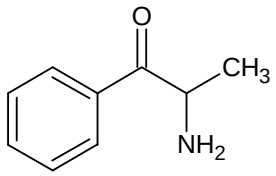
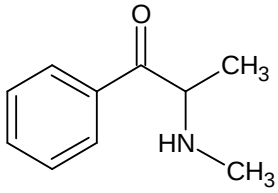
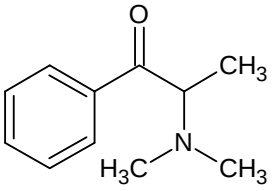
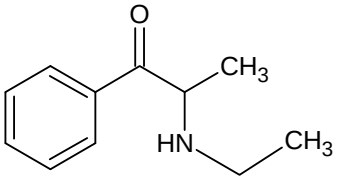
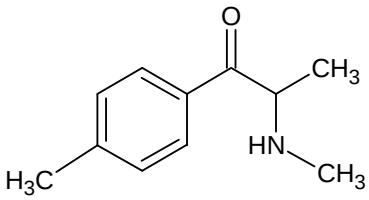
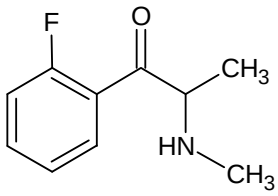
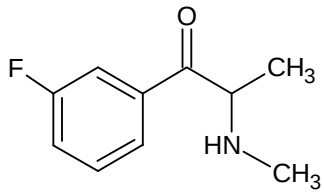
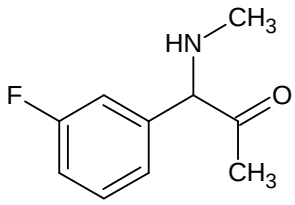
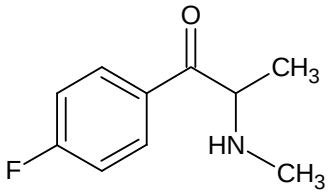
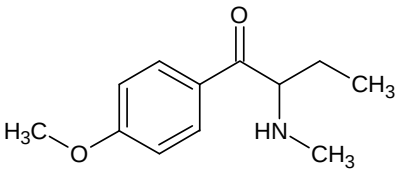
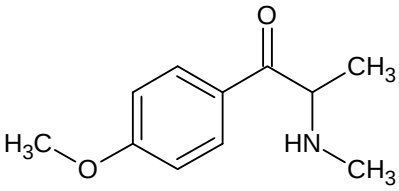
Analytical profiles of Methcathinone Related Compounds

The compounds

A	Cathinone	2-amino-1-phenylpropan-1-one Molecular Formula = $C_9H_{11}NO$ Formula Weight = 149.18974	
B	Methcathinone	2-(methylamino)-1-phenylpropan-1-one Molecular Formula = $C_{10}H_{13}NO$ Formula Weight = 163.21632	
C	Dimethylcathinone	2-(dimethylamino)-1-phenylpropan-1-one Molecular Formula = $C_{11}H_{15}NO$ Formula Weight = 177.2429	
D	Ethcathinone*	2-(ethylamino)-1-phenylpropan-1-one Molecular Formula = $C_{11}H_{15}NO$ Formula Weight = 177.2429	
E	4-Methyl-methcathinone* (Mephedrone)	2-(methylamino)-1-(4-methylphenyl)propan-1-one Molecular Formula = $C_{11}H_{15}NO$ Formula Weight = 177.2429	
F	2- Fluoro-methcathinone	1-(2-fluorophenyl)-2-(methylamino)propan-1-one Molecular Formula = $C_{10}H_{12}FNO$ Formula Weight = 181.2067832	

G	3- Fluoro-methcathinone*	1-(3-fluorophenyl)-2-(methylamino)propan-1-one Molecular Formula = $C_{10}H_{12}FNO$ Formula Weight = 181.2067832	
H	3- Fluoro-iso-methcathinone* (by-product of synthesis of 3-fluoro-methcathinone)	1-(3-fluorophenyl)-1-(methylamino)propan-2-one Molecular Formula = $C_{10}H_{12}FNO$ Formula Weight = 181.2067832	
I	4- Fluoro-methcathinone	1-(4-fluorophenyl)-2-(methylamino)propan-1-one Molecular Formula = $C_{10}H_{12}FNO$ Formula Weight = 181.2067832	
J	4-methoxy-methylaminobutyrone	1-(4-methoxyphenyl)-2-(methylamino)butan-1-one Molecular Formula = $C_{12}H_{17}NO_2$ Formula Weight = 207.26888	
K	4-Methoxy-methcathinone (Methedrone, bk-PMMA)	1-(4-methoxyphenyl)-2-(methylamino)propan-1-one Molecular Formula = $C_{11}H_{15}NO_2$ Formula Weight = 193.2423	

* Compounds seen in UK products

Background and products

Cathinone is a pharmacologically active (stimulant) alkaloid extracted from the leaves of the Khat plant (Catha edulis). Khat leaves are chewed recreationally in parts of East Africa to produce a mild high much like caffeine from tea and coffee. Human metabolism of cathinone produces cathine and norpseudoephedrine, that are structurally similar to amfetamine and adrenaline. Cathine is one of the optical isomers of phenylpropanolamine, an appetite suppressant and nasal decongestant.

Cathinone and methcathinone are controlled under the UK Misuse of Drugs Act 1971; cathinone is Class C listed in Part III of schedule 2; methcathinone is Class B listed in Part II of Schedule 2.

Derivatives such as ethcathinone, 4-methylmethcathinone and the fluoromethcathinones, which are not controlled under current law, have been produced and marketed to satisfy the growing dance-scene drug culture. They are promoted as safe alternatives to ecstasy presumably to individuals who want to stay within the law. However, the safety of these compounds has not been evaluated and they are often sold in products where the contents are not accurately declared.

Seven products were originally purchased from the BioRepublik website, sold as 'legal alternatives to ecstasy'. They were described as 'Neorganics' and described two generations of products. The first being 'Neo-Dove 1'– "a well known, best seller, unique supplement designed especially to be the ultimate influence". 'Neo-Dove 2' is the next generation – "a superior supplement that will make you feel vital and happy". The other products purchased are listed below. The price of all Neorganics on the BioRepublik site was €28 for pack of four capsules or a multiple pack of up to 36 capsules could be purchased for €183. We took advantage of a special offer and purchased two capsules of each for €99.

Bio Republik
Herbal Domain

14 capsules were received; Ten (two of each colour) in a large pot labelled 'Multi Vitamin' and four white capsules in a smaller pot, with same outer label. It is unknown which capsule is which.

Neo DOVE S:C:D Push Up S.C. Sub Coca HIGH SPIRIT Neo Dove 2 LIFT

Further products obtained from the Future Legals website; High Spirit, S.C.D and Lift Neorganics were also analysed.

A product called 'Charge' was purchased from the popular legal high website Everyonedoesit.com. It was a powder and was described as **'novelty bath salts'**

Product Contents

Product	TICTAC No.	Source	Contents
	24198	BioRepublik.com (Large pot)	Ethcathinone + 4-Methylmethcathinone
	24199	BioRepublik.com (Large pot)	Ethcathinone + 4-Methylmethcathinone
	24200	BioRepublik.com (Large pot)	3-Fluoromethcathinone
	24201	BioRepublik.com (Large pot)	3-Fluoromethcathinone
	24202	BioRepublik.com (Small pot)	Ethcathinone + 4-Methylmethcathinone
	24203	BioRepublik.com (Large pot)	3-Fluoromethcathinone
	24388	BioRepublik.com (Small pot)	Ethcathinone + 4-Methylmethcathinone
	24180	BioRepublik.com (Small pot)	Ethcathinone + 4-Methylmethcathinone
	24192	BioRepublik.com (Small pot)	Ethcathinone + 4-Methylmethcathinone
	24197	Everyonedoesit .com	3-Fluoromethcathinone
	24095	Future Legals	3-Fluoromethcathinone
	24096	Future Legals	3-Fluoromethcathinone
	24093	Future Legals	3-Fluoromethcathinone

GC/MS

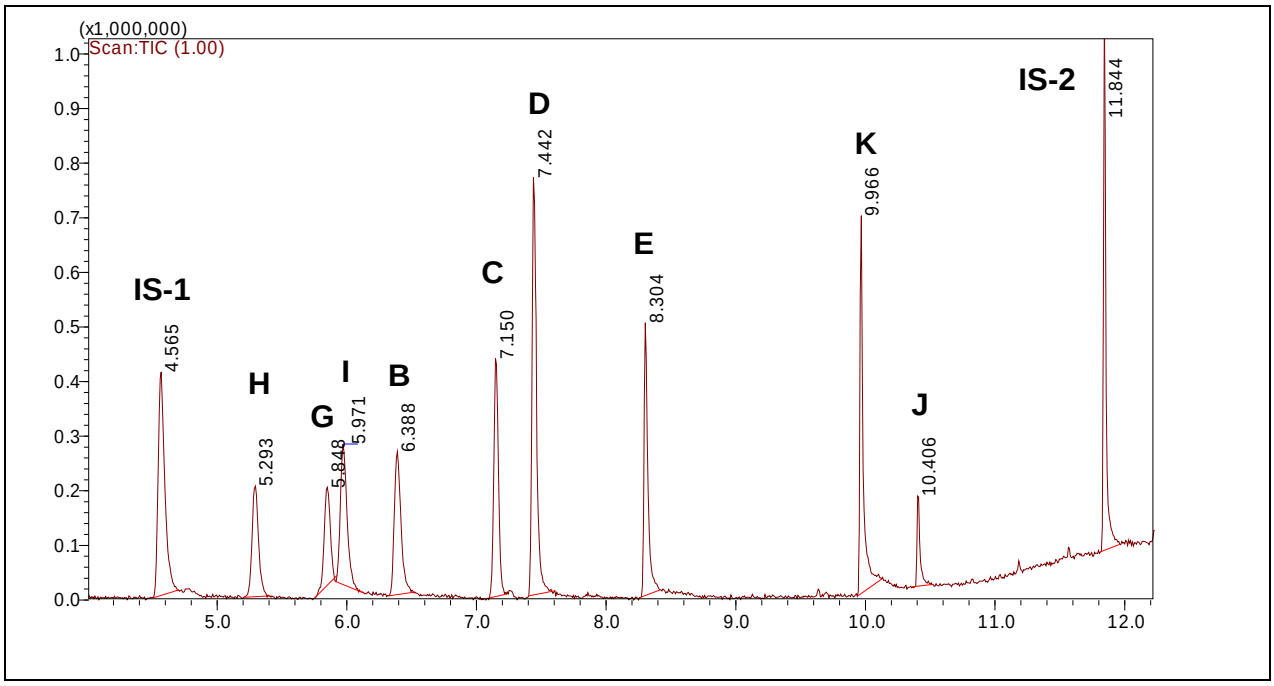
Samples were analysed on a Shimadzu QP2010 gas chromatograph mass spectrometer with an HP5MS column (30m x 0.25mm, 0.50µm).

Injection temperature	225°C
Injection mode	Splitless
Carrier gas	Helium
Flow rate	1.0 ml/min
Pressure	9.5 psi
Ion source temperature	200°C
Interface temperature	250°C

Column oven temperature programme:

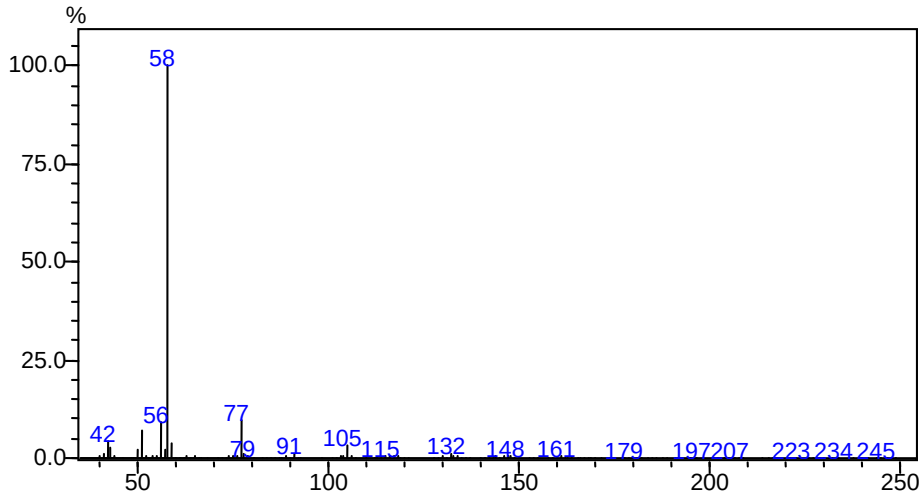
Rate	Final temperature	Time
-	140°C	Hold 6.1 minutes
20.00°C/min	200°C	Until 9.1 minutes
40.00°C/min	280°C	Until 12.2 minutes

Chromatogram:-

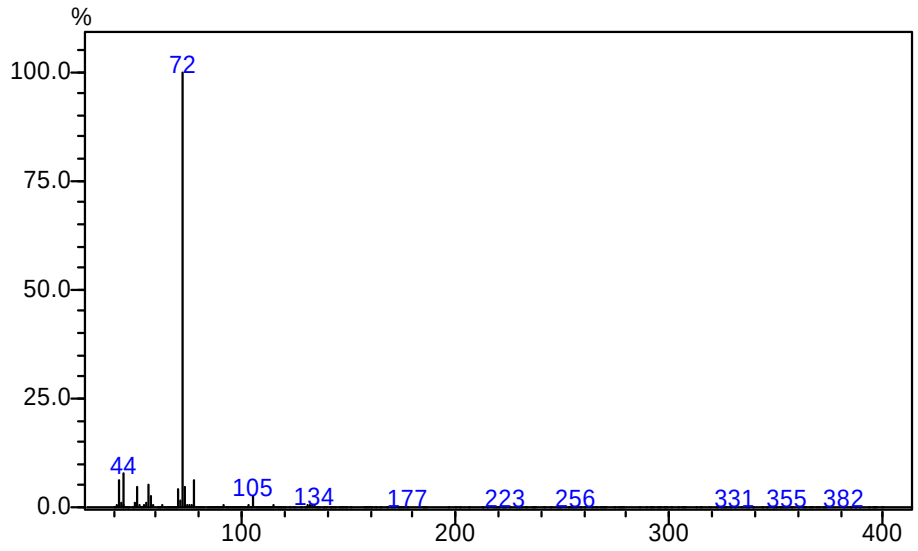


ID	Compound Name	Abbreviations	Retention time (mins.)
IS-1	Quinoline	IS-1	4.565
B	Methcathinone (Ephedrone)	MC	6.388
C	Dimethyl-methcathinone	DMMC	7.150
D	Ethcathinone (Ethylpropion)	EC	7.442
E	4-MethylMethcathinone (Mephedrone)	4-MMC	8.304
F	2-Fluoromethcathinone	2-FMC	Separate chromatogram (see below)
G	3-Fluoromethcathinone	3-FMC	5.848
H	3-Fluoro*iso*methcathinone	3-F*iso*MC	5.293
I	4-Fluoromethcathinone	4-FMC	5.971
J	4-methoxy-methylaminobutyrone	4-MAB	10.406
K	4-methoxy-methcathinone (Methedrone)	BK-PMMA	9.966
IS-2	Pyribenzamine	IS-2	11.844

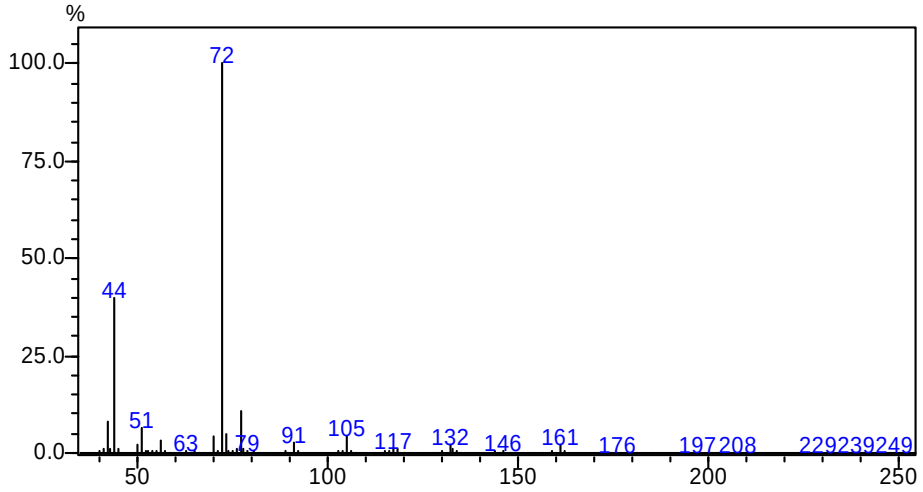
(B) METHCATHINONE



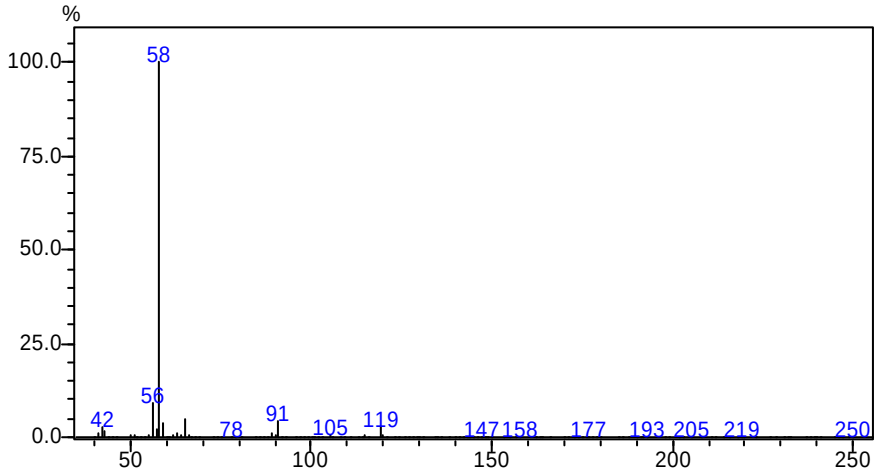
(C) DIMETHYLCATHINONE



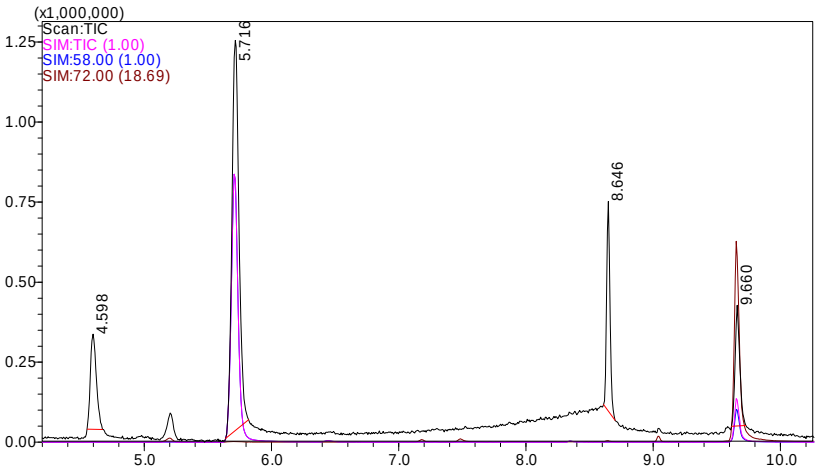
(D) ETHCATHINONE



(E) 4-METHYLMETHCATHINONE



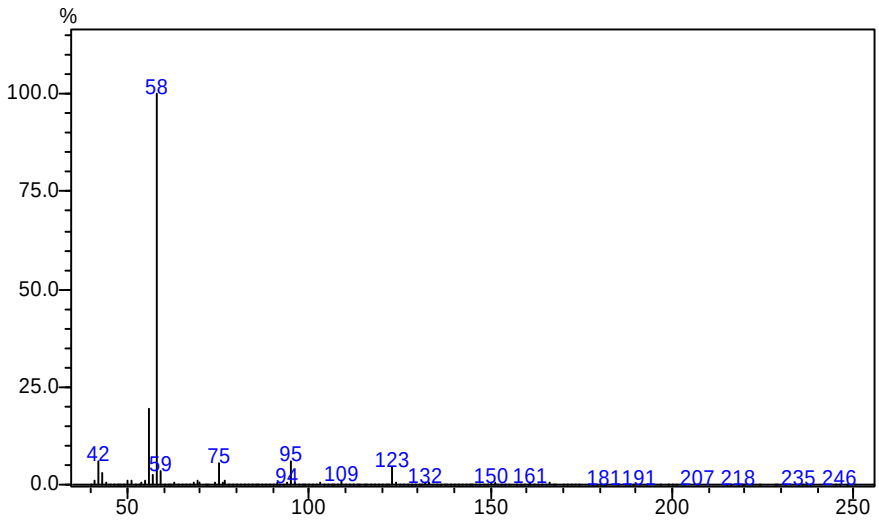
(F) 2-FLUOROMETHCATHINONE (Chromatogram and Mass Spectra)



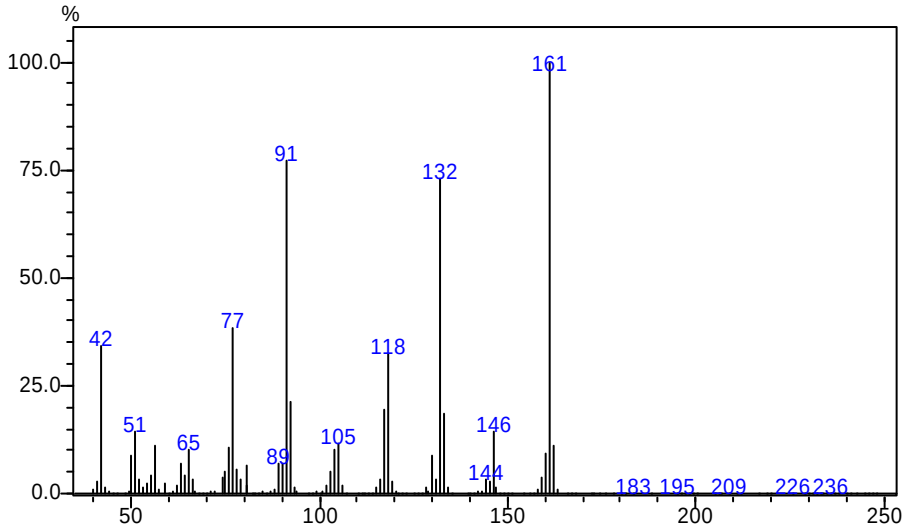
Separate chromatogram to show breakdown in GC:

IS-1	4.598
2-FMC peak 1	5.716
2-FMC peak 2	8.646
IS-2……	9.660

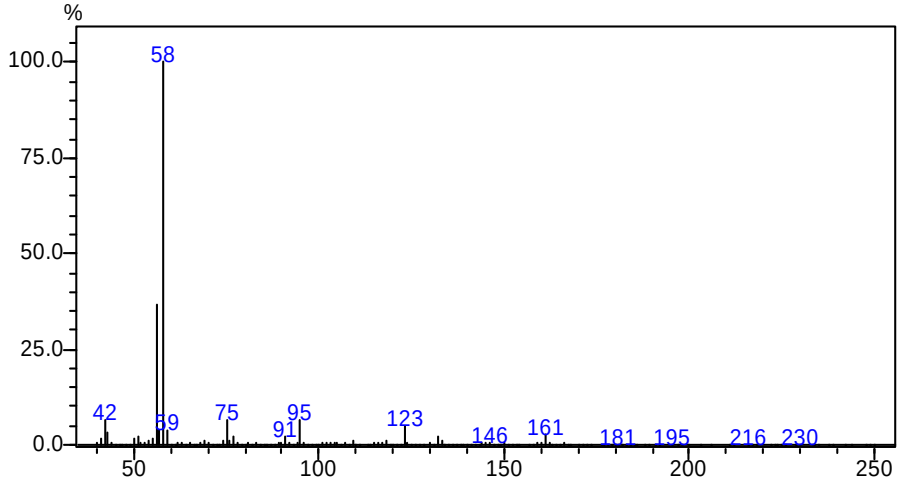
2-FMC peak 1:



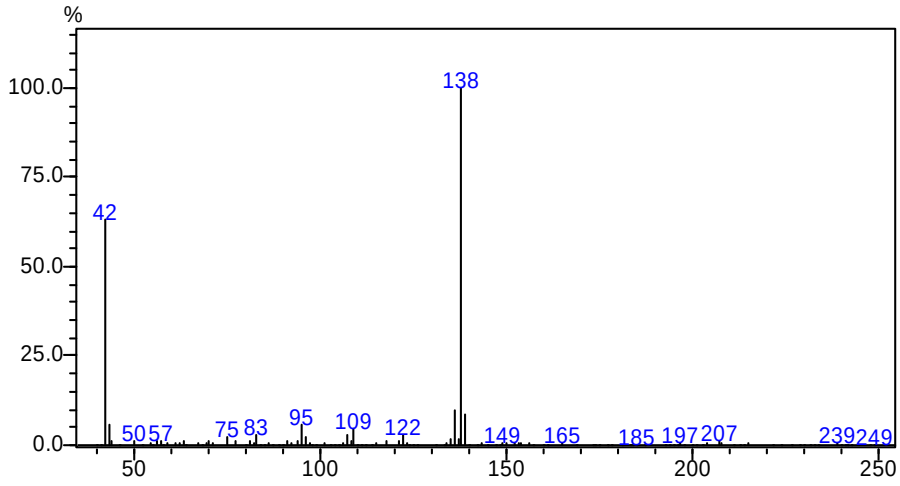
2-FMC peak 2:



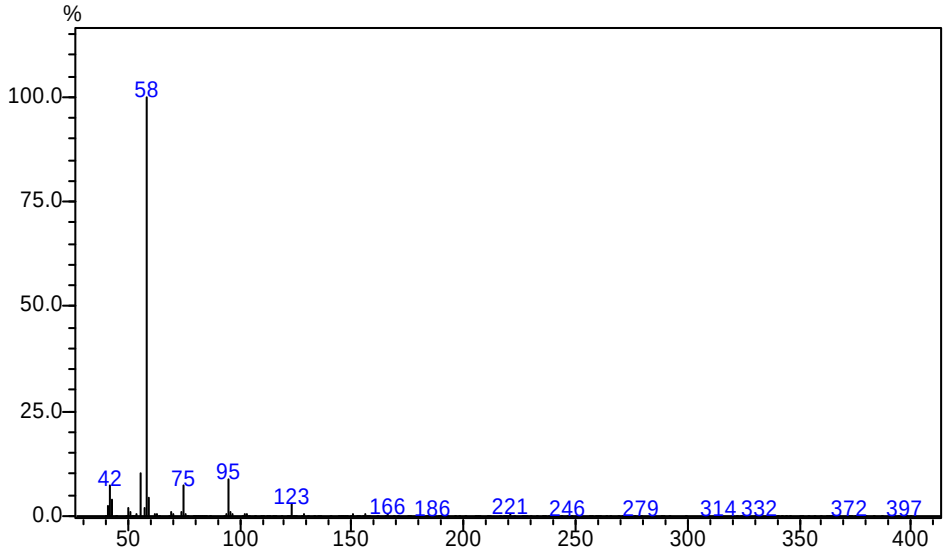
(G) 3-FLUOROMETHCATHINONE



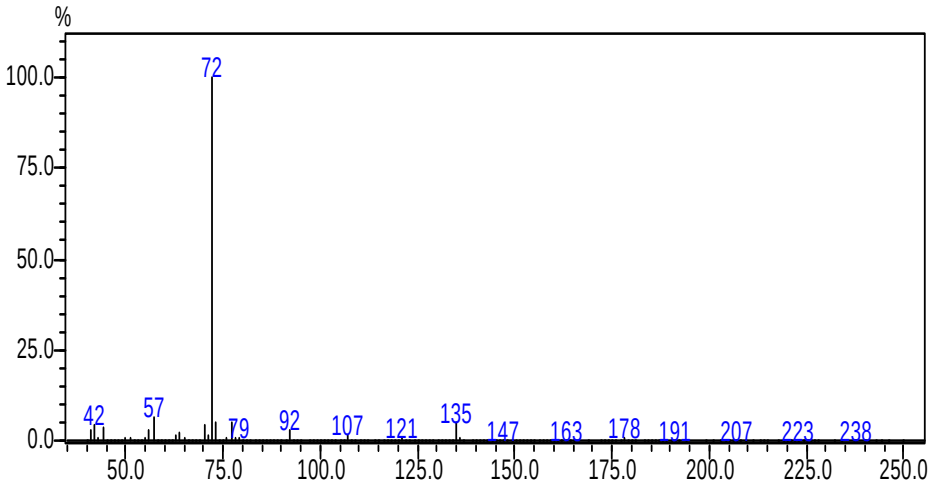
(H) 3-FLUORO*ISO*METHCATHINONE BY-PRODUCT OF SYNTHESIS OF 3-FMC



(I) 4-FLUOROMETHCATHINONE



(J) 4-METHOXY-METHYLAMINOBUTYRONE



(K) 4-METHOXY-METHCATHINONE (METHEDRONE)