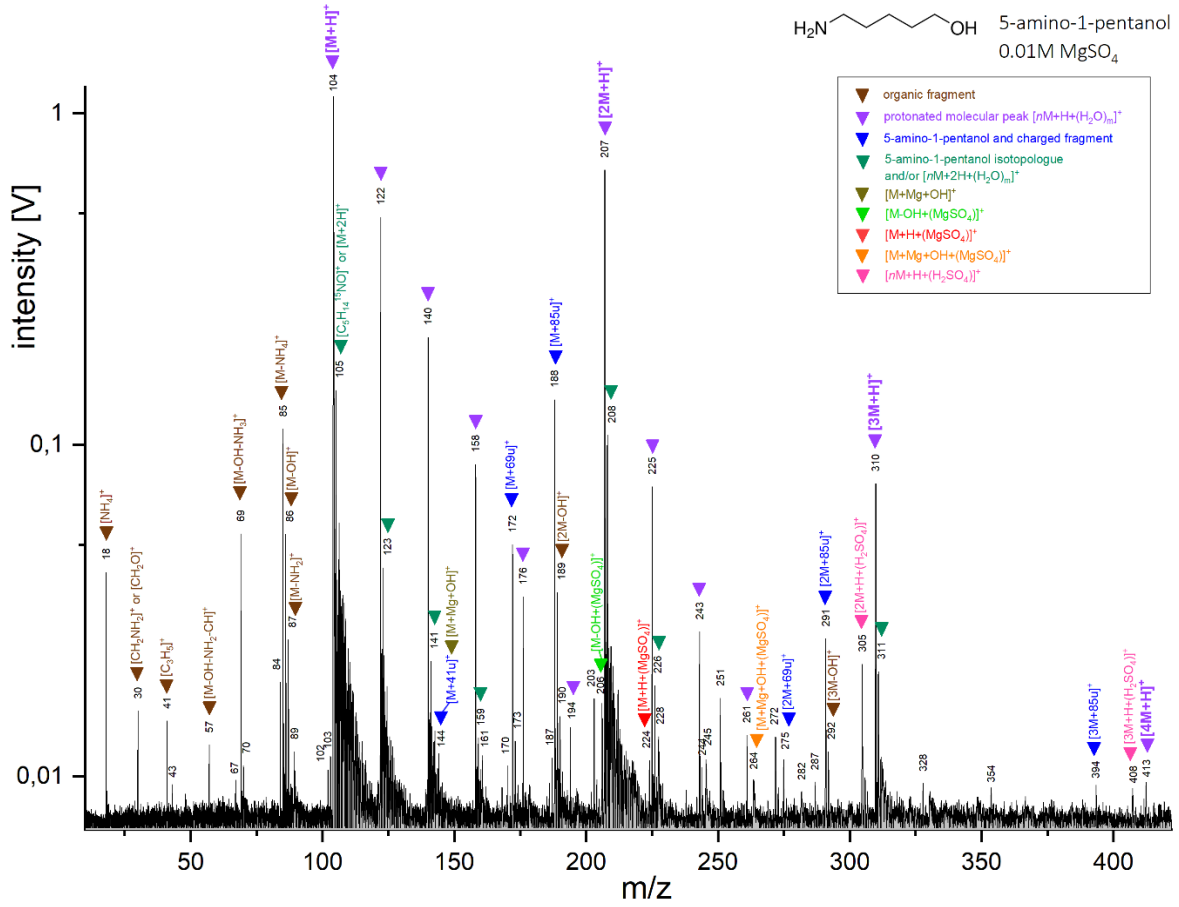

Figure S4. Baseline corrected cation mass spectrum of 5-amino-1-pentanol (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 6.4 µs.

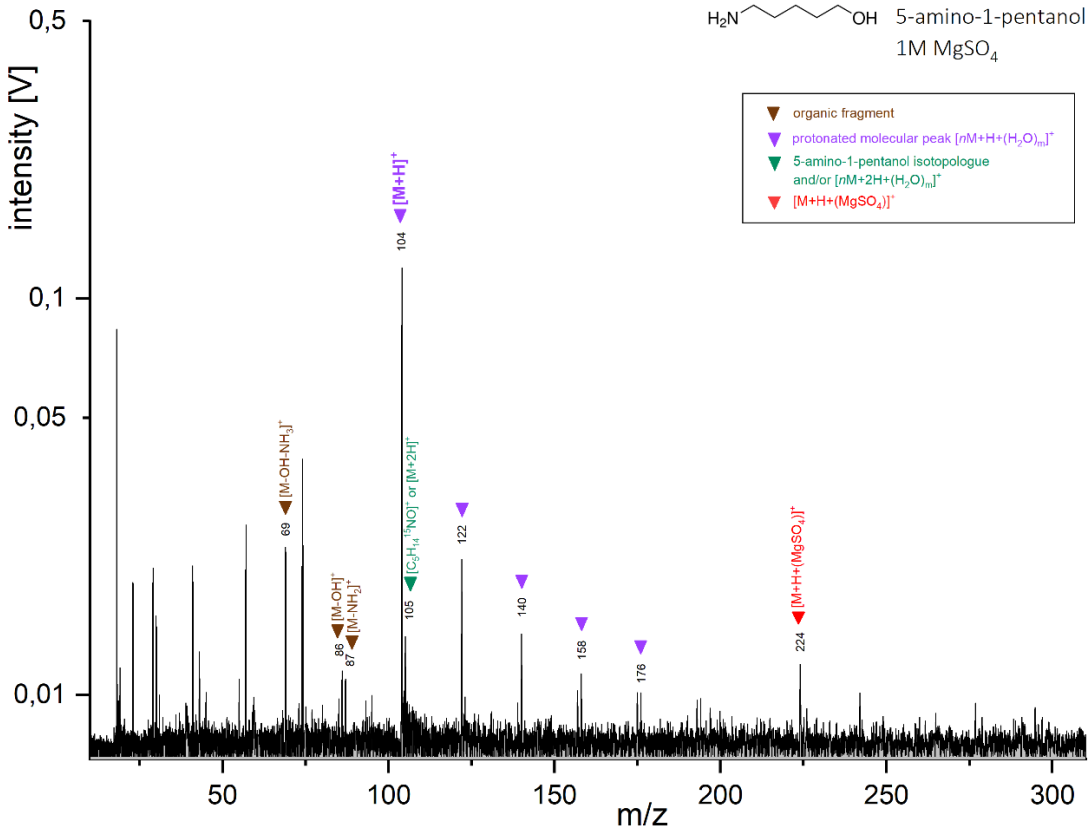

Figure S5. Baseline corrected cation mass spectrum of 5-amino-1-pentanol (concentration 0.1 wt%) in 1M magnesium sulfate ($MgSO_4$), generated with a delay time of 7.2 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

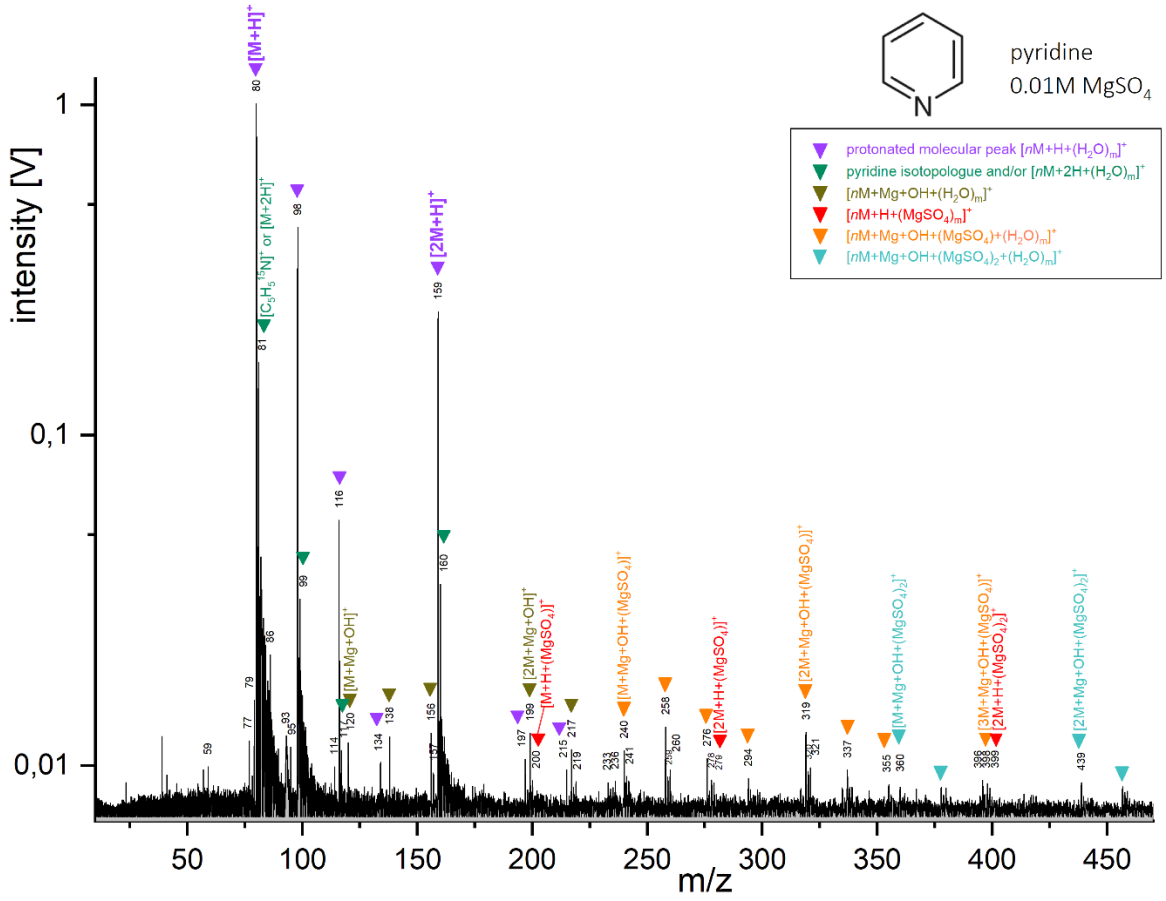

Figure S6. Baseline corrected cation mass spectrum of pyridine (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 6.0 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

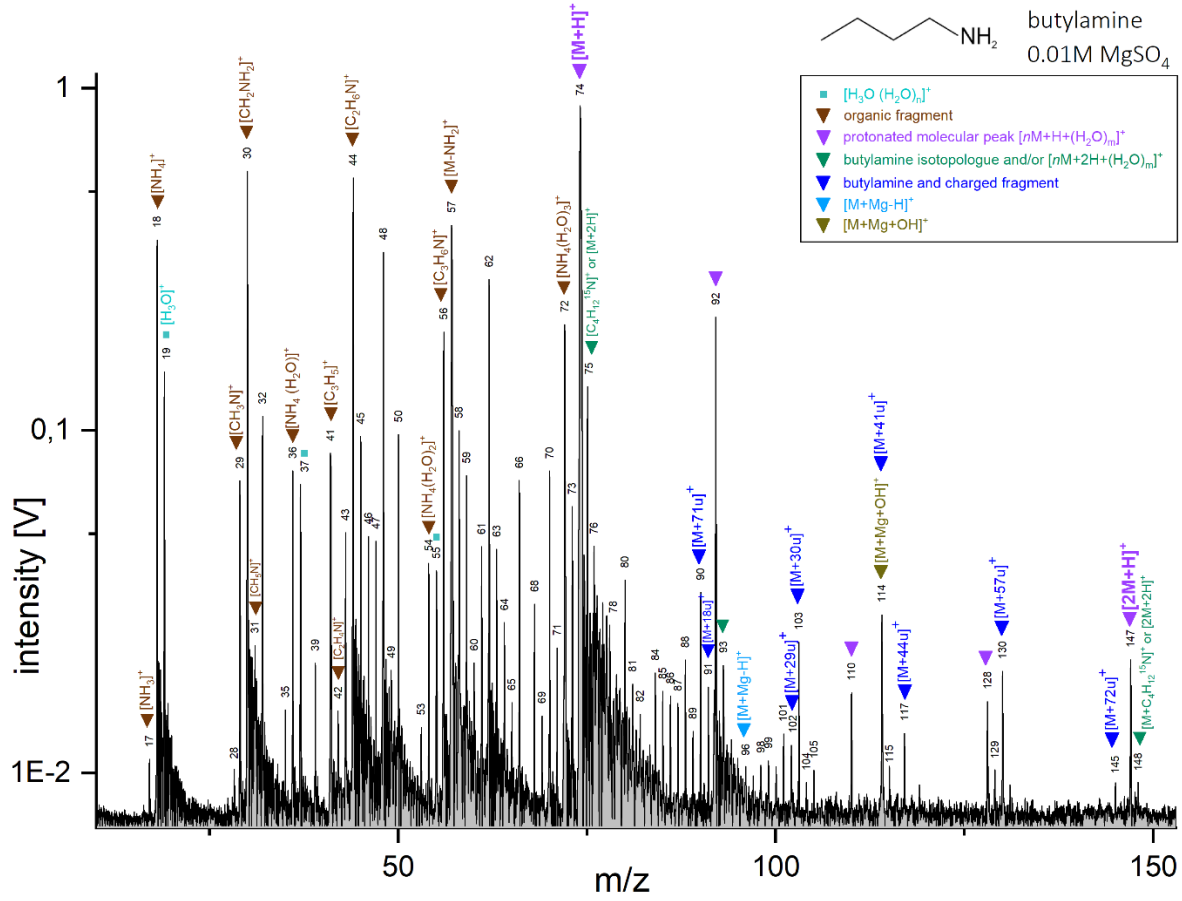

Figure S7. Baseline corrected cation mass spectrum of butylamine (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 5.5 µs.

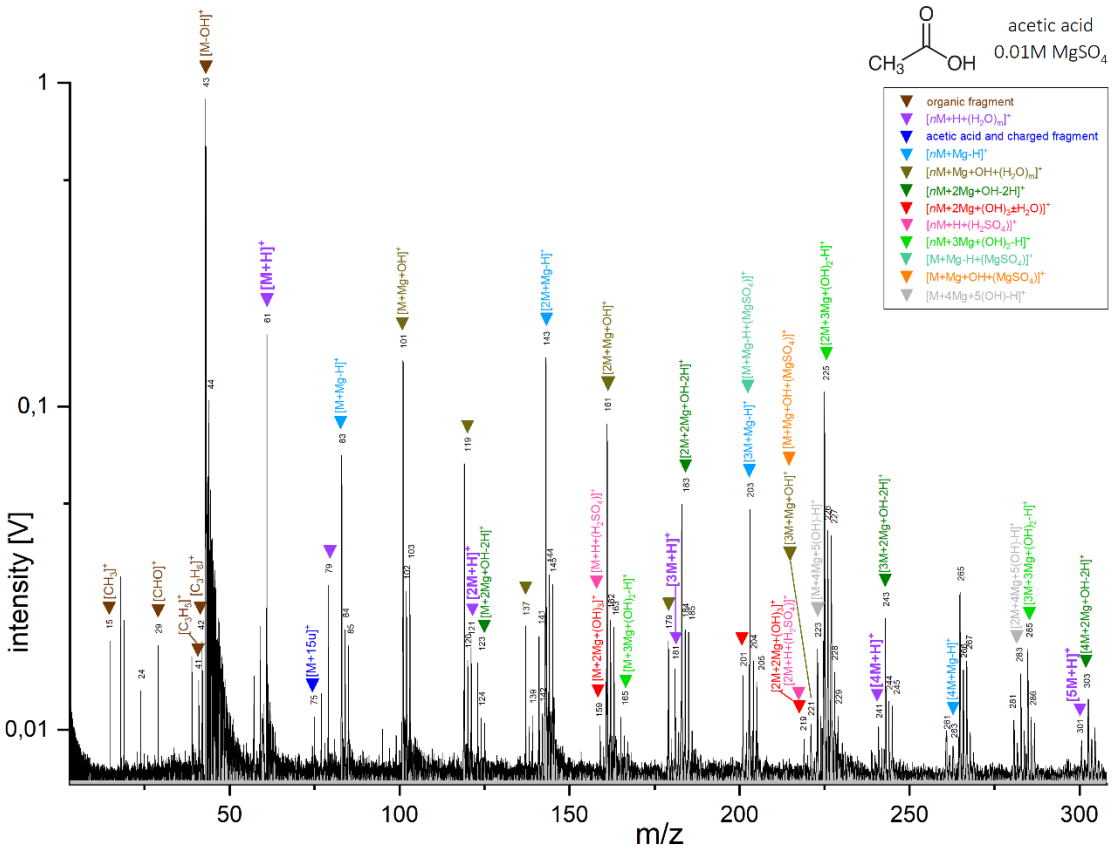

Figure S8. Baseline corrected cation mass spectrum of acetic acid (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 5.0 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

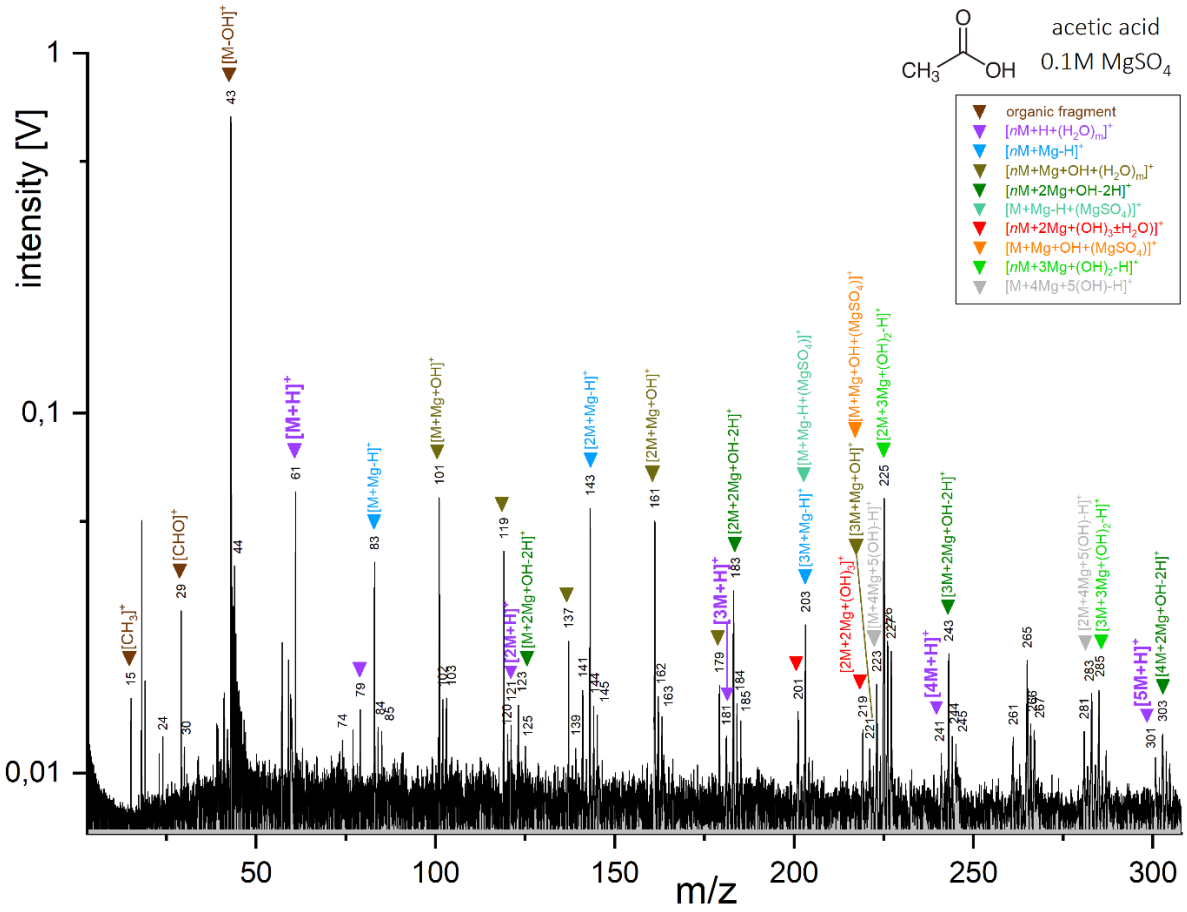

Figure S9. Baseline corrected cation mass spectrum of acetic acid (concentration 5 wt%) in 0.1M magnesium sulfate ($MgSO_4$), generated with a delay time of 5.0 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

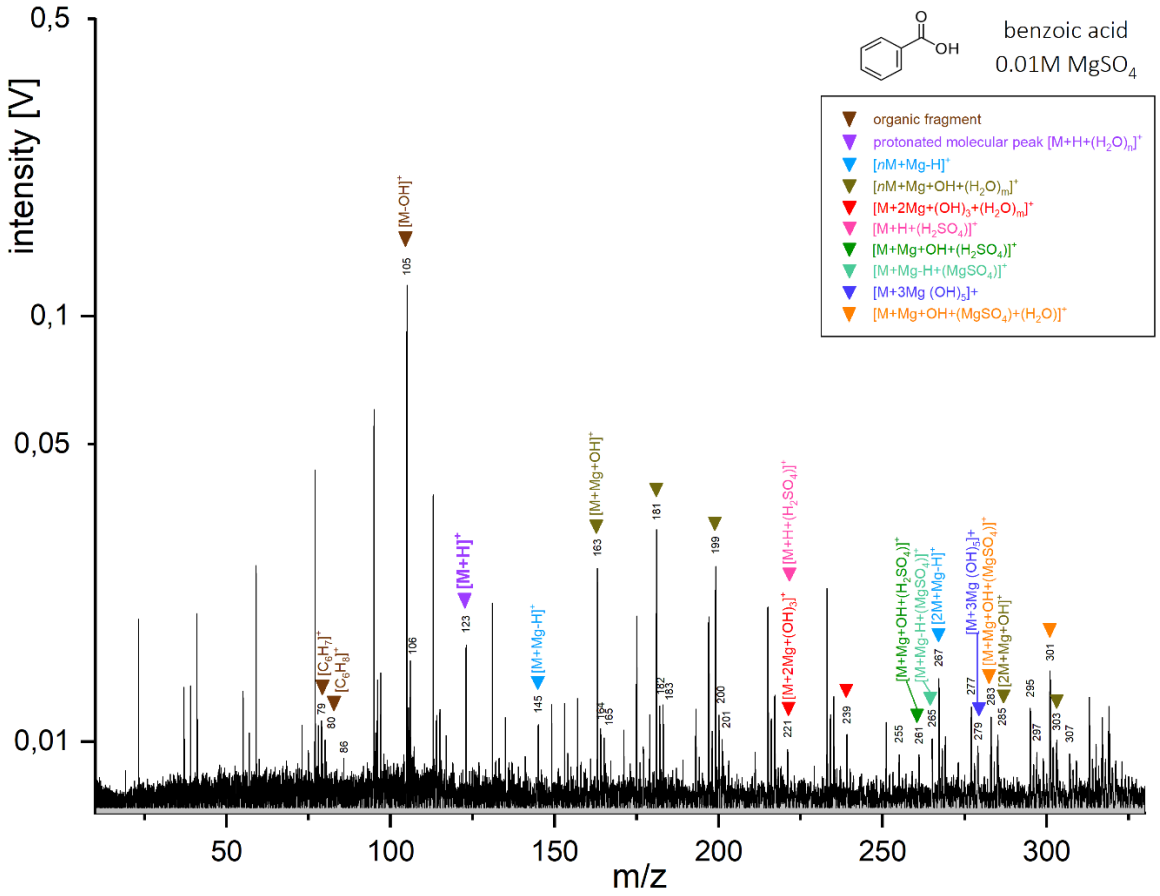

Figure S10. Baseline corrected cation mass spectrum of benzoic acid (concentration 0.17 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 5.8 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

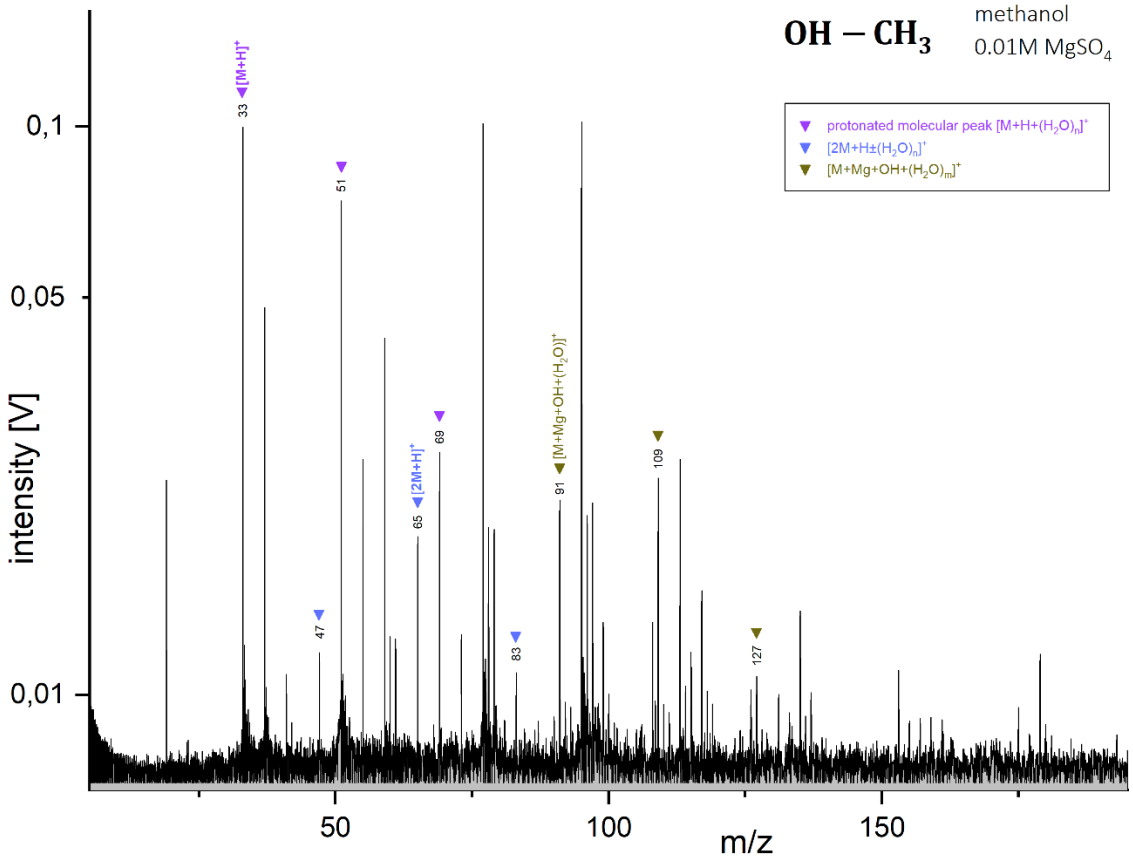

Figure S11. Baseline corrected cation mass spectrum of methanol (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 5.5 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

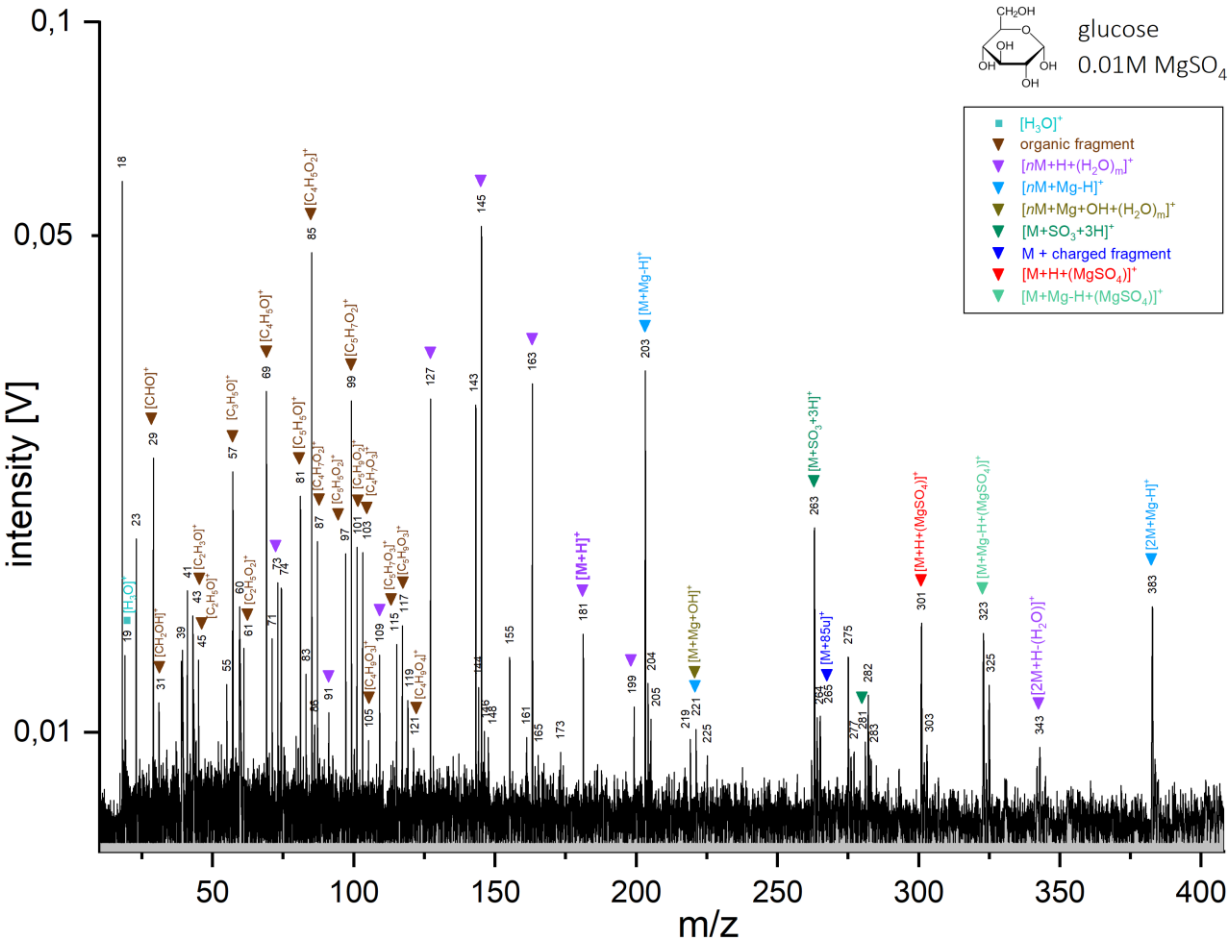

Figure S12. Baseline corrected cation mass spectrum of glucose (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 6.0 µs.

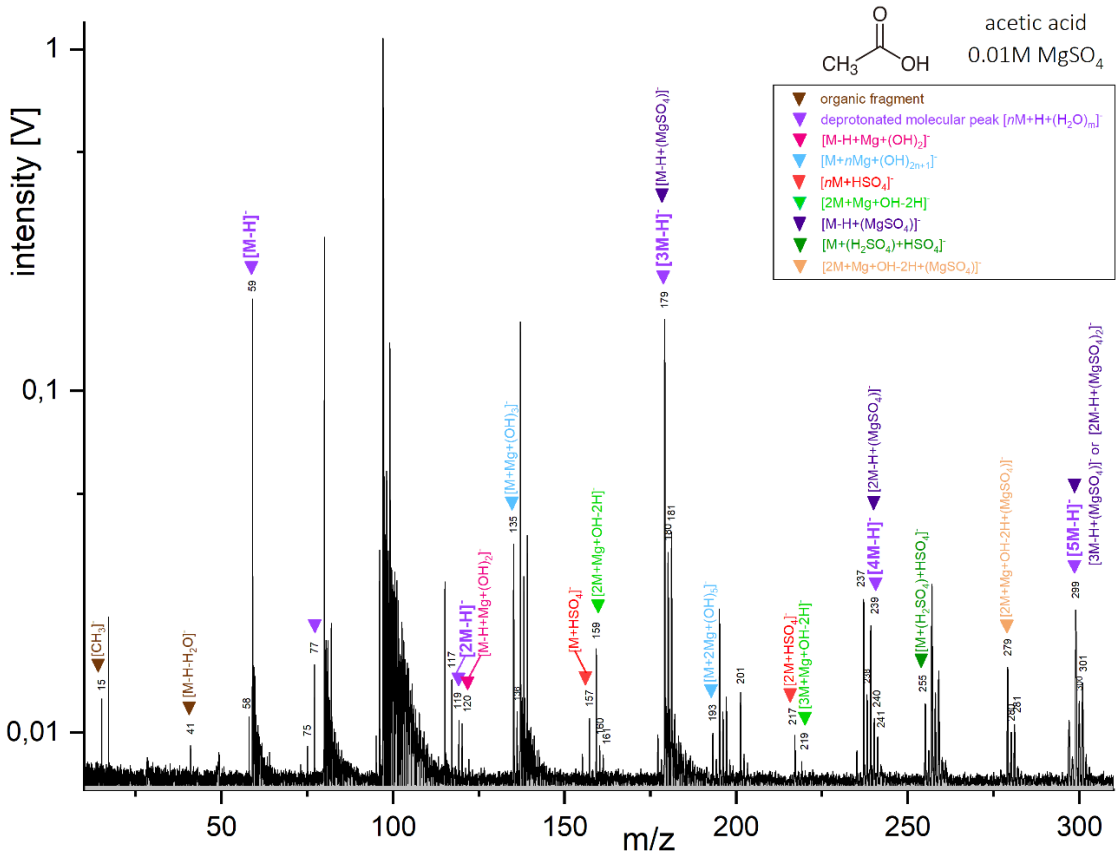

Figure S13. Baseline corrected anion mass spectrum of acetic acid (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 5.0 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

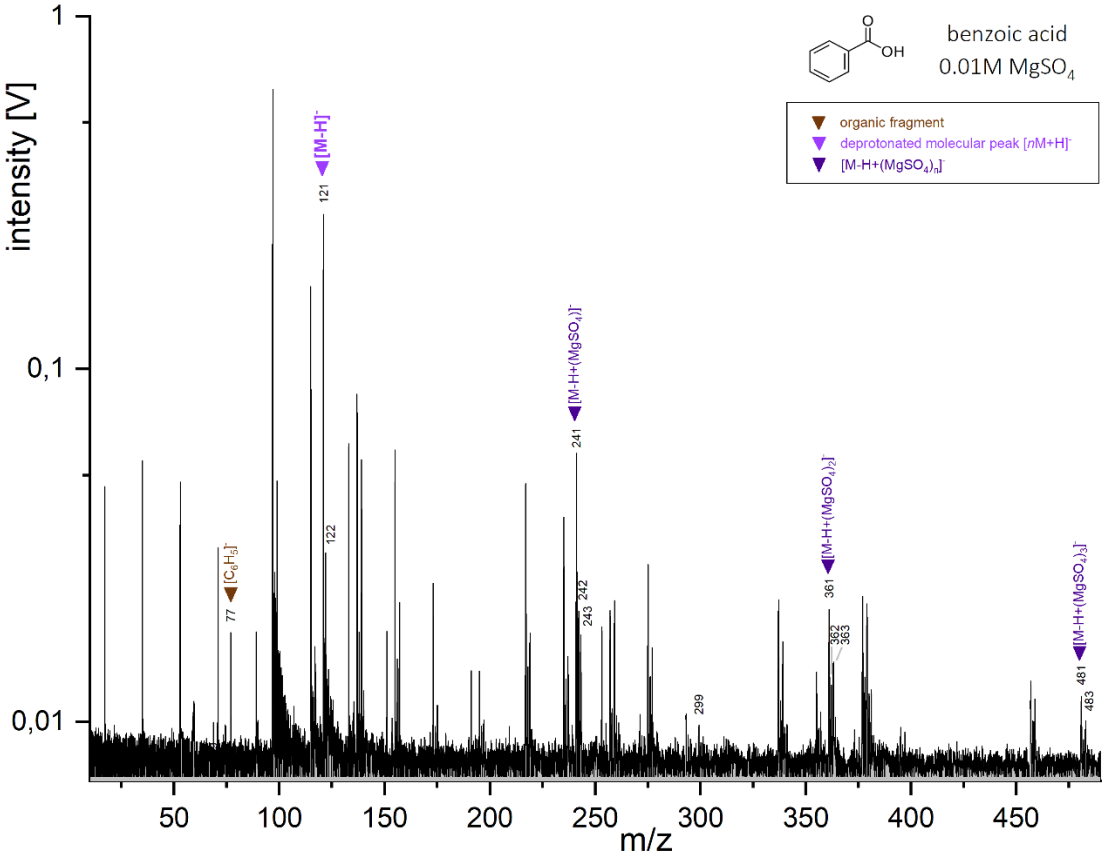

Figure S14. Baseline corrected anion mass spectrum of benzoic acid (concentration 0.17 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 5.8 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

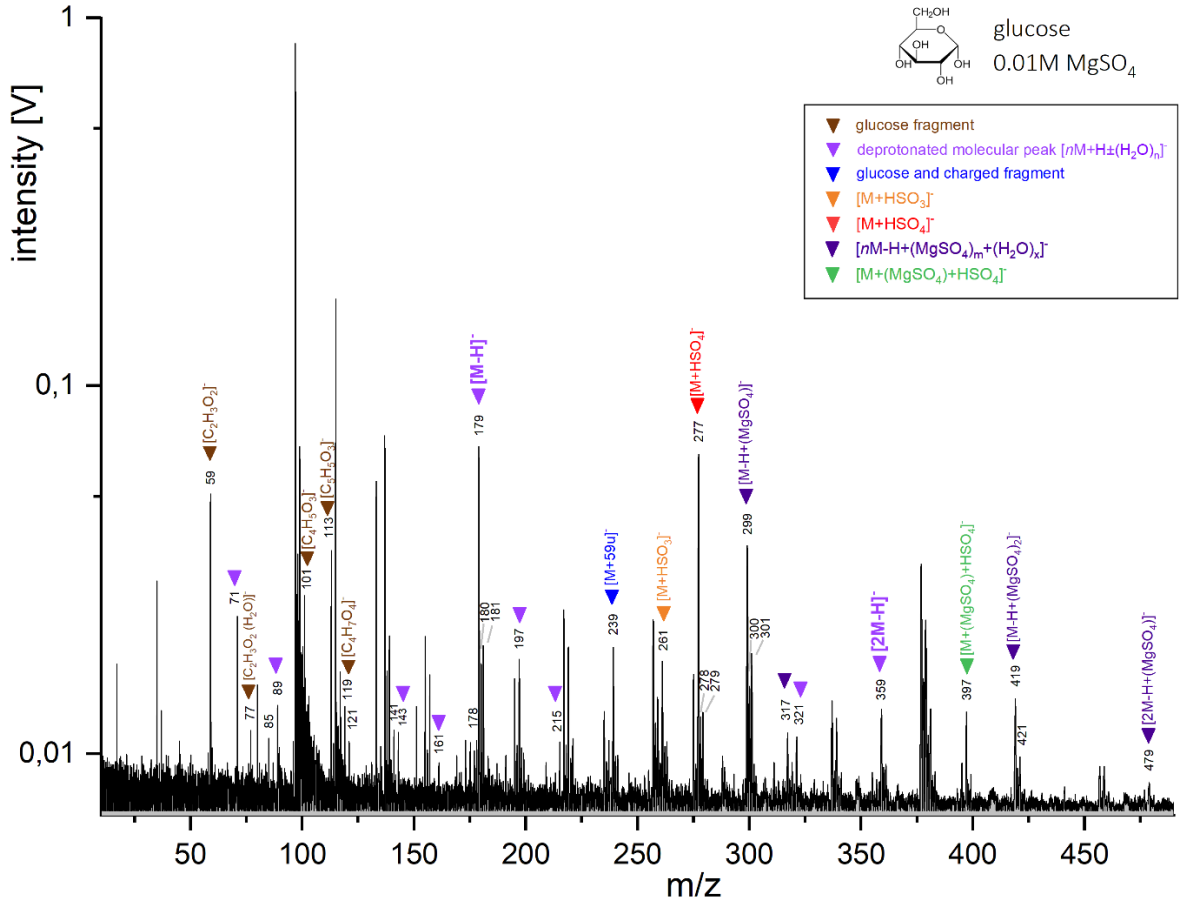

Figure S15. Baseline corrected anion mass spectrum of glucose (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 6.0 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

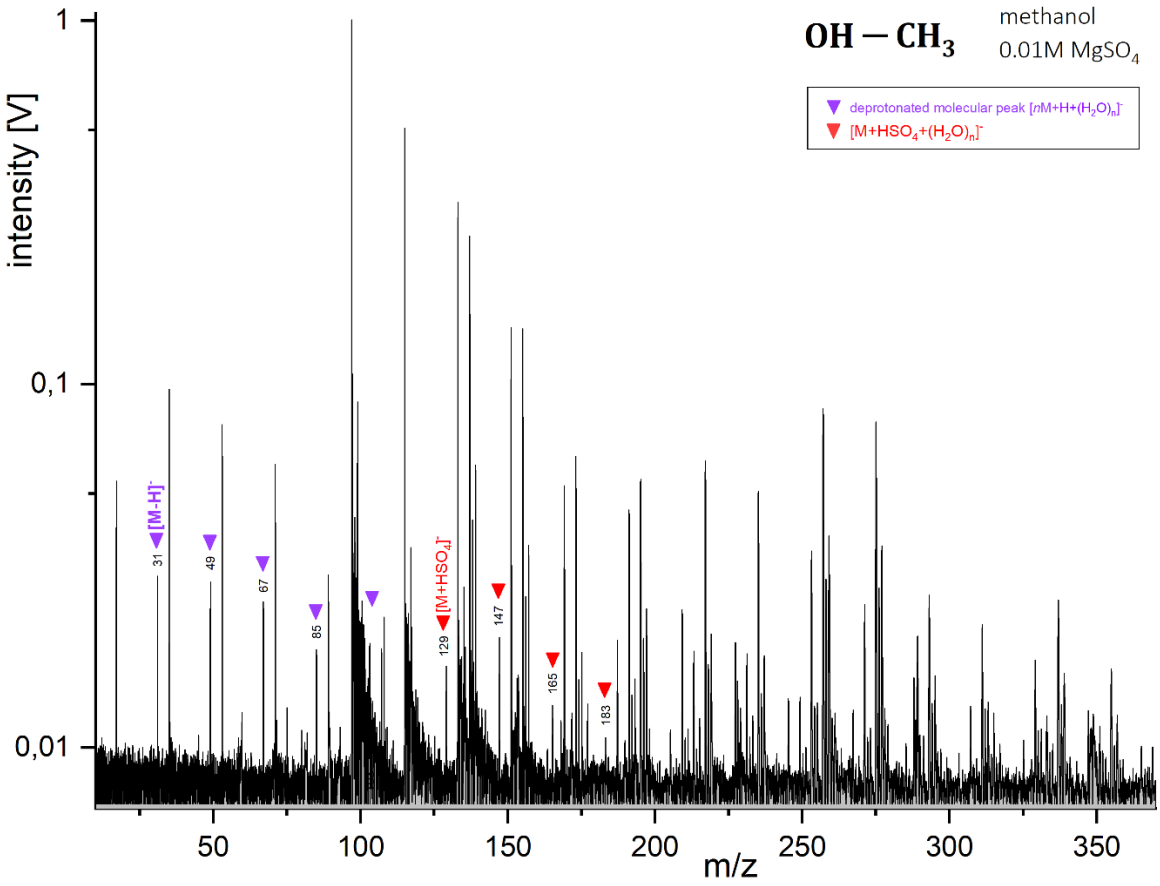

Figure S16. Baseline corrected anion mass spectrum of methanol (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 6.3 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

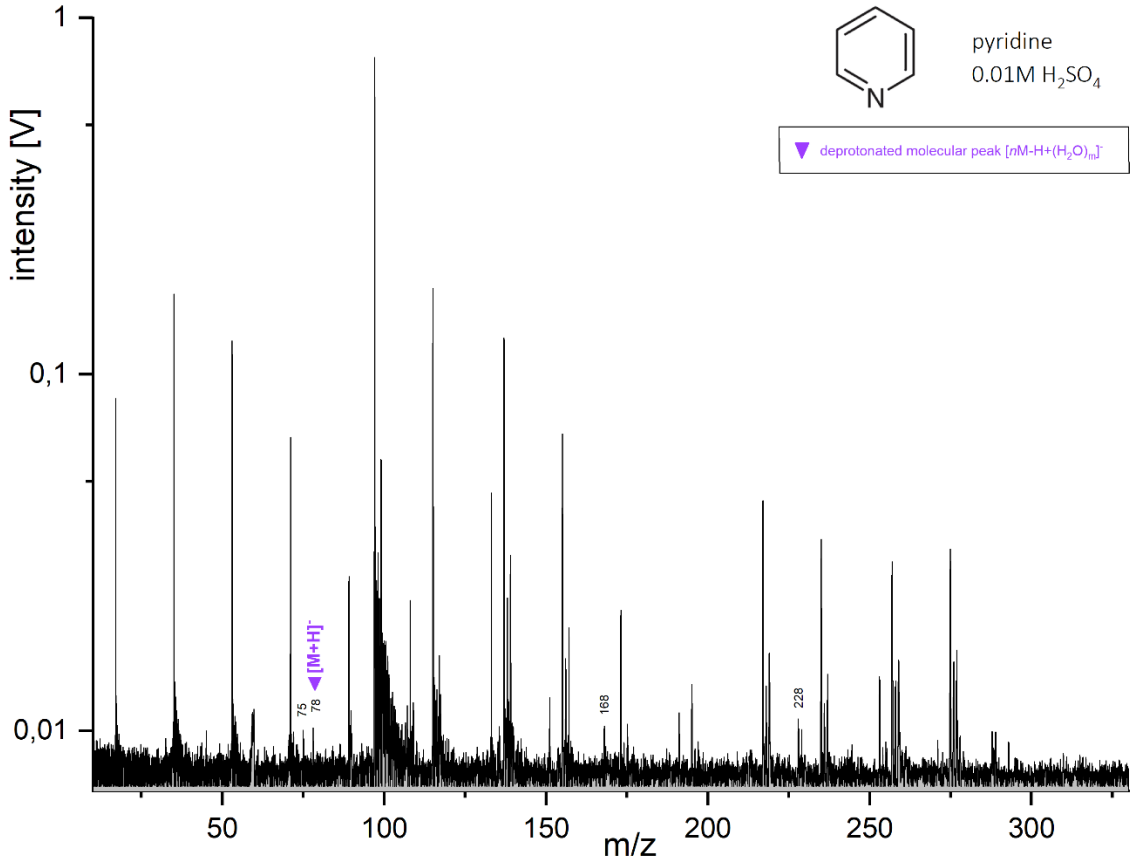

Figure S17. Baseline corrected anion mass spectrum of pyridine (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 5.8 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

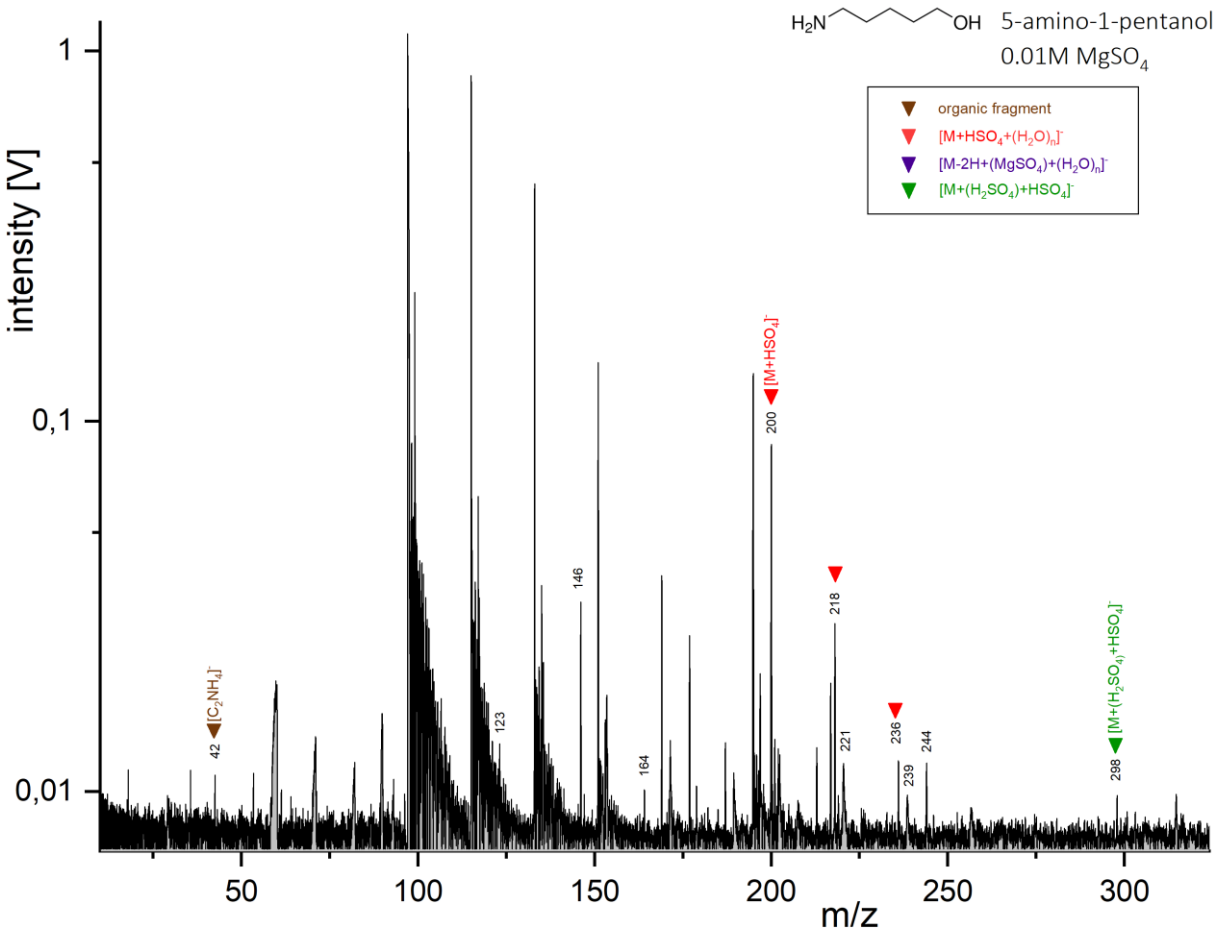

Figure S18. Baseline corrected anion mass spectrum of 5-amino-1-pentanol (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 6.1 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

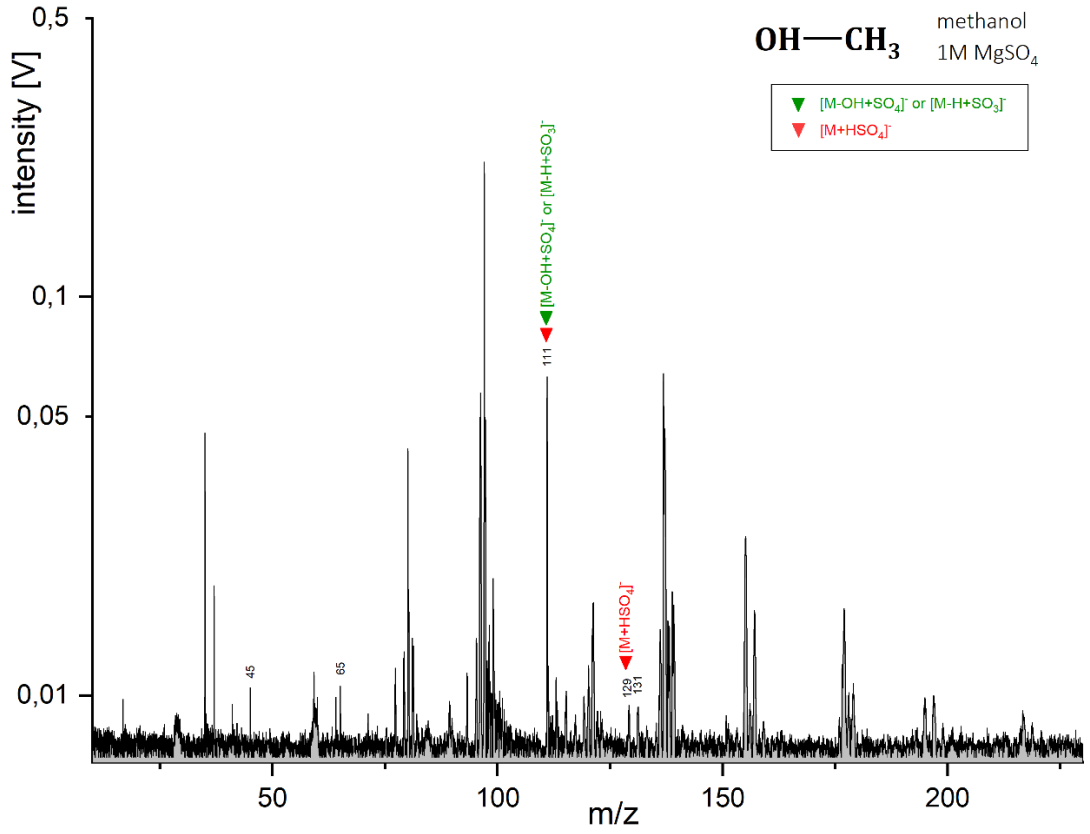

Figure S19. Baseline corrected anion mass spectrum of methanol (concentration 5 wt%) in 1M magnesium sulfate ($MgSO_4$), generated with a delay time of 9.3 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

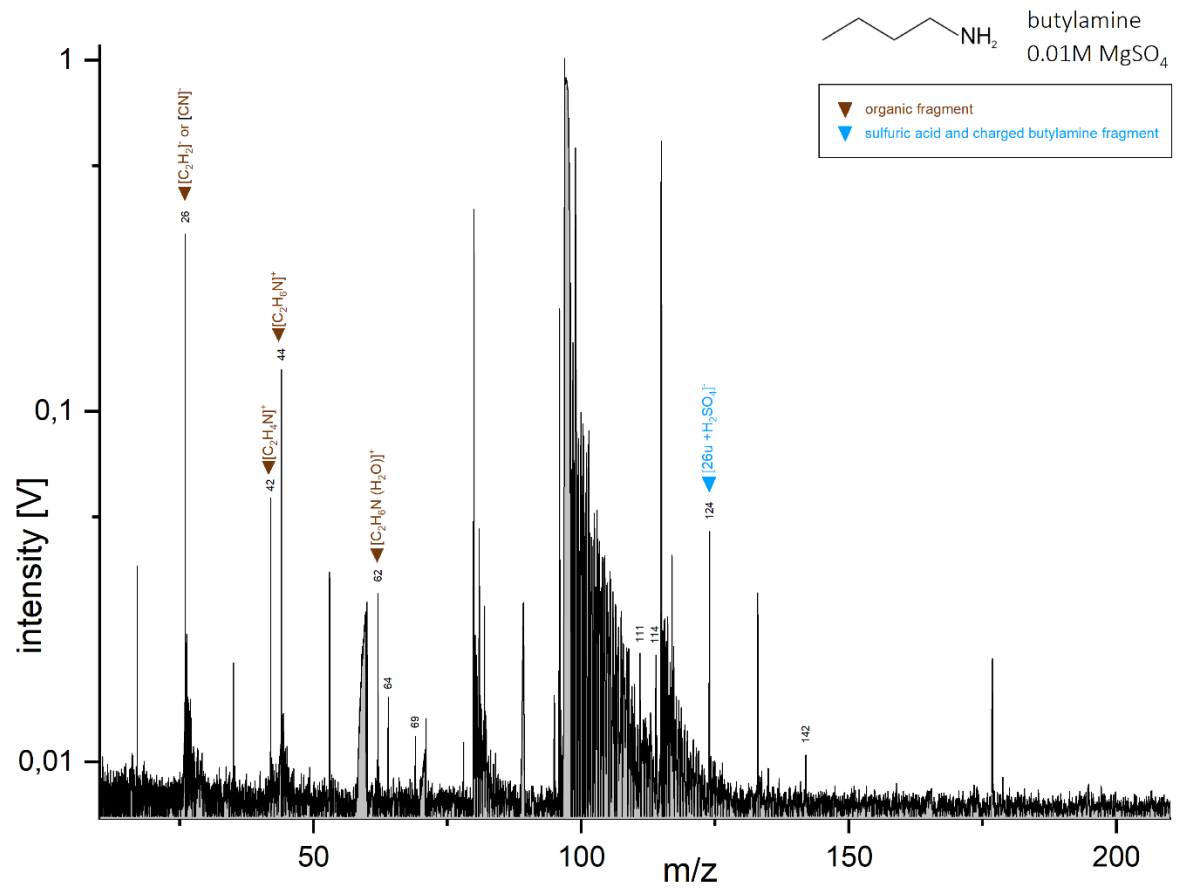

Figure S20. Baseline corrected anion mass spectrum of butylamine (concentration 5 wt%) in 0.01M magnesium sulfate ($MgSO_4$), generated with a delay time of 5.5 µs. Unlabeled peaks originate exclusively from the $MgSO_4$ matrix.

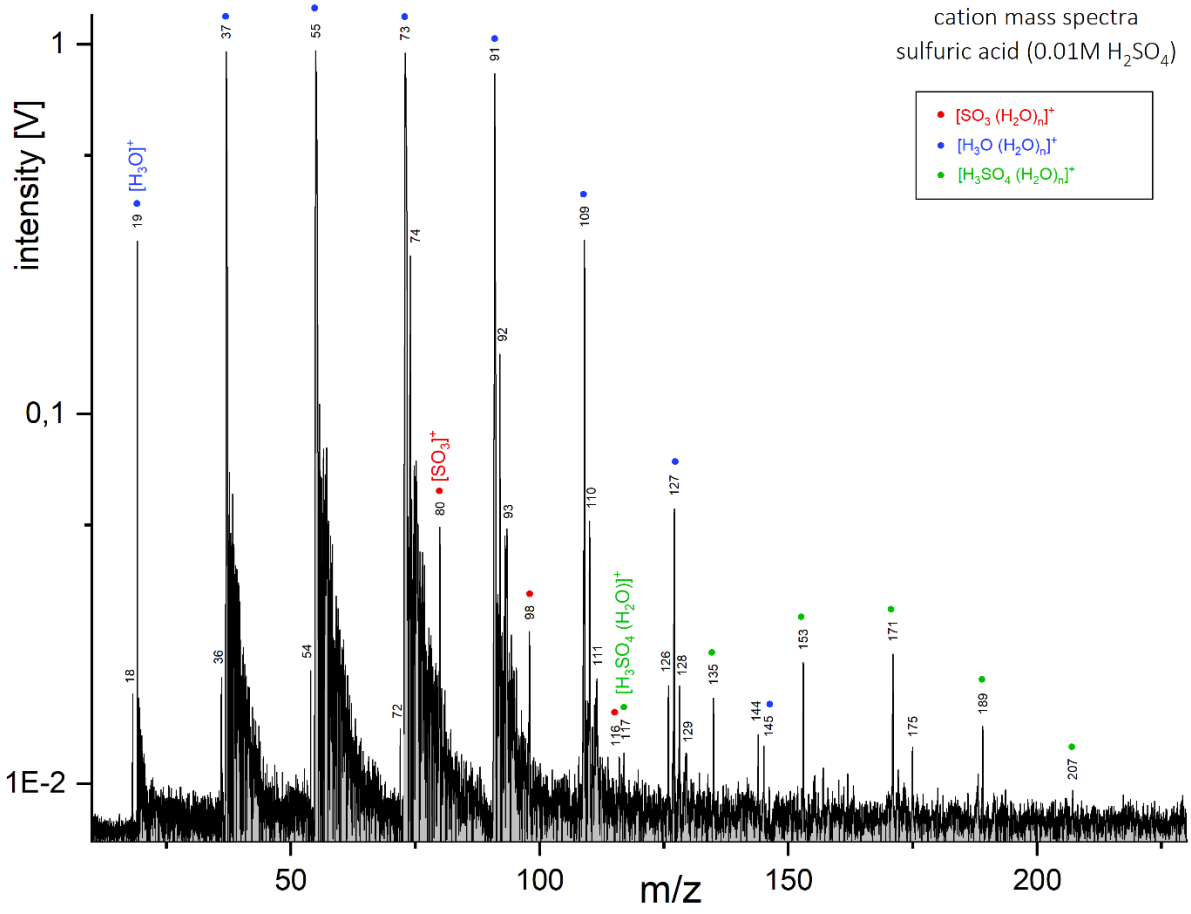

Figure S21. Baseline corrected cation mass spectrum of sulfuric acid (H_2SO_4) at a concentration of 0.01M, generated with a delay time of 6.0µs.

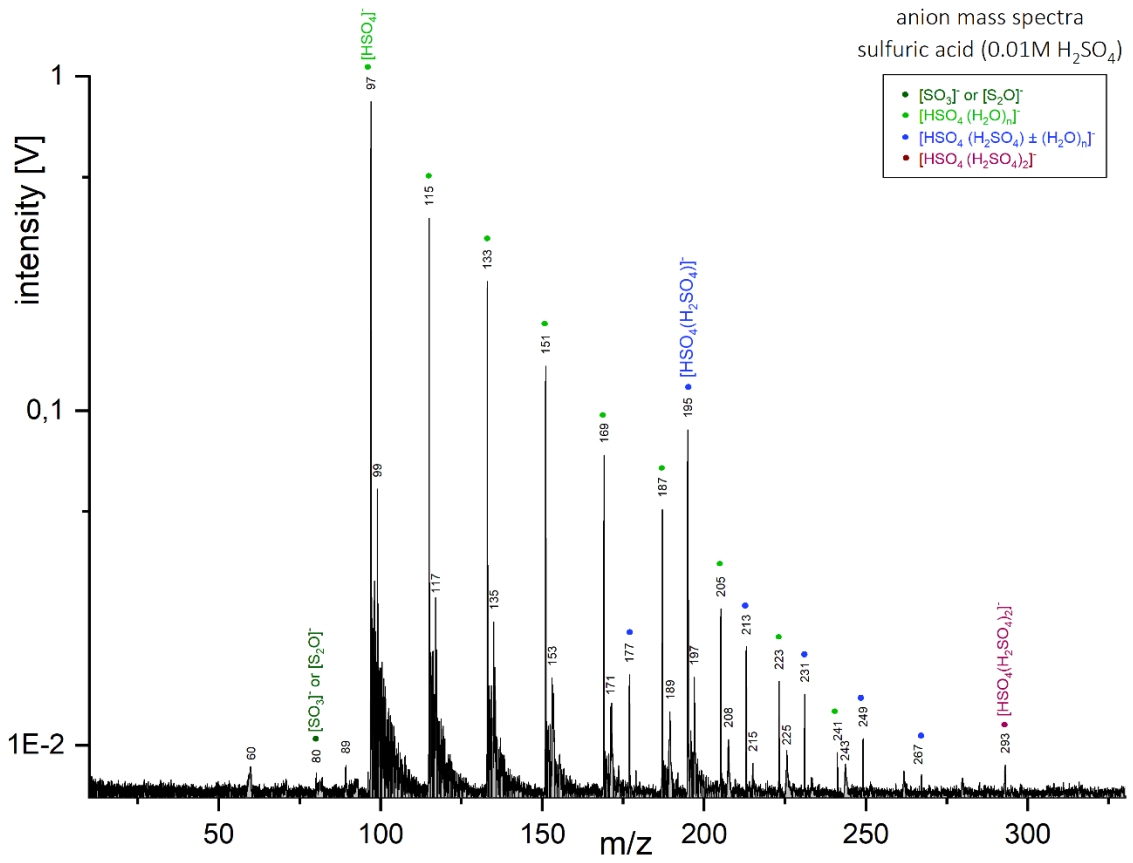

Figure S22. Baseline corrected anion mass spectrum of sulfuric acid (H_2SO_4) at a concentration of 0.01M, generated with a delay time of 6.2µs.

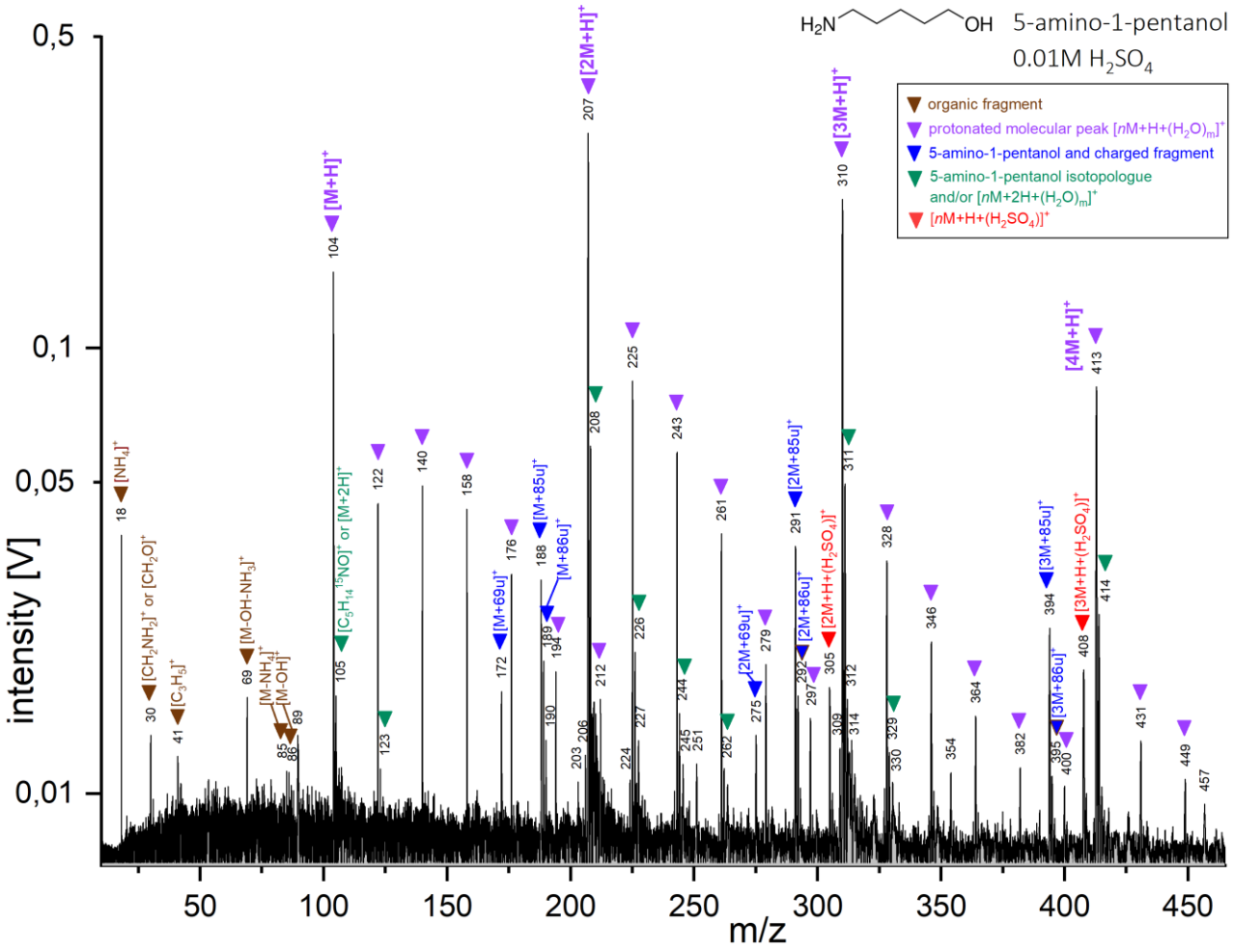

Figure S23. Baseline corrected cation mass spectrum of 5-amino-1-pentanol (concentration 5wt%) in 0.01M sulfuric acid (H_2SO_4), generated with a delay time of 6.8µs.

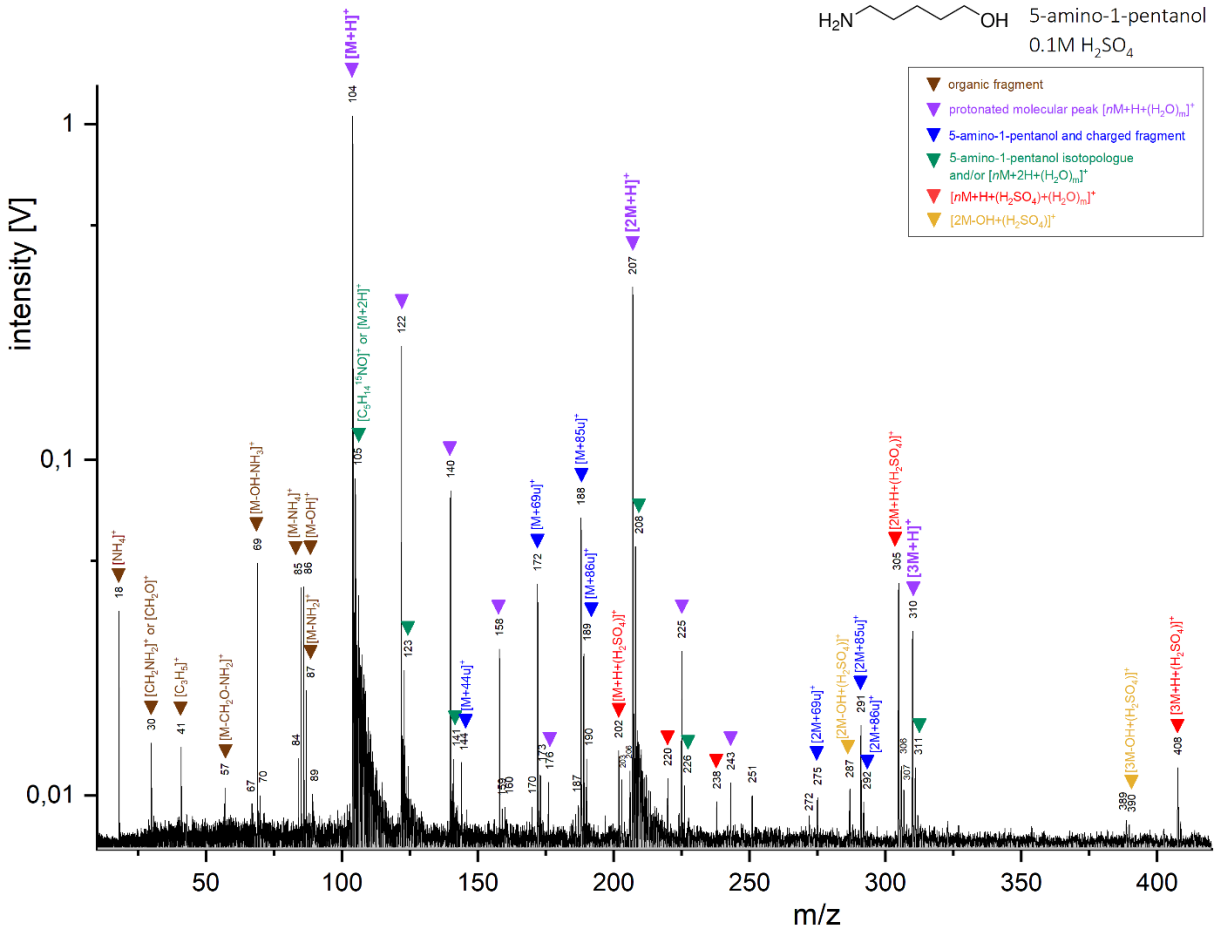

Figure S24. Baseline corrected cation mass spectrum of 5-amino-1-pentanol (concentration 5wt%) in 0.1M sulfuric acid (H_2SO_4), generated with a delay time of 6.8µs.

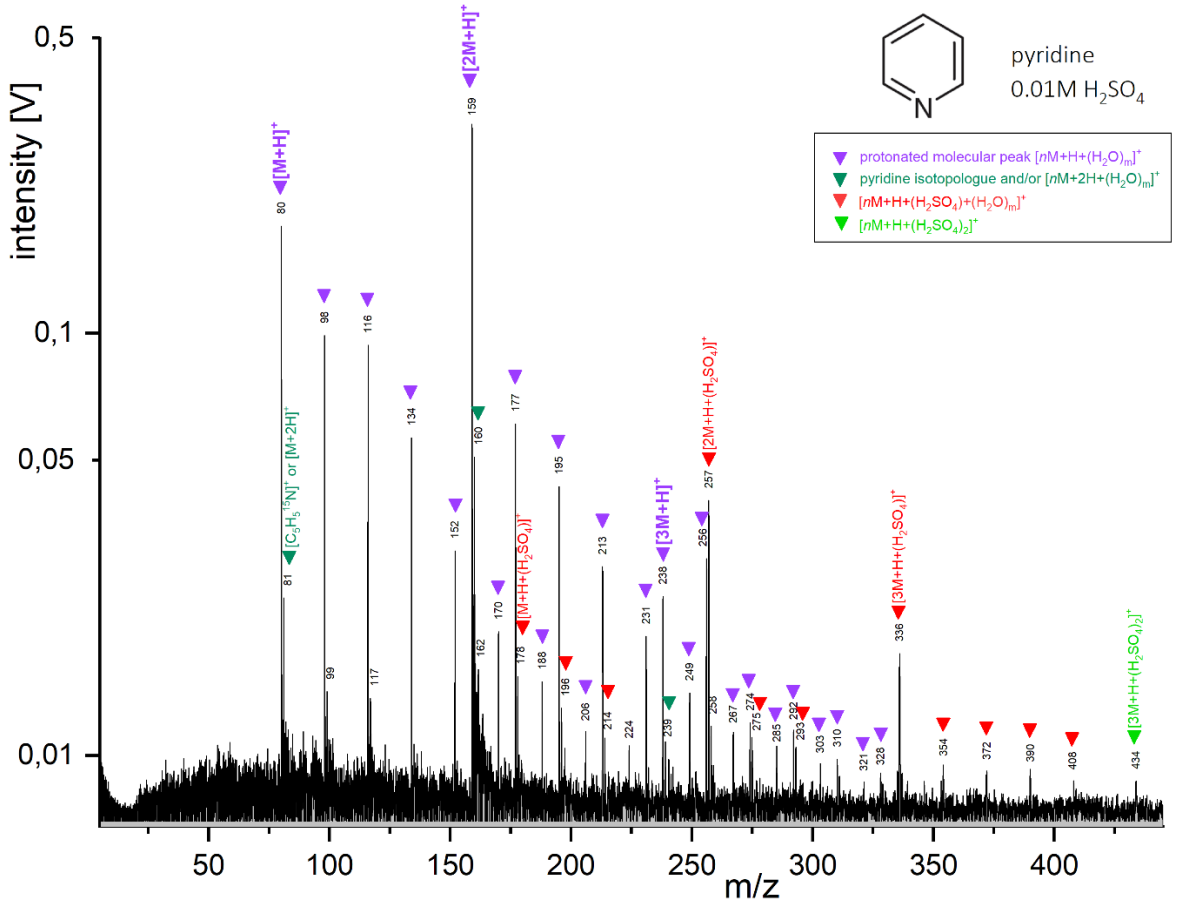

Figure S25. Baseline corrected cation mass spectrum of pyridine (concentration 5wt%) in 0.01M sulfuric acid (H_2SO_4), generated with a delay time of 6.2µs.

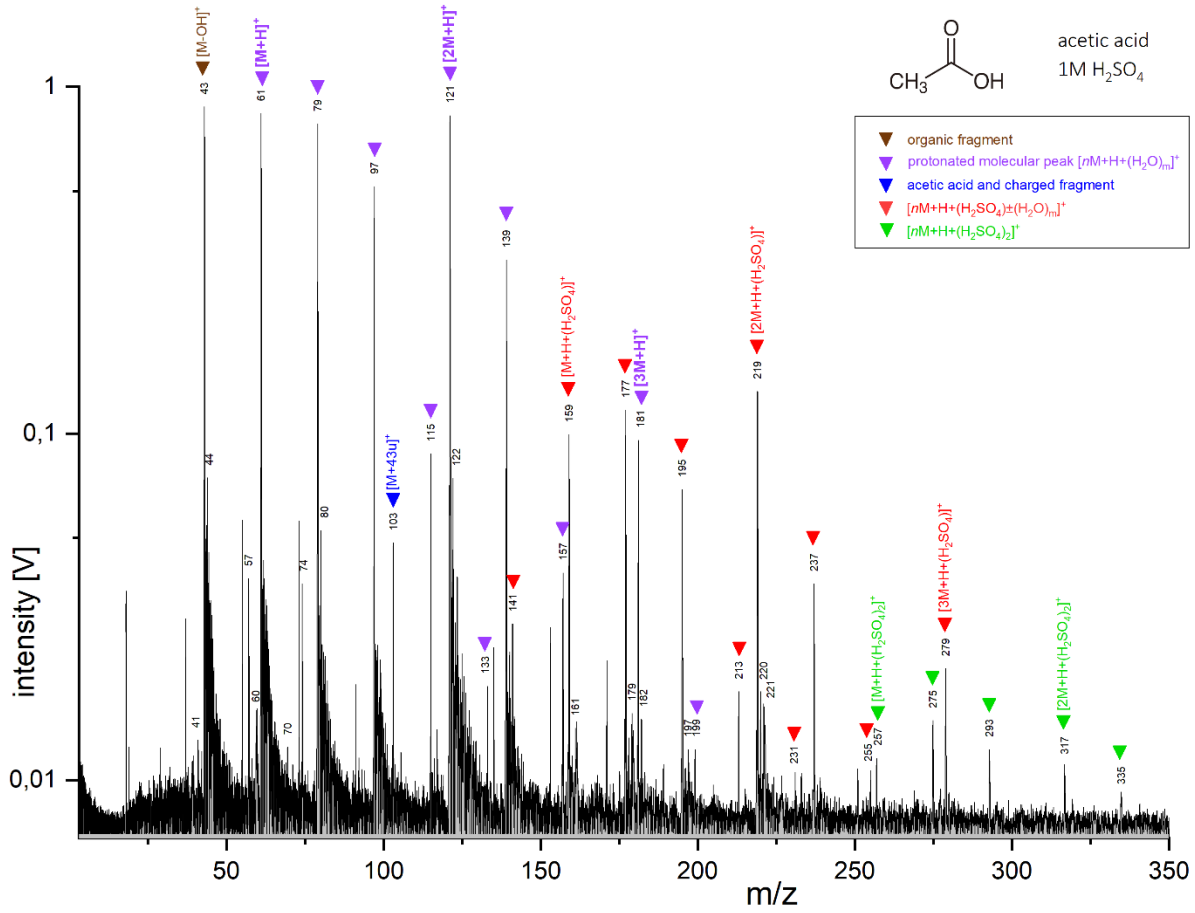

Figure S26. Baseline corrected cation mass spectrum of acetic acid (concentration 5wt%) in 1M sulfuric acid (H_2SO_4), generated with a delay time of 6.4µs.

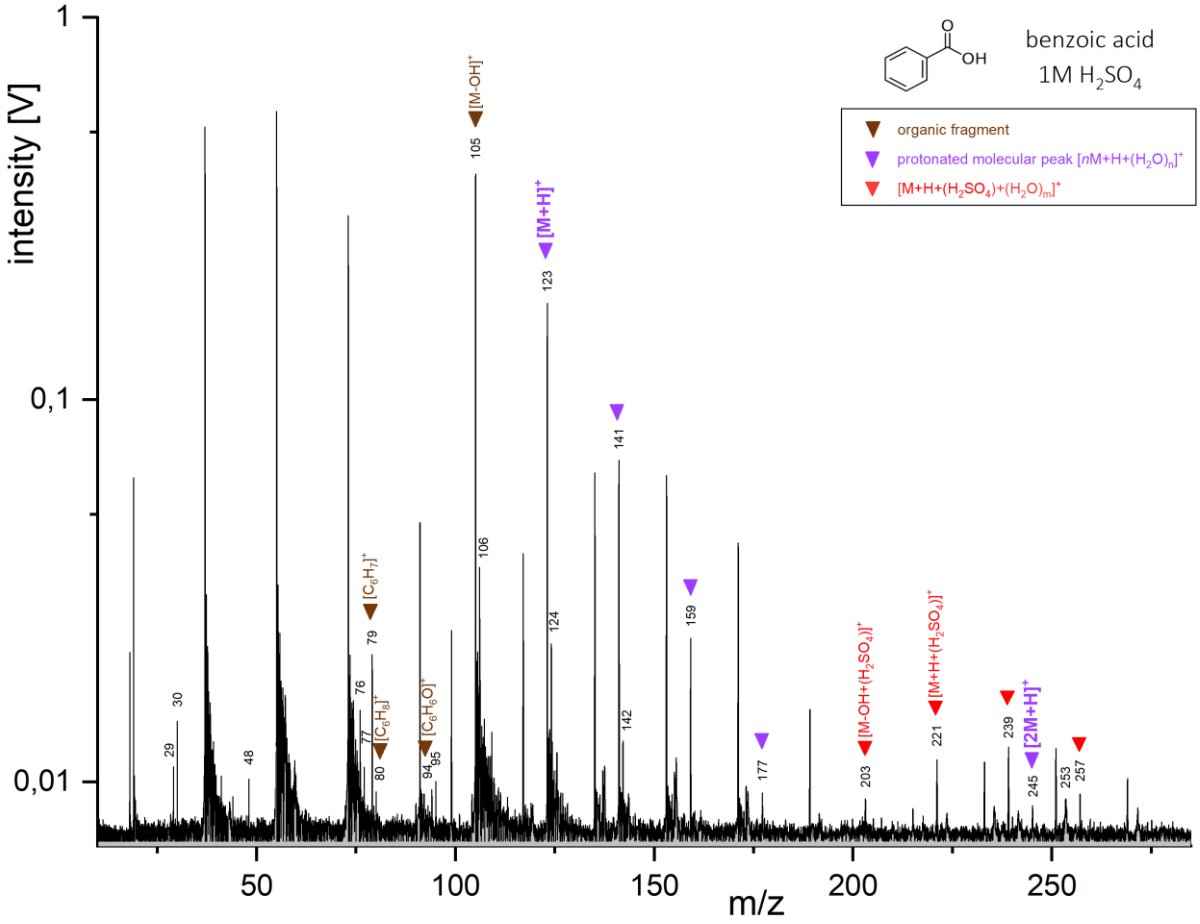

Figure S27. Baseline corrected cation mass spectrum of benzoic acid (concentration 0.17wt%) in 1M sulfuric acid (H_2SO_4), generated with a delay time of 6.0 µs. Unlabeled peaks originate exclusively from the H_2SO_4 matrix.

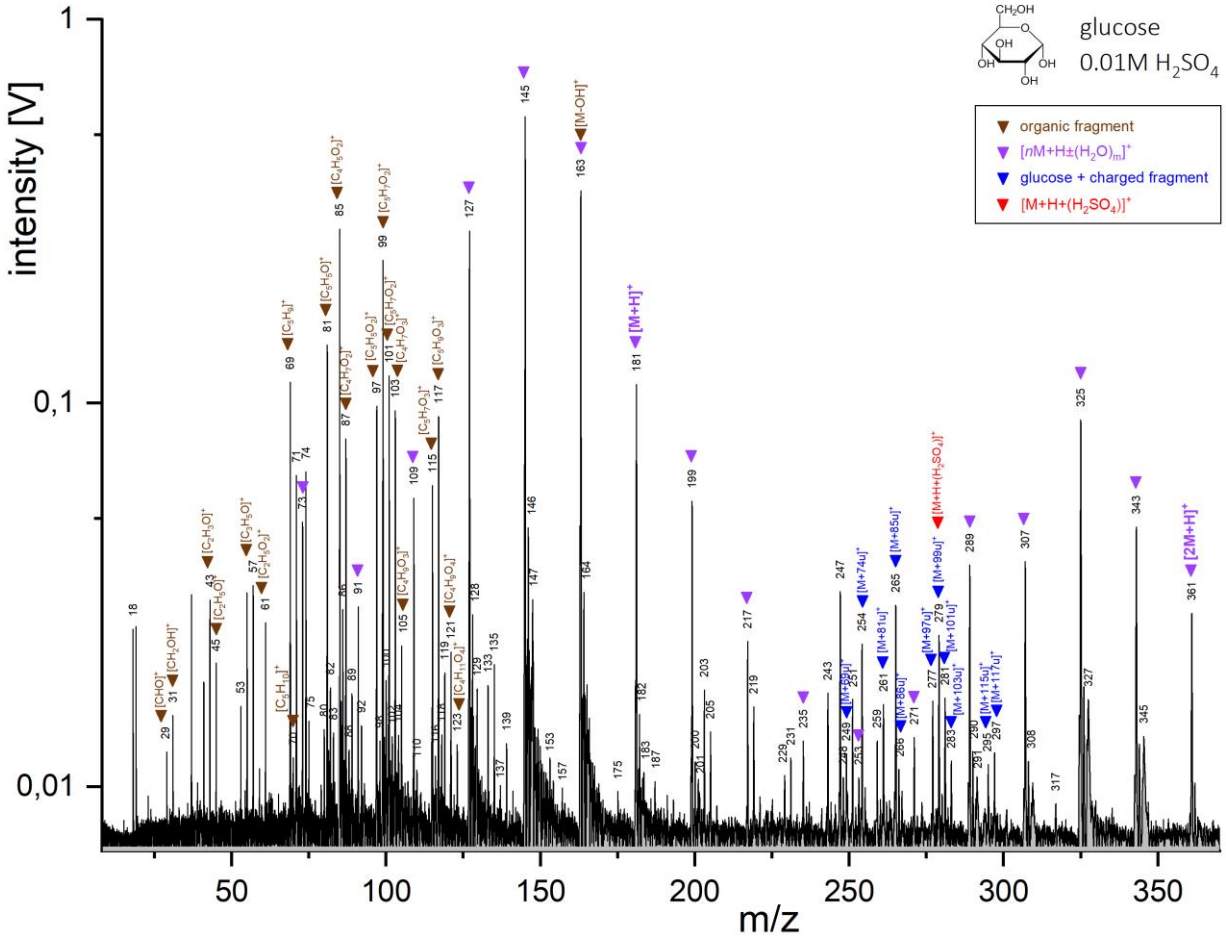

Figure S28. Baseline corrected cation mass spectrum of glucose (concentration 5wt%) in 0.01M sulfuric acid (H_2SO_4), generated with a delay time of 6.0µs. Unlabeled peaks originate exclusively from the H_2SO_4 matrix.

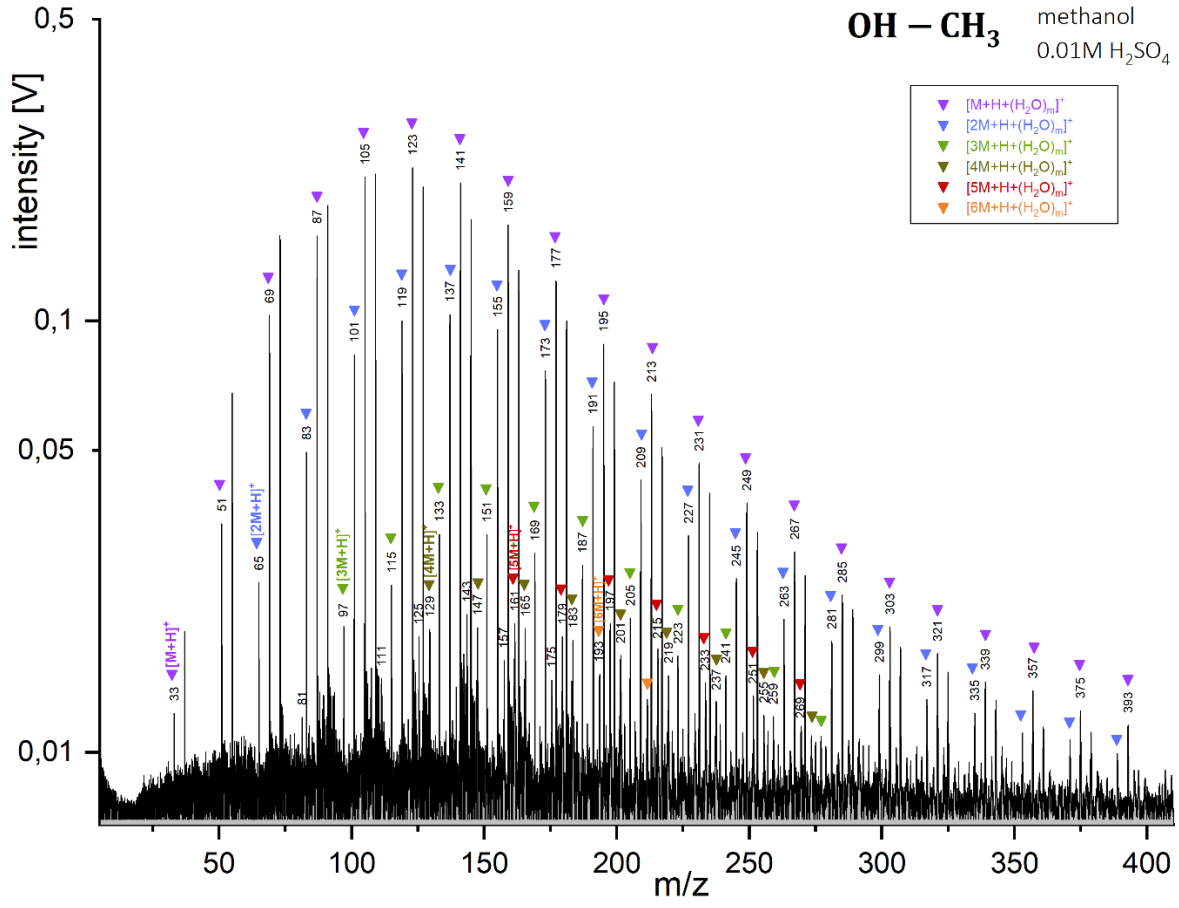

Figure S29. Baseline corrected cation mass spectrum of methanol (concentration 5wt%) in 0.01M sulfuric acid (H_2SO_4), generated with a delay time of 6.7µs. Unlabeled peaks originate exclusively from the H_2SO_4 matrix.

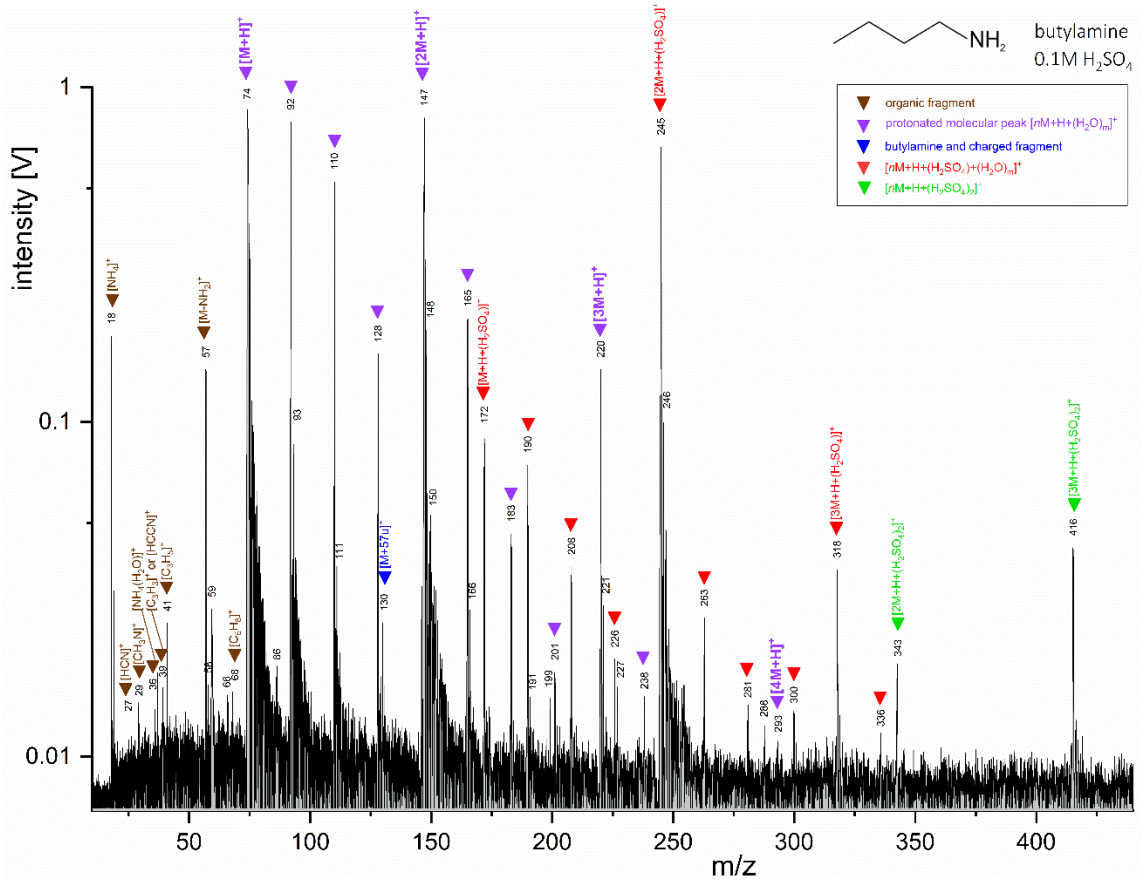

Figure S30. Baseline corrected cation mass spectrum of butylamine (concentration 1.3wt%) in 0.1M sulfuric acid (H_2SO_4), generated with a delay time of 6.4µs.

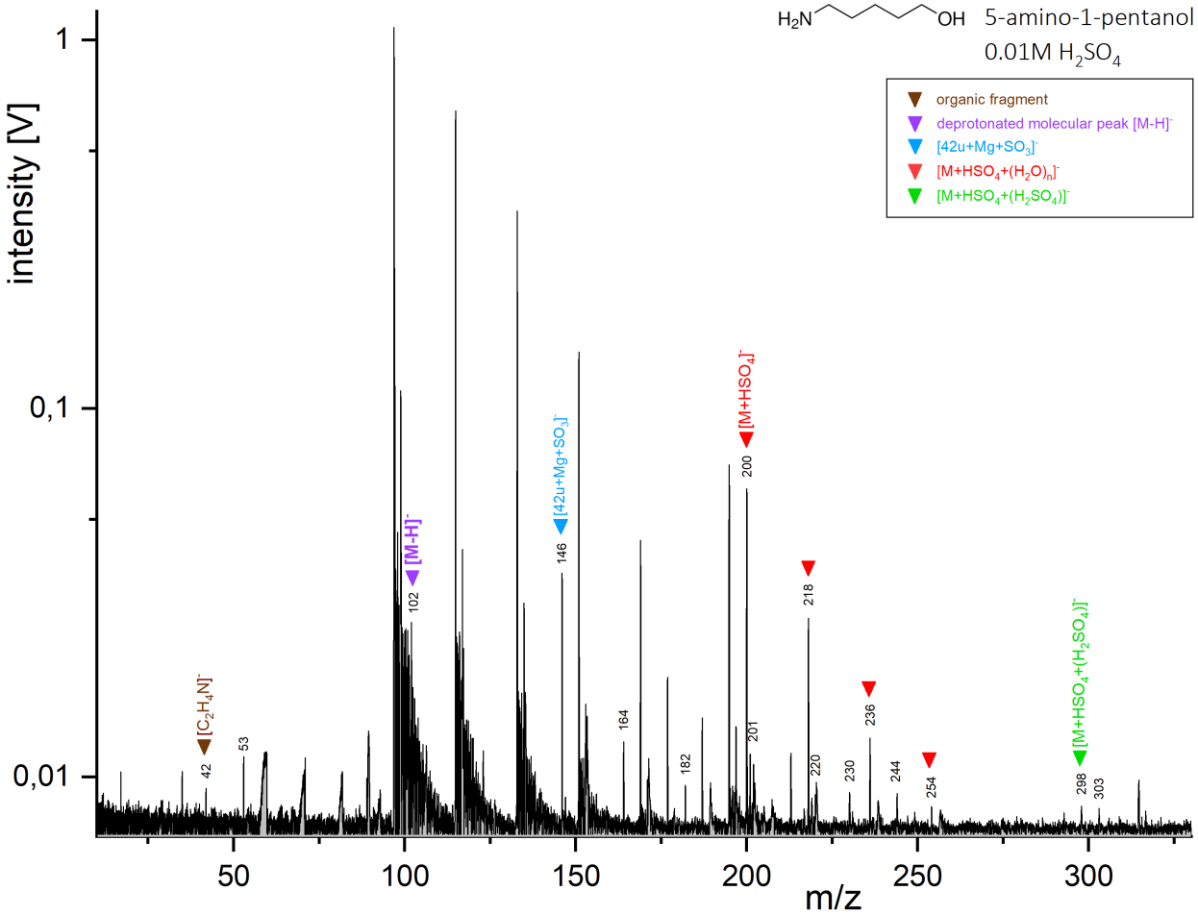

Figure S31. Baseline corrected anion mass spectrum of 5-amino-1-pentanol (concentration 5wt%) in 0.01M sulfuric acid (H_2SO_4), generated with a delay time of 6.2µs. Unlabeled peaks originate exclusively from the H_2SO_4 matrix.

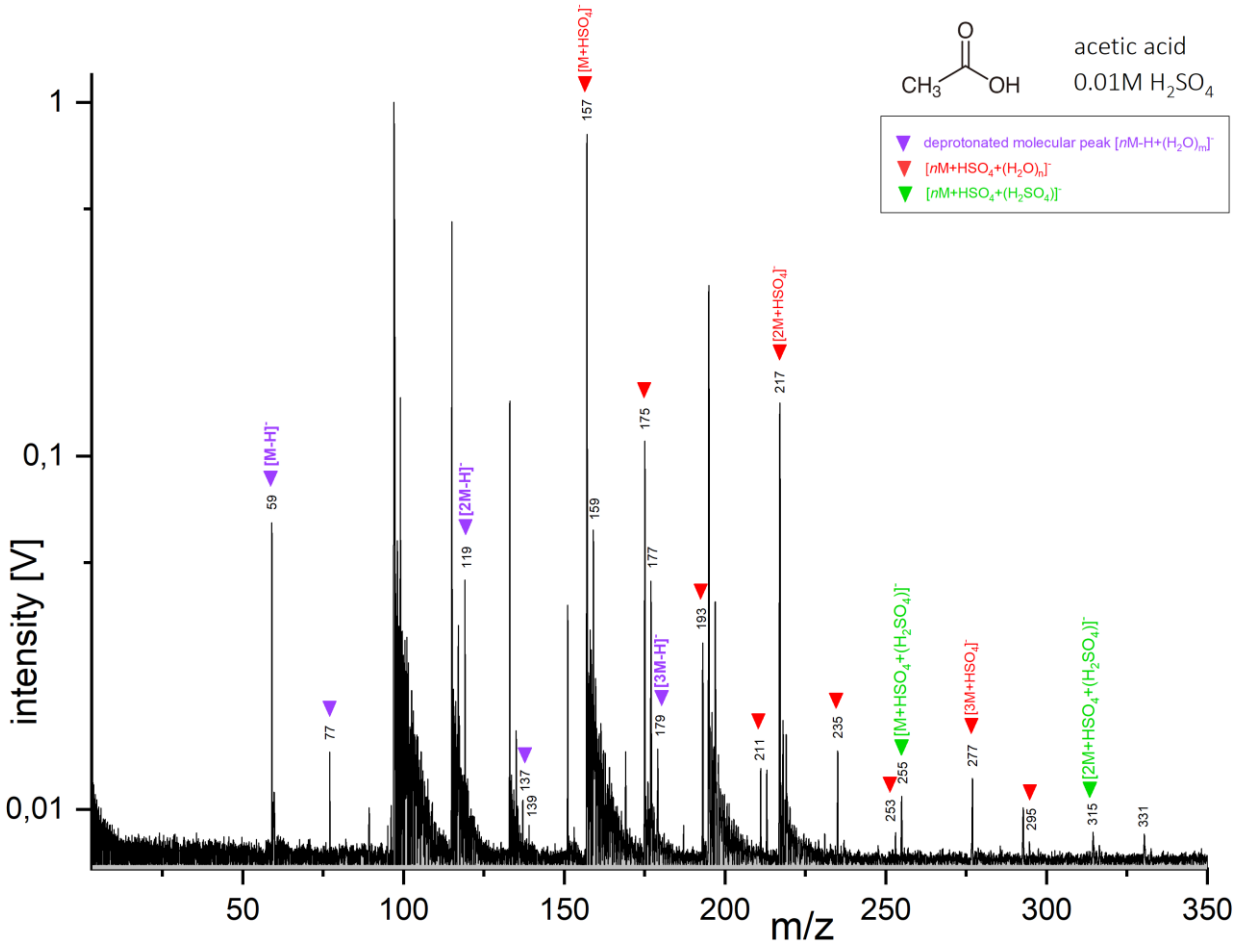

Figure S32. Baseline corrected anion mass spectrum of acetic acid (concentration 5wt%) in 0.1M sulfuric acid (H_2SO_4), generated with a delay time of 6.4µs. Unlabeled peaks originate exclusively from the H_2SO_4 matrix.

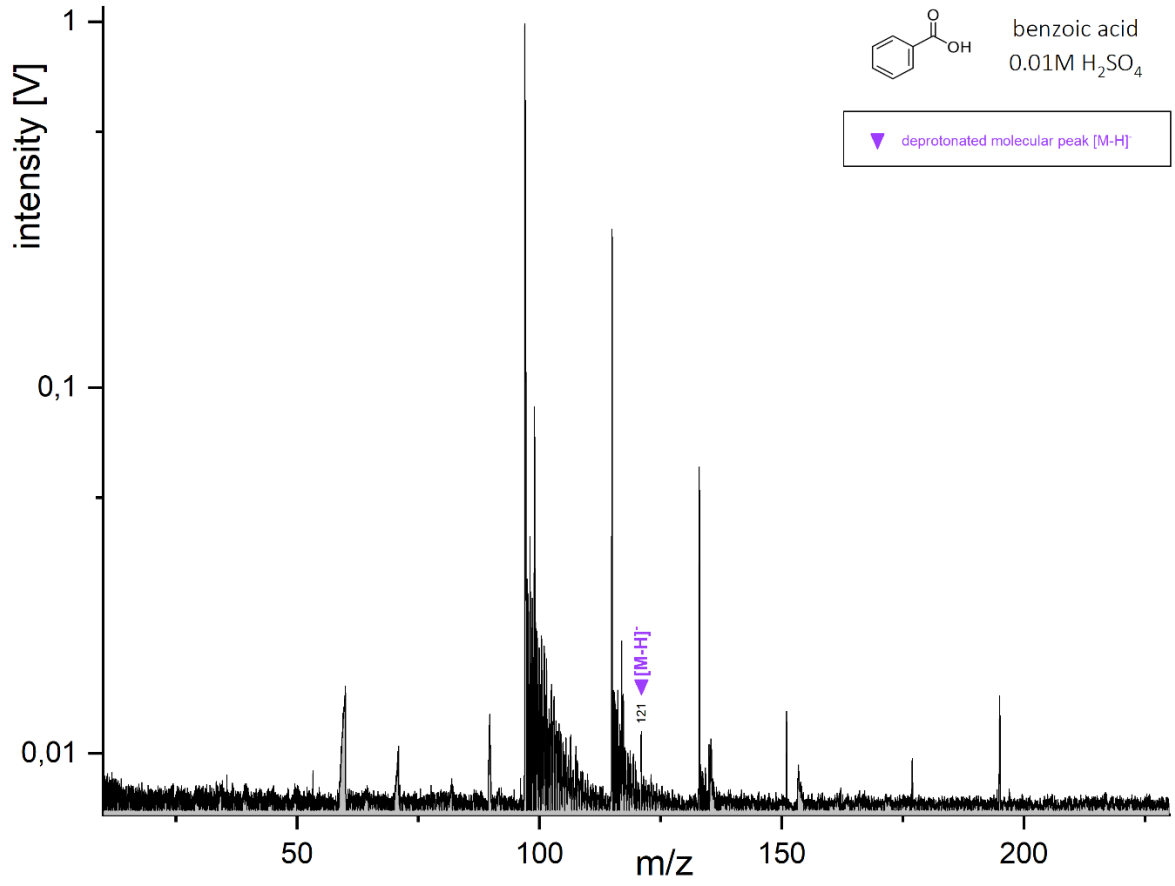

Figure S33. Baseline corrected anion mass spectrum of benzoic acid (concentration 0.17wt%) in 1M sulfuric acid (H_2SO_4), generated with a delay time of 5.7 µs. Unlabeled peaks originate exclusively from the H_2SO_4 matrix.

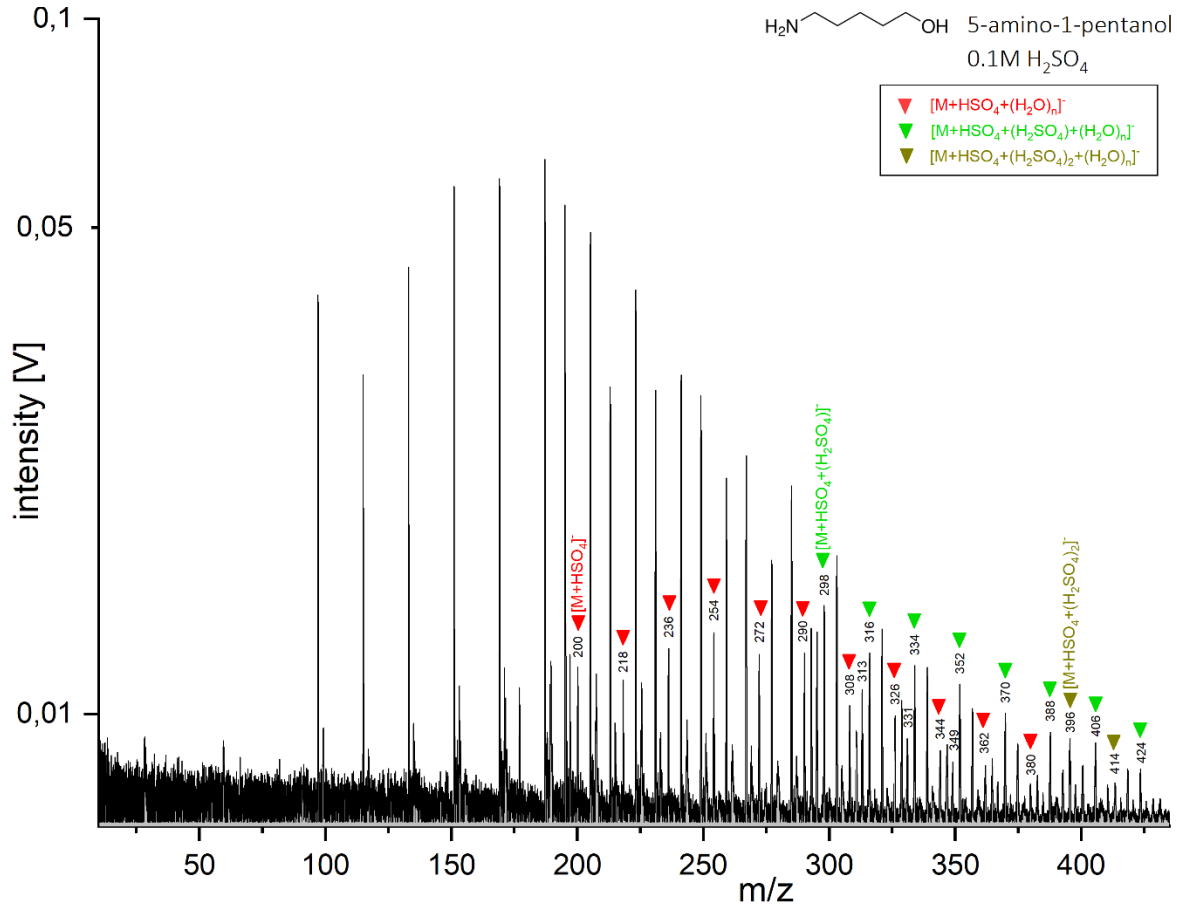

Figure S34. Baseline corrected anion mass spectrum of 5-amino-1-pentanol (concentration 5wt%) in 0.1M sulfuric acid (H_2SO_4), generated with a delay time of 6.8µs. Unlabeled peaks originate exclusively from the H_2SO_4 matrix.

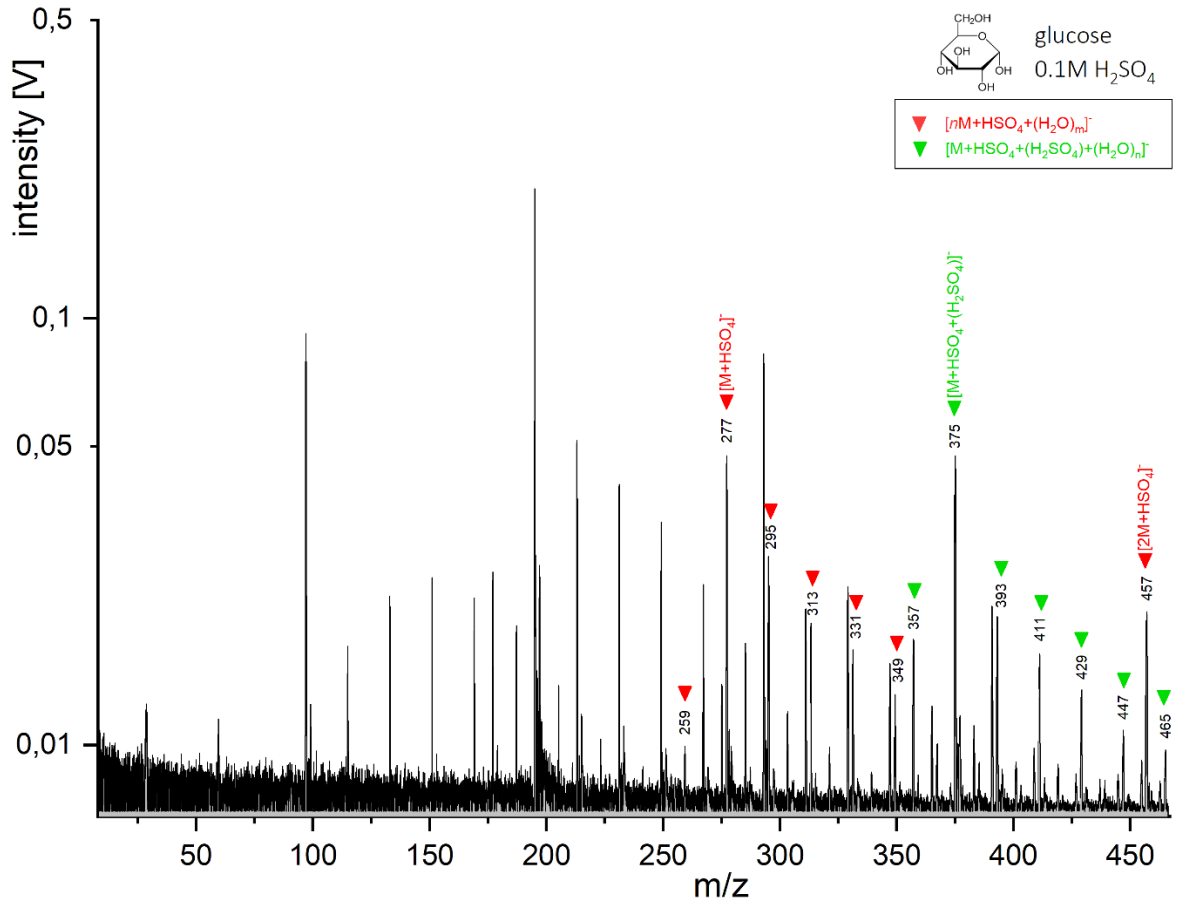

Figure S35. Baseline corrected anion mass spectrum of glucose (concentration 5wt%) in 0.1M sulfuric acid (H_2SO_4), generated with a delay time of 6.9µs. Unlabeled peaks originate exclusively from the H_2SO_4 matrix.

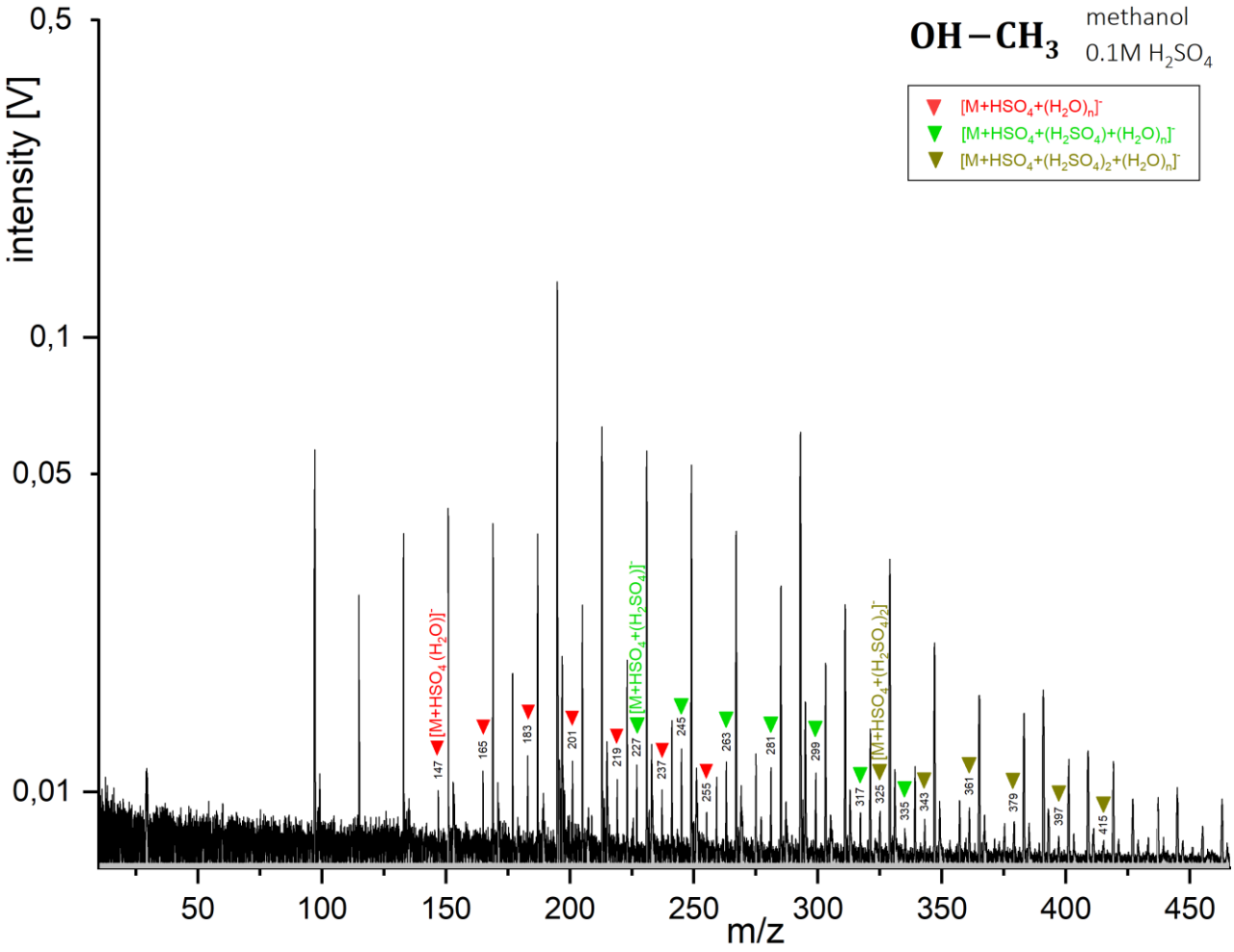

Figure S36. Baseline corrected anion mass spectrum of methanol (concentration 5wt%) in 0.1M sulfuric acid (H_2SO_4), generated with a delay time of 6.8 µs. Unlabeled peaks originate exclusively from the H_2SO_4 matrix.

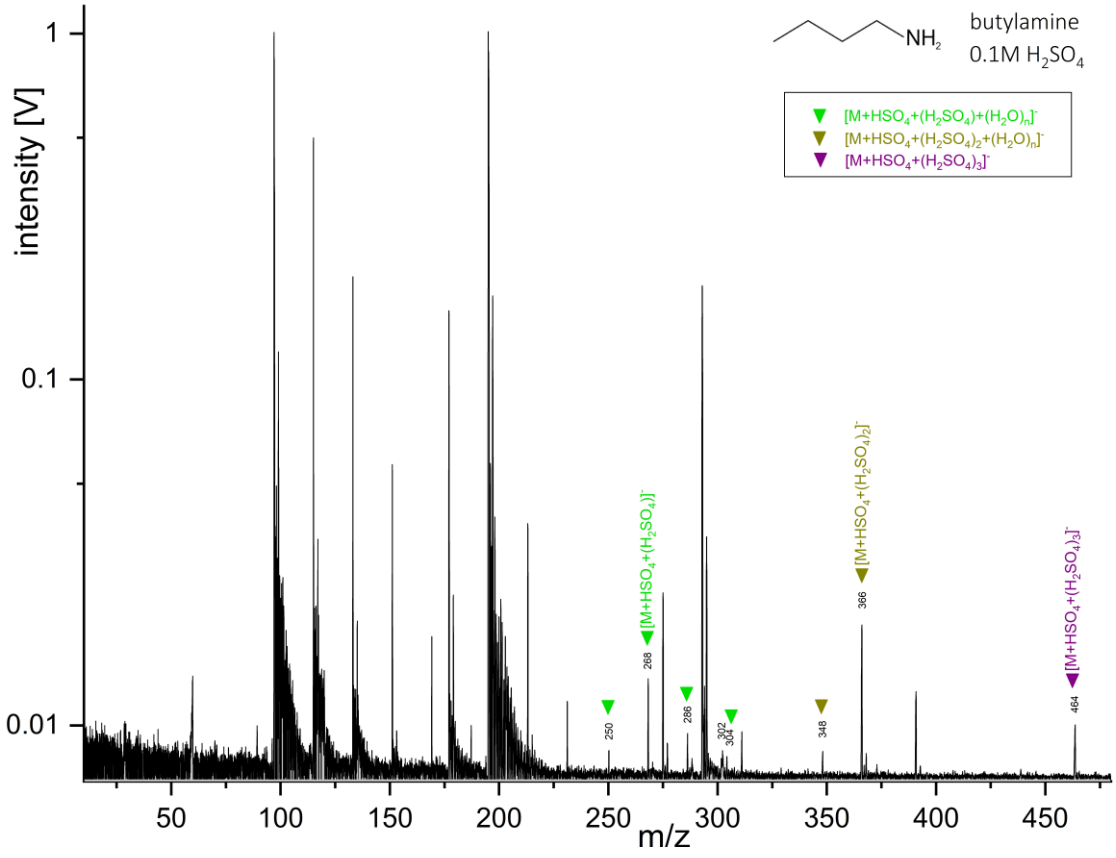

Figure S37. Baseline corrected anion mass spectrum of butylamine (concentration 5wt%) in 0.1M sulfuric acid (H_2SO_4), generated with a delay time of 6.4 µs. Unlabeled peaks originate exclusively from the H_2SO_4 matrix.

	m/z	pure H_2O	$MgSO_4$			H_2SO_4		
			0.01M	0.1M	1M	0.01M	0.1M	1M
5-amino-1-pentanol	18	$[NH_4]^+$	$[NH_4]^+$	$[NH_4]^+$		$[NH_4]^+$	$[NH_4]^+$	$[NH_4]^+$
	25, 29							UI
	30	$[CH_2NH_2]^+$ or $[CH_2O]^+$	$[CH_2NH_2]^+$ or $[CH_2O]^+$	$[CH_2NH_2]^+$ or $[CH_2O]^+$		$[CH_2NH_2]^+$ or $[CH_2O]^+$	$[CH_2NH_2]^+$ or $[CH_2O]^+$	$[CH_2NH_2]^+$ or $[CH_2O]^+$
	31							$[CH_3O]^+$
	36	$[NH_4 (H_2O)]^+$		$[NH_4 (H_2O)]^+$				$[NH_4 (H_2O)]^+$
	41		$[C_3H_5]^+$	$[C_3H_5]^+$		$[C_3H_5]^+$	$[C_3H_5]^+$	$[C_3H_5]^+$
	42							UI
	43		UI	UI				UI
	44							UI
	45							$[C_2H_5O]^+$
	48	$[CH_2NH_2 (H_2O)]^+$		$[CH_2NH_2 (H_2O)]^+$				
	54	$[NH_4 (H_2O)_2]^+$						$[NH_4 (H_2O)_2]^+$
	56			UI				
	57	$[M\text{-}CH_2O\text{-}NH_2]^+$	$[M\text{-}CH_2O\text{-}NH_2]^+$	$[M\text{-}CH_2O\text{-}NH_2]^+$			$[M\text{-}CH_2O\text{-}NH_2]^+$	$[M\text{-}CH_2O\text{-}NH_2]^+$
	58			UI				UI
	62			UI				
	66	UI						
	67		UI				UI	
	69	$[M\text{-}OH\text{-}NH_3]^+$	$[M\text{-}OH\text{-}NH_3]^+$	$[M\text{-}OH\text{-}NH_3]^+$	$[M\text{-}OH\text{-}NH_3]^+$	$[M\text{-}OH\text{-}NH_3]^+$	$[M\text{-}OH\text{-}NH_3]^+$	$[M\text{-}OH\text{-}NH_3]^+$
	70	UI	UI	UI			UI	UI
	72, 80	UI						
	84	UI	UI	UI			UI	UI
	85	$[M\text{-}NH_4]^+$	$[M\text{-}NH_4]^+$	$[M\text{-}NH_4]^+$		$[M\text{-}NH_4]^+$	$[M\text{-}NH_4]^+$	$[M\text{-}NH_4]^+$
	86	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$
	87	$[M\text{-}NH_2]^+$	$[M\text{-}NH_2]^+$	$[M\text{-}NH_2]^+$	$[M\text{-}NH_2]^+$		$[M\text{-}NH_2]^+$	$[M\text{-}NH_2]^+$
	88	UI						UI
	89		UI			UI	UI	
	90	UI						UI
	98							UI
	102	UI	UI	UI				UI
	103	UI	UI					UI
Acetic acid	15		$[CH_3]^+$	$[CH_3]^+$				
	24		UI	UI				

Acetic acid	29		$[CHO]^+$	$[CHO]^+$			
	30, 34			UI			
	41		$[C_3H_5]^+$				UI
	42	UI	$[C_3H_6]^+$		UI		UI
	43	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$
	44	UI	UI	UI	UI	UI	UI
	57	UI			UI	UI	UI
Benzoic acid	23	UI					
	29						UI
	30						UI
	41	$[C_3H_5]^+$					
	43	UI					
	48						UI
	59, 61	UI					
	74				UI		
	76						UI
	77	UI			UI	UI	UI
	79	$[C_6H_7]^+$	$[C_6H_7]^+$		$[C_6H_7]^+$	$[C_6H_7]^+$	$[C_6H_7]^+$
	80	$[C_6H_8]^+$	$[C_6H_8]^+$		$[C_6H_8]^+$	$[C_6H_8]^+$	$[C_6H_8]^+$
	86		UI				
	92					UI	
	93	$[C_7H_9]^+$					
	94				$[C_6H_6O]^+$	$[C_6H_6O]^+$	$[C_6H_6O]^+$
	95	UI			UI		UI
	104	UI					
	105	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$	$[M\text{-}OH]^+$
	106	UI			UI	UI	UI
Butylamine	17		$[NH_3]^+$	$[NH_3]^+$			
	18	$[NH_4]^+$	$[NH_4]^+$	$[NH_4]^+$?	$[NH_4]^+$	$[NH_4]^+$	$[NH_4]^+$
	25						UI
	27					$[HCN]^+$	$[HCN]^+$
	28		UI	UI			
	29	$[CH_3N]^+$	$[CH_3N]^+$			$[CH_3N]^+$	$[CH_3N]^+$
	30		$[CH_2NH_2]^+$ or $[CH_2O]^+$	$[CH_2NH_2]^+$ or $[CH_2O]^+$			
	31		$[CH_5N]^+$	$[CH_5N]^+$			
	32		UI	UI			

	33					UI
	34		UI			
	35		UI	UI		
	36	$[NH_4(H_2O)]^+$	$[NH_4(H_2O)]^+$	$[NH_4(H_2O)]^+$	$[NH_4(H_2O)]^+$	
	39				$[C_3H_3]^+$ or $[HCCN]^+$	$[C_3H_3]^+$ or $[HCCN]^+$
	41	$[C_3H_5]^+$	$[C_3H_5]^+$		$[C_3H_5]^+$	$[C_3H_5]^+$	$[C_3H_5]^+$
	42		$[C_2H_4N]^+$	$[C_2H_4N]^+$		
	43		UI	UI		UI
	44		$[C_2H_6N]^+$	$[C_2H_6N]^+$		
	45, 46, 47, 48		UI	UI		
	49		UI			
	50, 53		UI	UI		
Butylamine	54	$[NH_4(H_2O)_2]^+$	$[NH_4(H_2O)_2]^+$	$[NH_4(H_2O)_2]^+$		
	56		$[C_3H_6N]^+$	$[C_3H_6N]^+$		
	57	$[M\text{-}NH_2]^+$	$[M\text{-}NH_2]^+$	$[M\text{-}NH_2]^+$	$[M\text{-}NH_2]^+$	$[M\text{-}NH_2]^+$	$[M\text{-}NH_2]^+$
	58	UI	UI	UI		UI	UI
	59		UI		UI	UI	
	60		UI	UI			UI
	61-65		UI	UI		
	66		UI	UI		UI	
	67-71		UI	UI		
	68					$[C_3H_5N_2]^+$ or $[C_5H_9]^+$	
	72	$[NH_4(H_2O)_3]^+$	$[NH_4(H_2O)_3]^+$			
	15					$[CH_3]^+$	
	18				UI		
	27					UI	
	29	$[CHO]^+$	$[CHO]^+$	$[CHO]^+$	$[CHO]^+$	$[CHO]^+$	$[CHO]^+$
	31	$[CH_2OH]^+$	$[CH_2OH]^+$	$[CH_2OH]^+$	$[CH_2OH]^+$	$[CH_2OH]^+$	$[CH_2OH]^+$
	33					UI	
	39					UI	UI
	41				UI	UI	UI
Glucose	43	$[C_2H_3O]^+$	$[C_2H_3O]^+$	$[C_2H_3O]^+$	$[C_2H_3O]^+$	$[C_2H_3O]^+$	$[C_2H_3O]^+$
	45	$[C_2H_5O]^+$	$[C_2H_5O]^+$	$[C_2H_5O]^+$	$[C_2H_5O]^+$	$[C_2H_5O]^+$	$[C_2H_5O]^+$
	53					UI	UI
	55		UI	UI			

Glucose	57	$[C_3H_5O]^+$	$[C_3H_5O]^+$	$[C_3H_5O]^+$	$[C_3H_5O]^+$	$[C_3H_5O]^+$	$[C_3H_5O]^+$
	58					UI	UI
	59				UI	UI	UI
	60		UI			UI	
	61	$[C_2H_5O_2]^+$	$[C_2H_5O_2]^+$	$[C_2H_5O_2]^+$	$[C_2H_5O_2]^+$	$[C_2H_5O_2]^+$	$[C_2H_5O_2]^+$
	63					UI	UI
	69	$[C_4H_5O]^+$	$[C_4H_5O]^+$	$[C_4H_5O]^+$	$[C_4H_5O]^+$	$[C_4H_5O]^+$	$[C_4H_5O]^+$
	70	$[C_5H_{10}]^+$	$[C_5H_{10}]^+$			$[C_5H_{10}]^+$	$[C_5H_{10}]^+$
	71		UI	UI	UI	UI	UI
	73	$[C_3H_5O_2]^+$	$[C_3H_5O_2]^+$	$[C_3H_5O_2]^+$	$[C_3H_5O_2]^+$	$[C_3H_5O_2]^+$	$[C_3H_5O_2]^+$
	74		UI		UI	UI	UI
	75	UI	UI		UI	UI	UI
	79	UI				UI	UI
	80				UI	UI	UI
	81	$[C_5H_5O]^+$	$[C_5H_5O]^+$	$[C_5H_5O]^+$	$[C_5H_5O]^+$	$[C_5H_5O]^+$	$[C_5H_5O]^+$
	82	UI			UI	UI	UI
	83	UI	UI		UI	UI	UI
	85	$[C_4H_5O_2]^+$	$[C_4H_5O_2]^+$	$[C_4H_5O_2]^+$	$[C_4H_5O_2]^+$	$[C_4H_5O_2]^+$	$[C_4H_5O_2]^+$
	86		UI	UI	UI	UI	UI
	87	$[C_4H_7O_2]^+$	$[C_4H_7O_2]^+$	$[C_4H_7O_2]^+$	$[C_4H_7O_2]^+$	$[C_4H_7O_2]^+$	$[C_4H_7O_2]^+$
	88	UI			UI	UI	UI
	89	UI	UI		UI	UI	UI
	91	$[M+H-(H_2O)_5]^+$	$[M+H-(H_2O)_5]^+$	$[M+H-(H_2O)_5]^+$	$[M+H-(H_2O)_5]^+$	$[M+H-(H_2O)_5]^+$	$[M+H-(H_2O)_5]^+$
	92				UI	UI	UI
	93	UI	UI	UI		UI	UI
	97	$[C_5H_5O_2]^+$	$[C_5H_5O_2]^+$	$[C_5H_5O_2]^+$	$[C_5H_5O_2]^+$	$[C_5H_5O_2]^+$	$[C_5H_5O_2]^+$
	98				UI	UI	UI
	99	$[C_5H_7O_2]^+$	$[C_5H_7O_2]^+$	$[C_5H_7O_2]^+$	$[C_5H_7O_2]^+$	$[C_5H_7O_2]^+$	$[C_5H_7O_2]^+$
	100				UI	UI	UI
	101	$[C_5H_9O_2]^+$	$[C_5H_9O_2]^+$	$[C_5H_9O_2]^+$	$[C_5H_9O_2]^+$	$[C_5H_9O_2]^+$	$[C_5H_9O_2]^+$
	102				UI	UI	UI
	103	$[C_4H_7O_3]^+$	$[C_4H_7O_3]^+$	$[C_4H_7O_3]^+$	$[C_4H_7O_3]^+$	$[C_4H_7O_3]^+$	$[C_4H_7O_3]^+$
	104				UI	UI	UI
	105	$[C_4H_9O_3]^+$	$[C_4H_9O_3]^+$		$[C_4H_9O_3]^+$	$[C_4H_9O_3]^+$	$[C_4H_9O_3]^+$
	109	$[M+H-(H_2O)_4]^+$	$[M+H-(H_2O)_4]^+$	$[M+H-(H_2O)_4]^+$	$[M+H-(H_2O)_4]^+$	$[M+H-(H_2O)_4]^+$	$[M+H-(H_2O)_4]^+$
	110				UI	UI	UI
	111				UI	UI	UI

Glucose	115	$[C_5H_7O_3]^+$	$[C_5H_7O_3]^+$	$[C_5H_7O_3]^+$	$[C_5H_7O_3]^+$	$[C_5H_7O_3]^+$	$[C_5H_7O_3]^+$
	116				UI	UI	UI
	117	$[C_5H_9O_3]^+$	$[C_5H_9O_3]^+$	$[C_5H_9O_3]^+$	$[C_5H_9O_3]^+$	$[C_5H_9O_3]^+$	$[C_5H_9O_3]^+$
	118				UI	UI	UI
	119	UI	UI	UI	UI	UI	UI
	121	$[C_4H_9O_4]^+$	$[C_4H_9O_4]^+$		$[C_4H_9O_4]^+$	$[C_4H_9O_4]^+$	$[C_4H_9O_4]^+$
	123	$[C_4H_{11}O_4]^+$	$[C_4H_{11}O_4]^+$		$[C_4H_{11}O_4]^+$	$[C_4H_{11}O_4]^+$	$[C_4H_{11}O_4]^+$
	127	$[M+H-(H_2O)_3]^+$	$[M+H-(H_2O)_3]^+$	$[M+H-(H_2O)_3]^+$	$[M+H-(H_2O)_3]^+$	$[M+H-(H_2O)_3]^+$	$[M+H-(H_2O)_3]^+$
	128	UI			UI	UI	UI
	129				UI		UI
	130	UI				UI	UI
	133	UI			UI	UI	UI
	135	UI			UI	UI	UI
	137				UI	UI	UI
	139		UI		UI		UI
	141			UI	UI	UI	UI
	143		UI	UI		UI	
	144		UI				
	145	$[M+H-(H_2O)_2]^+$	$[M+H-(H_2O)_2]^+$	$[M+H-(H_2O)_2]^+$	$[M+H-(H_2O)_2]^+$	$[M+H-(H_2O)_2]^+$	$[M+H-(H_2O)_2]^+$
	146	UI	UI			UI	UI
	147				UI		
	148	UI	UI			UI	UI
	151				UI	UI	UI
	153				UI	UI	UI
	155		UI				
	157				UI	UI	UI
	159				UI		
	161		UI				
	163	$[M-OH]^+$	$[M-OH]^+$	$[M-OH]^+$	$[M-OH]^+$	$[M-OH]^+$	$[M-OH]^+$
	164	UI			UI	UI	UI
	165		UI				
	167						UI
	173		UI				
	169, 175				UI		
Methanol	15	$[CH_3]^+$					$[CH_3]^+$
	18						$[NH_4]^+$

Pyridine	23	UI			
	39				$[HC_2N]^+$ or $[C_3H_3]^+$
	41	UI			
	43				$[C_2H_5N]^+$
	53	$[C_3H_3N]^+$			$[C_3H_3N]^+$
	59, 77	UI	UI		
	79	UI	UI	UI	UI

Table S1. Fragment peaks, and their respective mass, detected in cation mode for the investigated organics in pure water matrix (Napoleoni et al. 2022), in 0.01M, 0.1M and 1M $MgSO_4$ and 0.01M, 0.1M and 1M H_2SO_4 matrices, at all investigated delay times and laser power intensities. UI stands for unidentified ion species. Species written in blue are tentative identifications.

	m/z	pure H_2O	$MgSO_4$			H_2SO_4		
			0.01M	0.1M	1M	0.01M	0.1M	1M
5-amino-1-pentanol	16	$[NH_2]^-$						
	26	$[C_2H_2]^-$ or $[CN]^-$						
	27			UI				
	42	$[C_2H_4N]^-$	$[C_2H_4N]^-$			$[C_2H_4N]^-$		
	43	UI		UI				
	44, 45, 46	UI						
	53					UI		
	59, 60	UI						
	61	UI		UI				
	62, 63, 64, 77, 78, 79, 80, 81, 83	UI						
	93					UI		
	95, 97, 98	UI						
Acetic acid	15	$[CH_3]^-$	$[CH_3]^-$	$[CH_3]^-$	$[CH_3]^-$			
	36	UI						
	41	$[M-H_3O]^-$	$[M-H_3O]^-$					
	54	UI						
	58	UI	UI	UI				
Benzoic acid	59	UI						
	77	$[M-COOH]^-$	$[M-COOH]^-$	$[M-COOH]^-$	$[M-COOH]^-$			
	95	$[M-COOH+(H_2O)]^-$						
	113	$[M-COOH+(H_2O)_2]^-$						
Butylamine	16	$[NH_2]^-$						
	26	$[C_2H_2]^-$ or $[CN]^-$	$[C_2H_2]^-$ or $[CN]^-$	$[C_2H_2]^-$ or $[CN]^-$	$[C_2H_2]^-$ or $[CN]^-$			
	32	$[N_2H_4]^-$						
	42		$[C_2H_4N]^-$	$[C_2H_4N]^-$	$[C_2H_4N]^-$			
	44	$[C_2H_6N]^-$	$[C_2H_6N]^-$	$[C_2H_6N]^-$				
	49	UI						

	53		UI			
	60		UI			
	61					UI
	62	UI	$[C_2H_4N\ (H_2O)]^-$	$[C_2H_4N\ (H_2O)]^-$		
	64		UI	UI	UI	
	66	UI		UI		
	67	UI				
	68			UI		
	69		UI	UI		
	70	UI				
	71			UI		
Glucose	31	UI				
	41				UI	
	43	UI			UI	
	45	UI		UI	UI	
	55, 57	UI				
	58	$[C_4H_{10}]^-$				
	59	$[C_2H_3O_2]^-$	$[C_2H_3O_2]^-$	$[C_2H_3O_2]^-$	$[C_2H_3O_2]^-$	
	62	UI				
	71	$[C_3H_3O_2]^-$ or $[M\text{-}H\text{-}(H_2O)_6]^-$	$[C_3H_3O_2]^-$ or $[M\text{-}H\text{-}(H_2O)_6]^-$		$[C_3H_3O_2]^-$ or $[M\text{-}H\text{-}(H_2O)_6]^-$	
	73	$[C_3H_5O_2]^-$				
	75	UI				
	77	$[C_2H_5O_3]^-$	$[C_2H_5O_3]^-$			
	78, 83, 84	UI				
	85	UI	UI			
	87	$[C_4H_7O_2]^-$				
	89	$[C_3H_5O_3]^-$ or $[M\text{-}H\text{-}(H_2O)_5]^-$	$[C_3H_5O_3]^-$ or $[M\text{-}H\text{-}(H_2O)_5]^-$		$[C_3H_5O_3]^-$ or $[M\text{-}H\text{-}(H_2O)_5]^-$	
	90, 95, 97, 99, 100	UI				
	101	$[C_4H_5O_3]^-$	$[C_4H_5O_3]^-$			
	102, 103, 105	UI				

	107	$[C_3H_7O_4]^-$ or $[M\text{-}H\text{-}(H_2O)_4]^-$		
	112	UI		
	113	$[C_5H_5O_3]^-$	$[C_5H_5O_3]^-$	
	114	UI		
	119	$[C_4H_7O_4]^-$	$[C_4H_7O_4]^-$	
	120	UI		
	121		UI	
	125	$[M\text{-}H\text{-}(H_2O)_3]^-$		
	131	UI		
	135	$[C_5H_{11}O_4]^-$		
	137	$[C_4H_9O_5]^-$		
	141		UI	
	143	$[M\text{-}H\text{-}(H_2O)_2]^-$	$[M\text{-}H\text{-}(H_2O)_2]^-$	
	149, 155	UI		
	159			
	161	$[M\text{-}H\text{-}(H_2O)]^-$	$[M\text{-}H\text{-}(H_2O)]^-$	
	167	UI		
	171			
	177		UI	
	178		UI	
Methanol				
	22, 33	UI		
	42	$[C_2H_4N]^-$		
	44, 45, 59	UI		
Pyridine	61	$[C_5H]^-$		
	63	UI		
	75		UI	
	77	UI		

Table S2. Fragment peaks, and their respective mass, detected in anion mode for the investigated organics in pure water matrix (Napoleoni et al. 2022), in 0.01M, 0.1M and 1M $MgSO_4$ and 0.01M, 0.1M and 1M H_2SO_4 matrices, at all investigated delay times and laser power intensities. UI stands for unidentified ion species.