

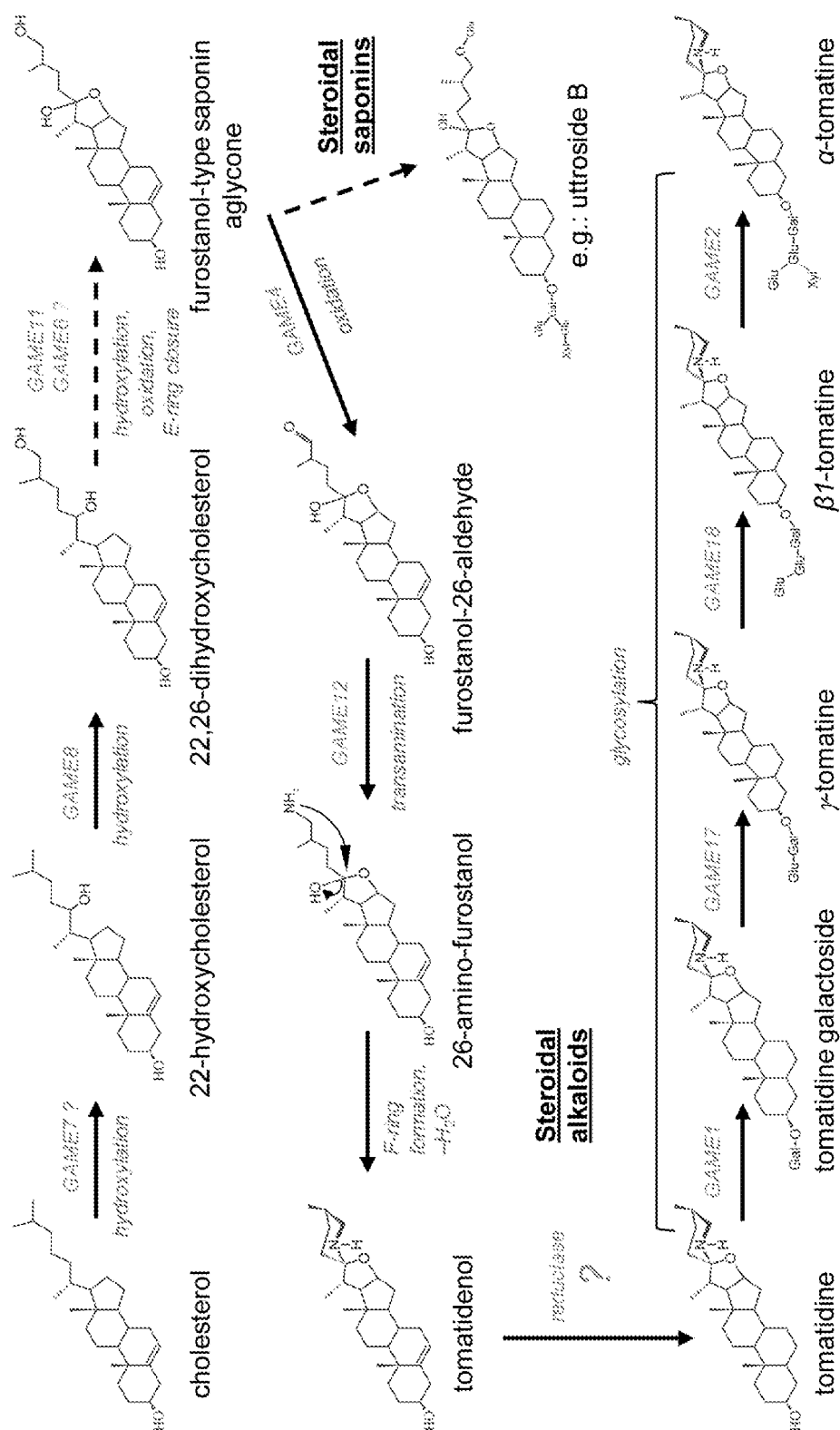
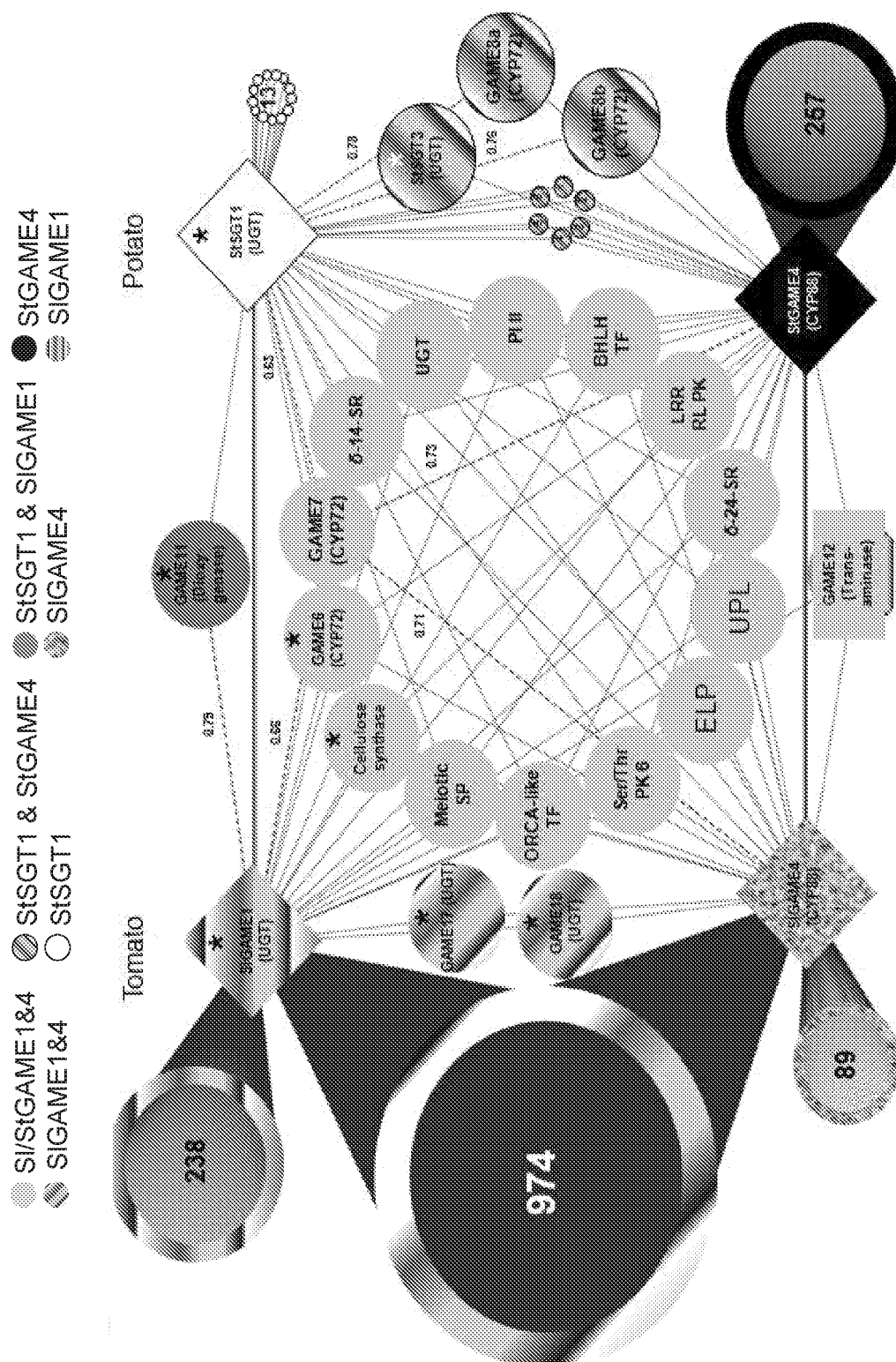


FIGURE 1



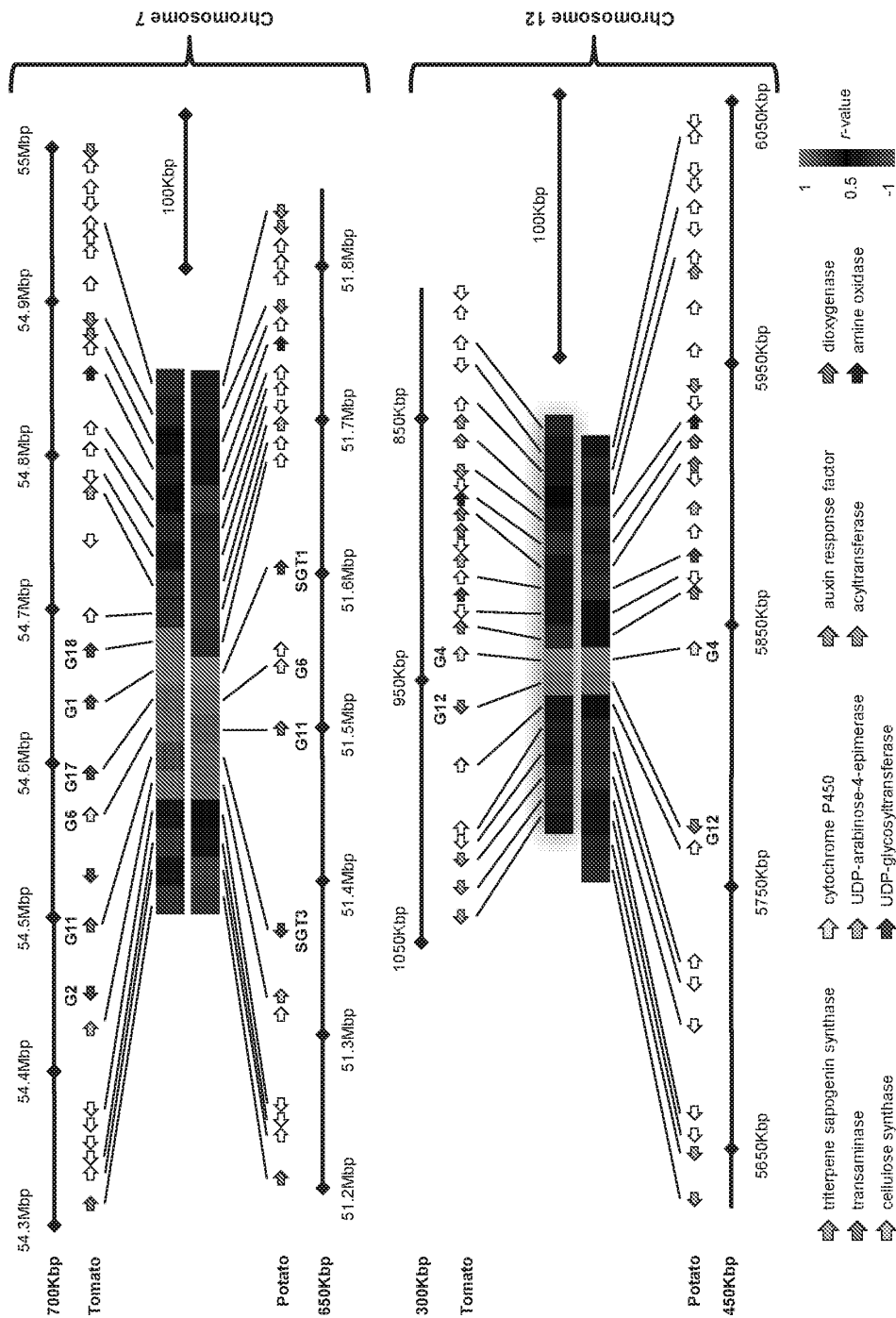


FIGURE 3

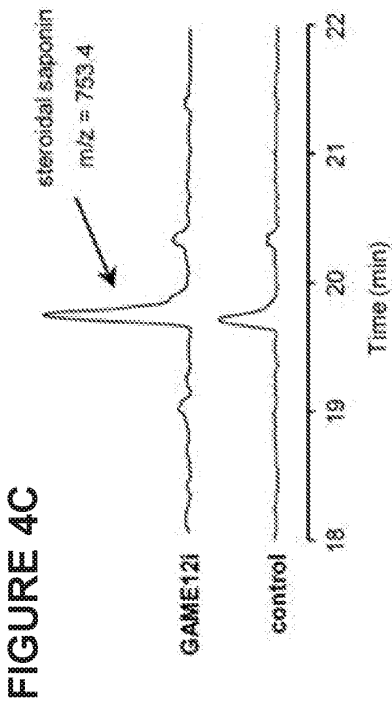
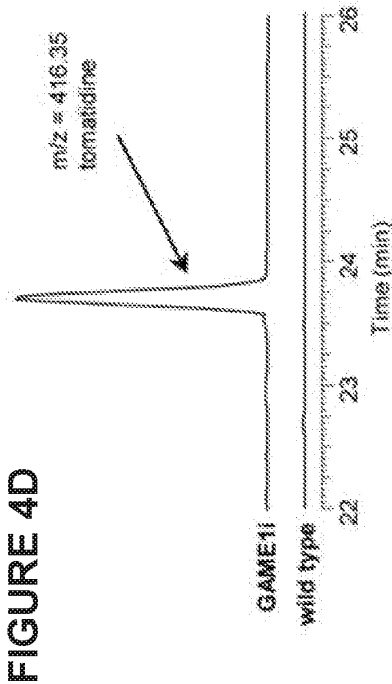
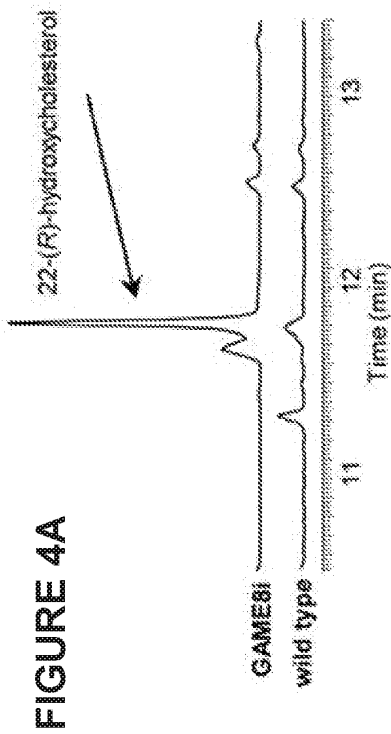
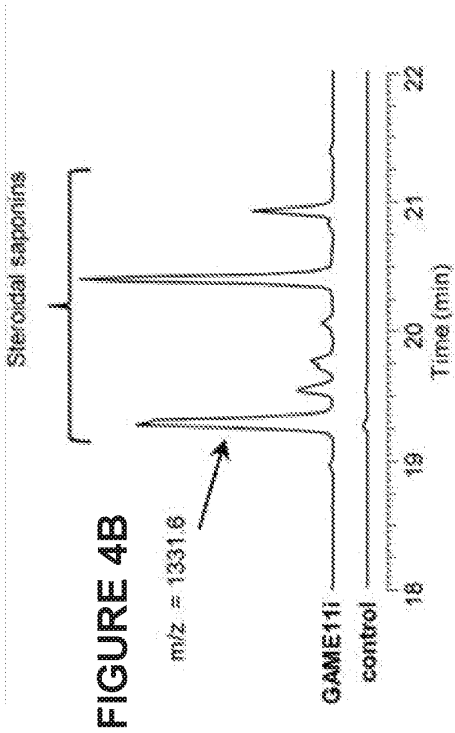


FIGURE 4F

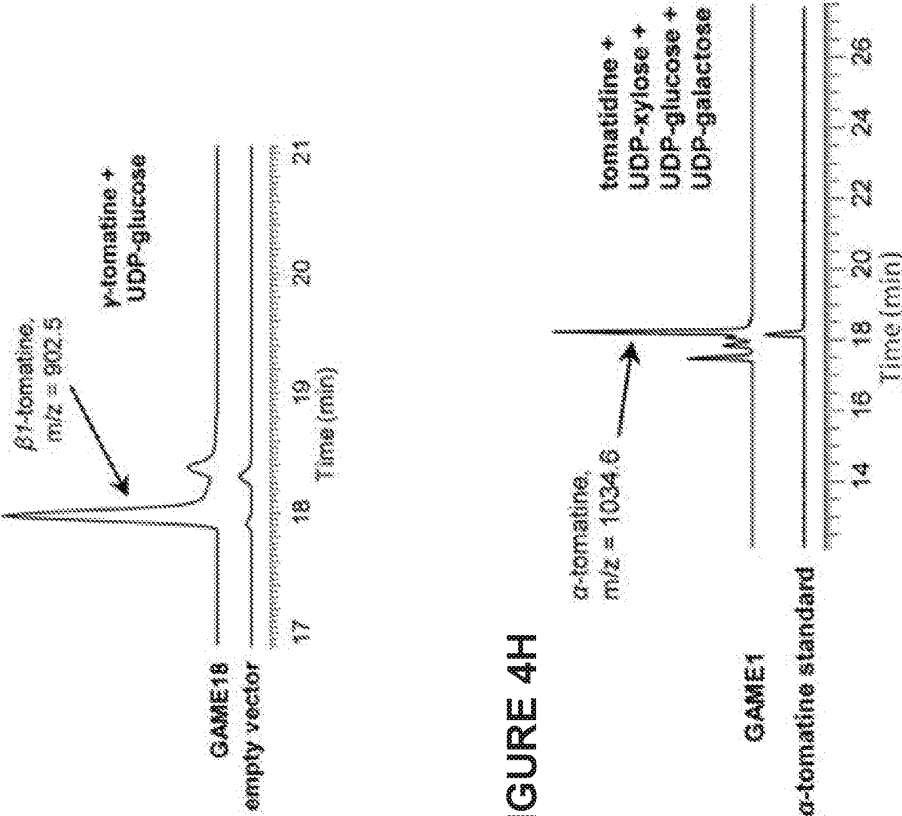


FIGURE 4H

FIGURE 4E

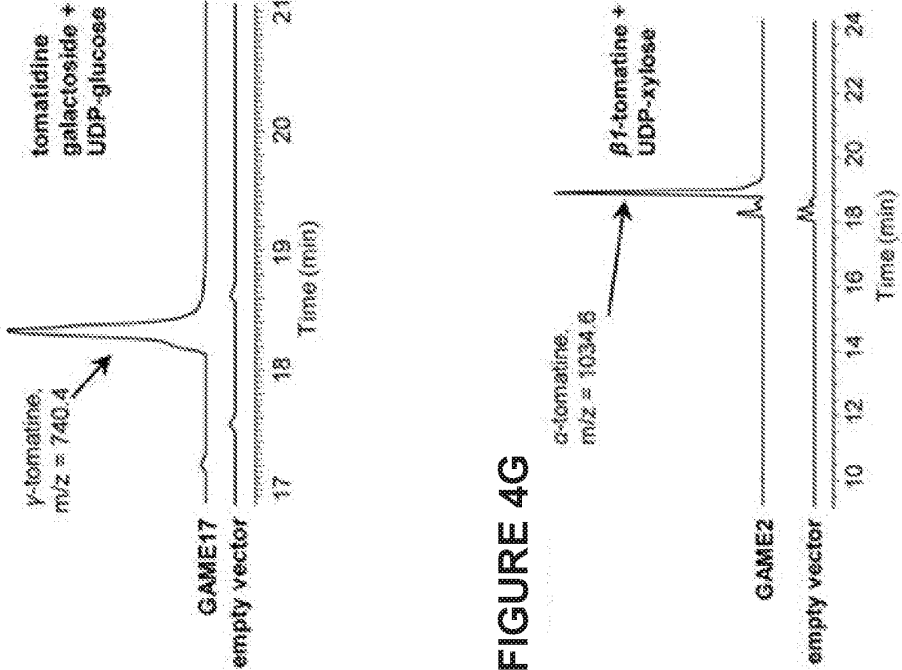


FIGURE 4G

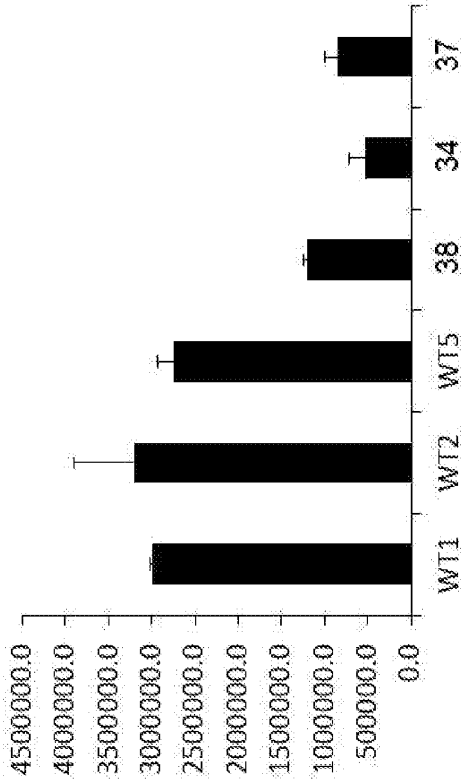


FIGURE 5B

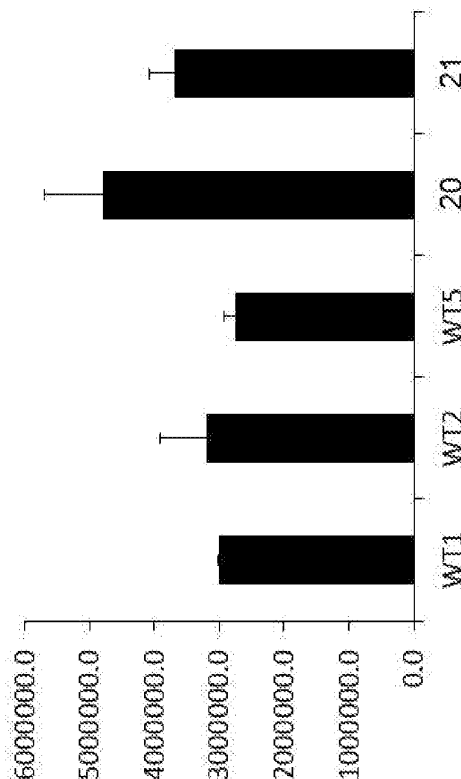


FIGURE 5D

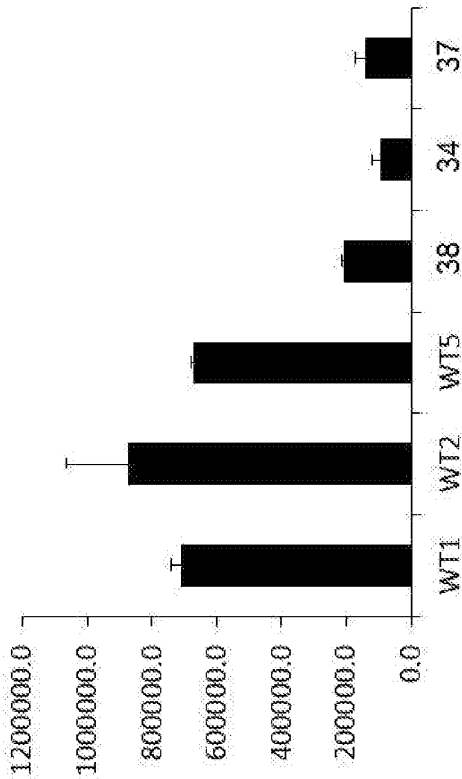


FIGURE 5A

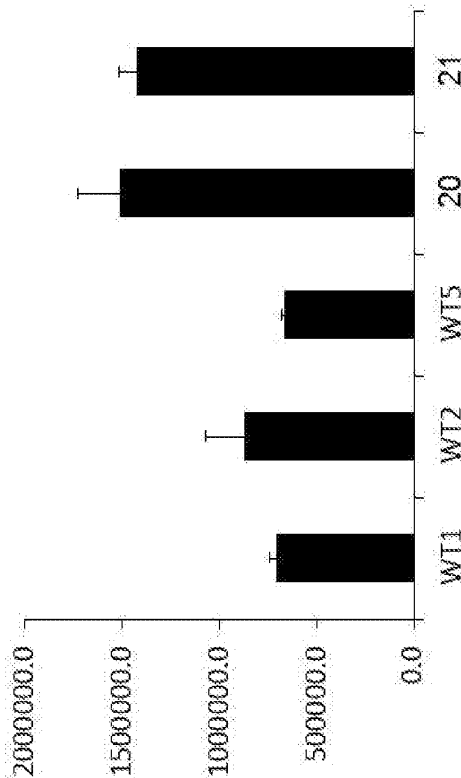


FIGURE 5C

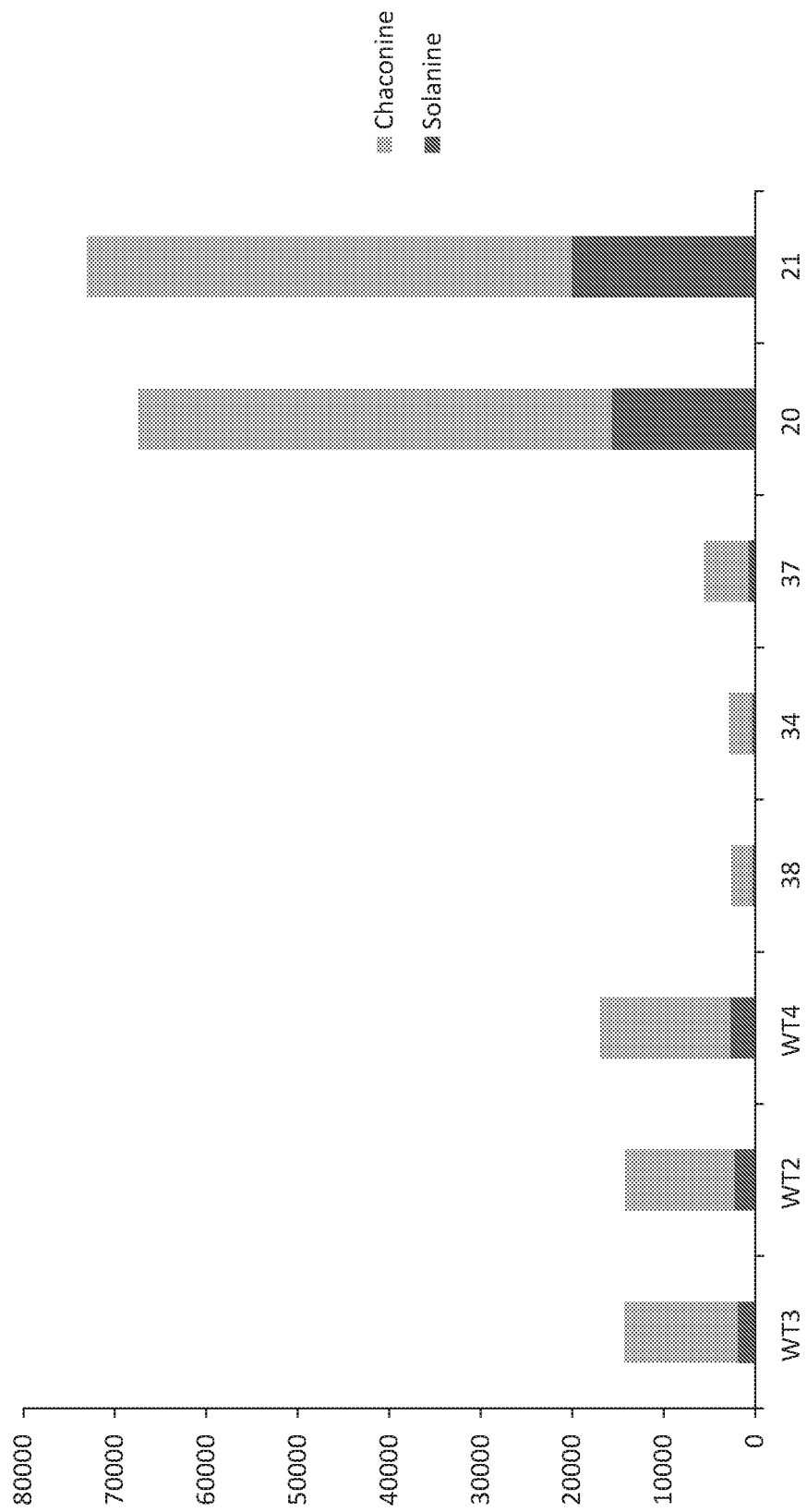


FIGURE 6

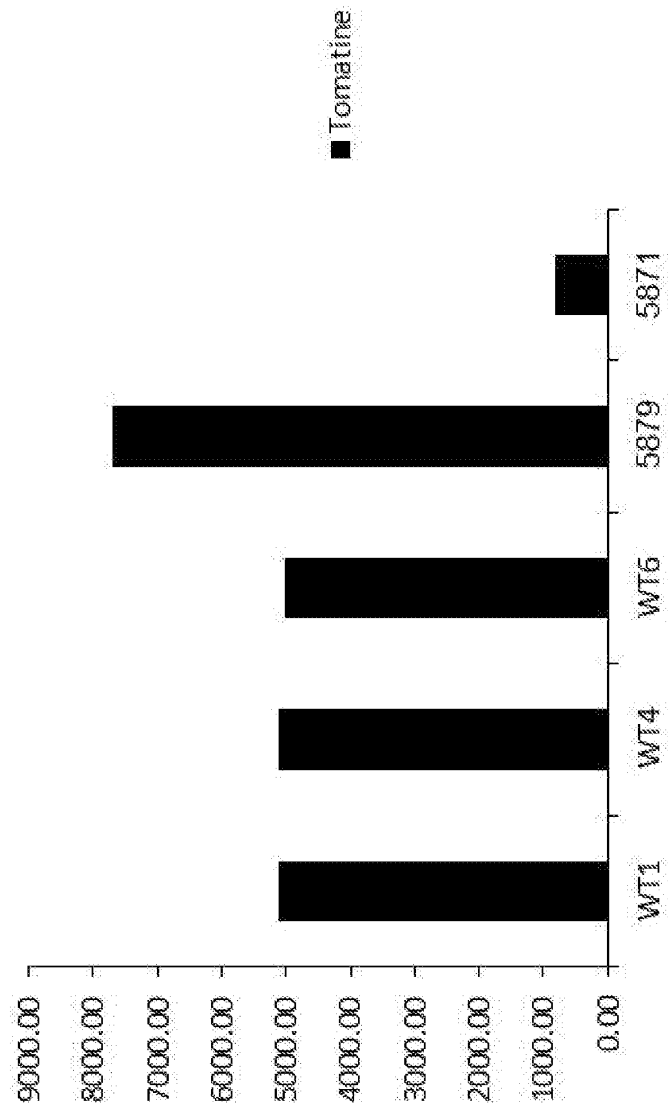


FIGURE 7

FIGURE 8A

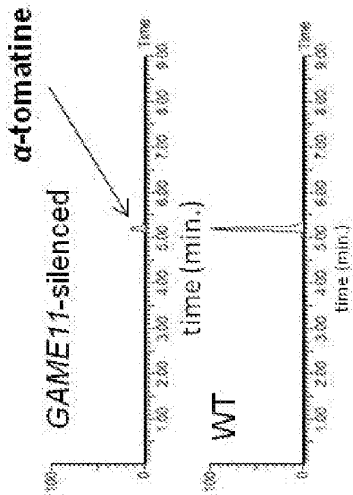


FIGURE 8B

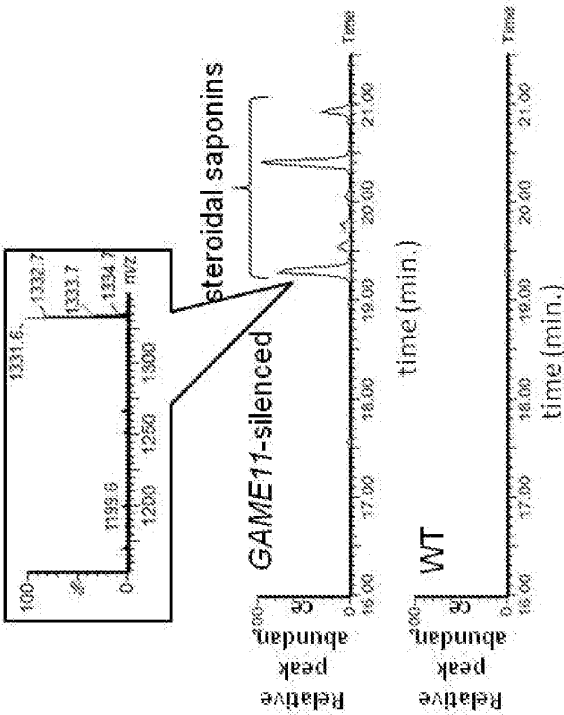
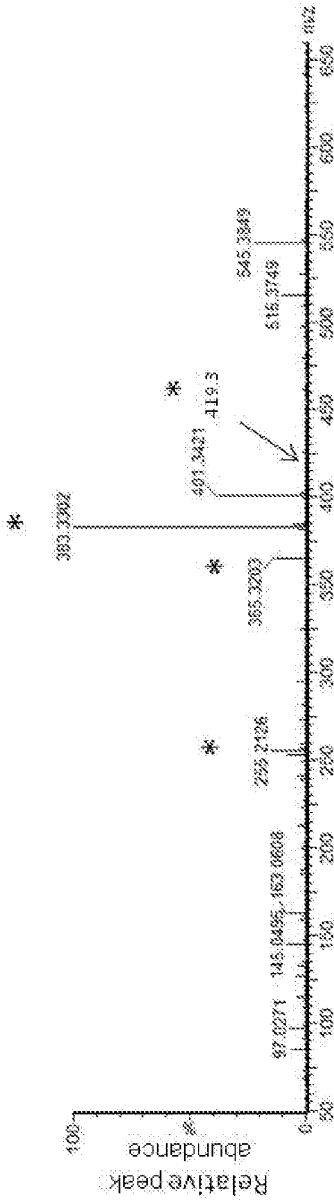
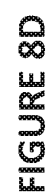


FIGURE 8C





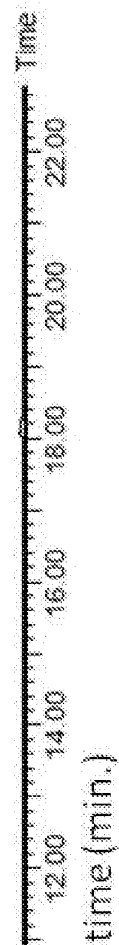


FIGURE 9B

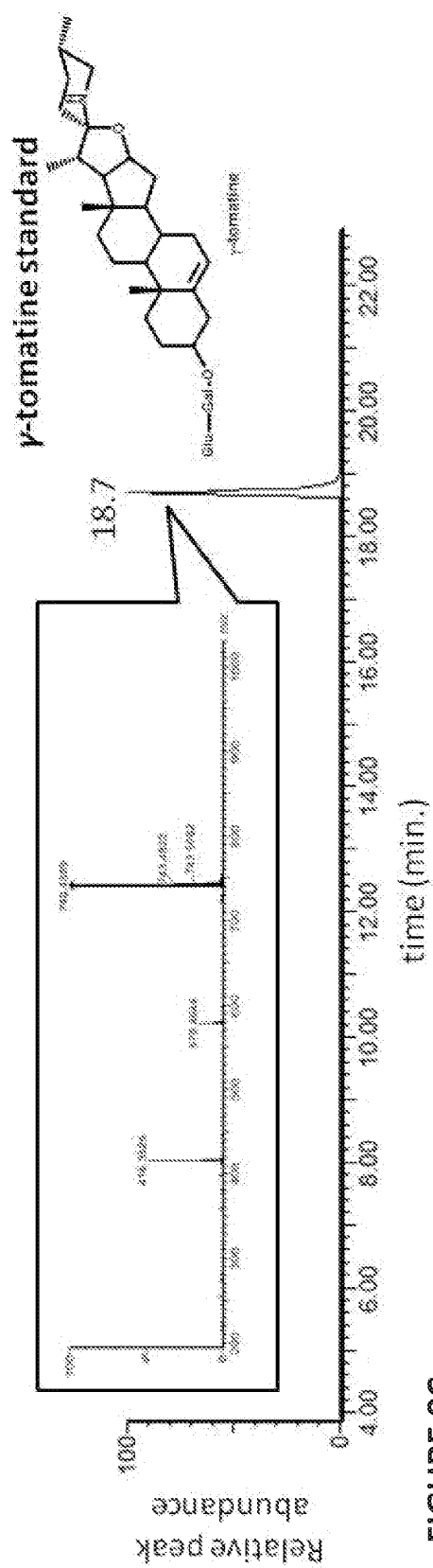


FIGURE 9C

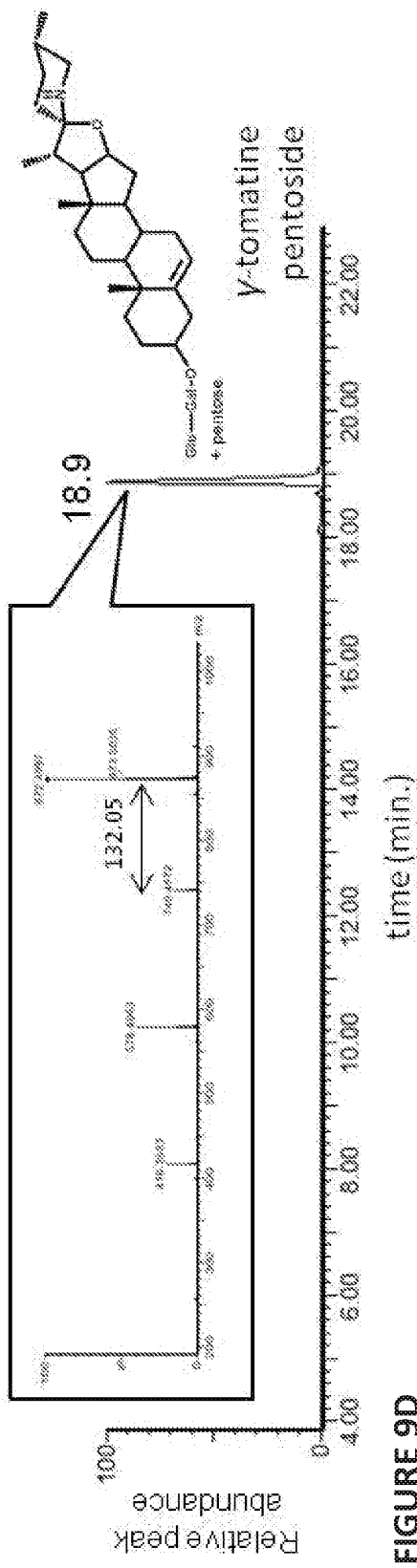


FIGURE 9D

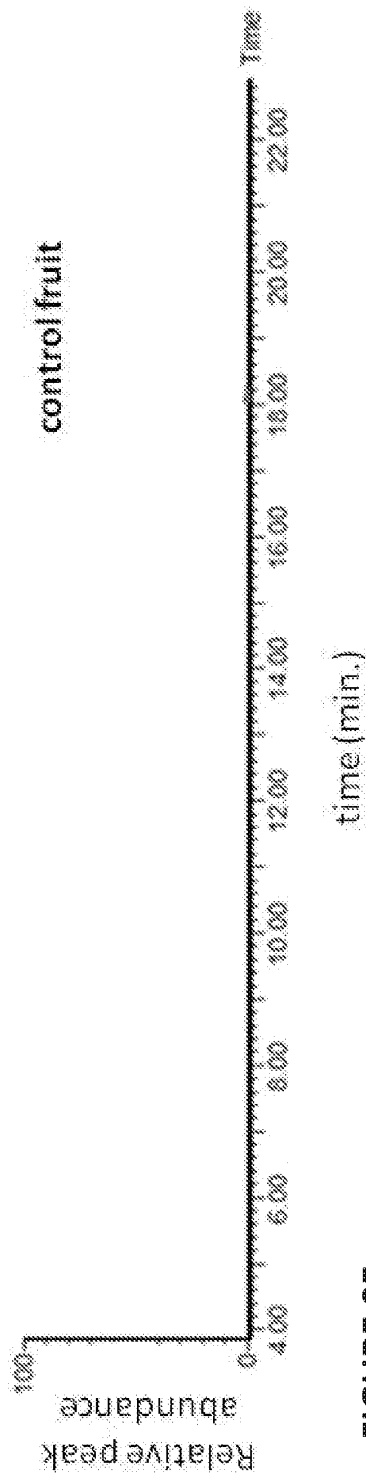


FIGURE 9E

FIGURE 10A

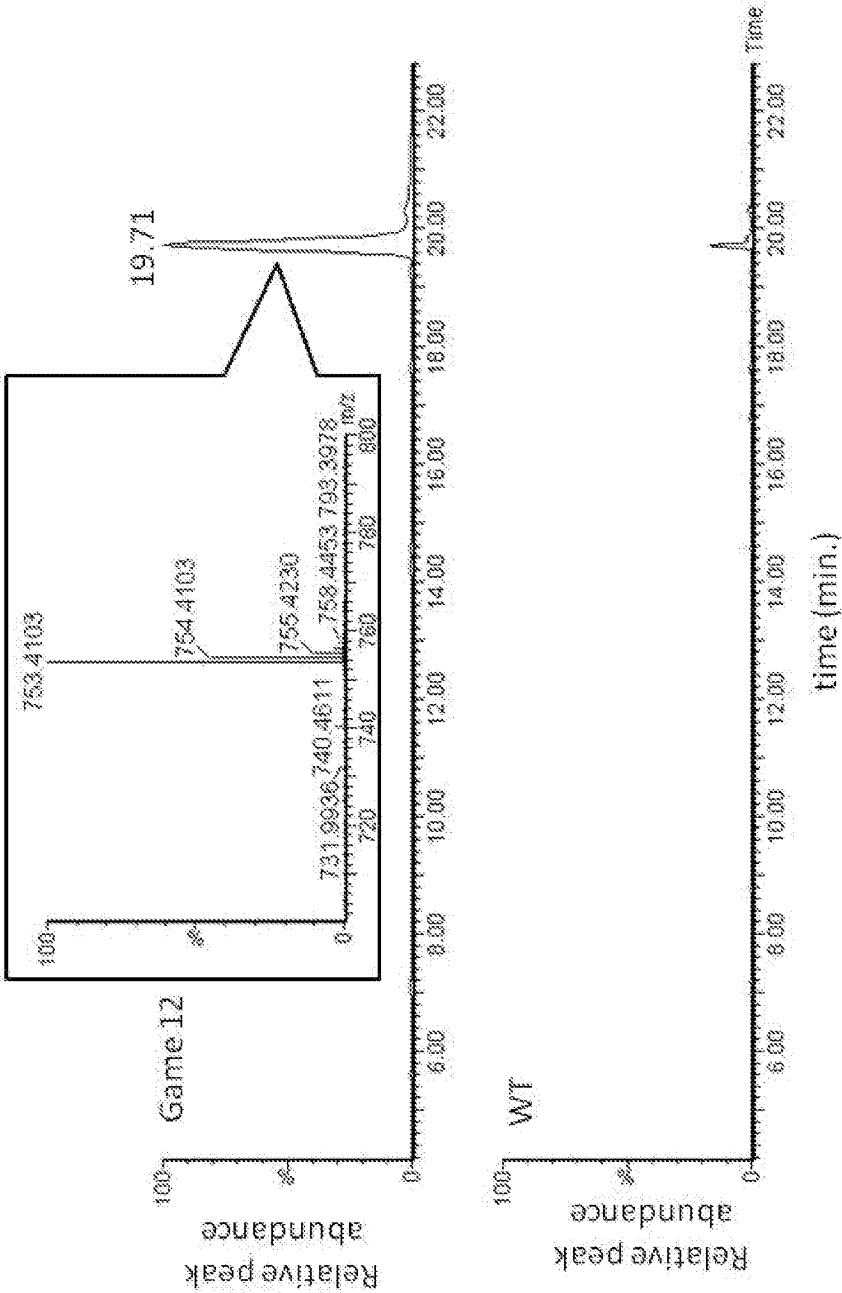
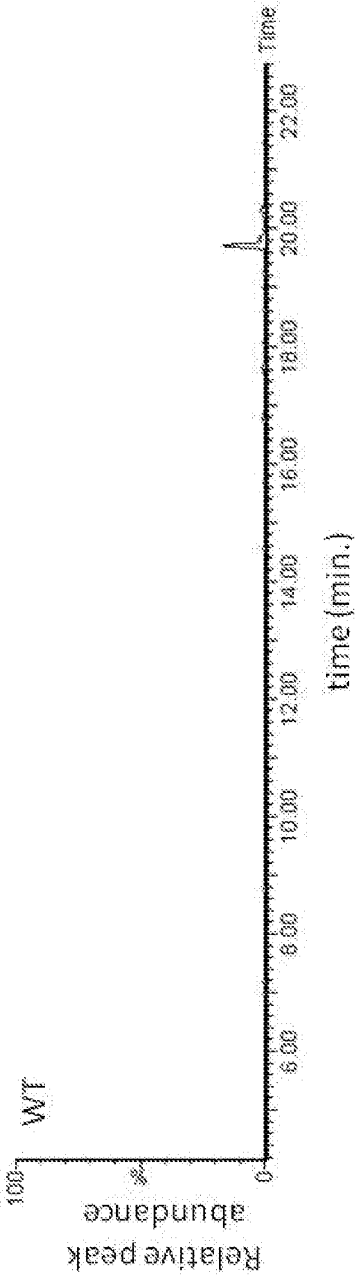


FIGURE 10B



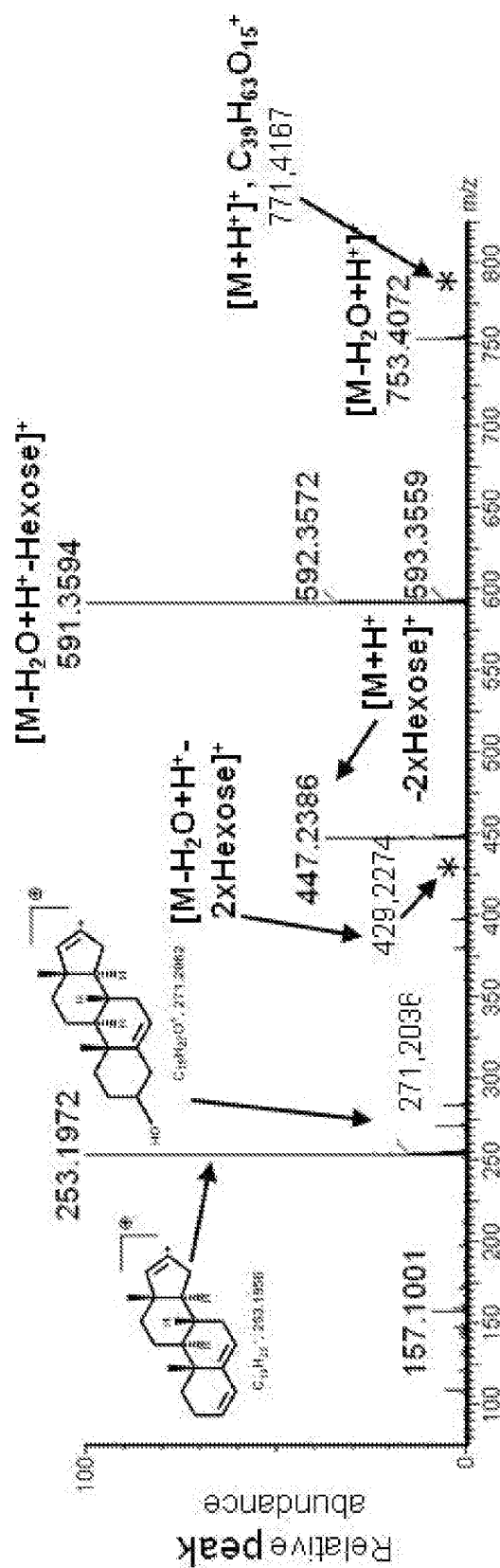


FIGURE 10C

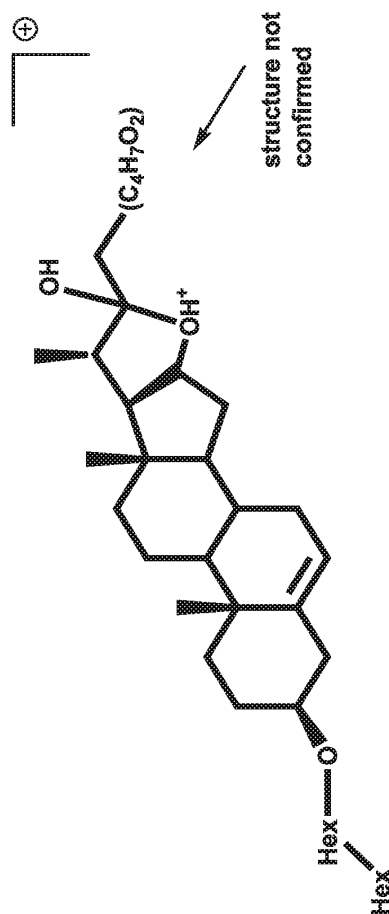


FIGURE 10D

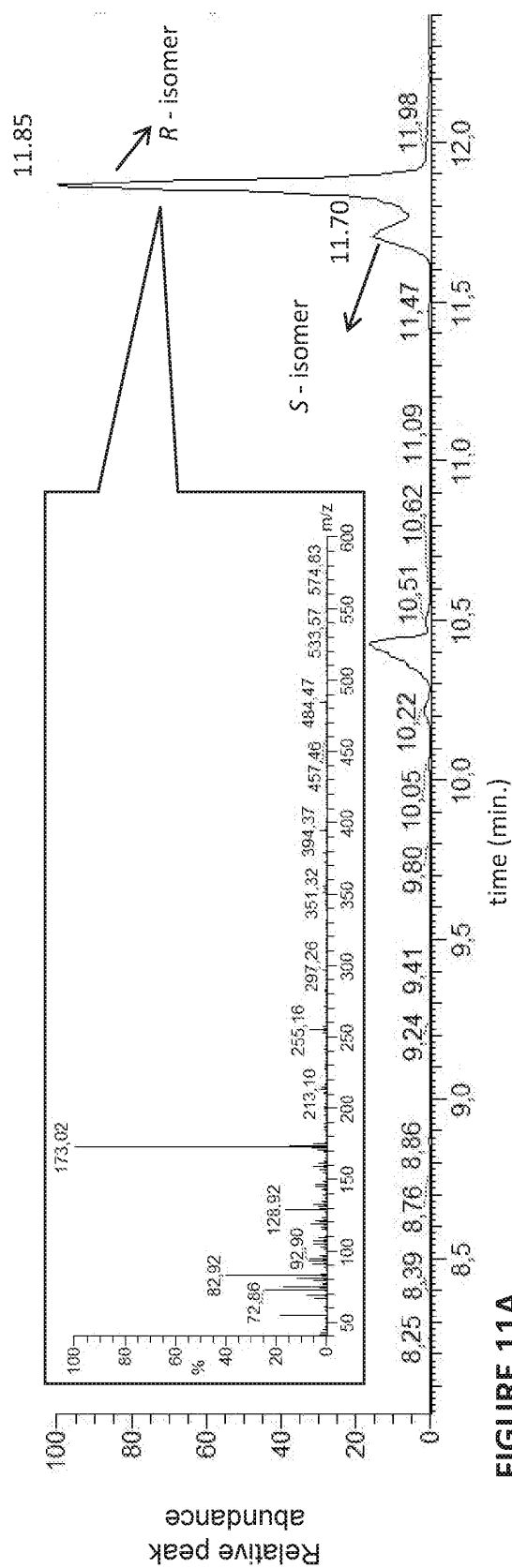


FIGURE 11A

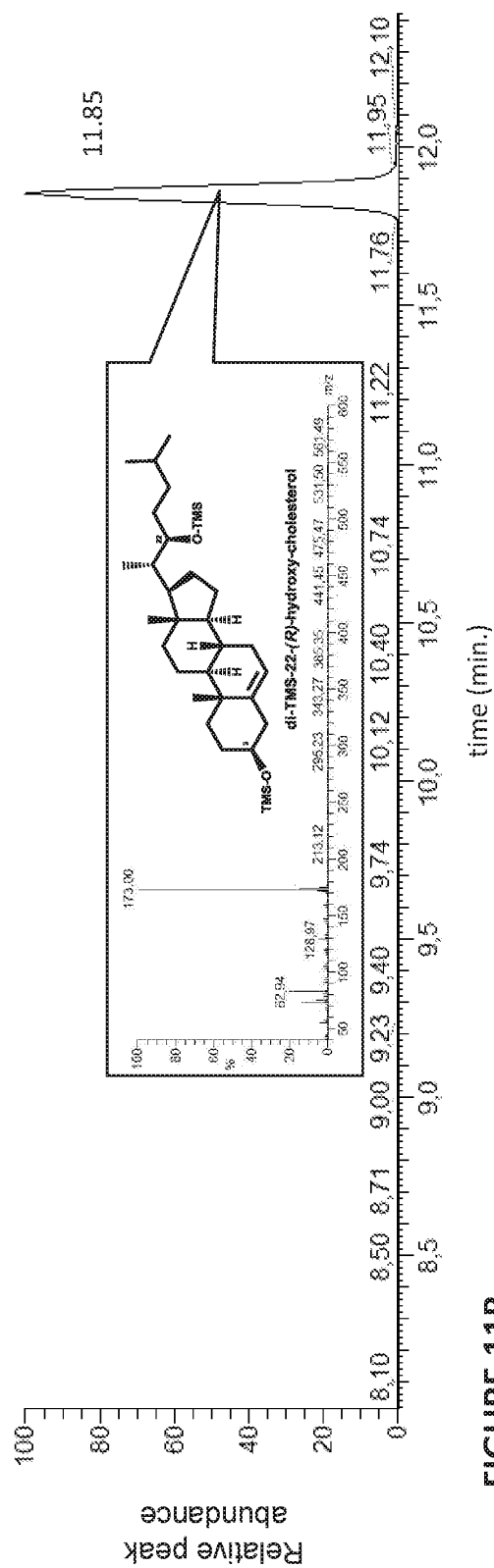
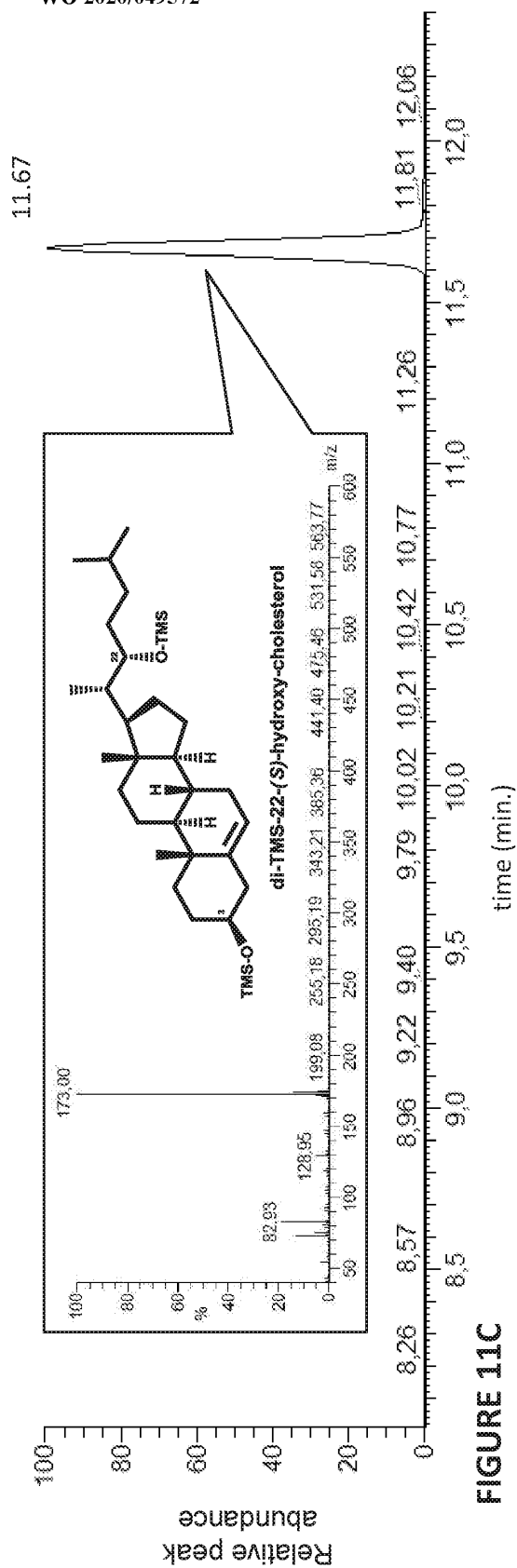
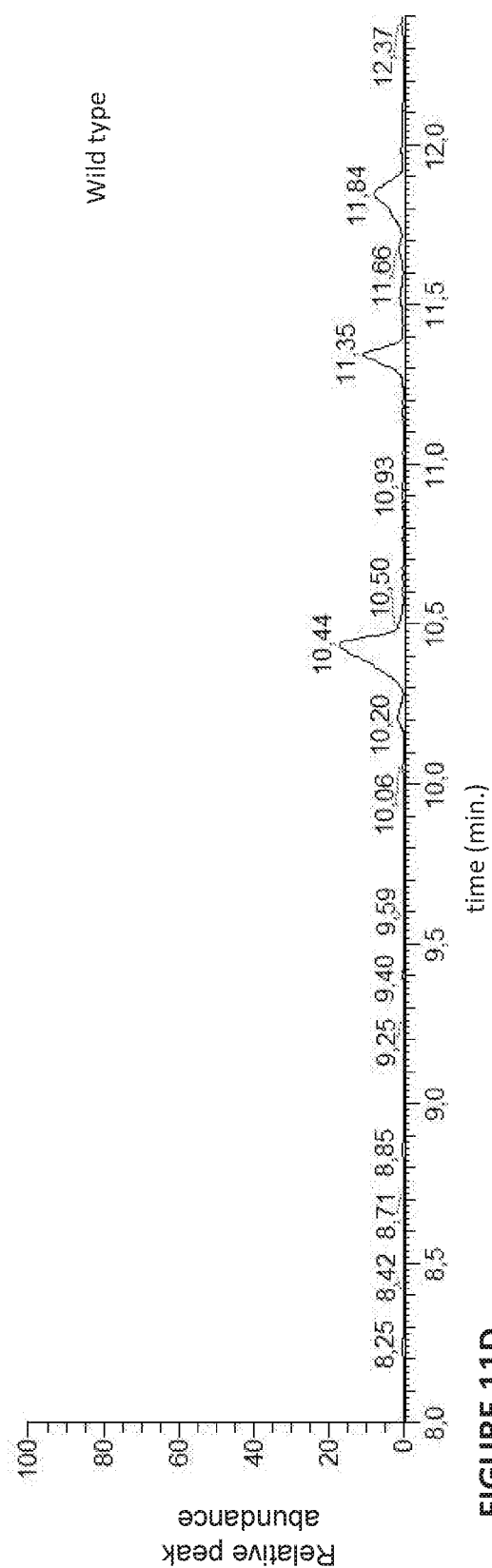


FIGURE 11B



Wild type



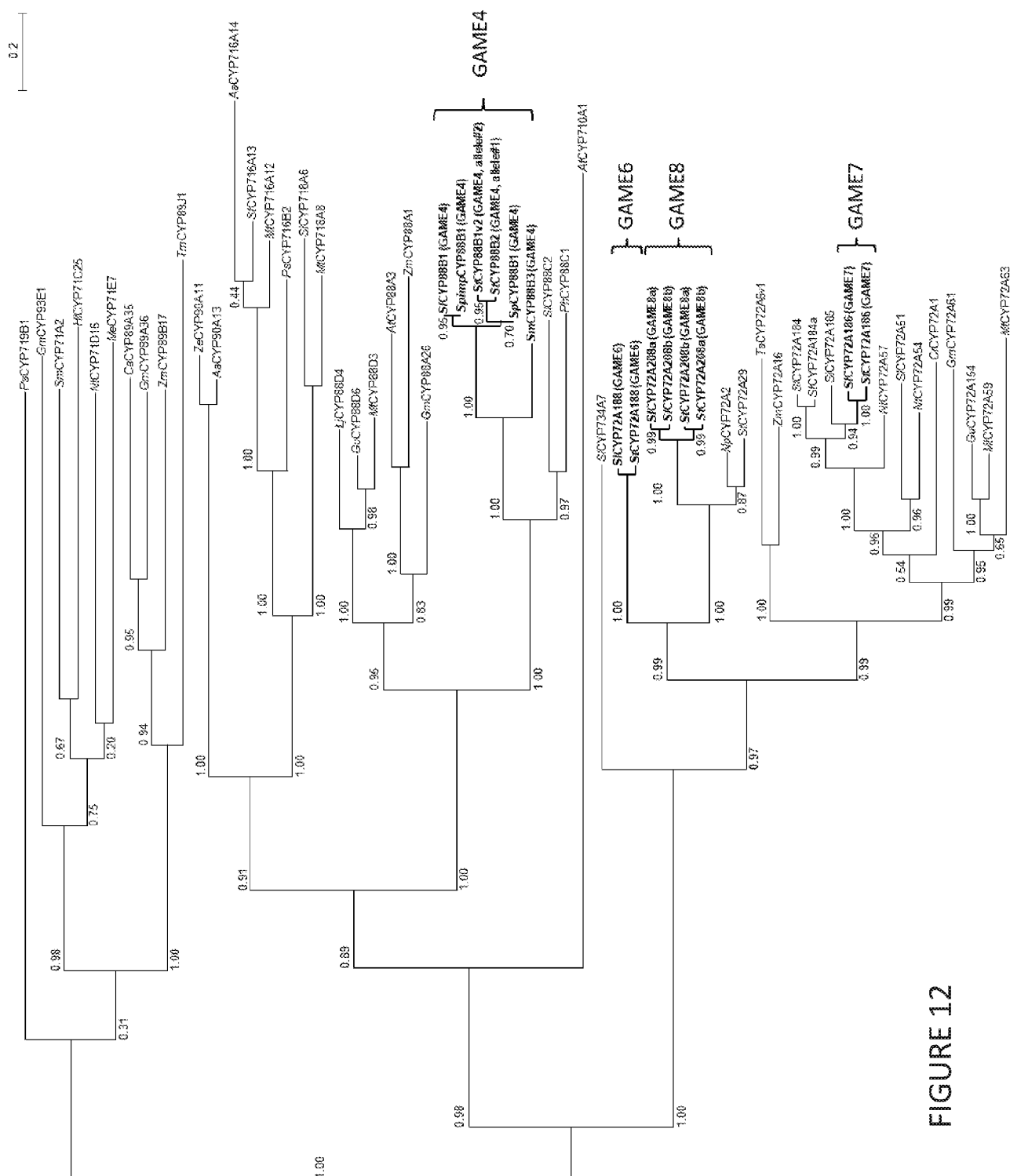
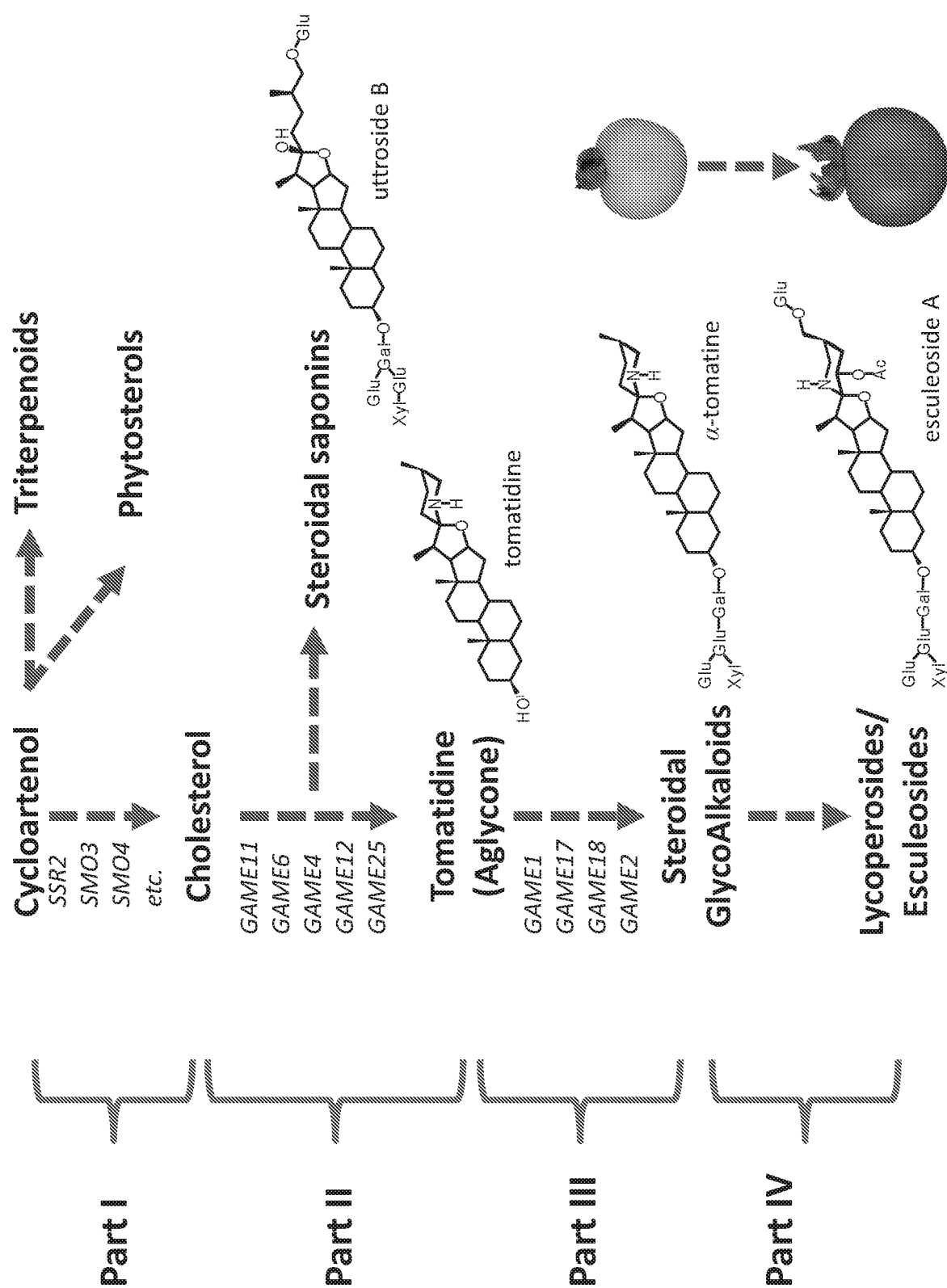


FIGURE 12



3
4
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6
7

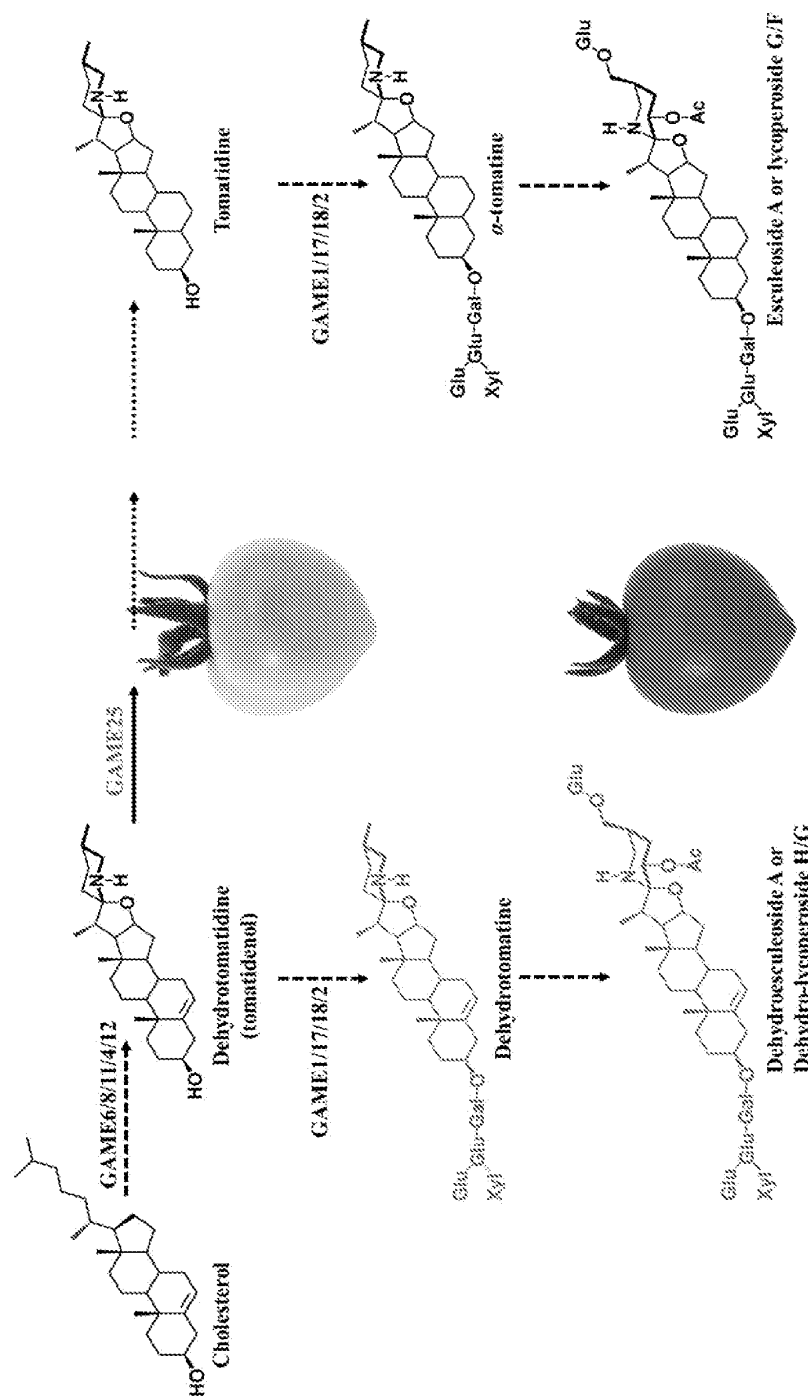


FIGURE 14A

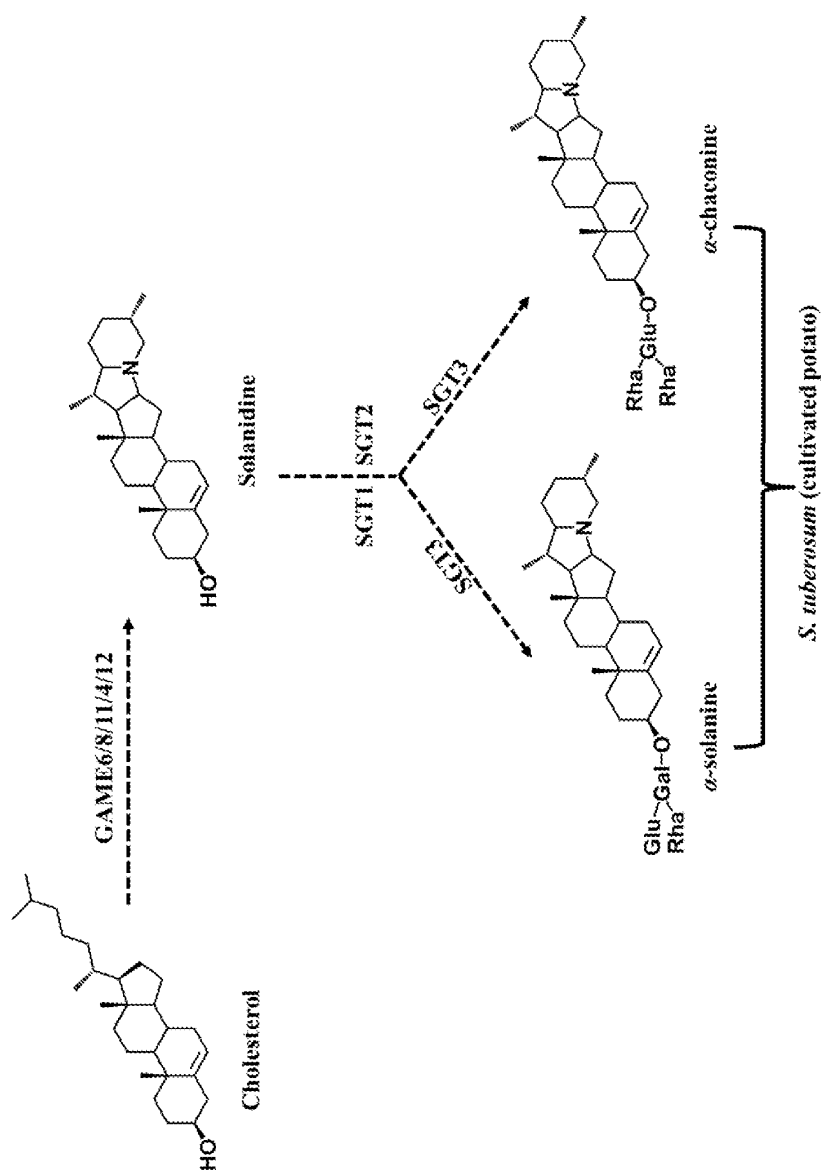


FIGURE 14B

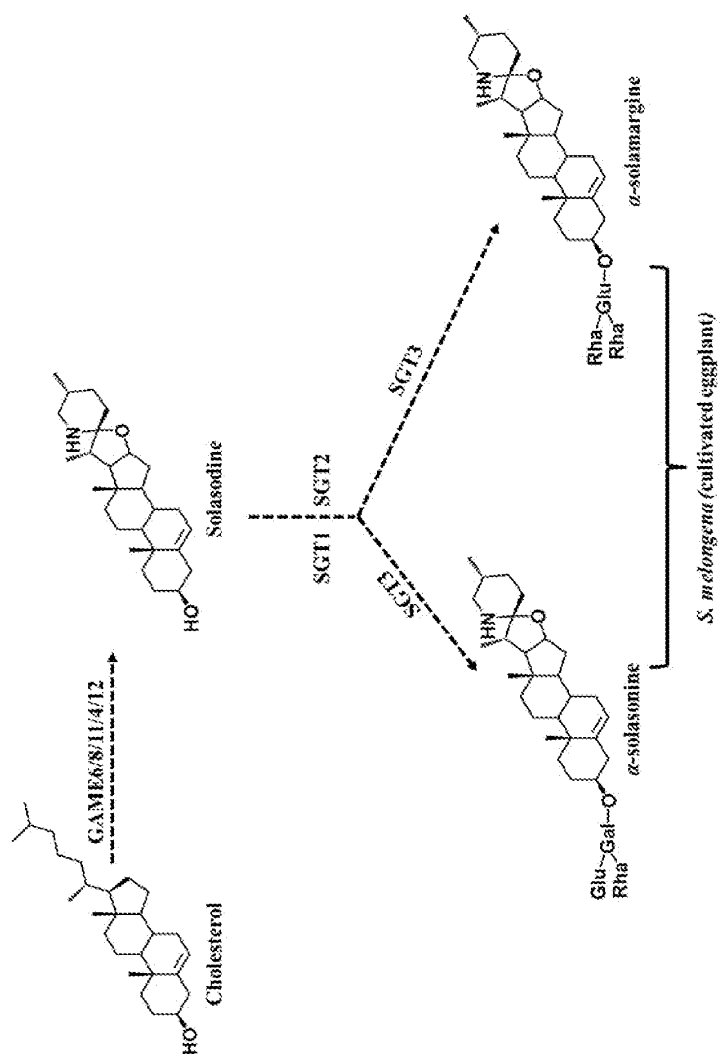


FIGURE 14C

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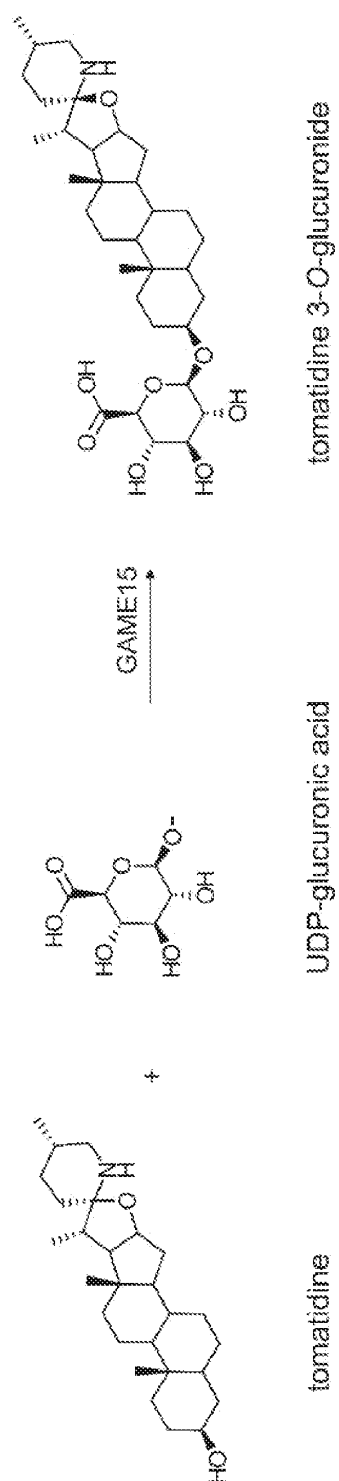


Figure 14D

FIGURE 15A

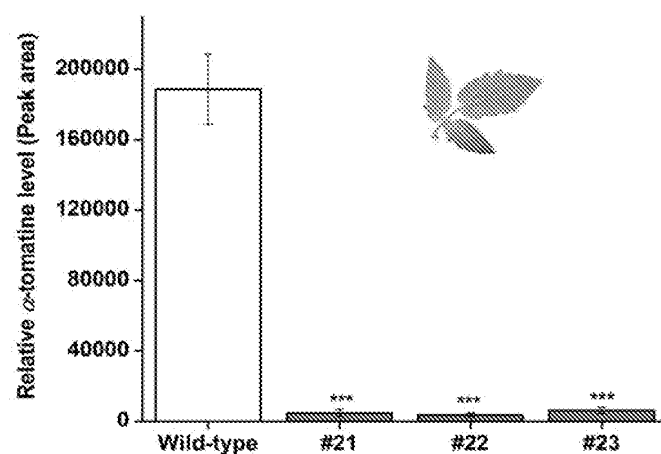


FIGURE 15B

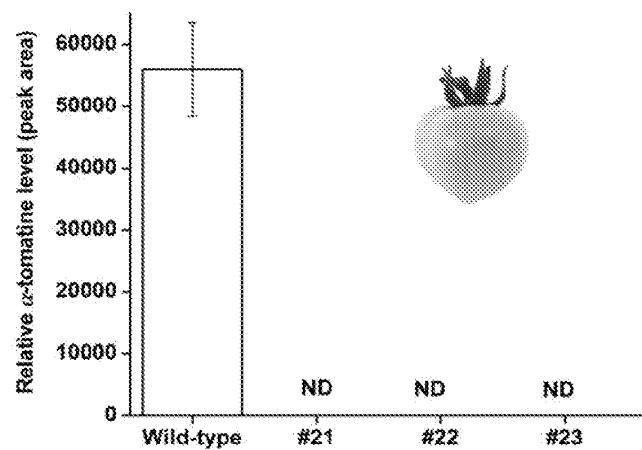
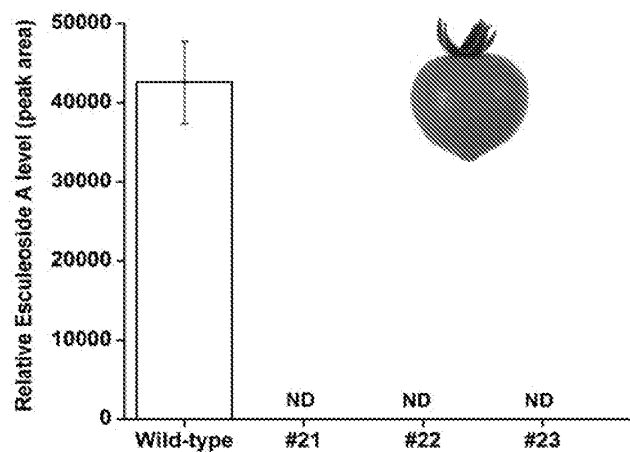


FIGURE 15C



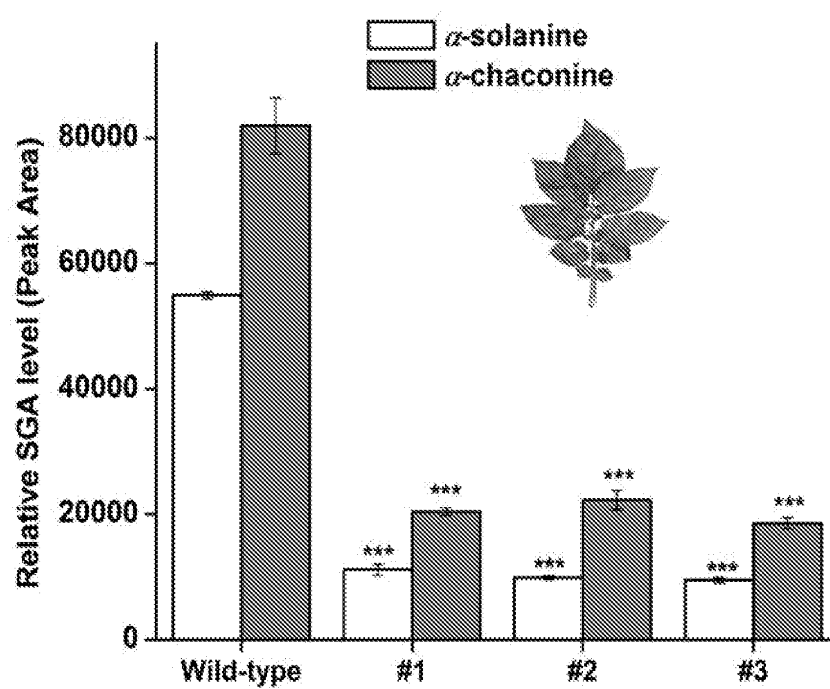


FIGURE 16

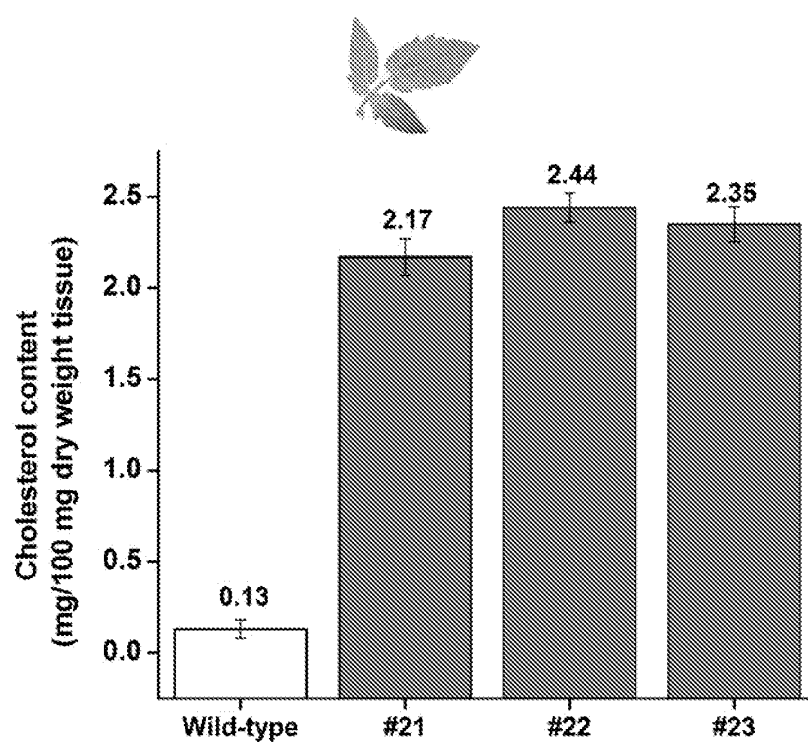


FIGURE 17

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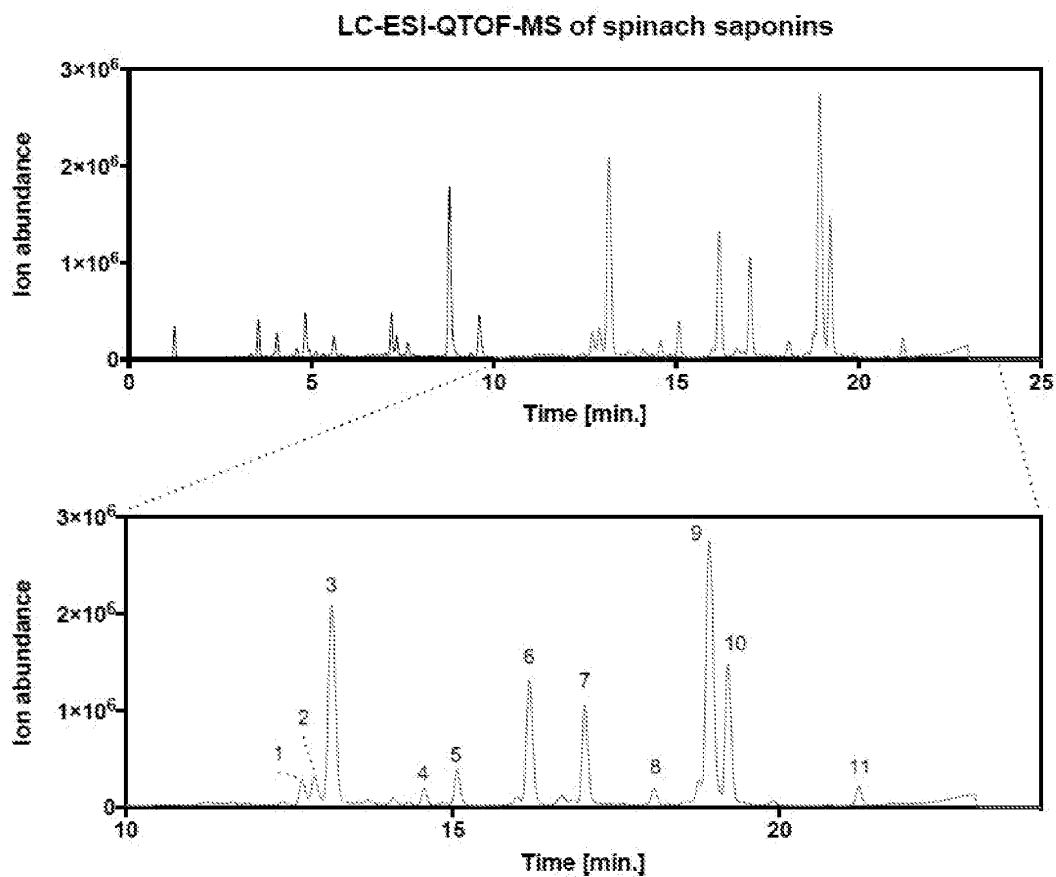


FIGURE 18

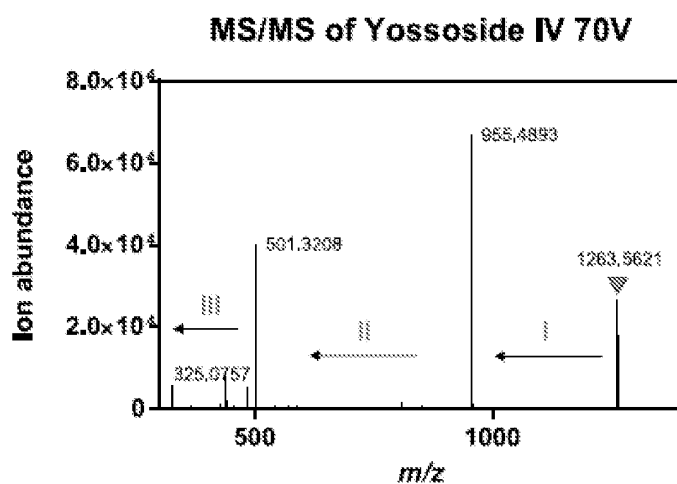
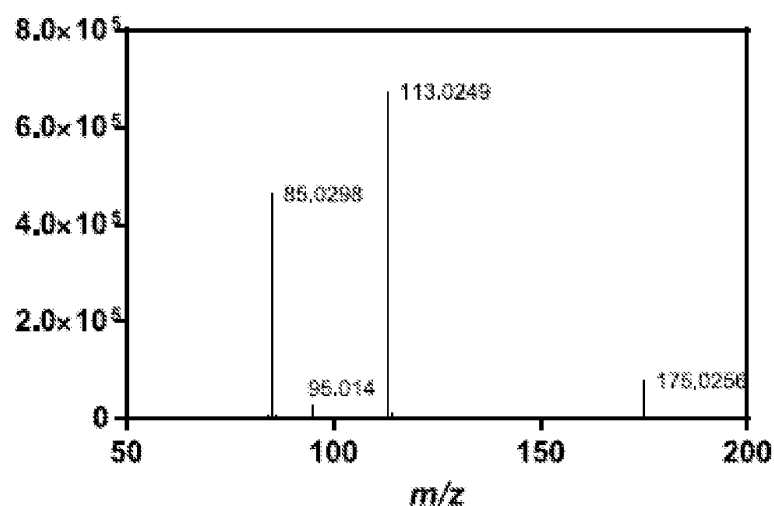
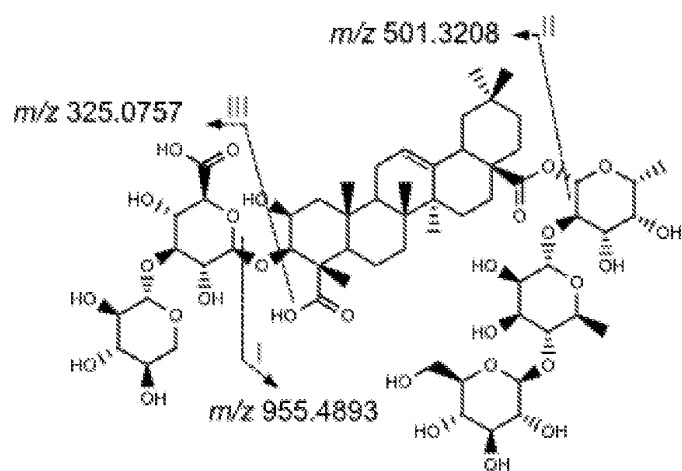


FIGURE 19A

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MS/MS of Yossoside IV 70V**FIGURE 19B****FIGURE 19C**

m/z (observed)	Predicted formula	Ion assignment	m/z (theoretical)	$\Delta m/z$ (ppm)
175.0256	C ₆ H ₇ O ₆	[GlcA-H ₂ O] ⁻	175.0246	7.4
113.0249	C ₅ H ₅ O ₃	[GlcA-2H ₂ O-CO ₂] ⁻	113.0239	8.8
95.0140	C ₅ H ₃ O ₂	[GlcA-3H ₂ O-CO ₂] ⁻	95.0133	7.4
85.0298	C ₄ H ₅ O ₂	[GlcA-2H ₂ O-CO ₂ -CO] ⁻	85.0290	9.4

FIGURE 19D

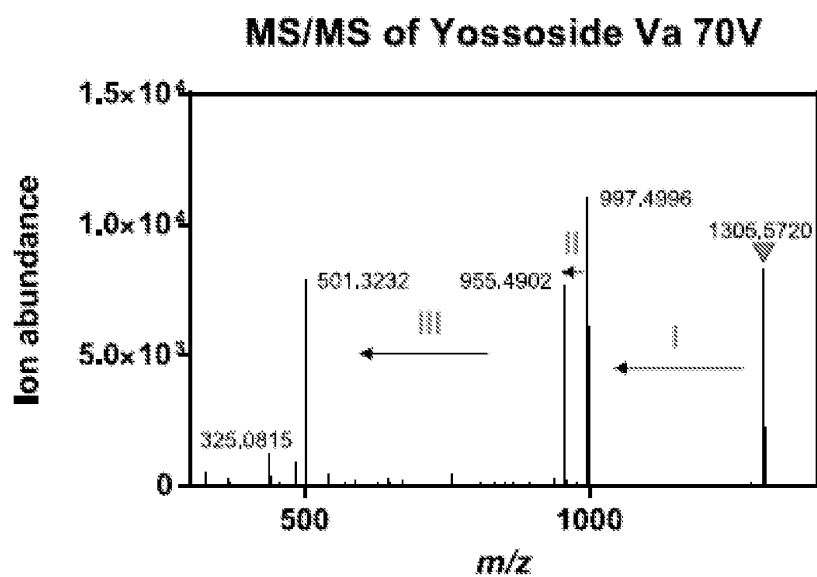


FIGURE 19E

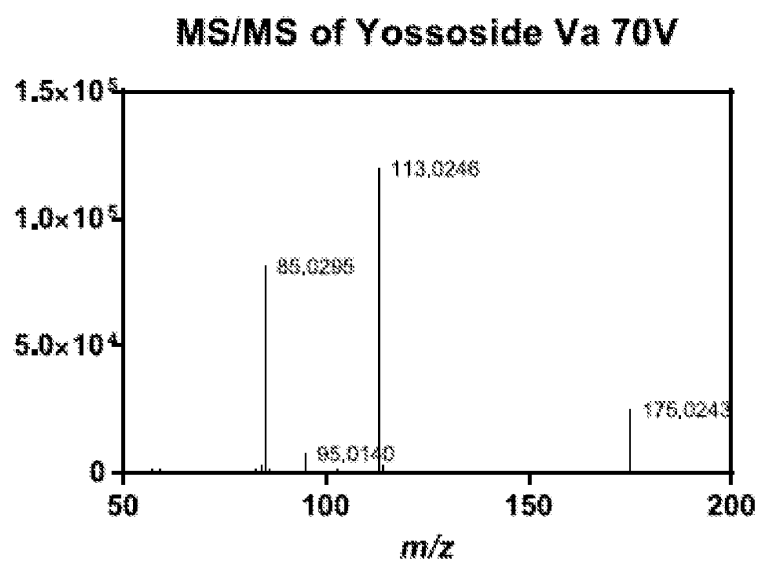


FIGURE 19F

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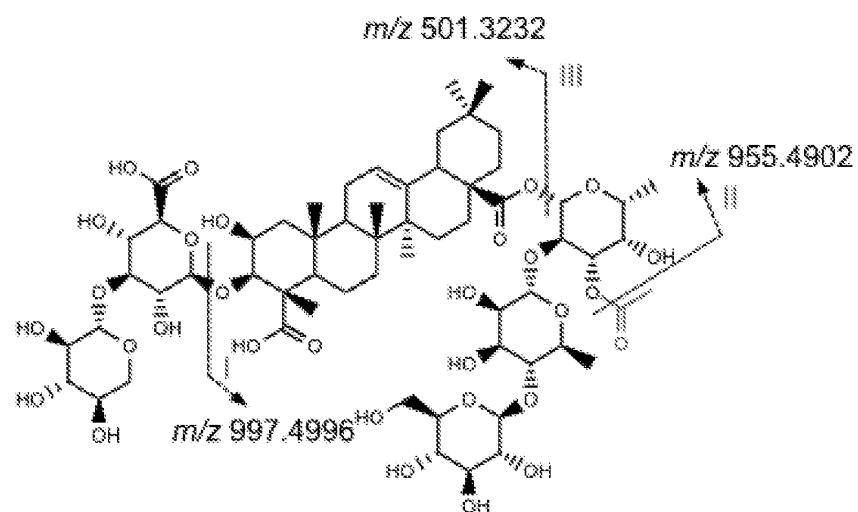


FIGURE 19G

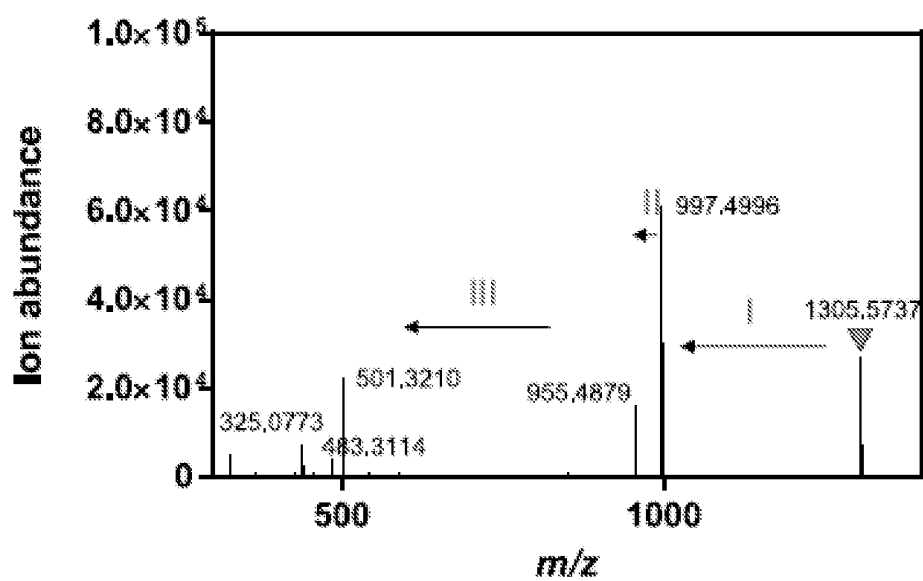
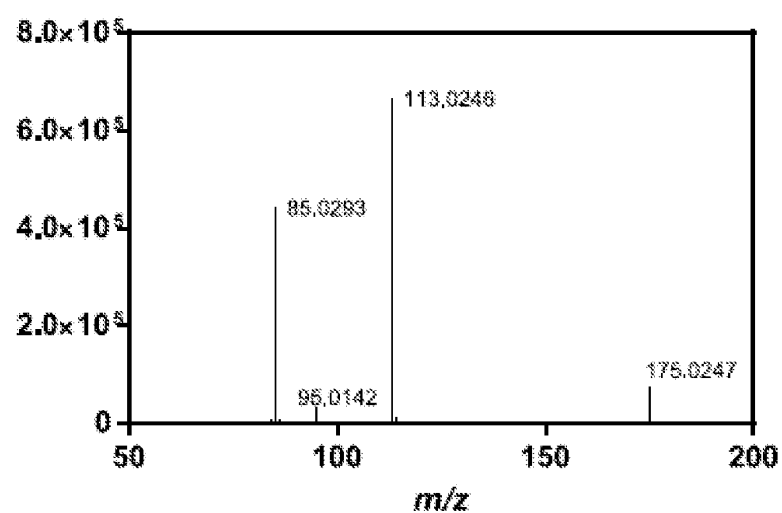
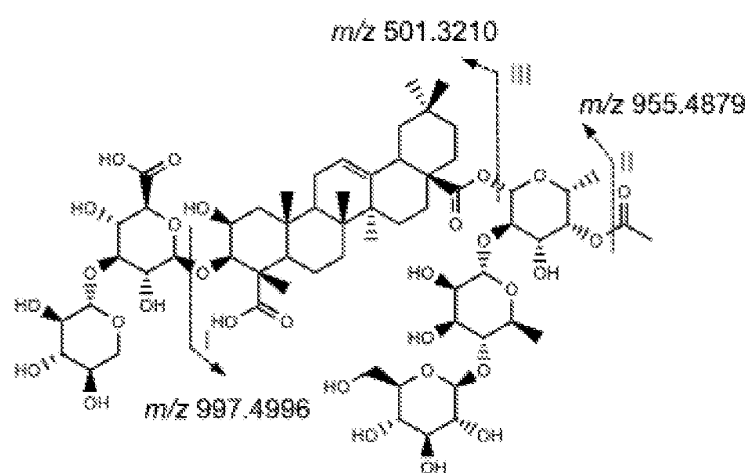
MS/MS of Yossoside V 70V

FIGURE 19H

MS/MS of Yossoside V 70V**FIGURE 19I****FIGURE 19J**

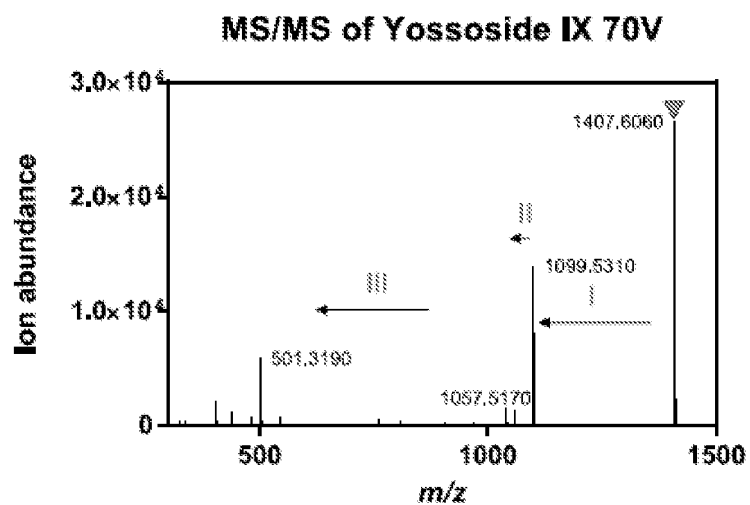


FIGURE 19K

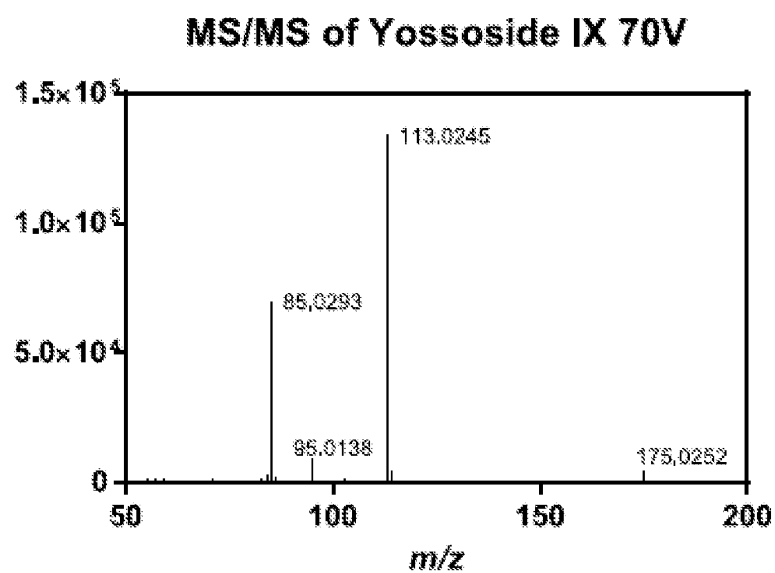


FIGURE 19L

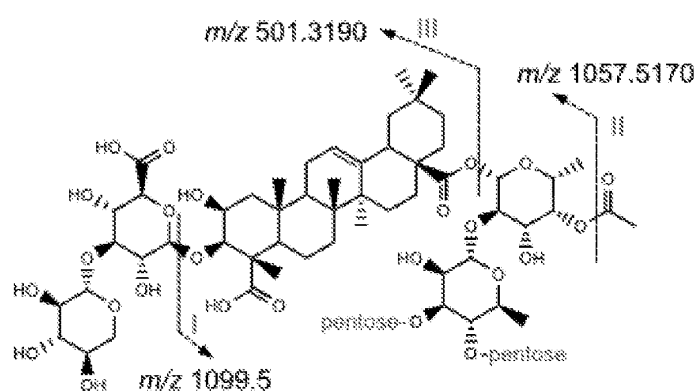


FIGURE 19M

MS/MS of Yossoside X 70V

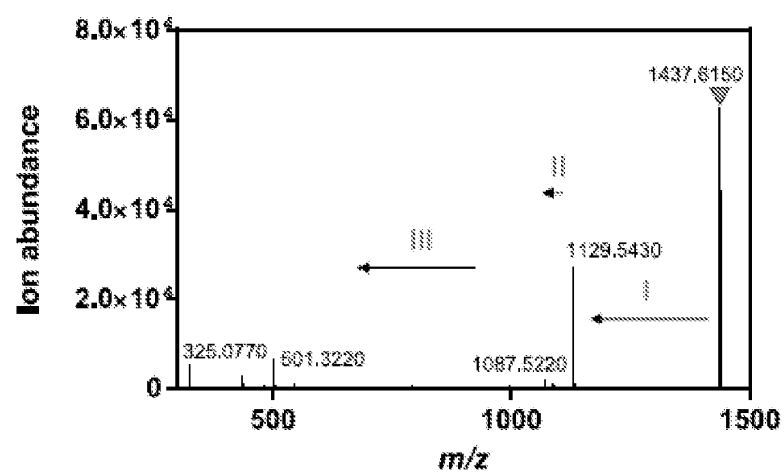
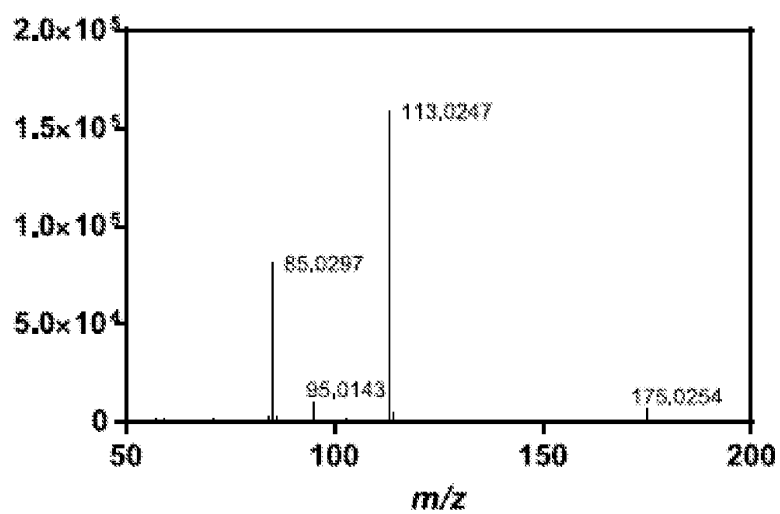
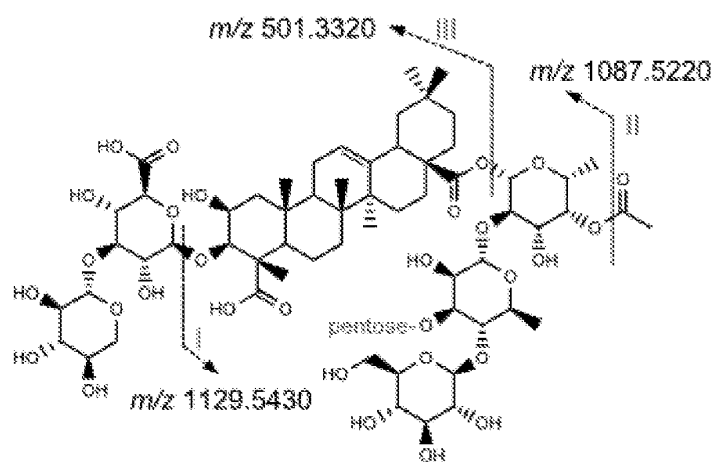


FIGURE 19N

MS/MS of Yossoside X 70V**FIGURE 19O****FIGURE 19P**

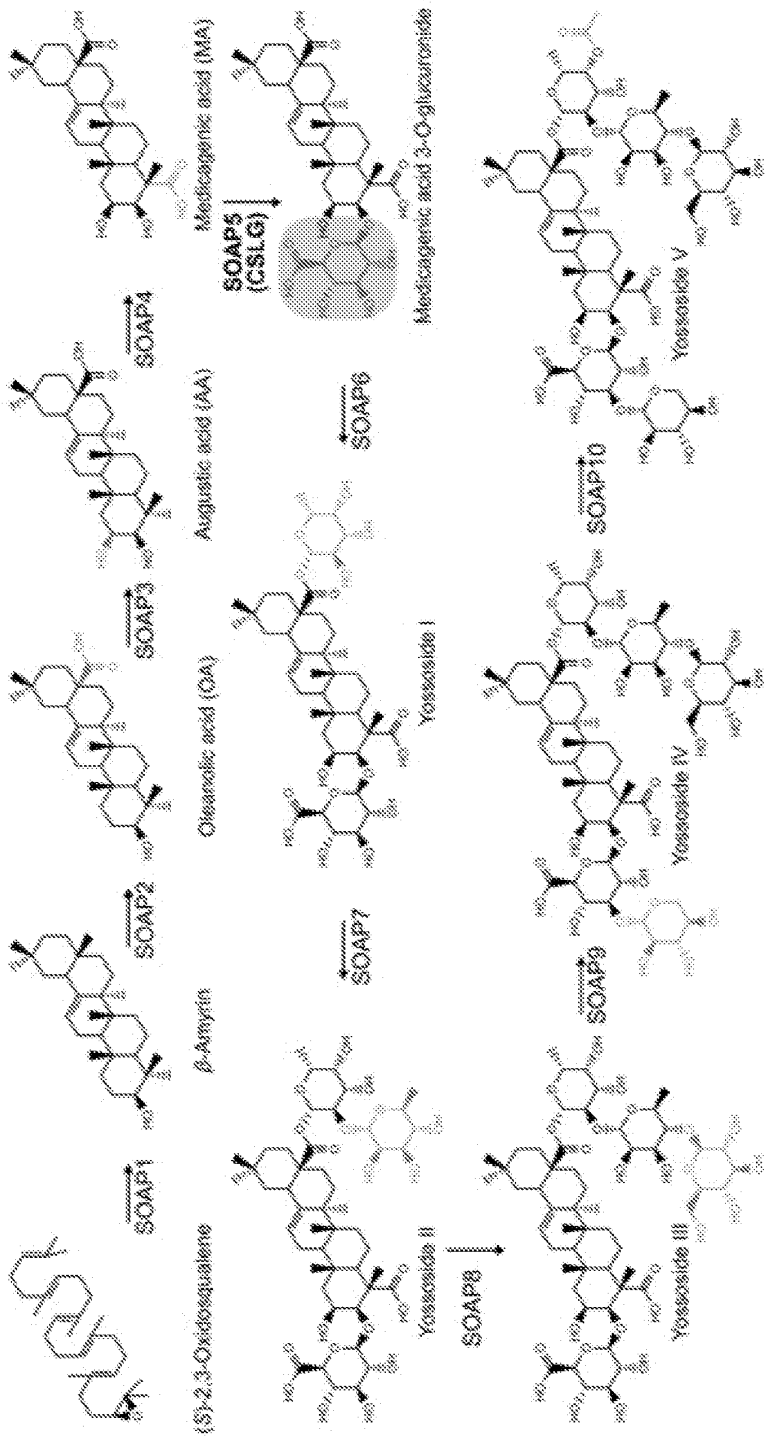


FIGURE 20A

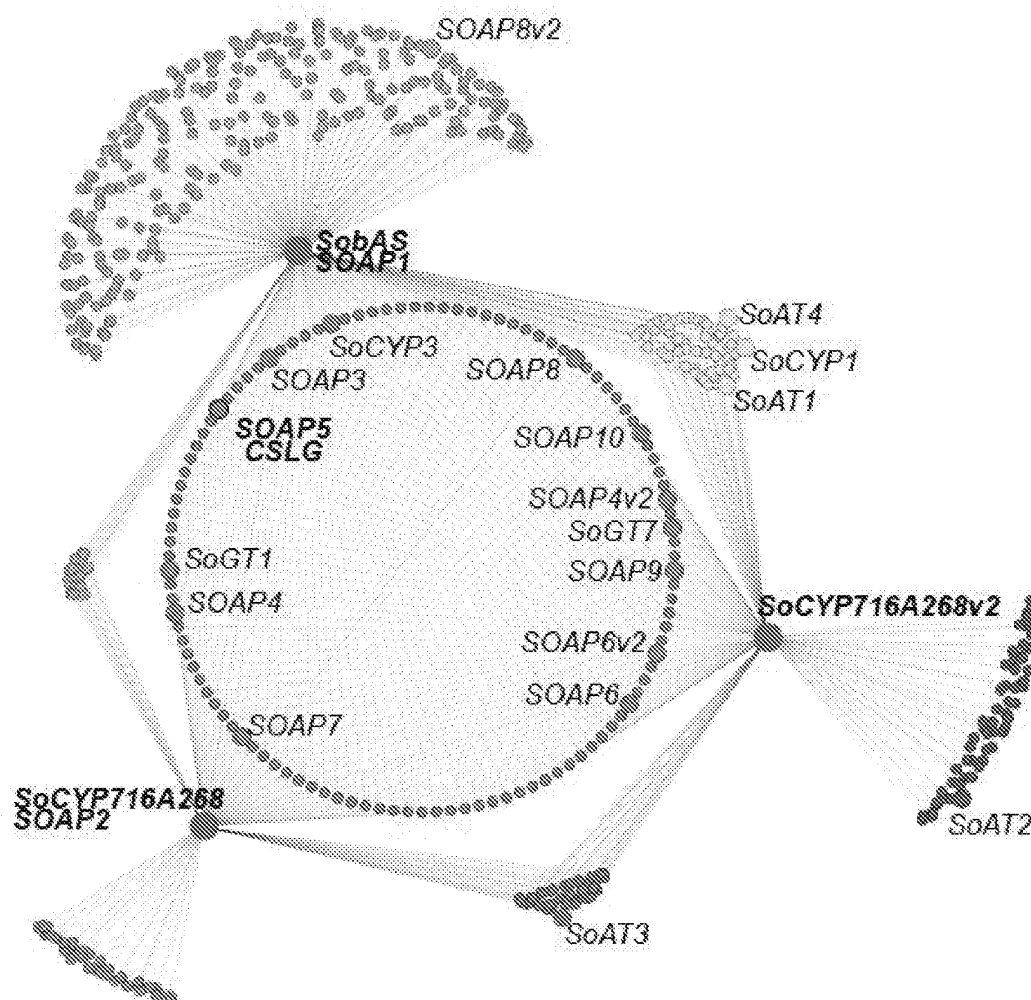


FIGURE 20B

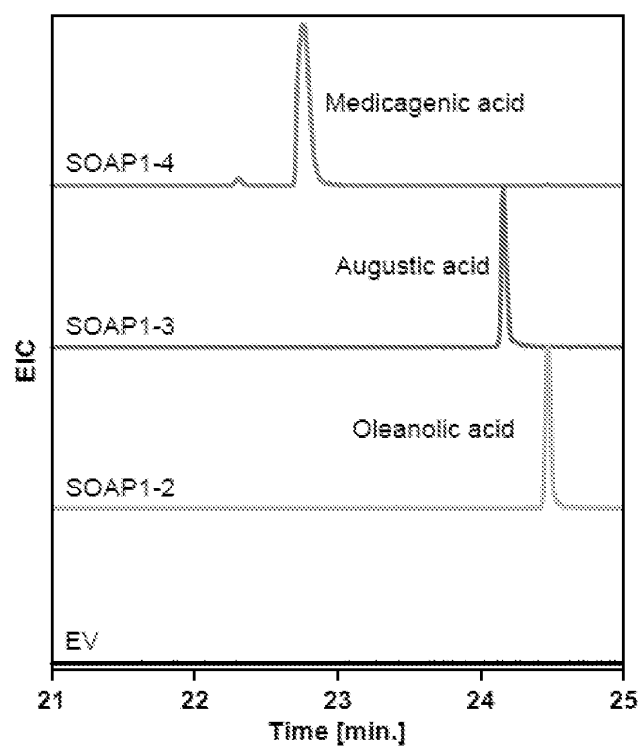


FIGURE 20C

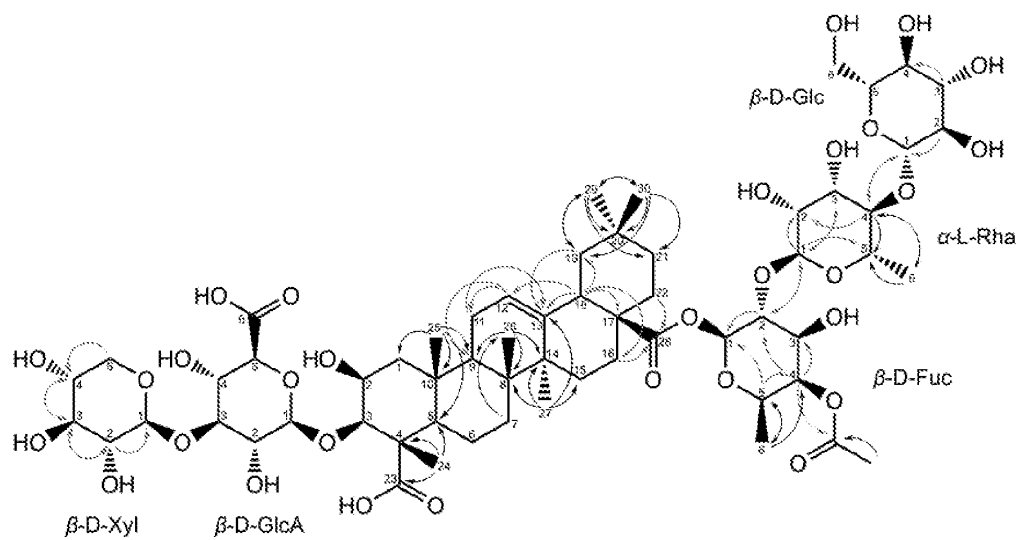


FIGURE 21

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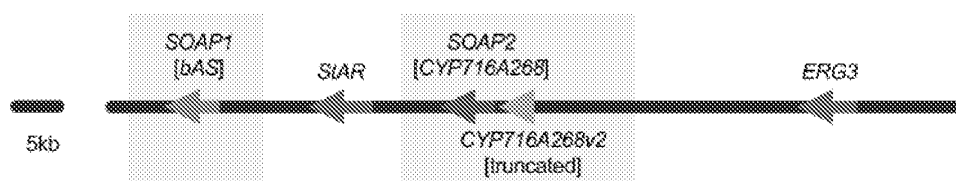


FIGURE 22A

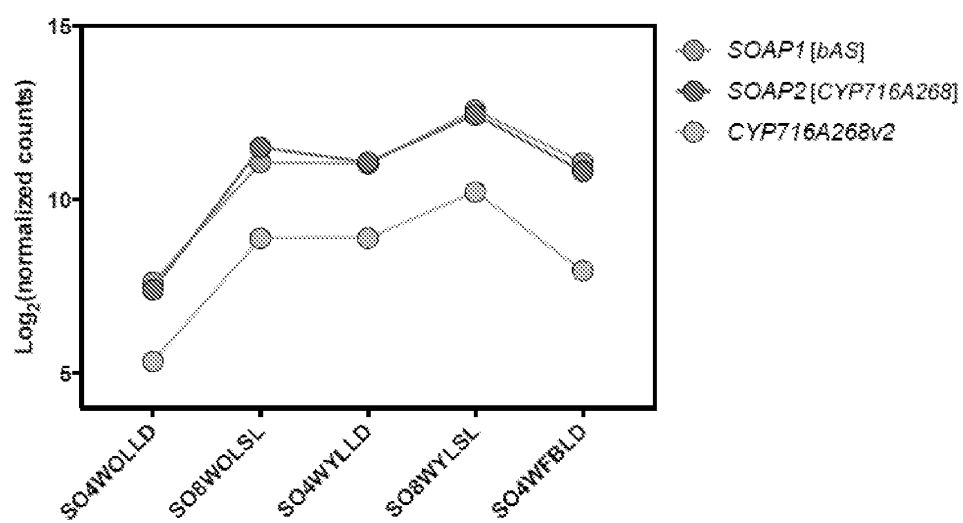


FIGURE 22B

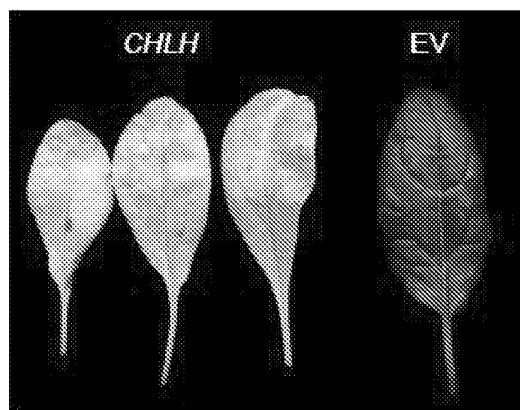


FIGURE 23A

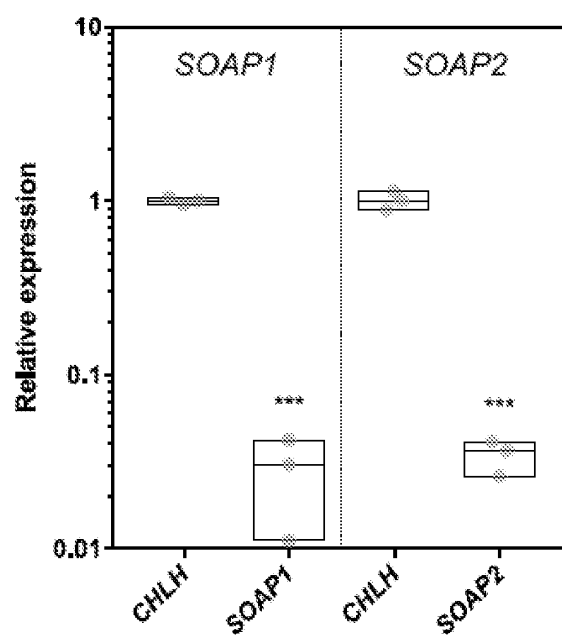


FIGURE 23B

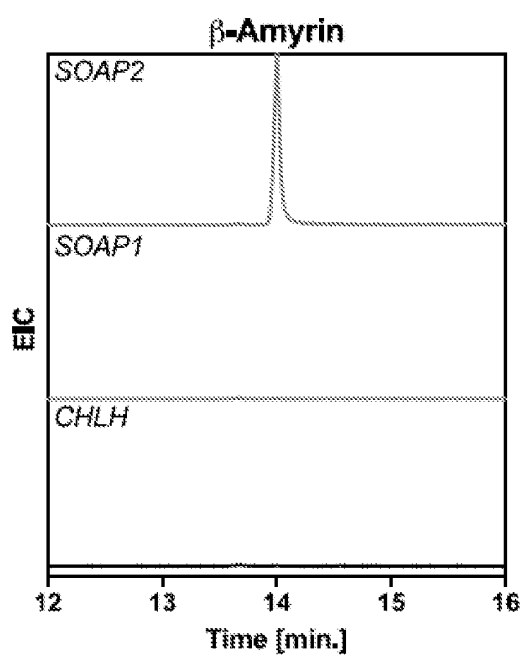


FIGURE 23C

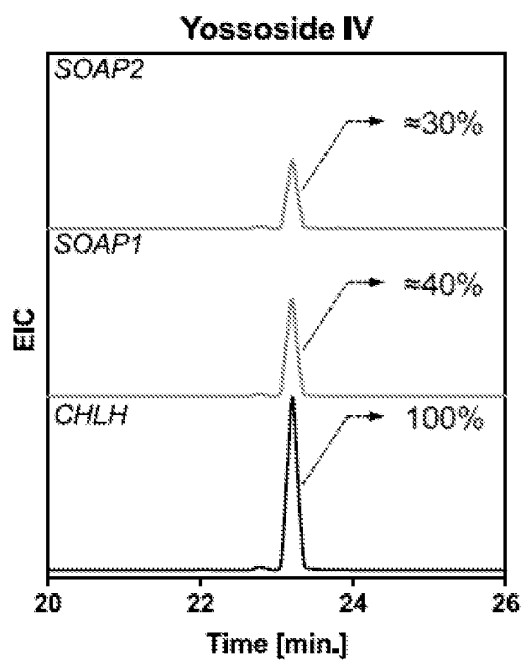


FIGURE 23D

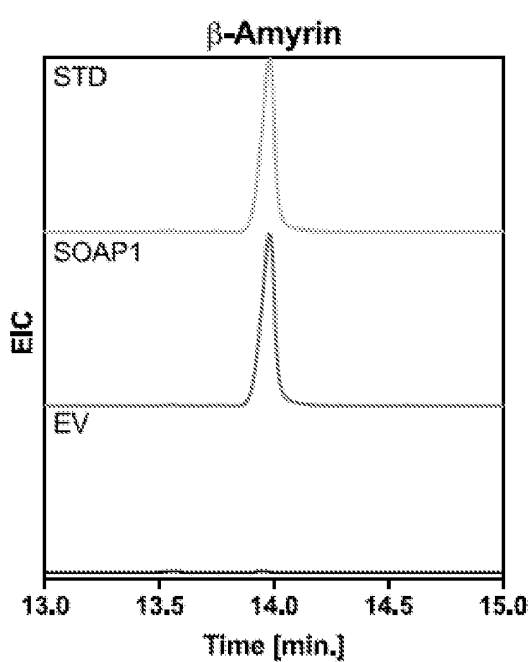


FIGURE 24A

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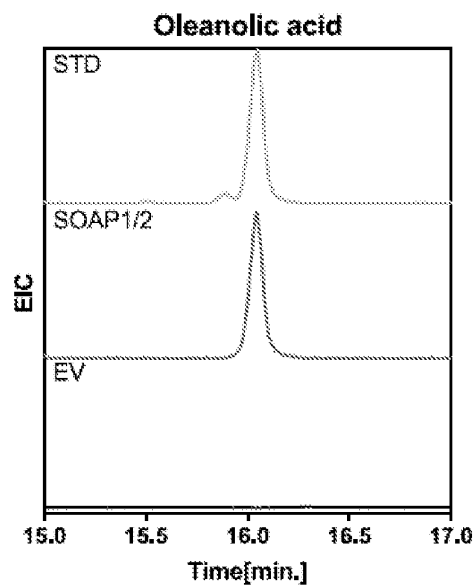


FIGURE 24B

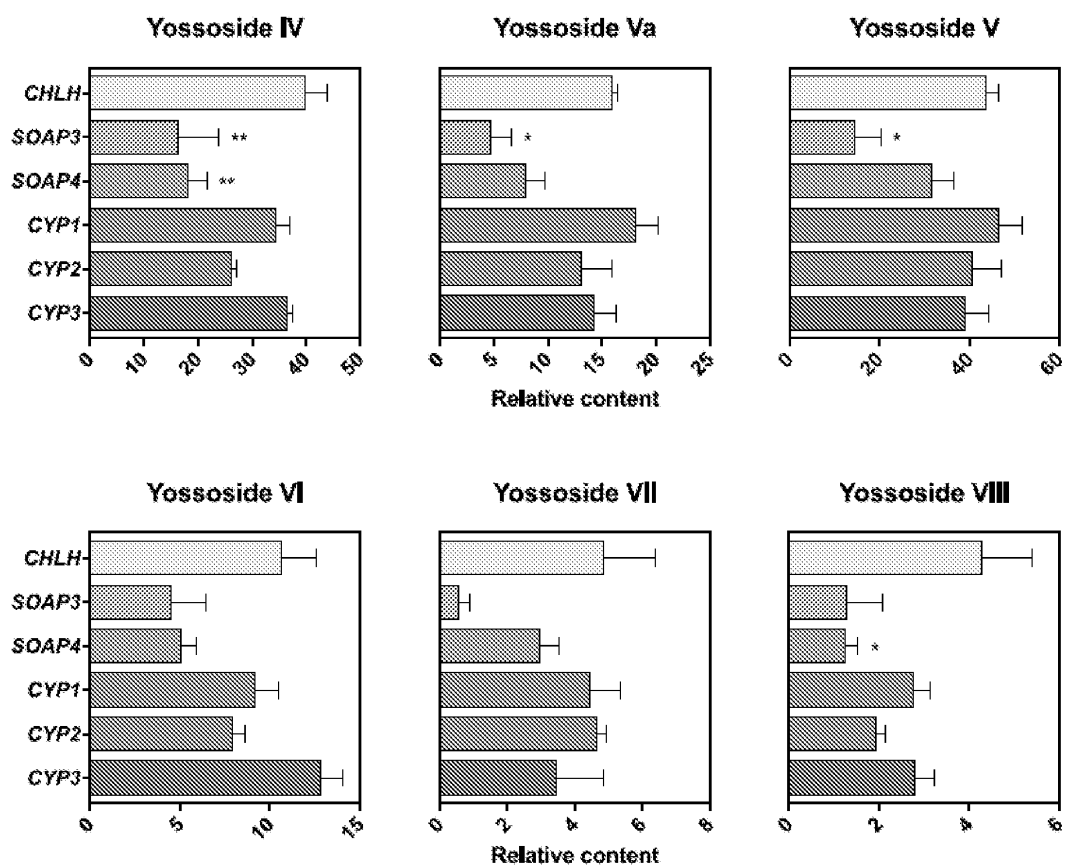


FIGURE 25

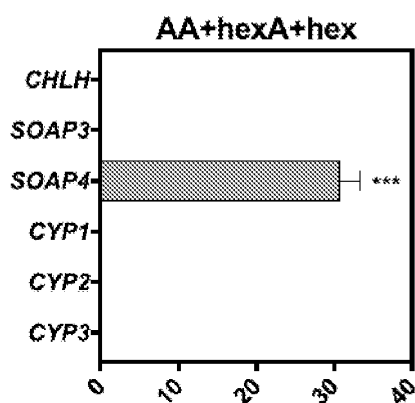


FIGURE 26A

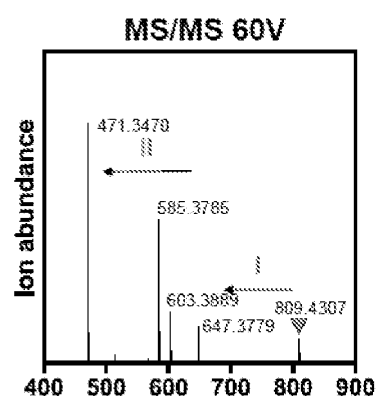


FIGURE 26B

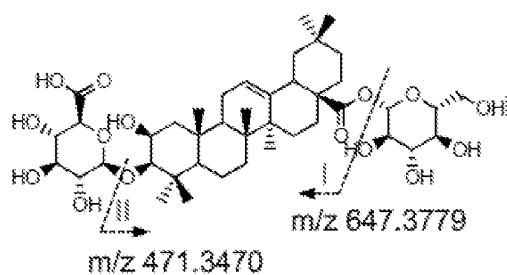


FIGURE 26C

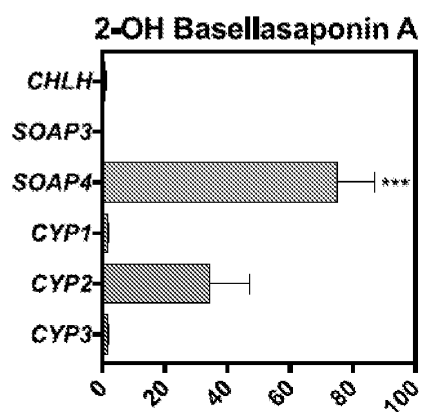


FIGURE 26D

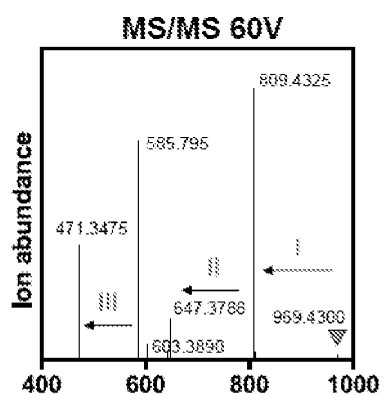


FIGURE 26E

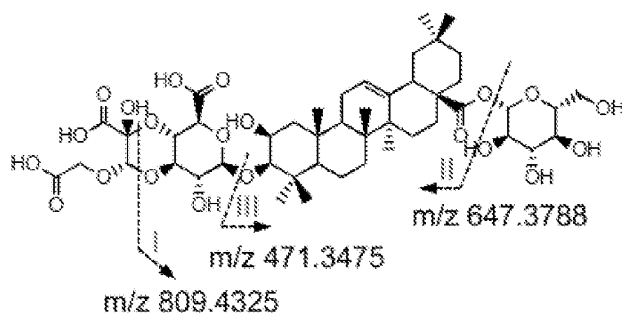


FIGURE 26F

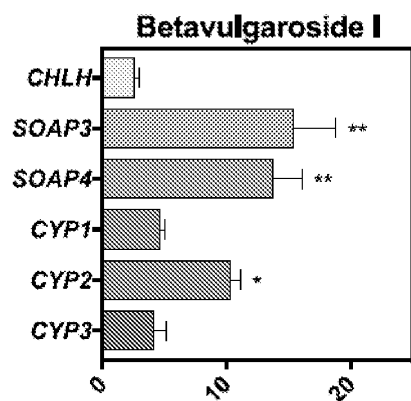


FIGURE 26G

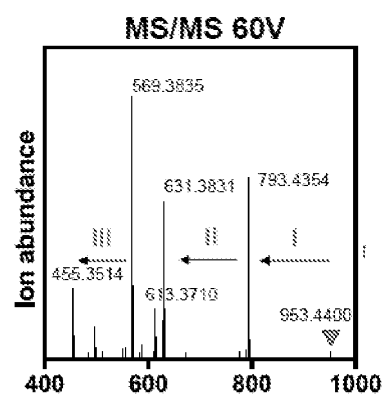


FIGURE 26H

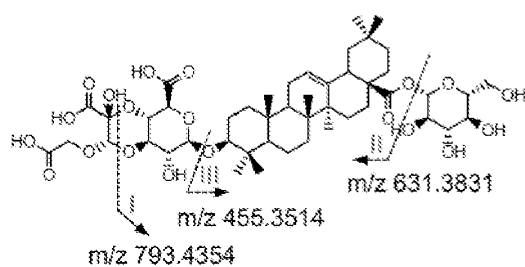


FIGURE 26I

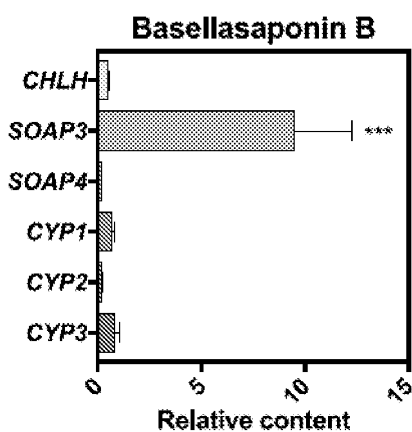


FIGURE 26J

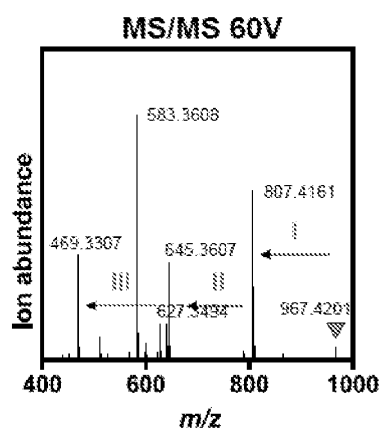


FIGURE 26K

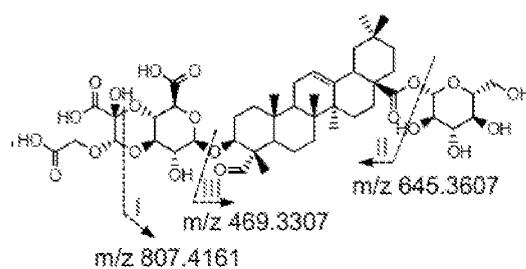


FIGURE 26L

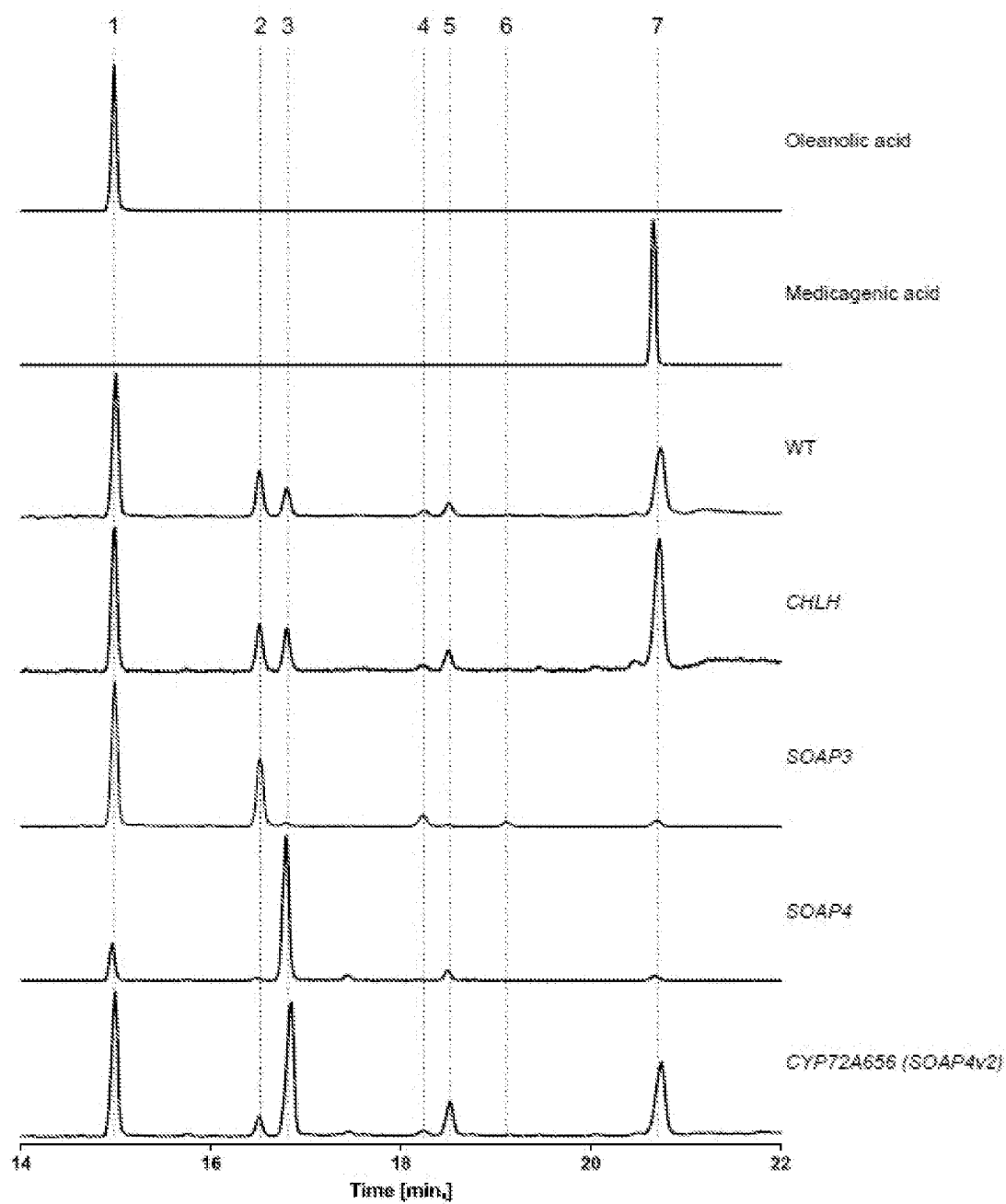


FIGURE 27

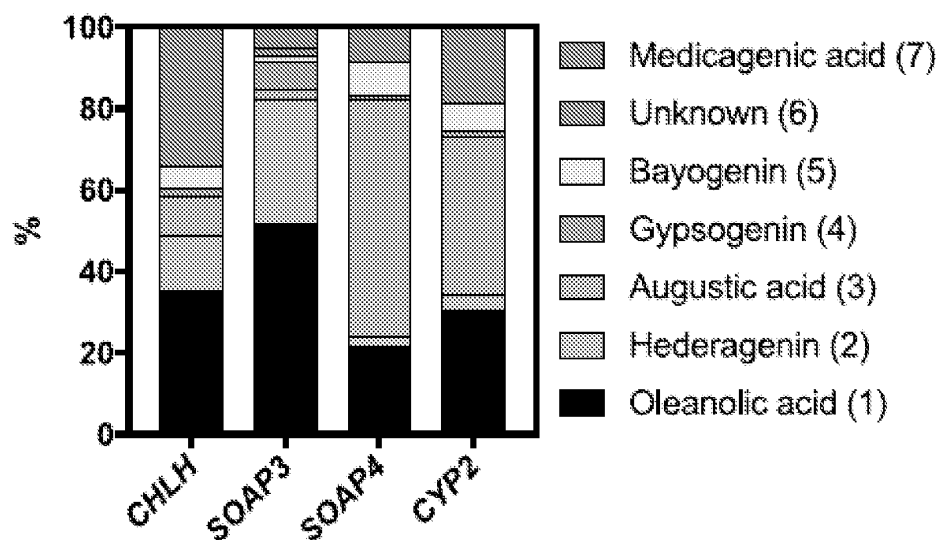


FIGURE 28A

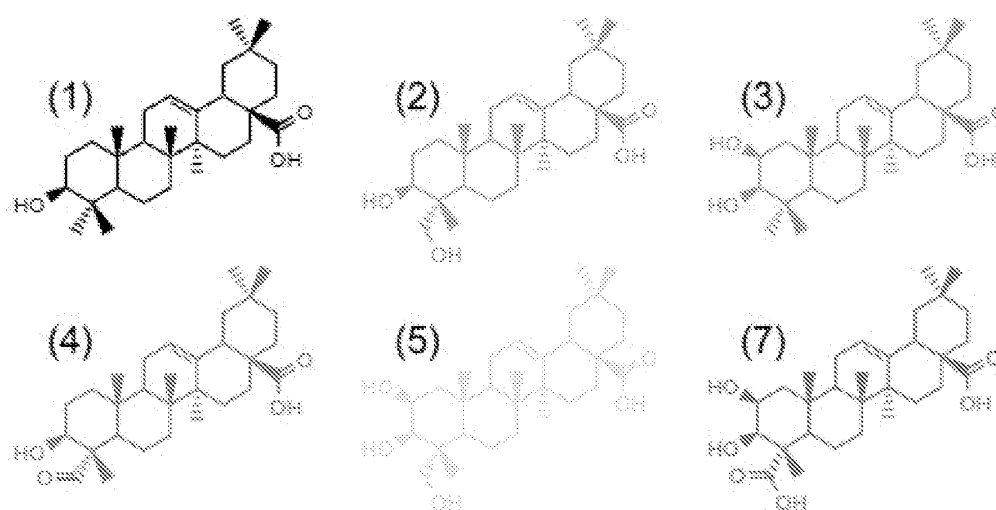


FIGURE 28B

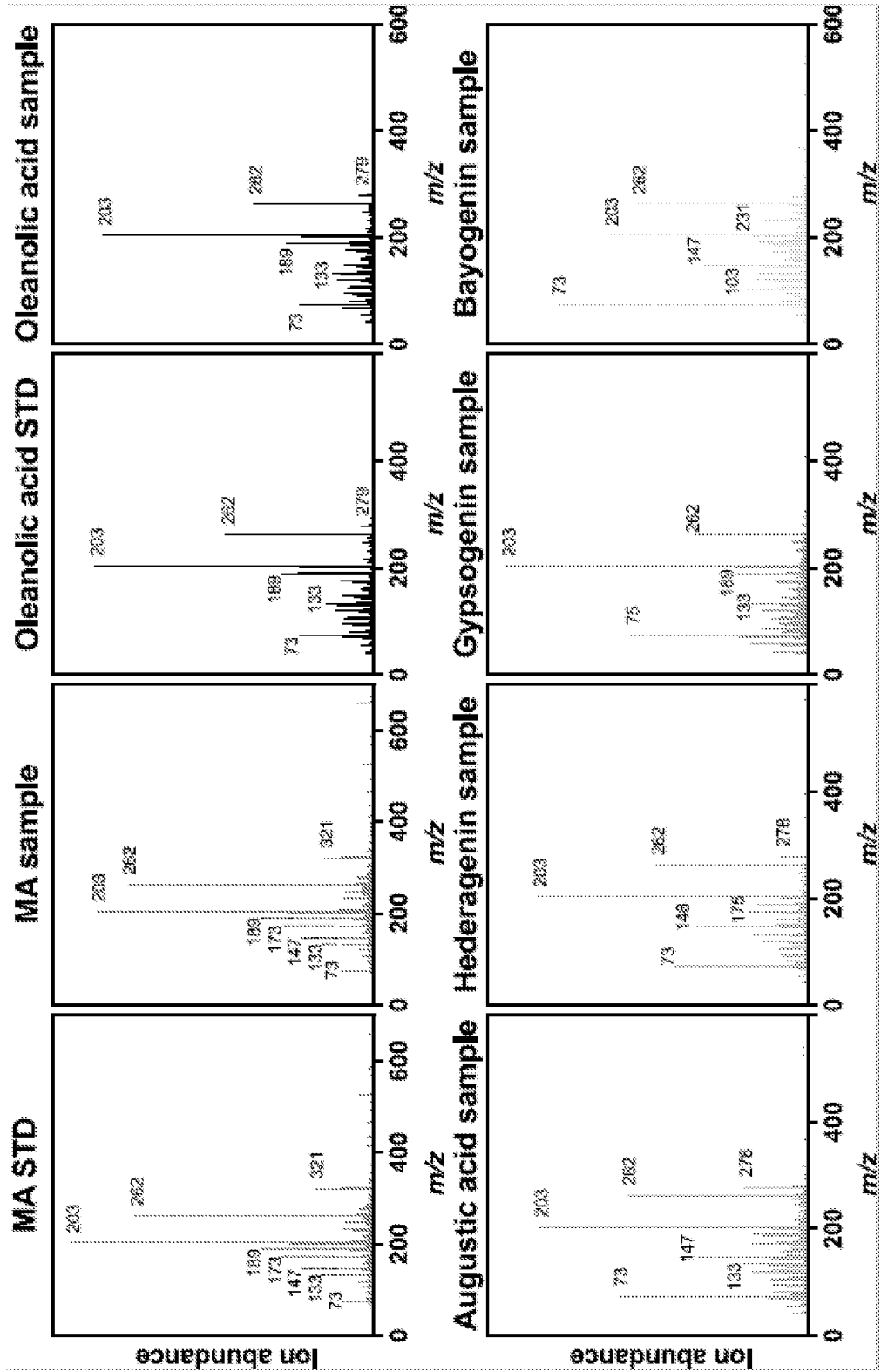


FIGURE 28C

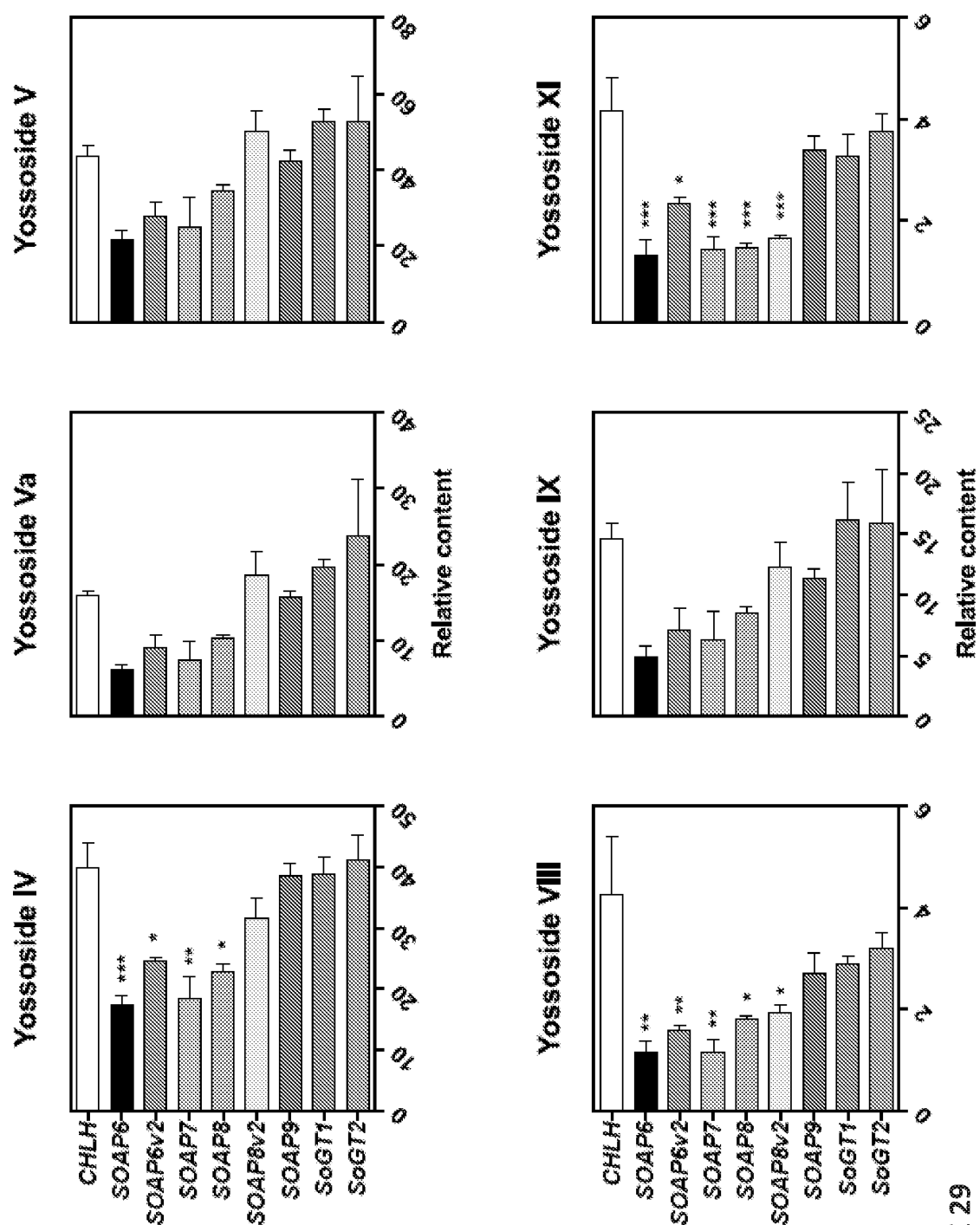


FIGURE 29

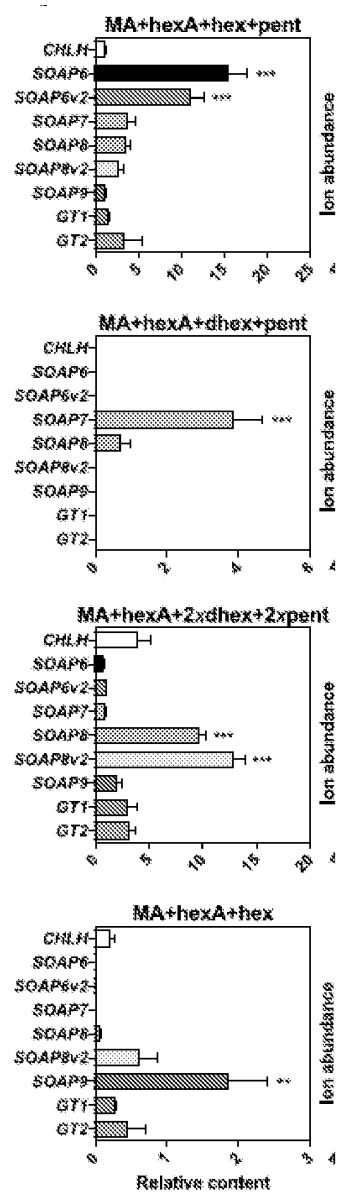


FIGURE 30A

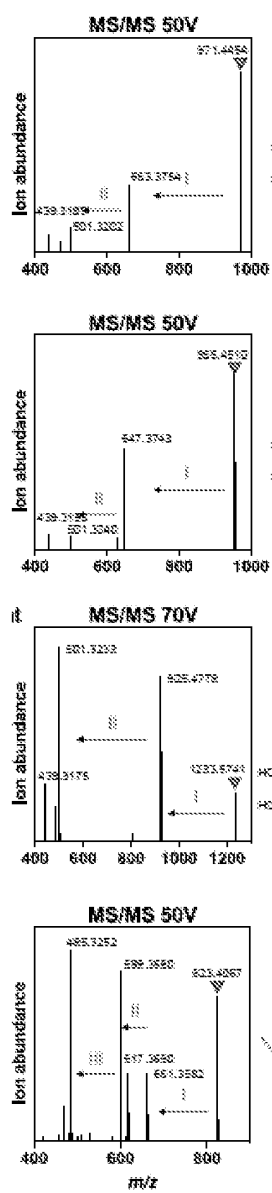
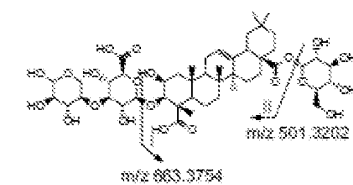
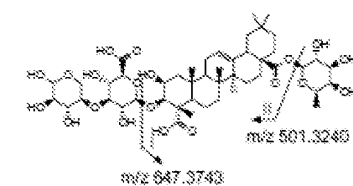
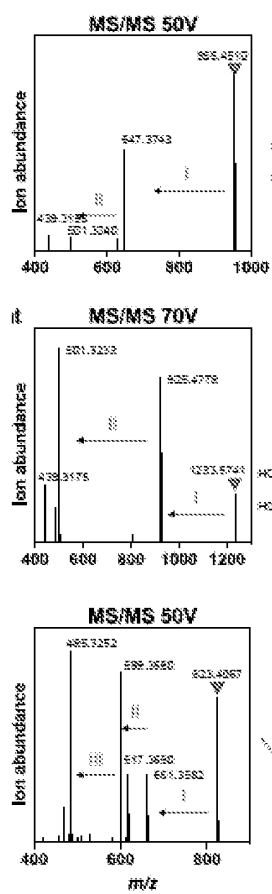
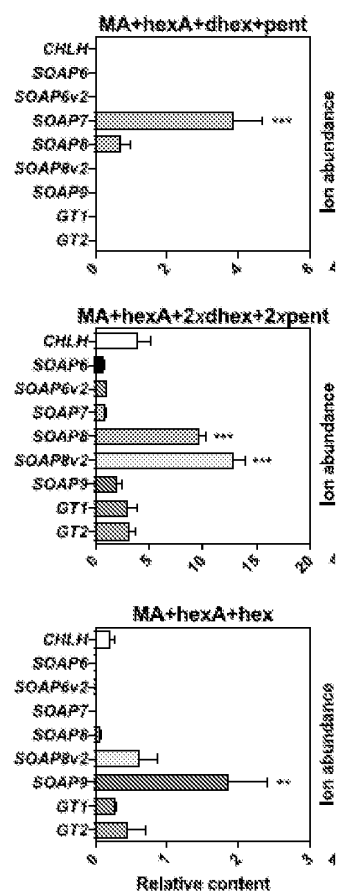


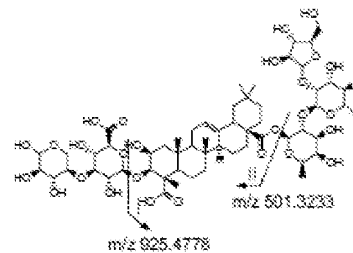
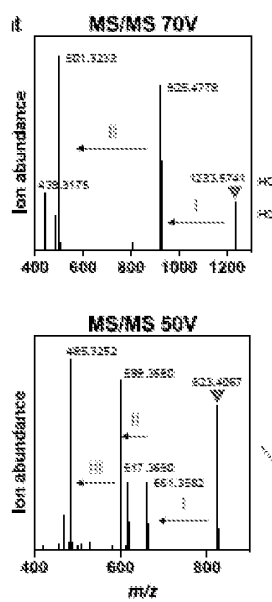
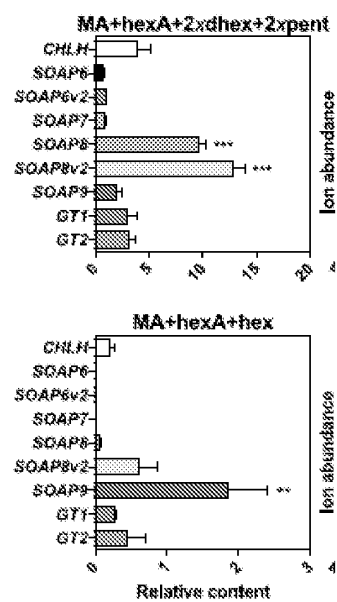
FIGURE 30B



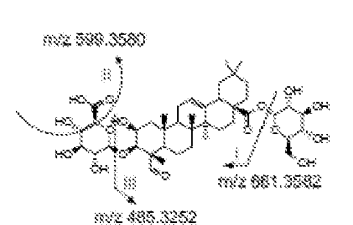
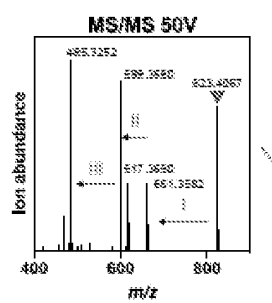
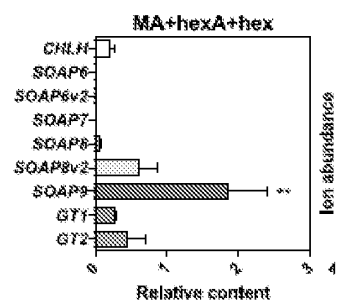
0



0



0



0

FIGURE 30C

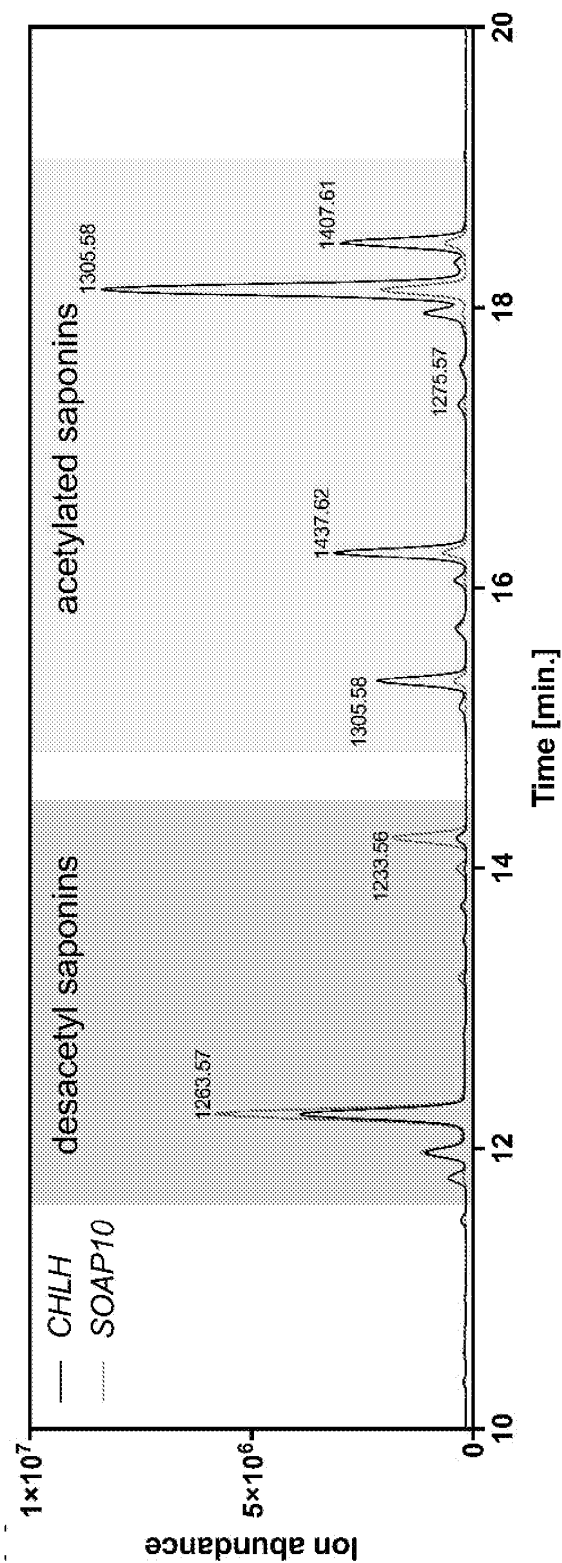


FIGURE 31A

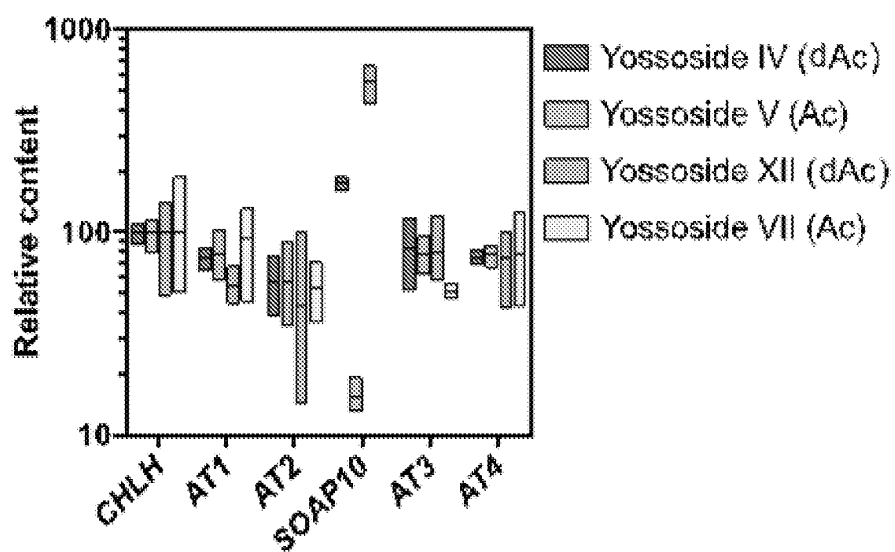


FIGURE 31B

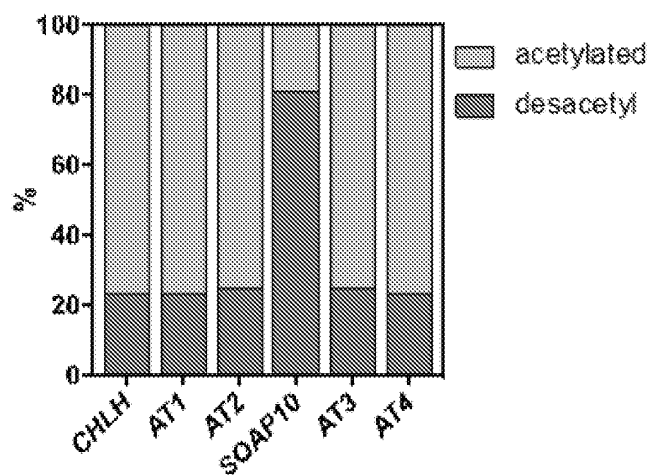


FIGURE 31C

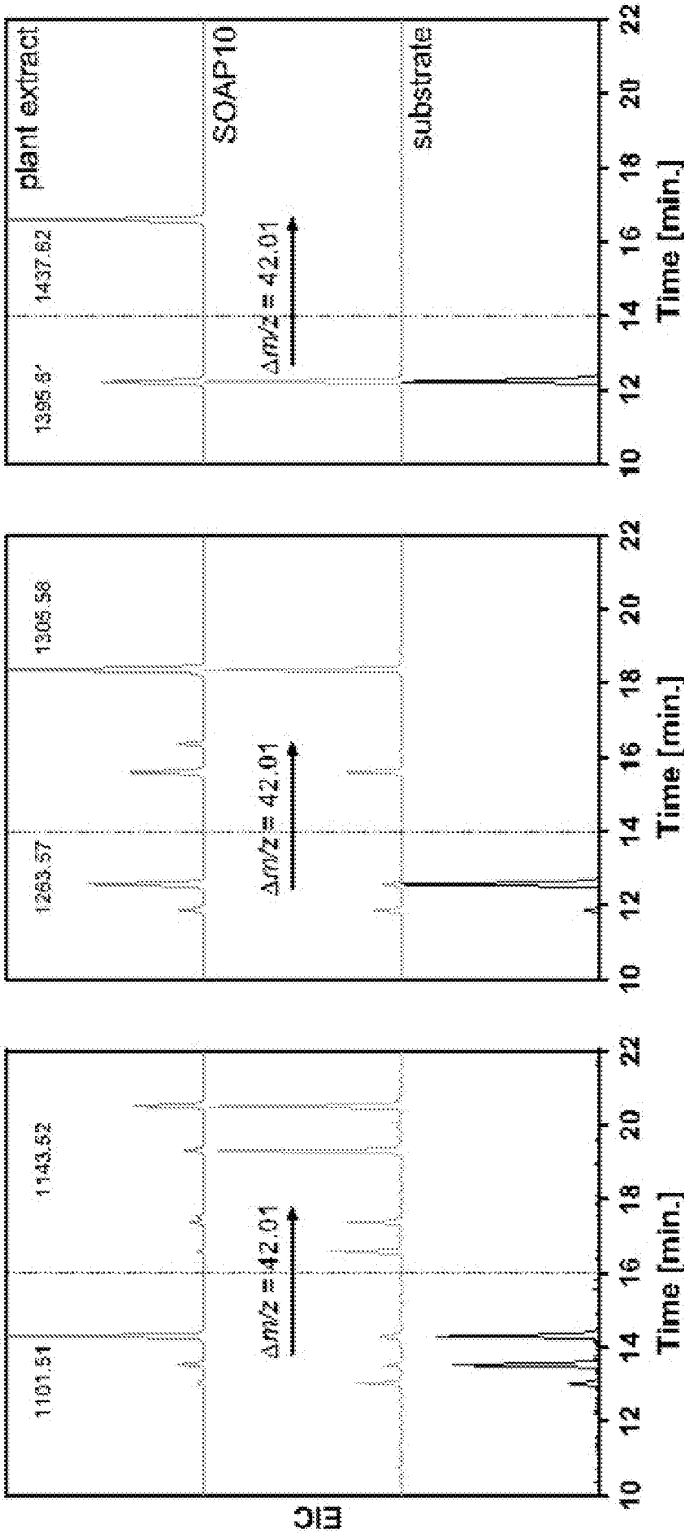


FIGURE 31D

FIGURE 31E

FIGURE 31F

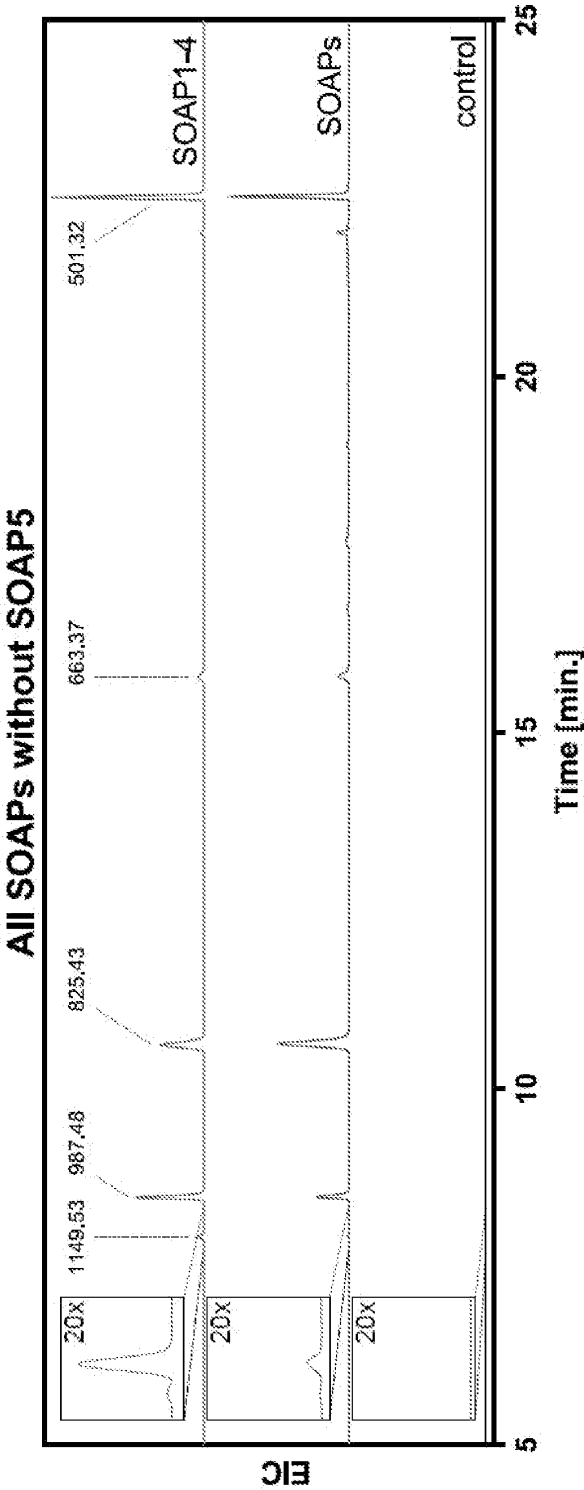


FIGURE 32A

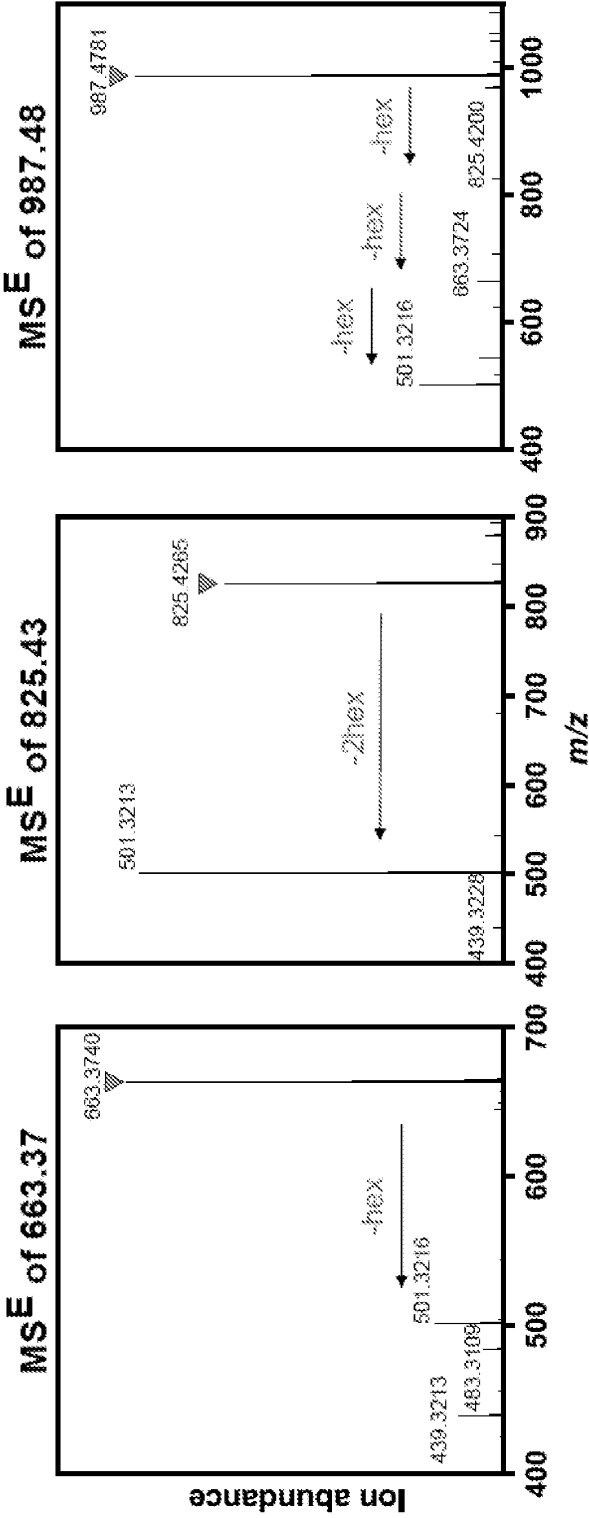


FIGURE 32B

FIGURE 32C

FIGURE 32D

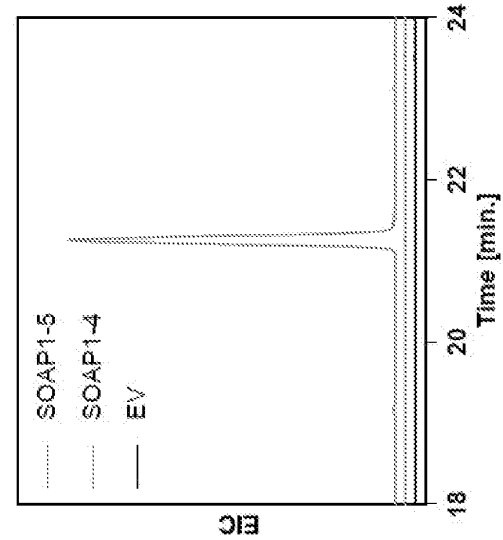


FIGURE 33C

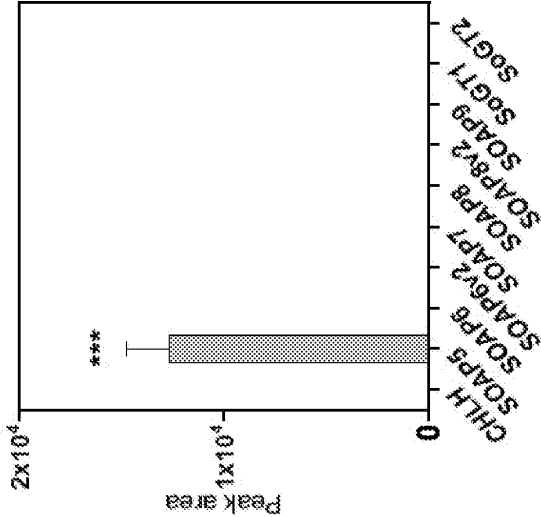


FIGURE 33B

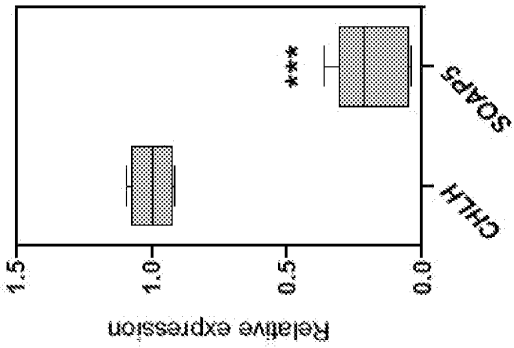


FIGURE 33A

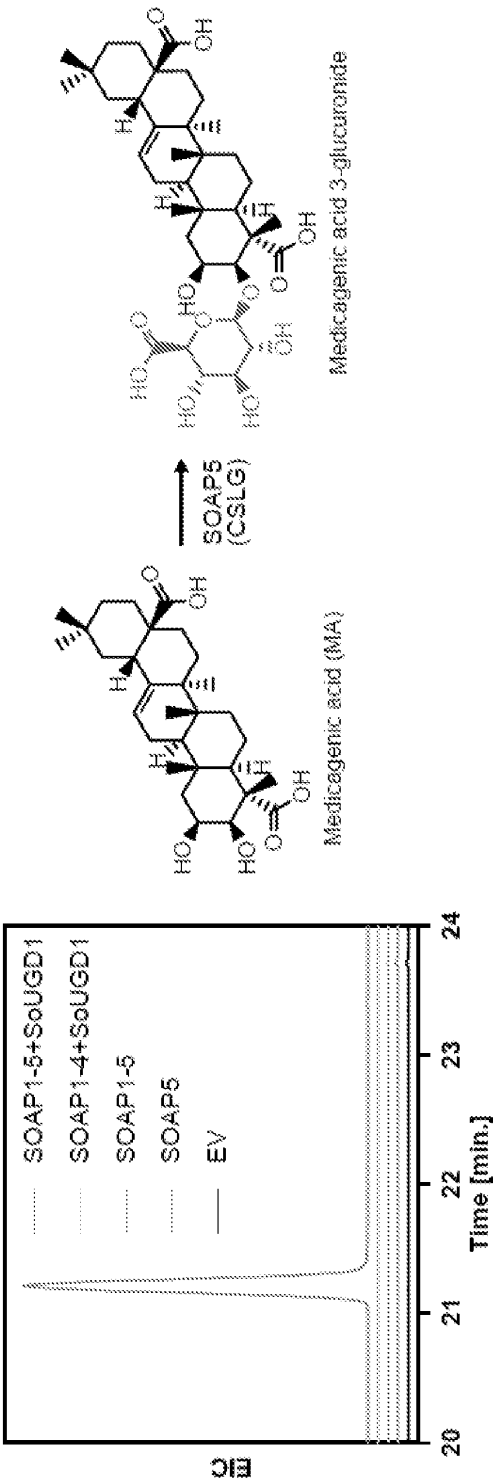


FIGURE 33E

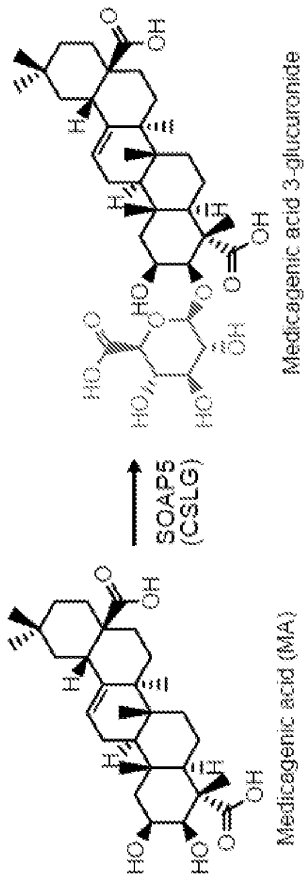


FIGURE 33D

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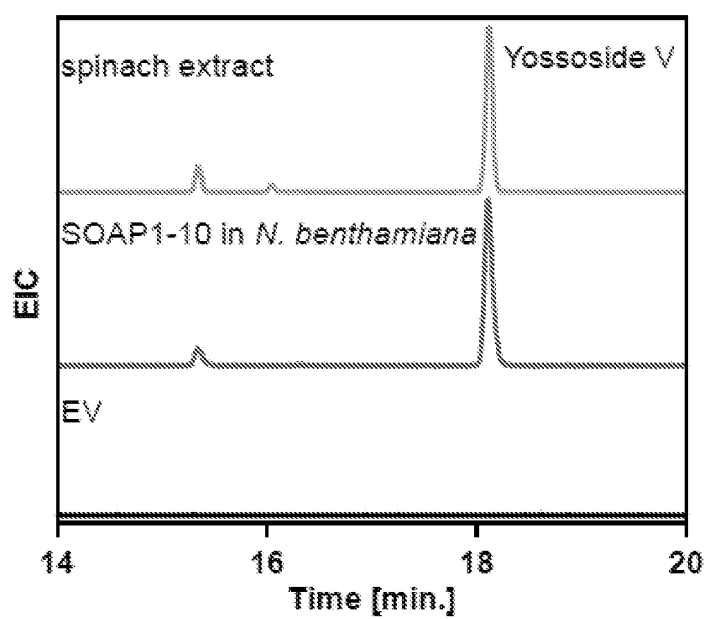


FIGURE 33F

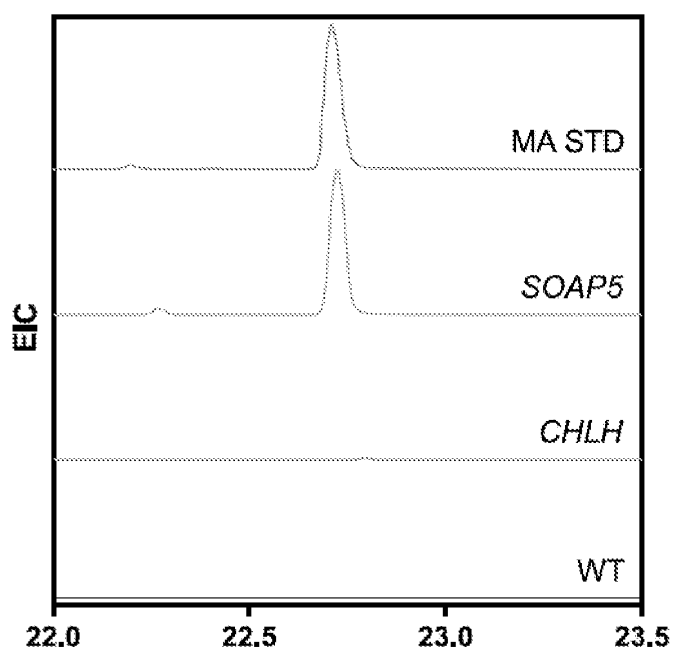


FIGURE 34A

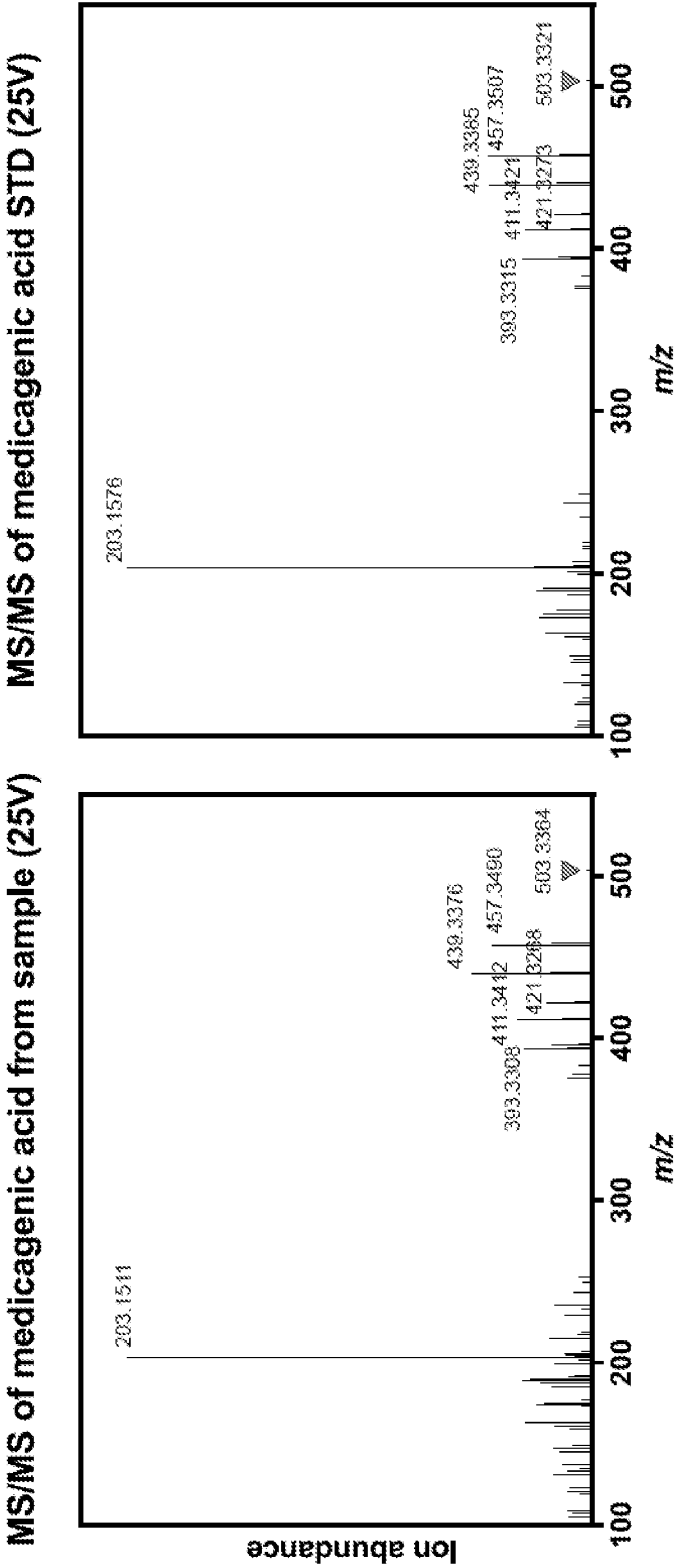


FIGURE 34B

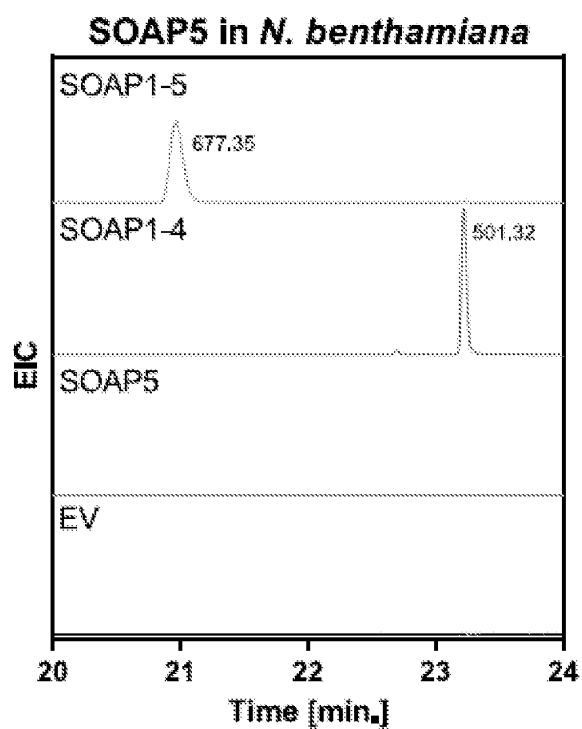


FIGURE 35A

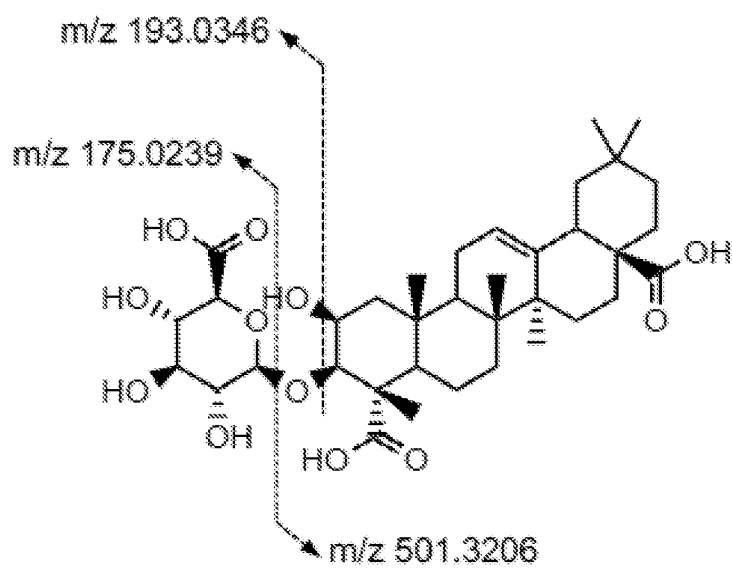


FIGURE 35B

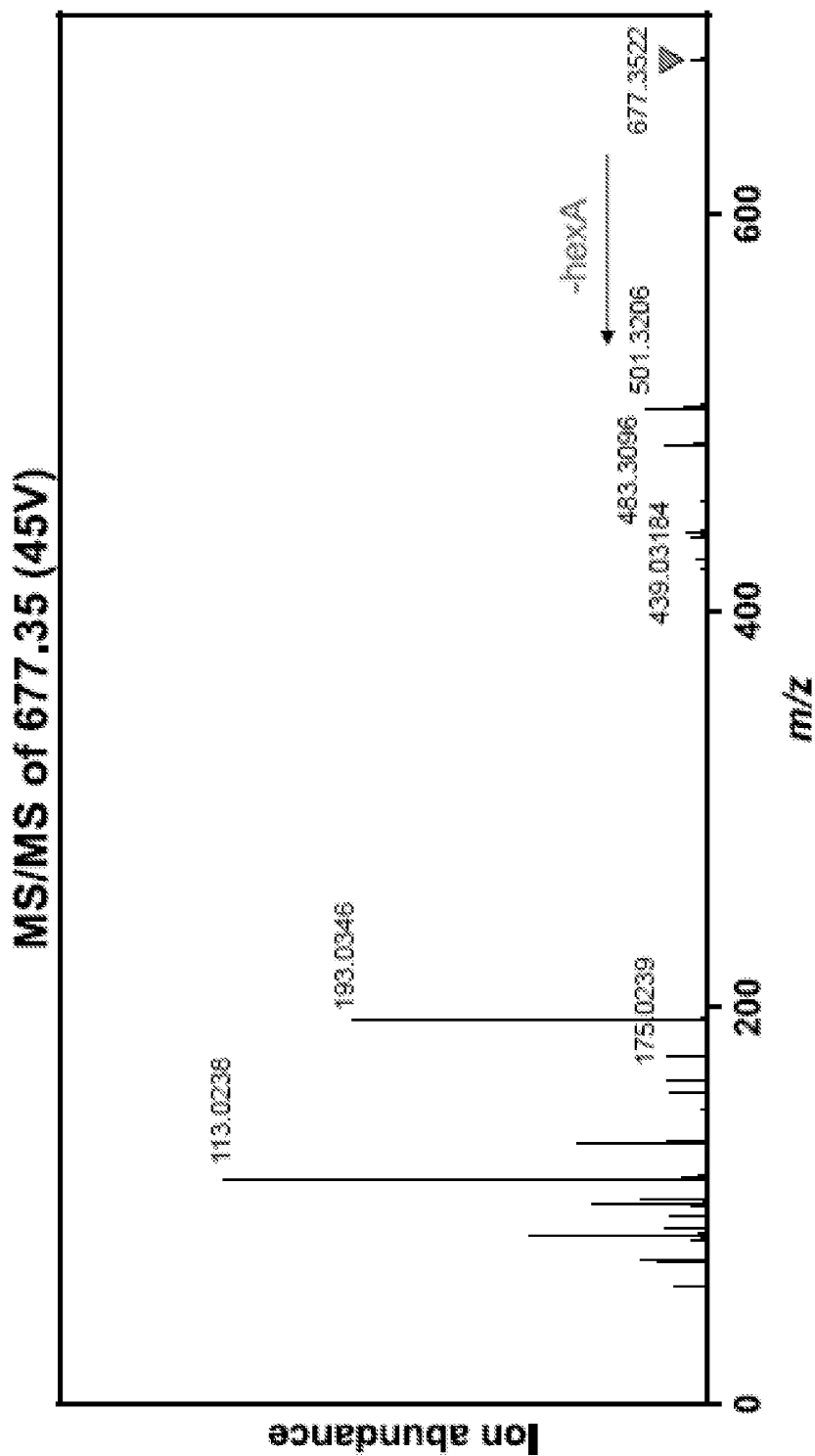


FIGURE 35C

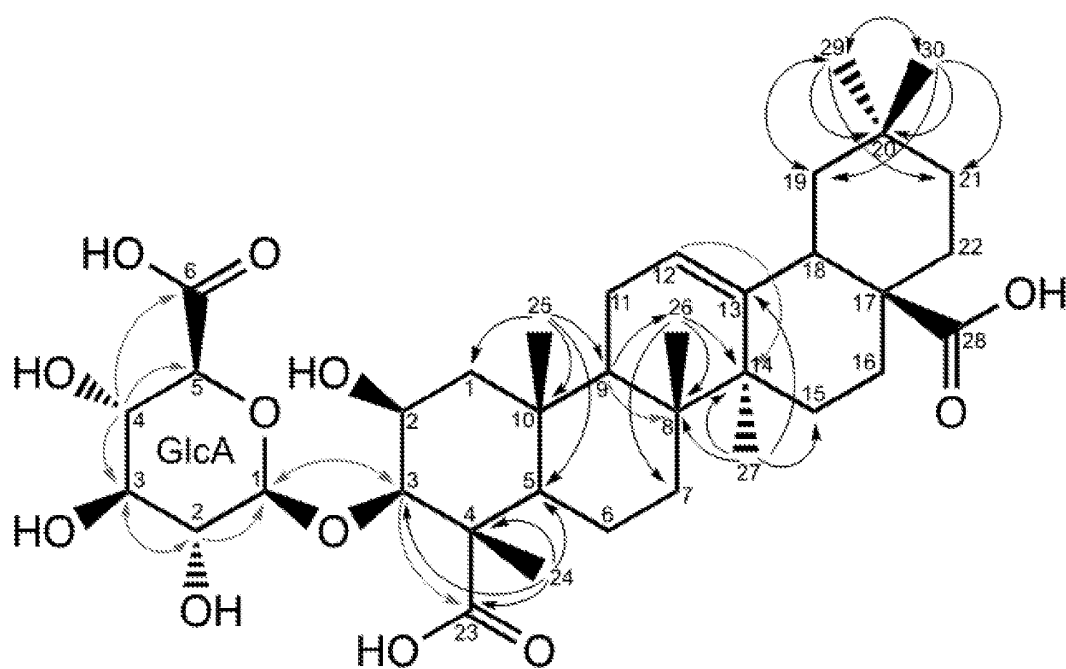


FIGURE 35D

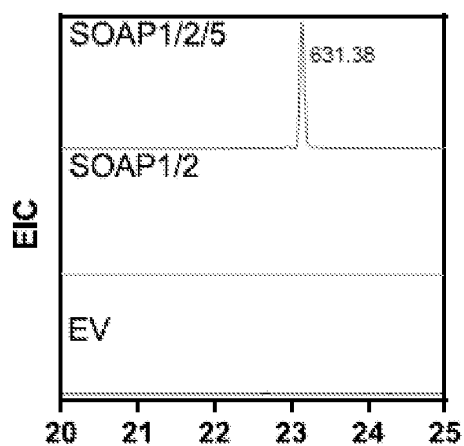
Oleanolic acid 3-GlcA

FIGURE 36A

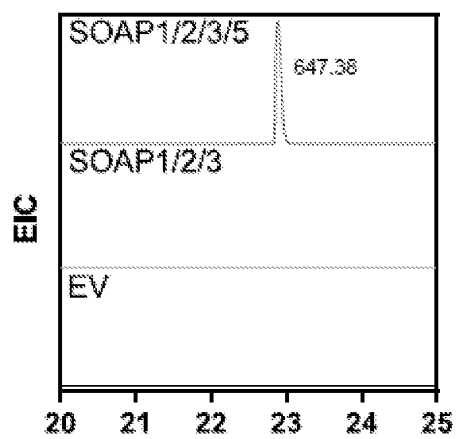
Augustic acid 3-GlcA

FIGURE 36B

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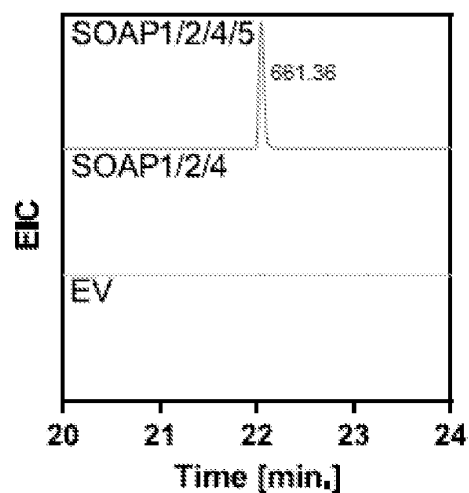
Gypsogenic acid 3-GlcA

FIGURE 36C

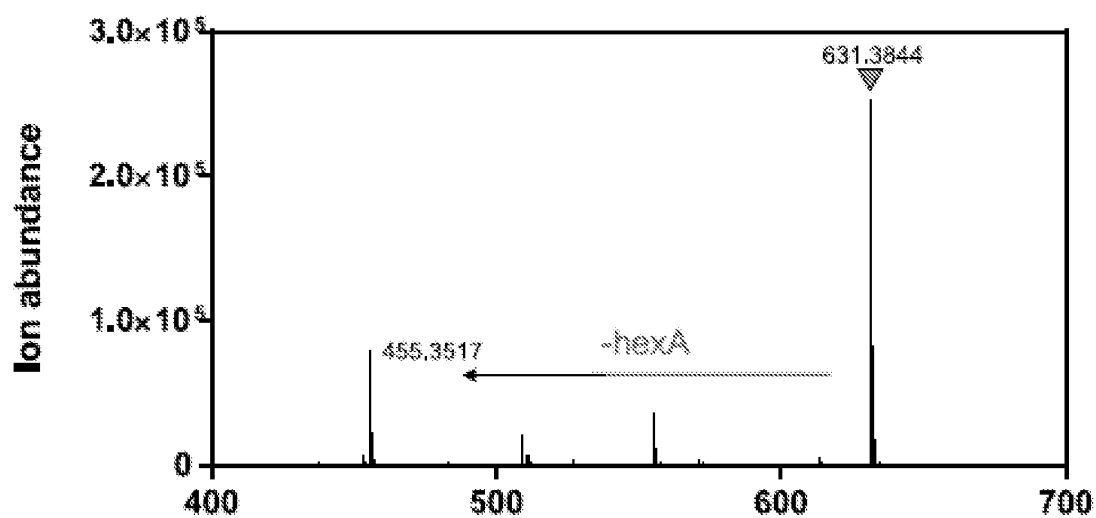
MS/MS of 631.38 (40V)

FIGURE 36D

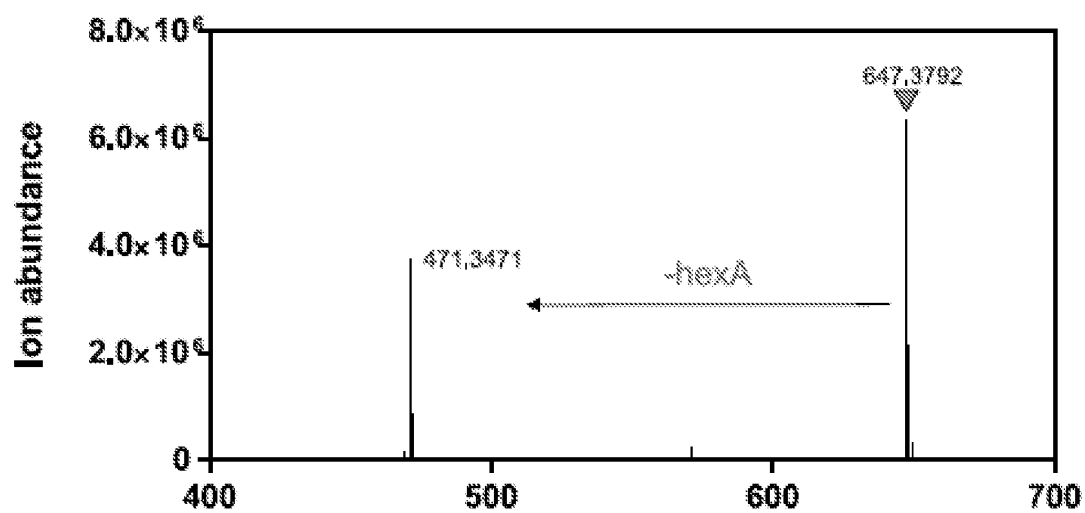
MS/MS of 647.38 (40V)

FIGURE 36E

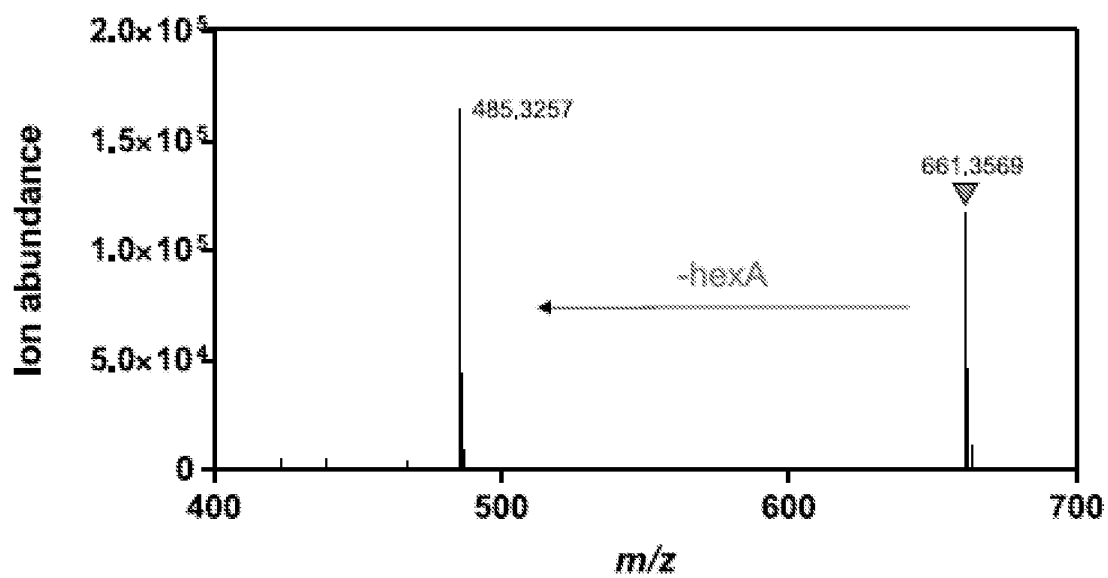
MS/MS of 661.36 (40V)

FIGURE 36F

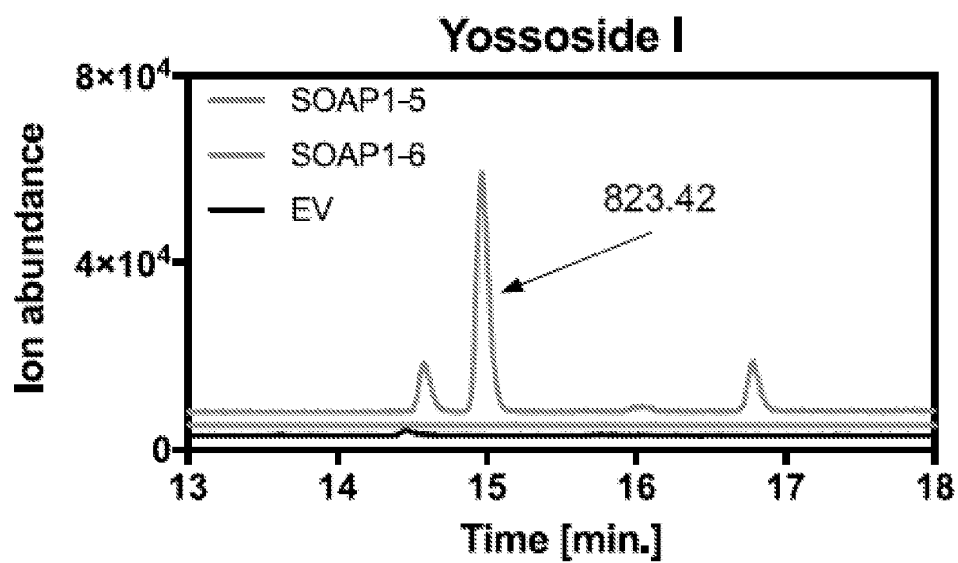


FIGURE 37A

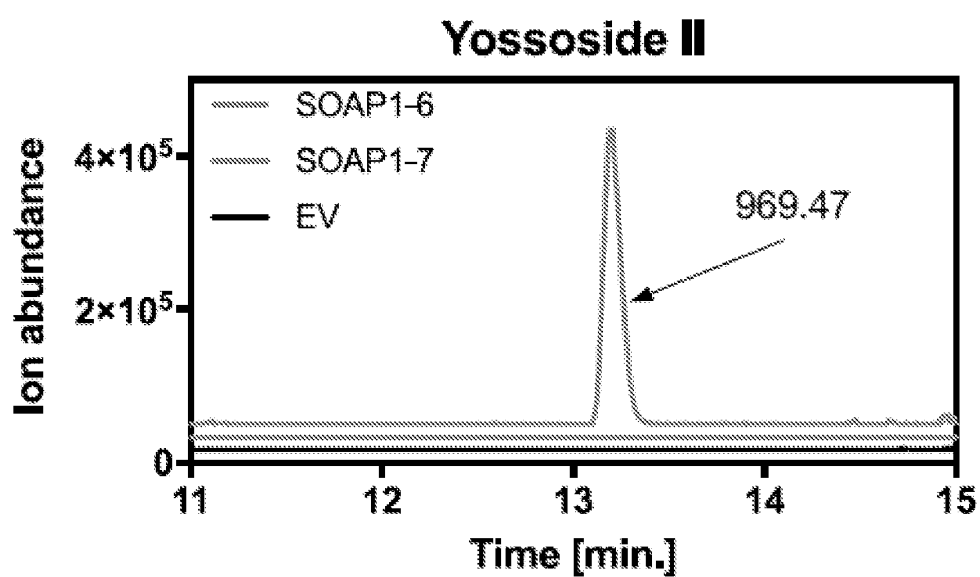


FIGURE 37B

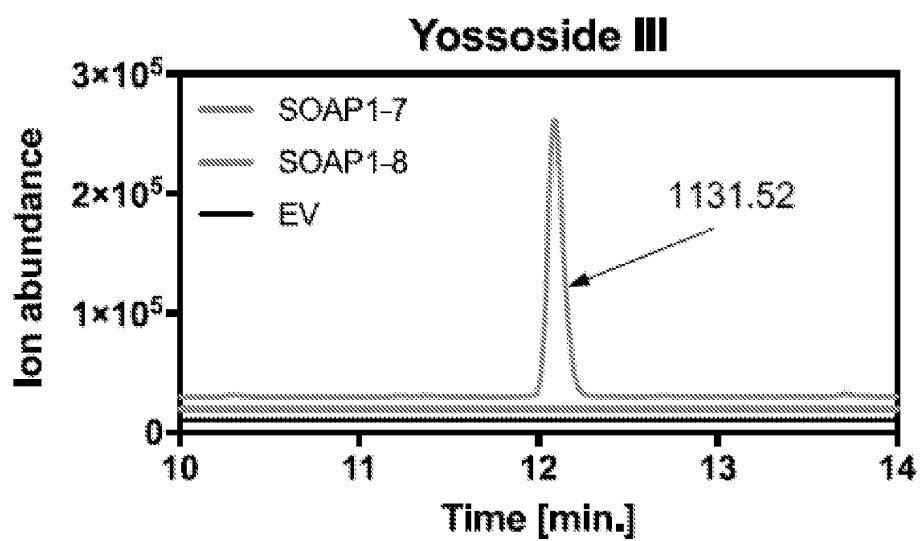


FIGURE 37C

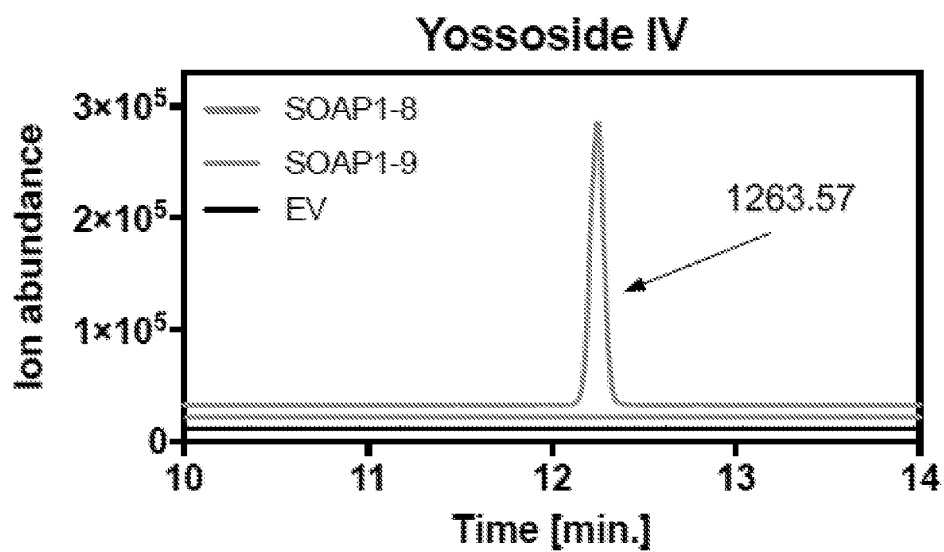


FIGURE 37D

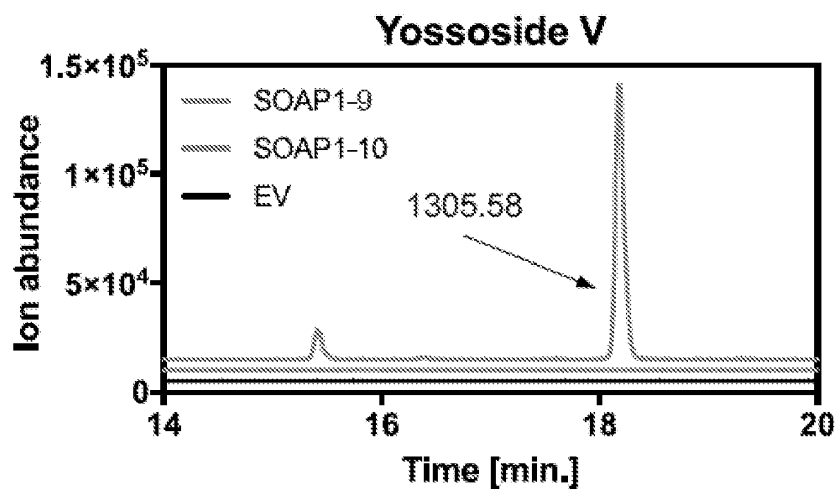


FIGURE 37E

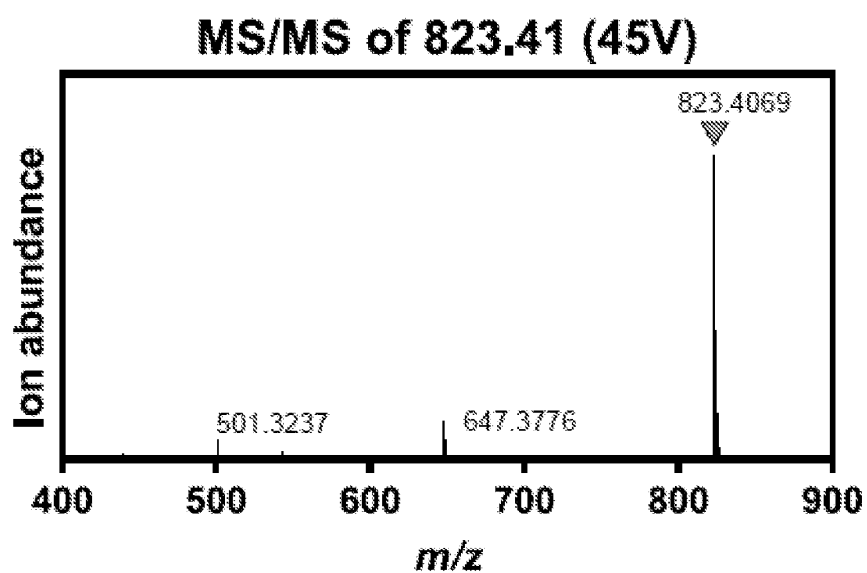


FIGURE 38A

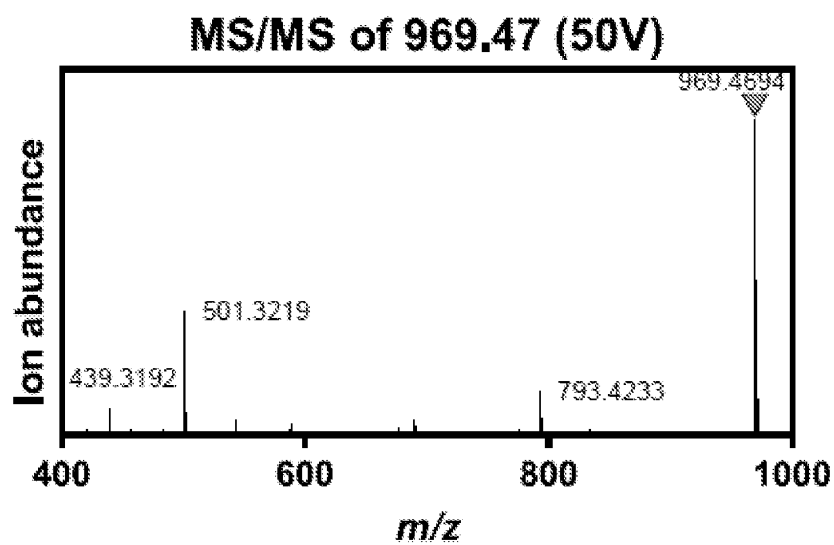


FIGURE 38B

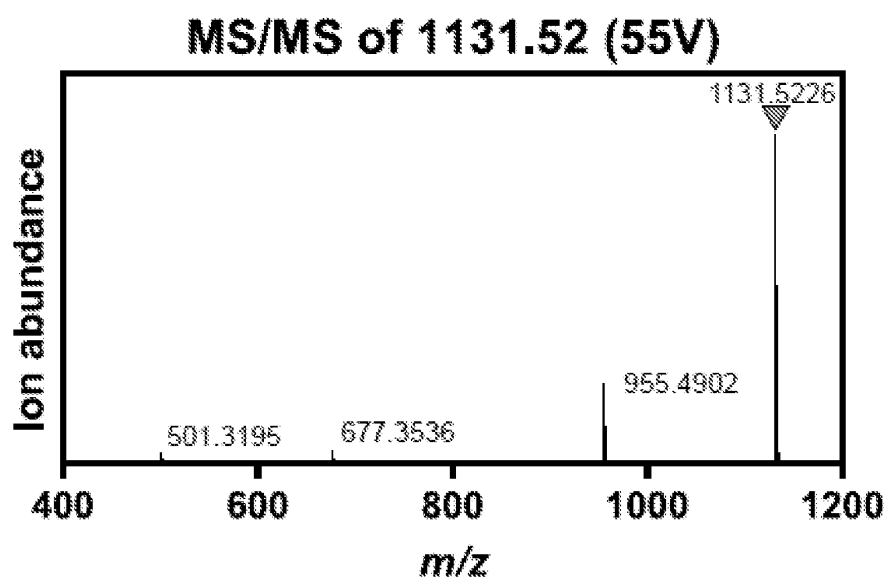


FIGURE 38C

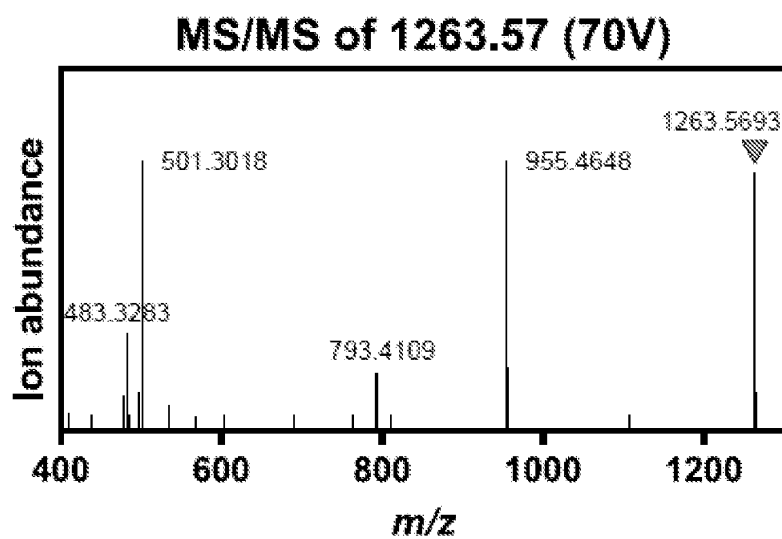


FIGURE 38D

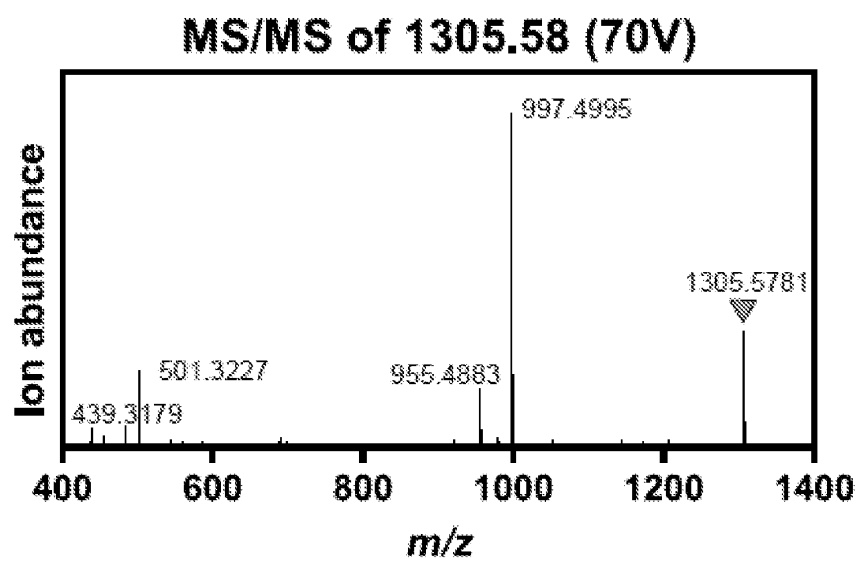


FIGURE 38E

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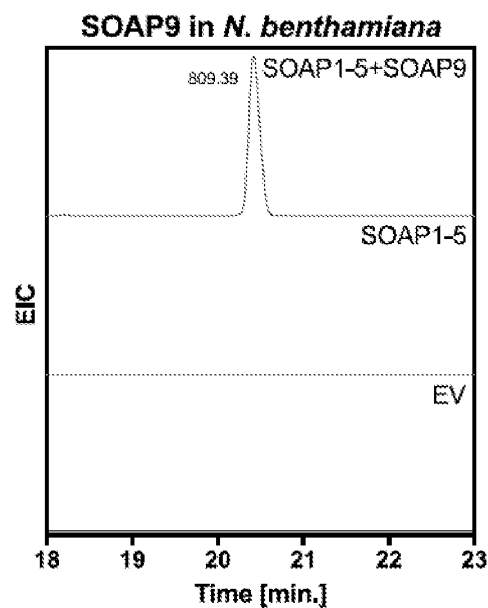


FIGURE 39A

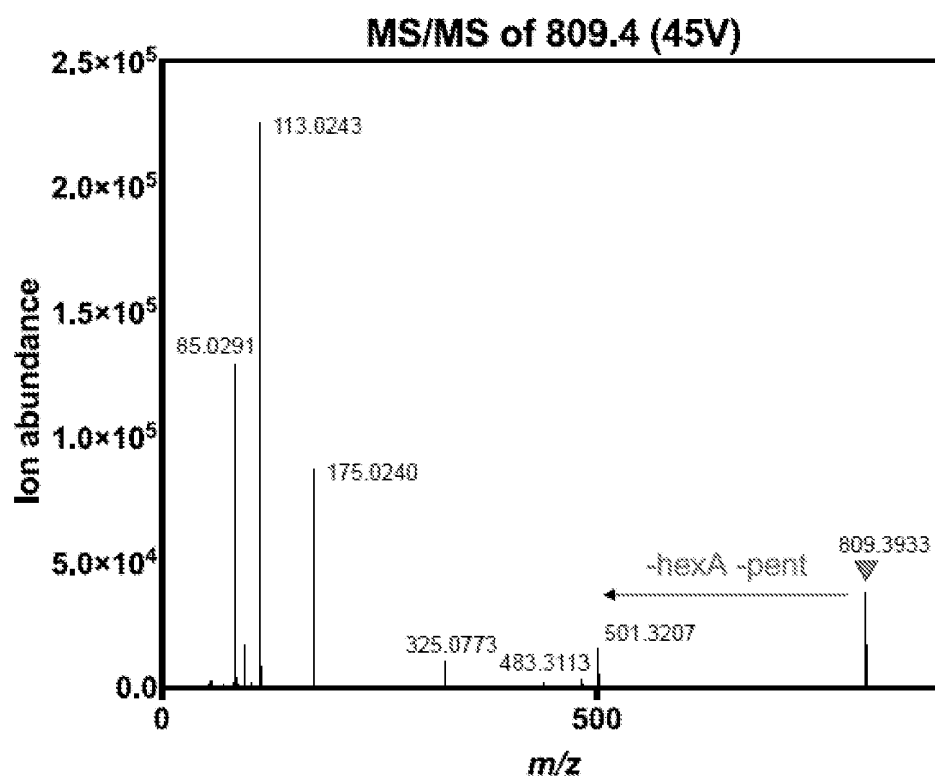


FIGURE 39B

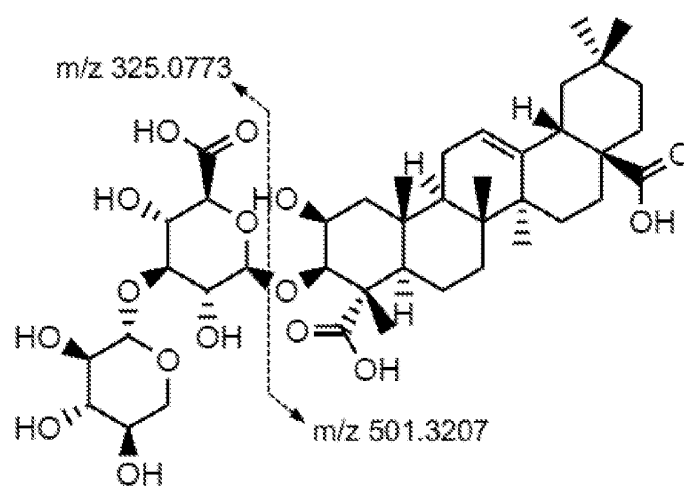


FIGURE 39C

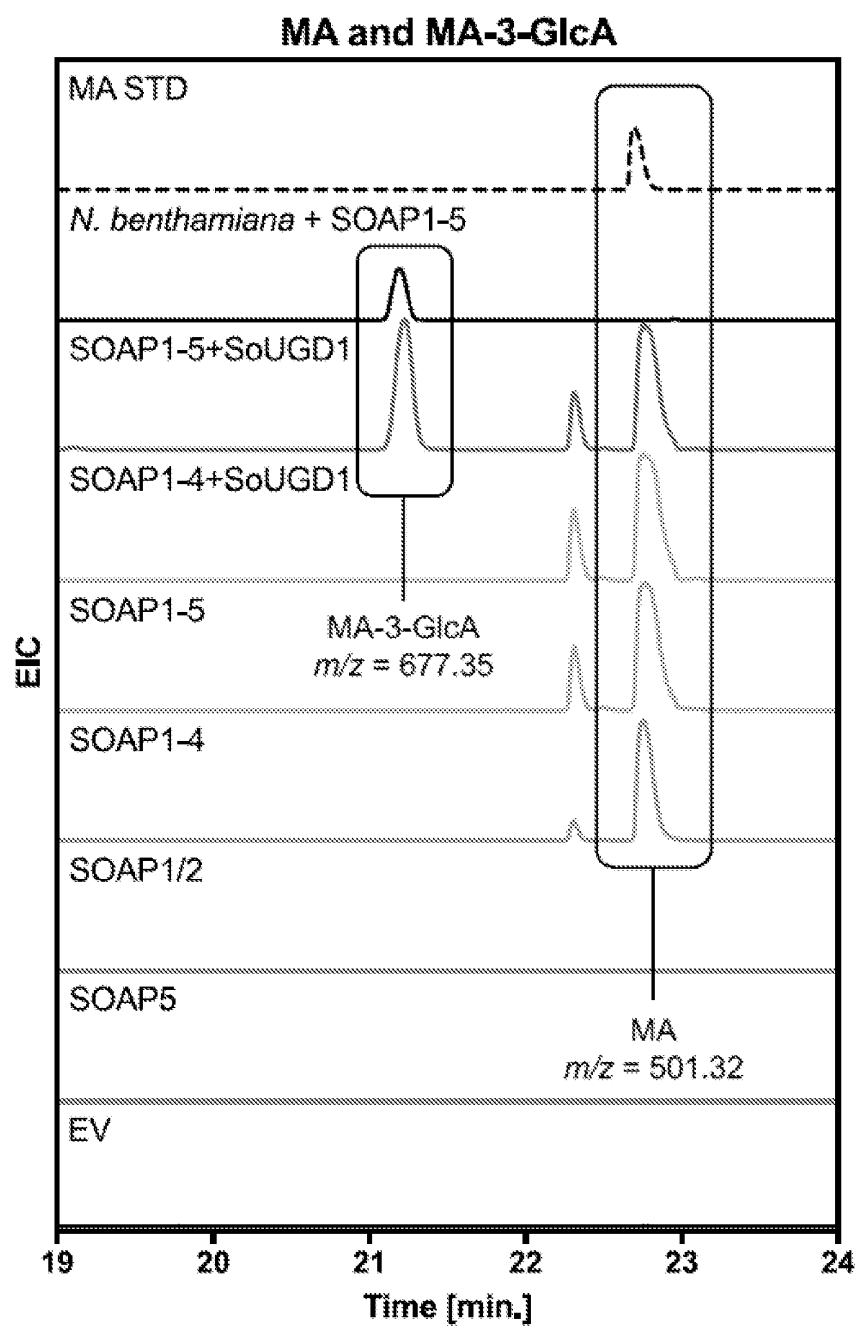


FIGURE 40A

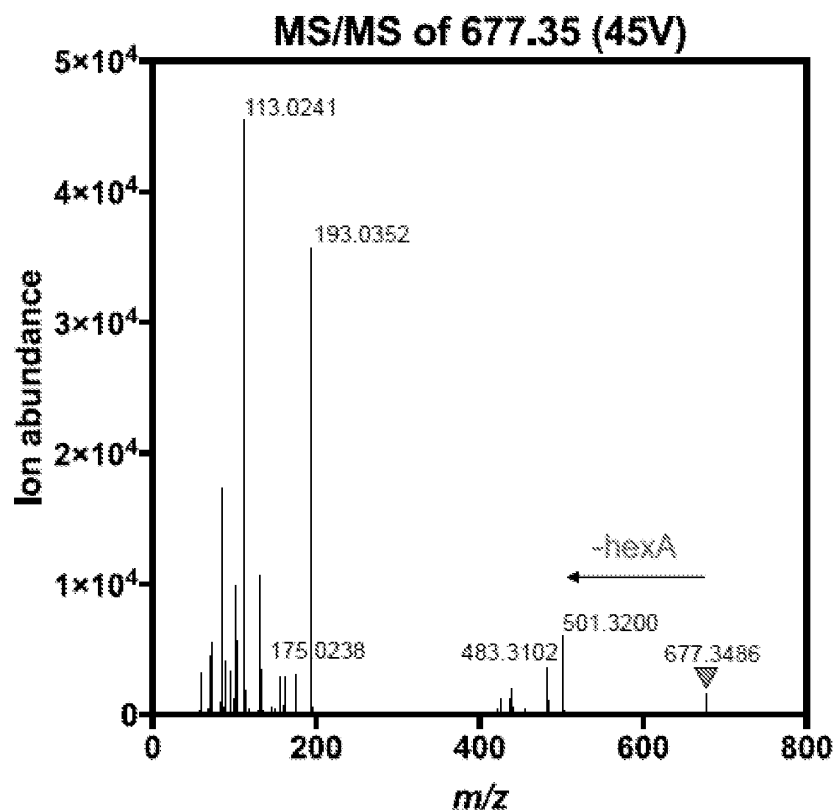


FIGURE 40B

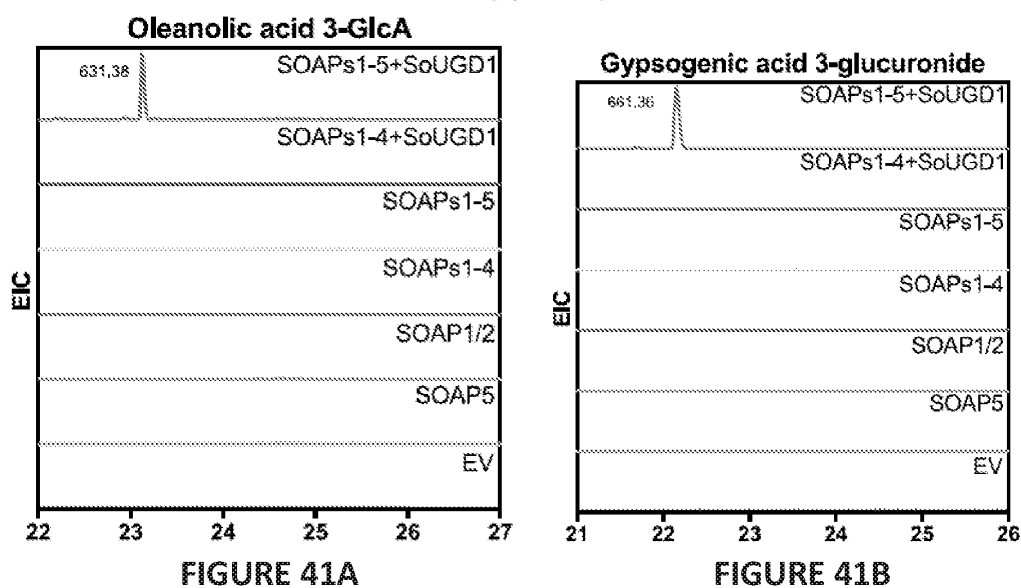


FIGURE 41A

FIGURE 41B

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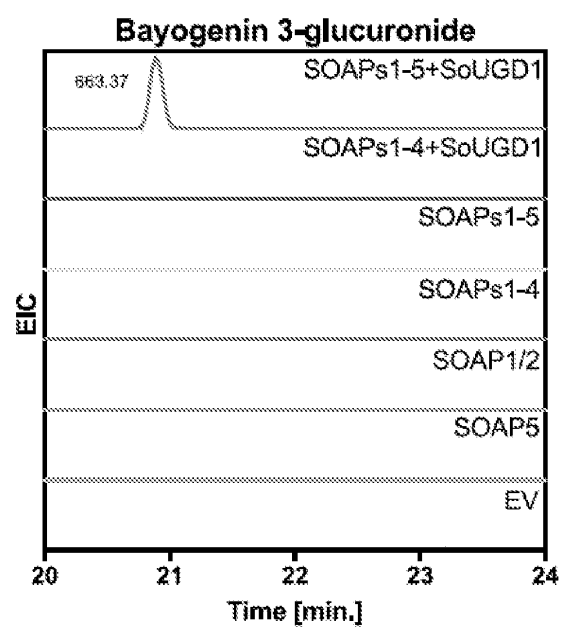


FIGURE 41C

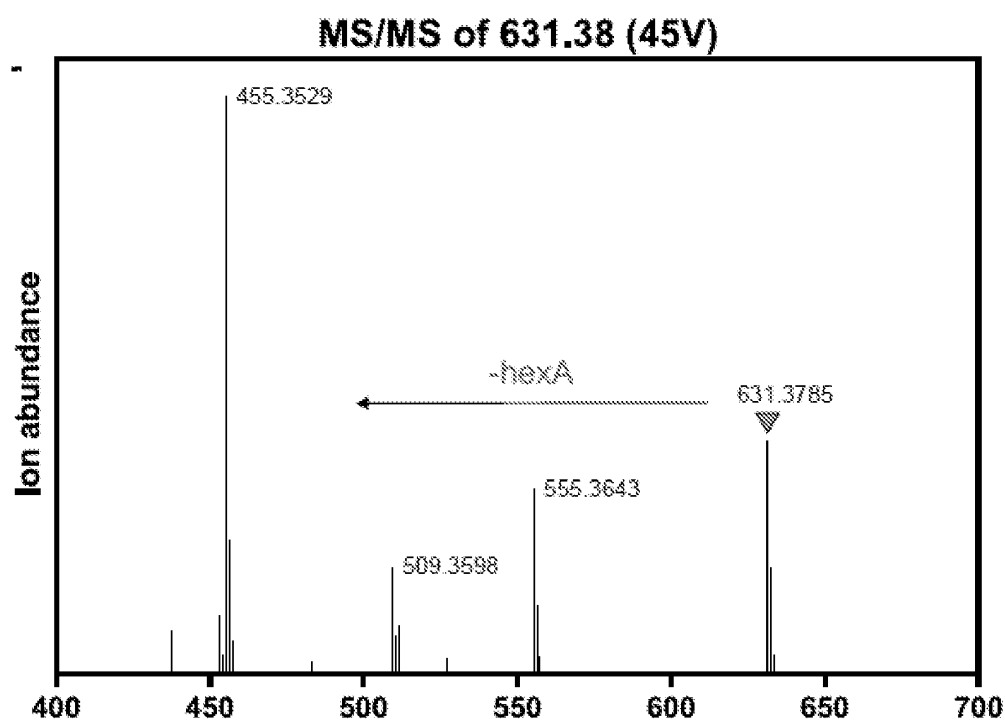


FIGURE 41D

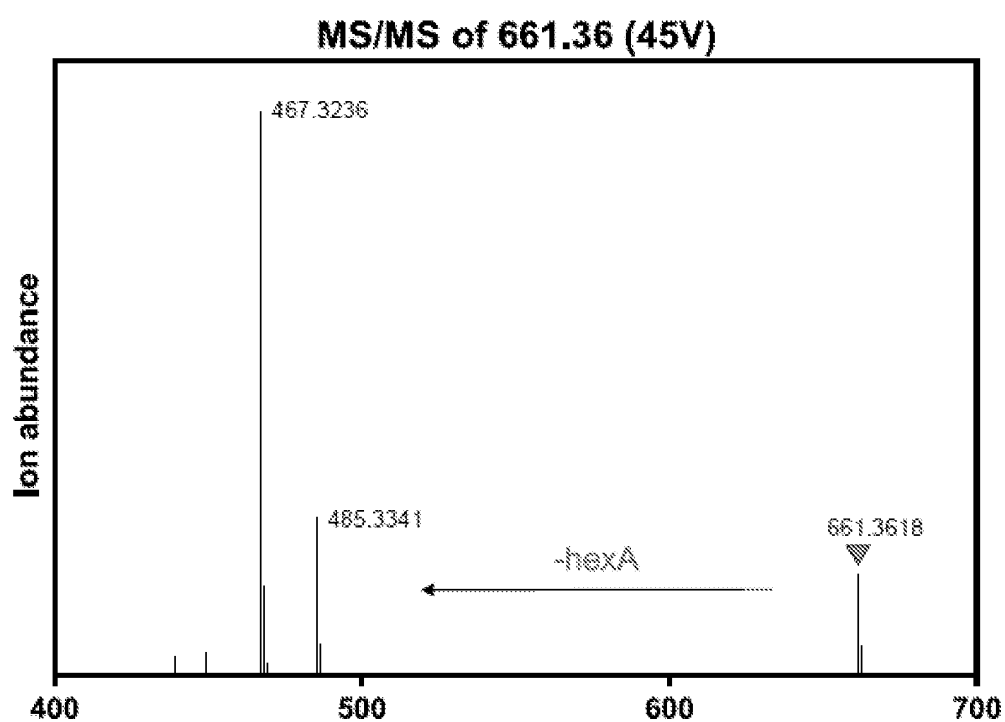


FIGURE 41E

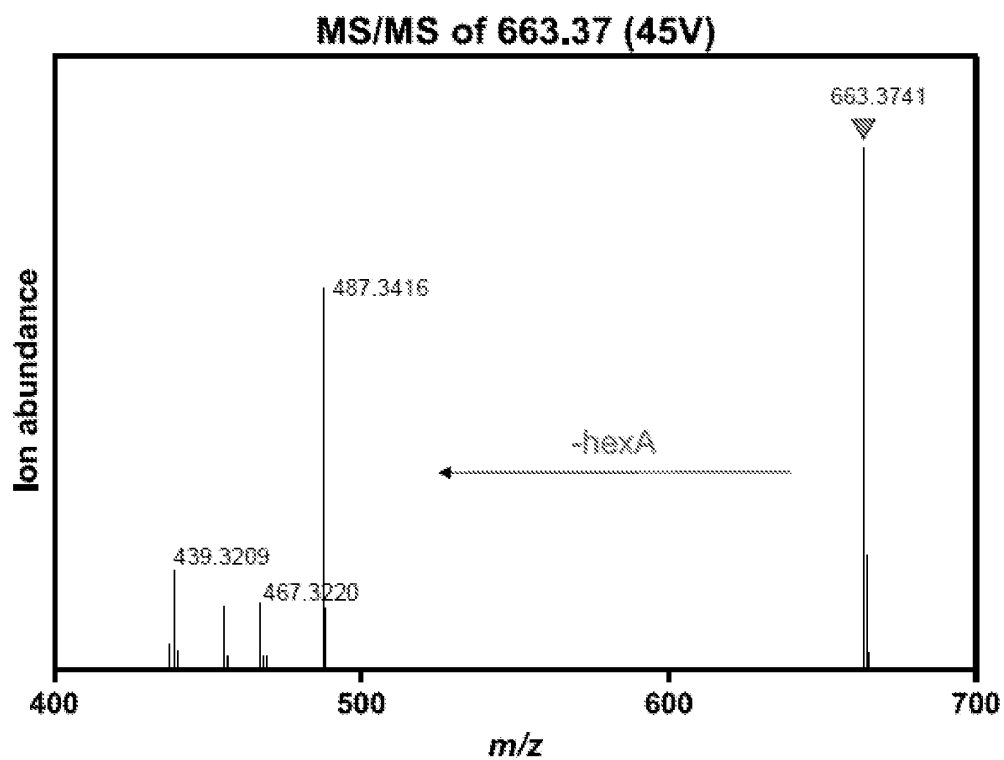


FIGURE 41F

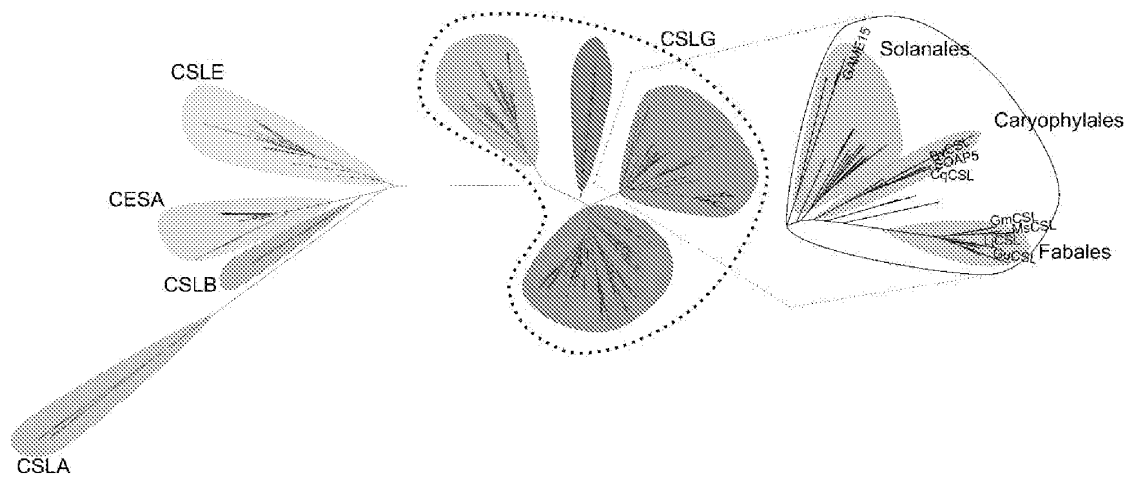


FIGURE 42A

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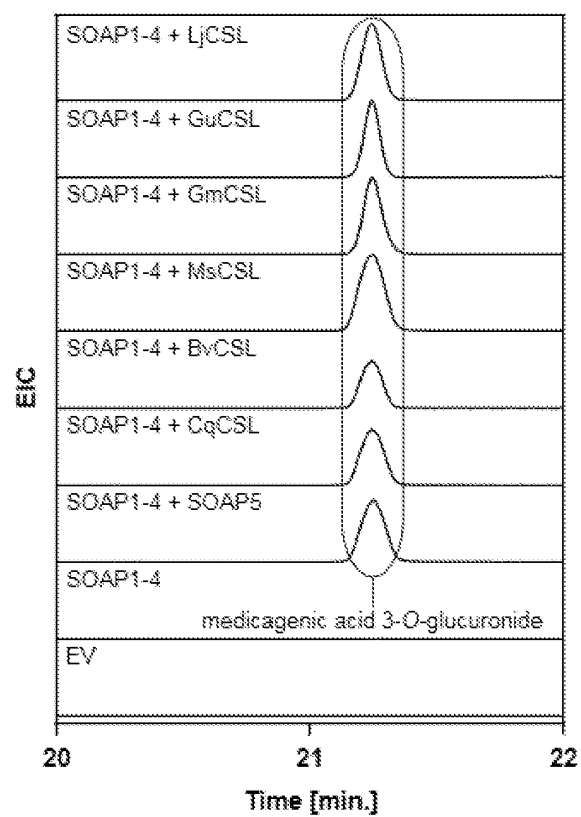


FIGURE 42B

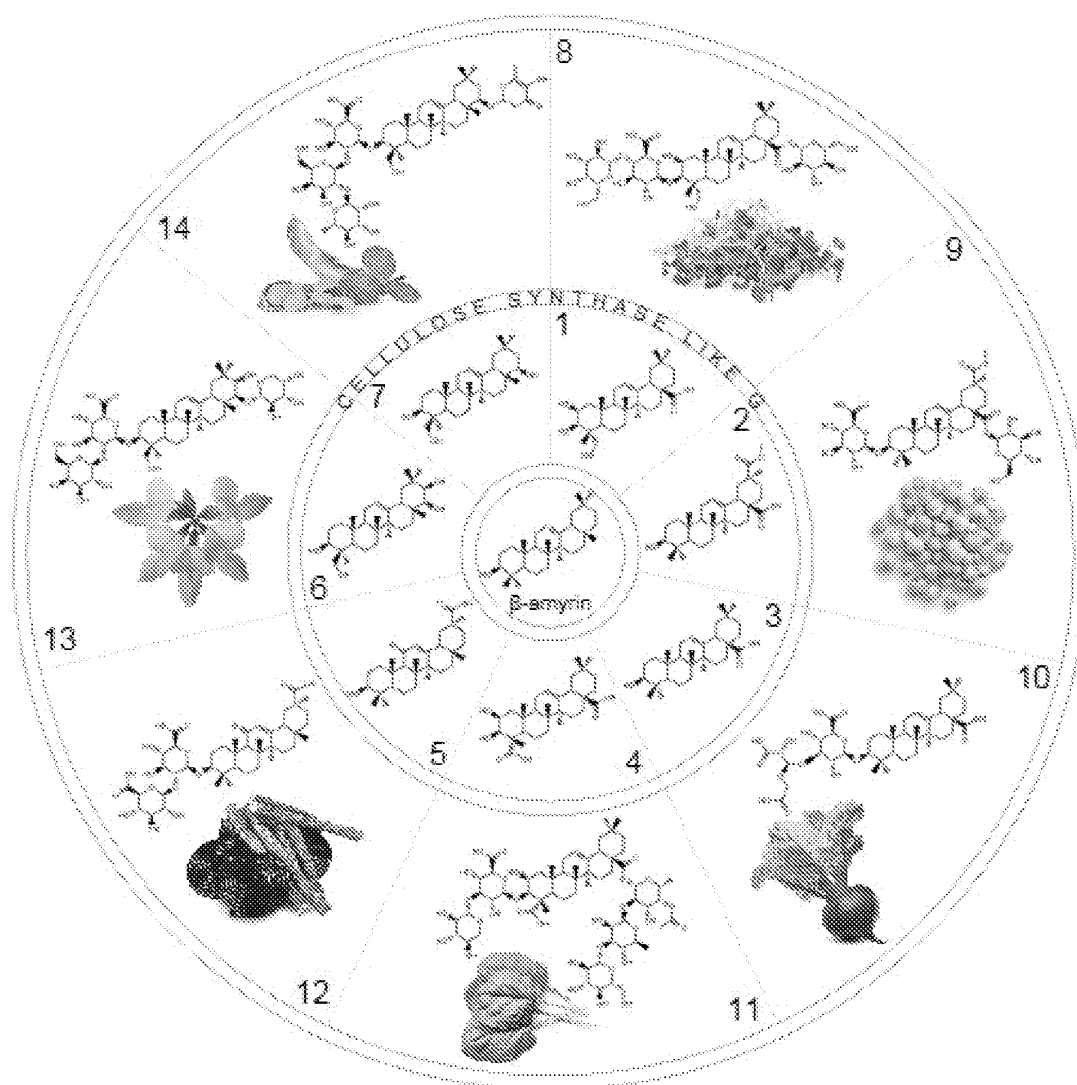


FIGURE 42C

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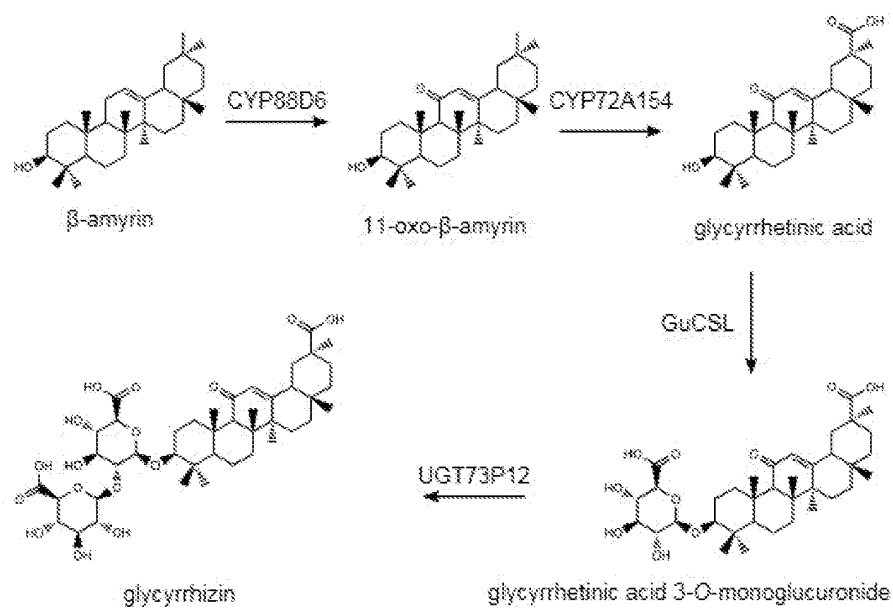


FIGURE 42D

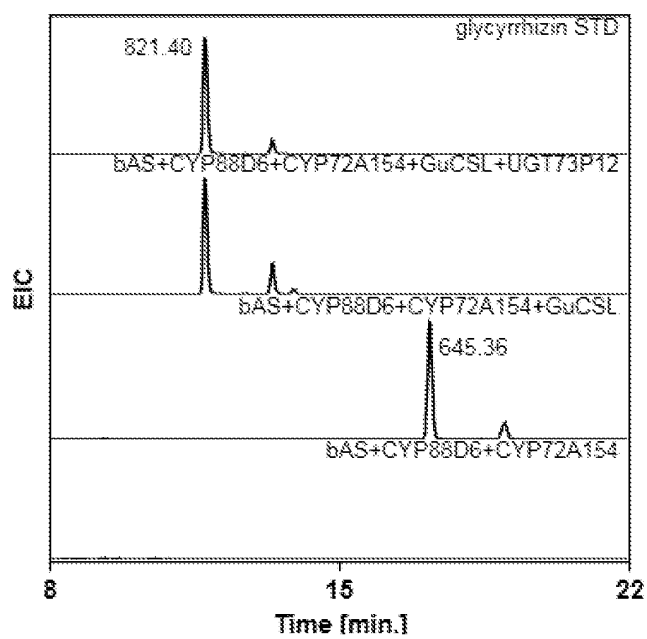


FIGURE 42E

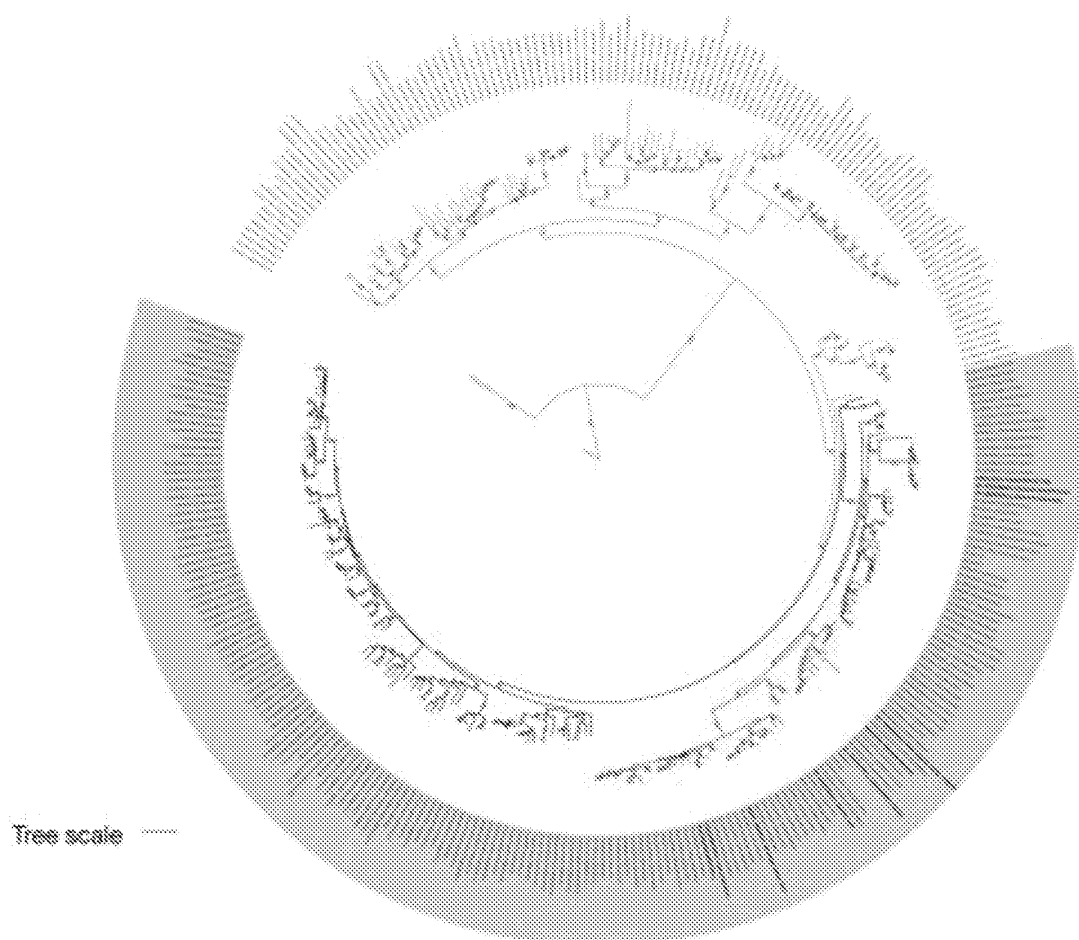


FIGURE 42F

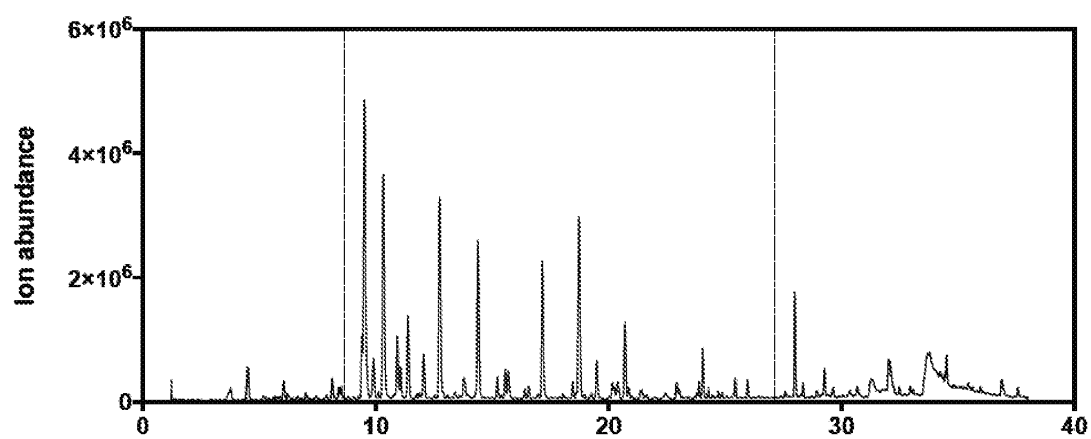
Chenopodium quinoa

FIGURE 43A

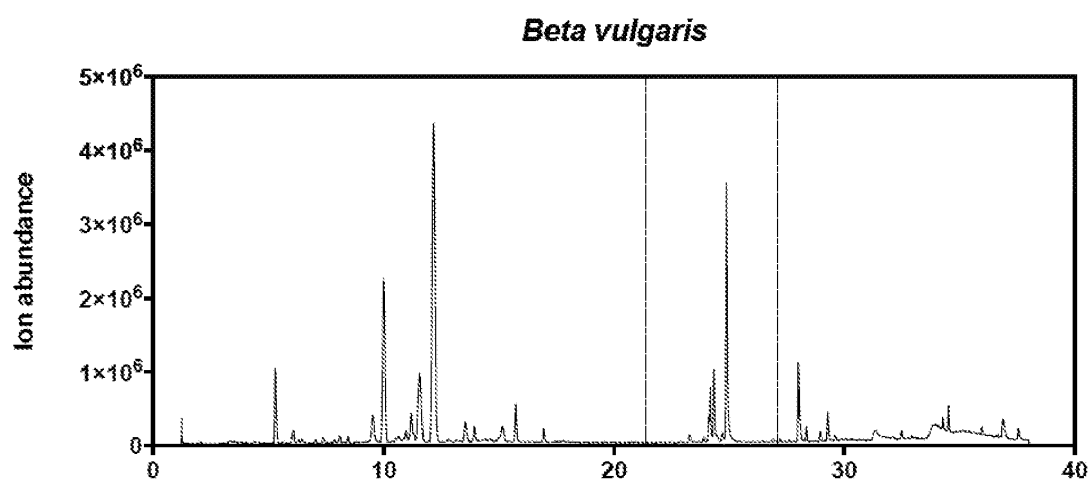


FIGURE 43B

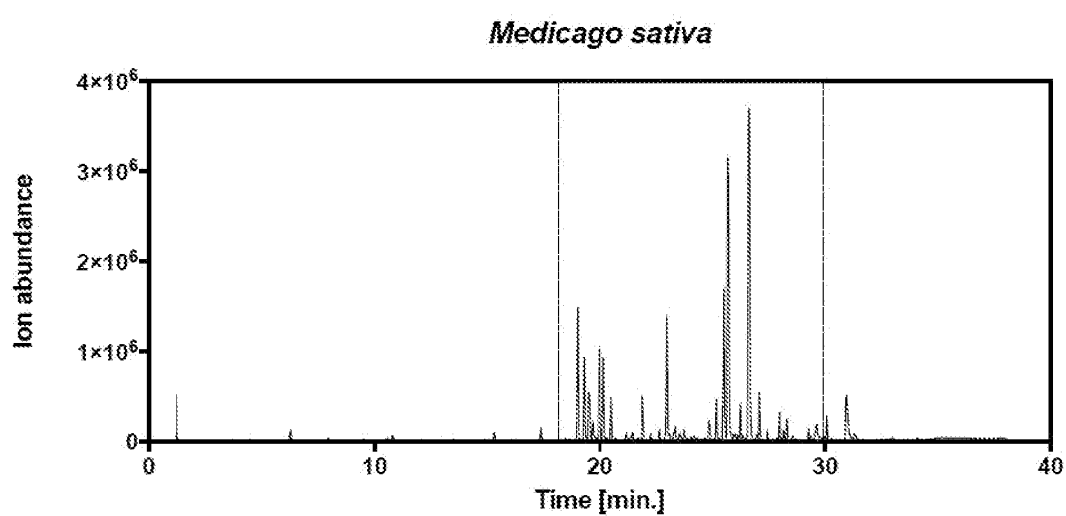


FIGURE 43C

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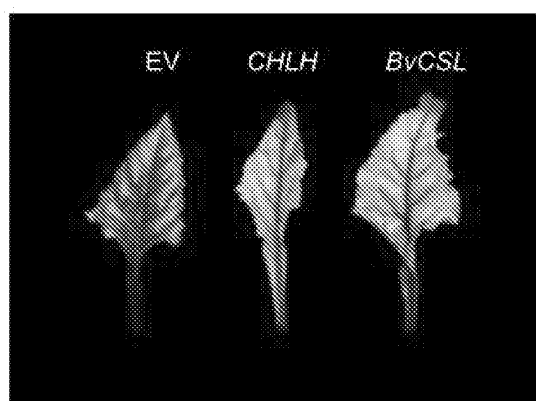


FIGURE 44A

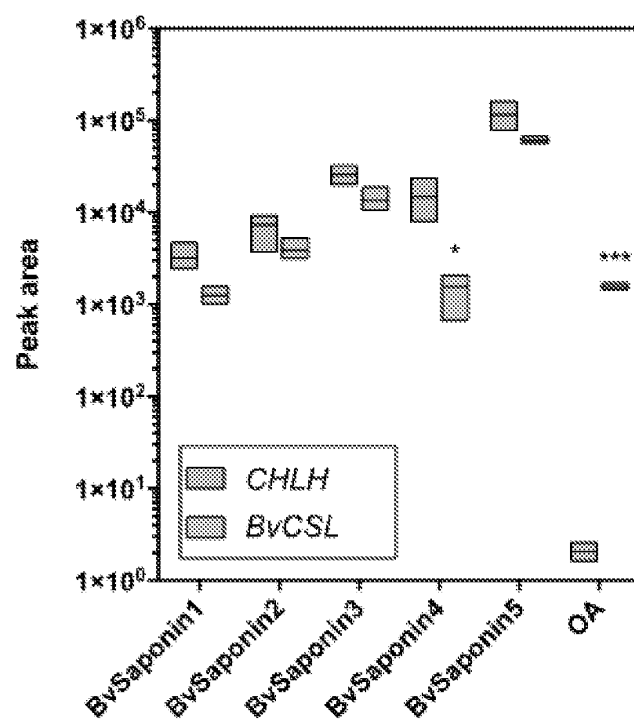


FIGURE 44B

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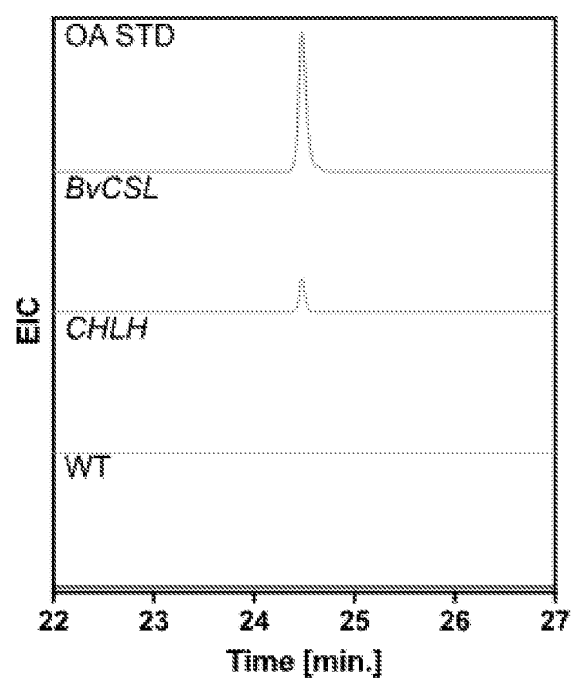


FIGURE 44C

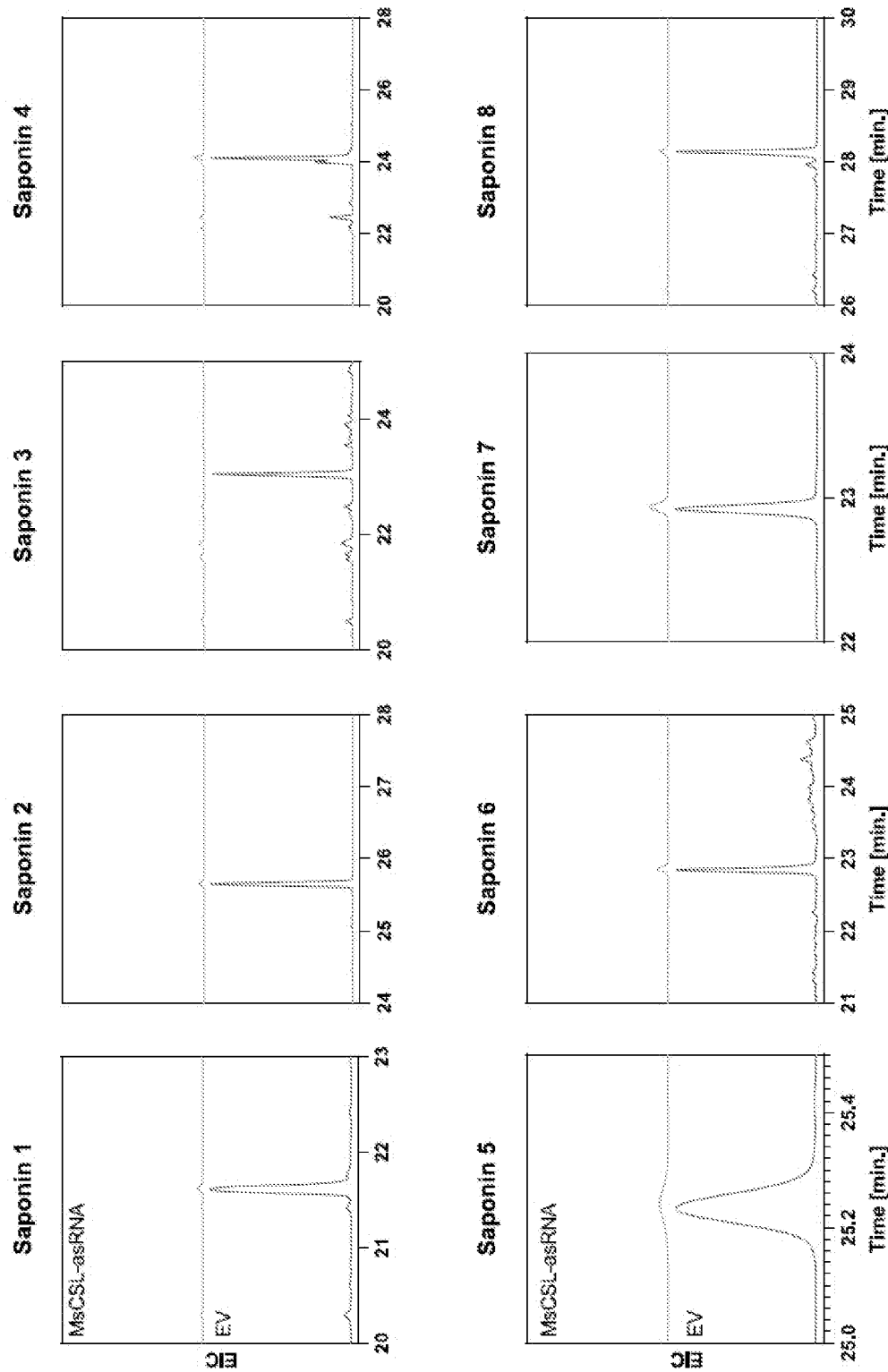


FIGURE 45A

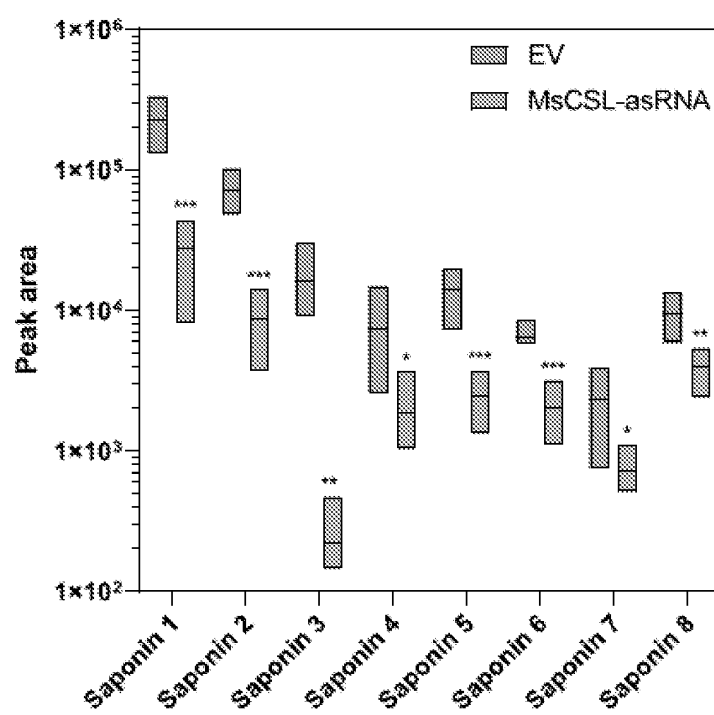


FIGURE 45B

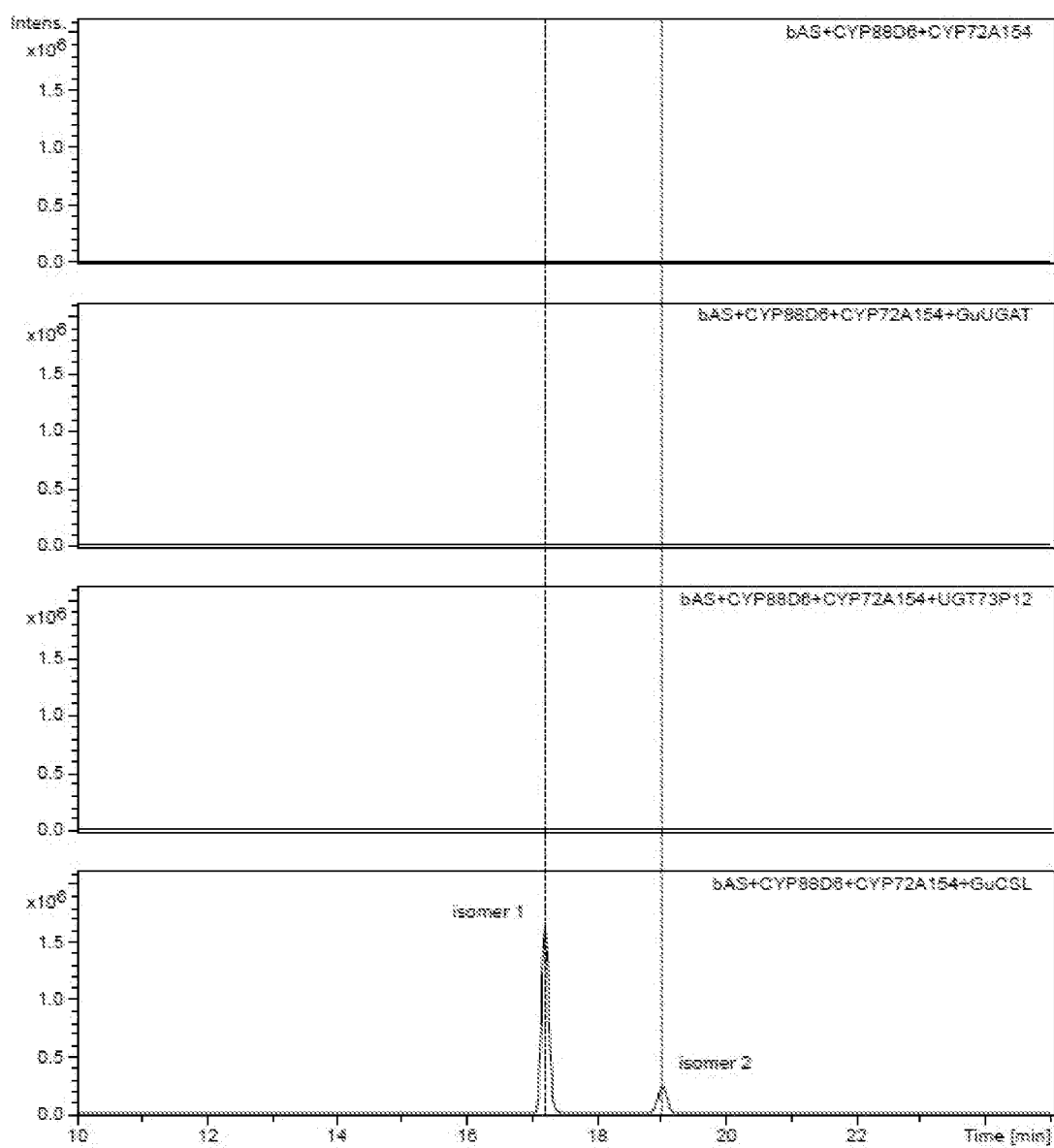


FIGURE 46A

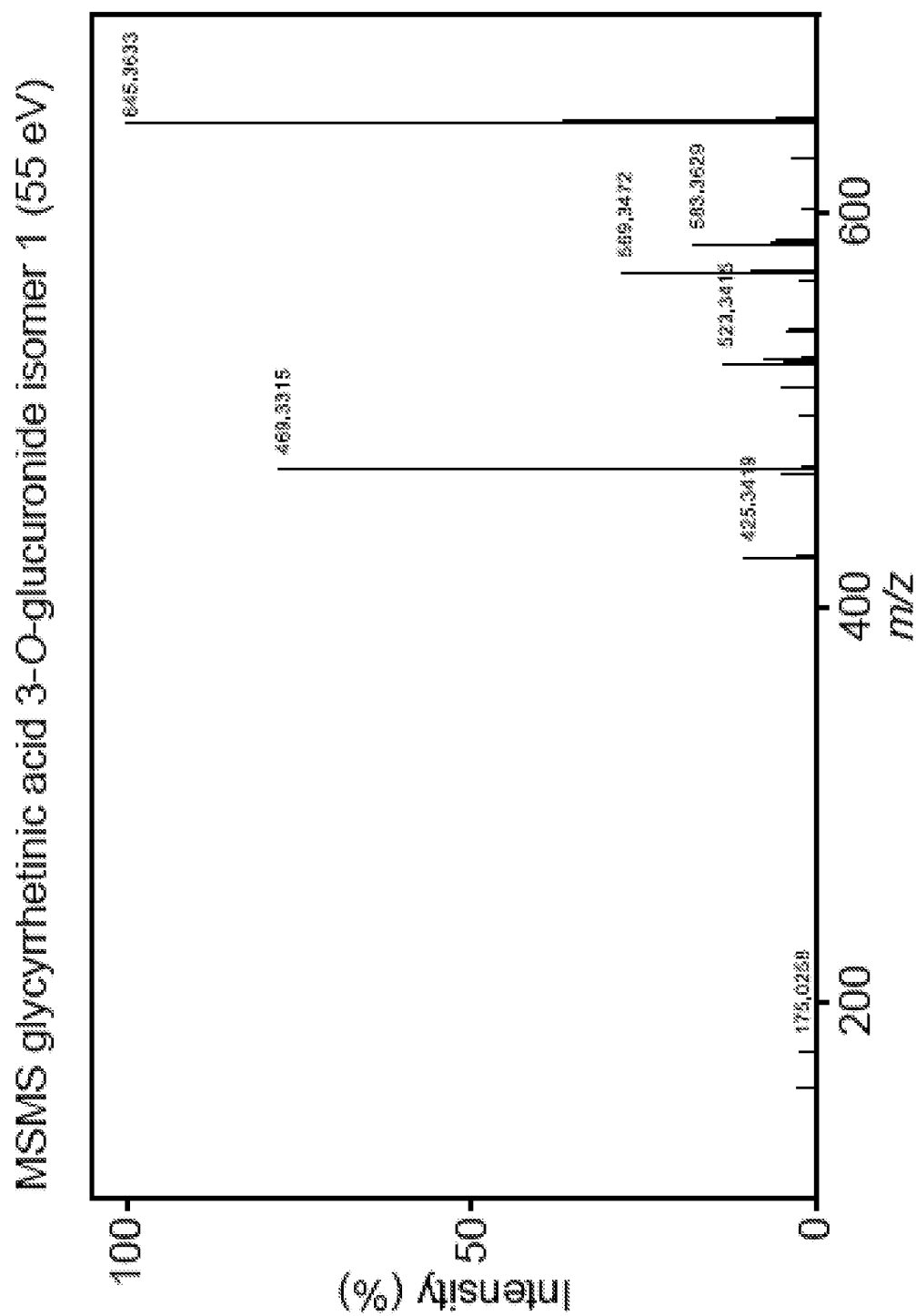


FIGURE 46B

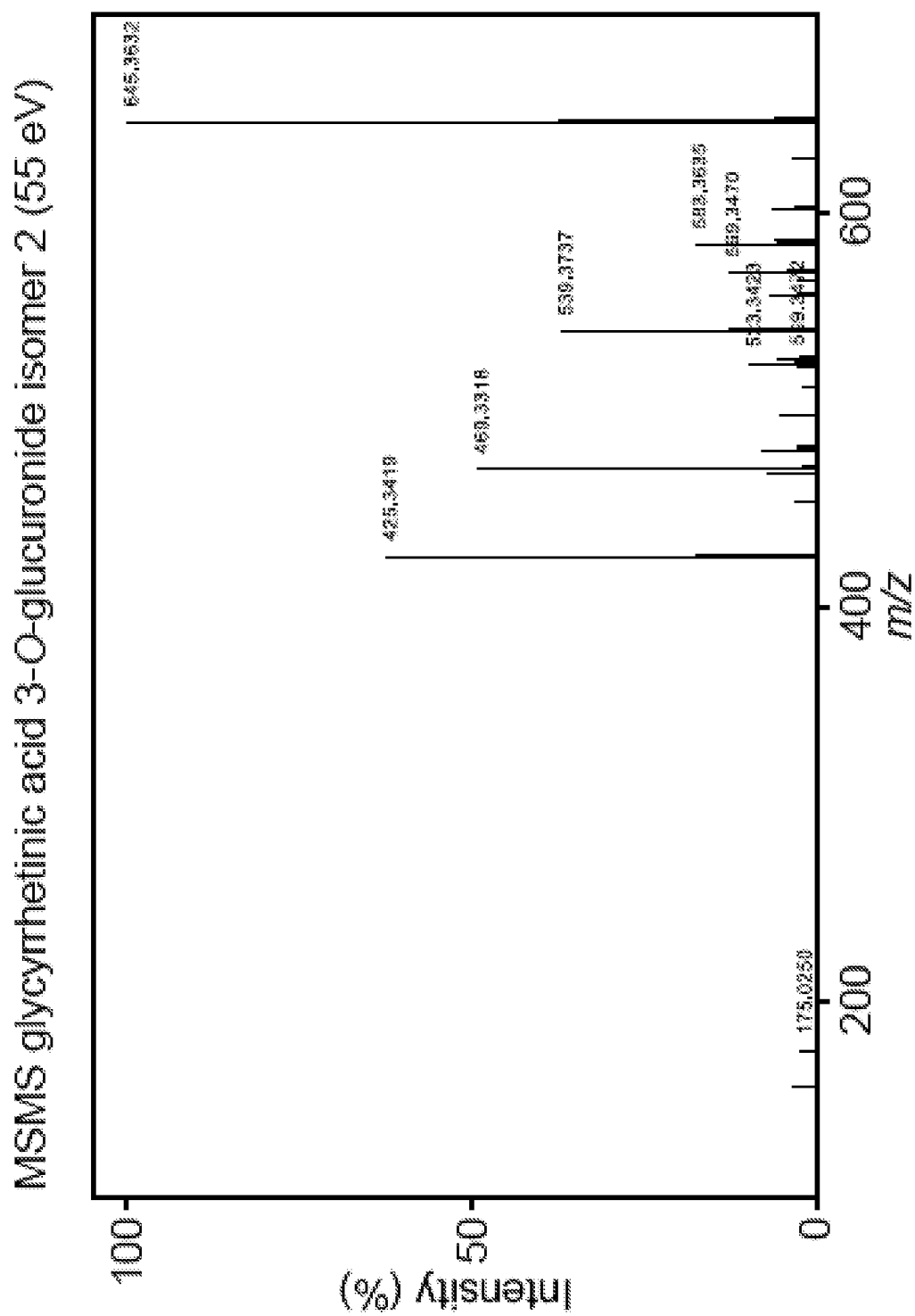


FIGURE 46C

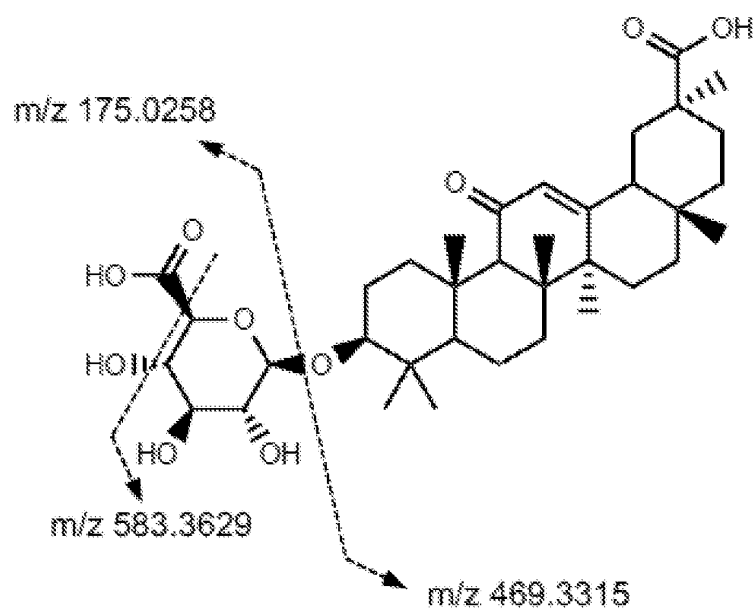


FIGURE 46D

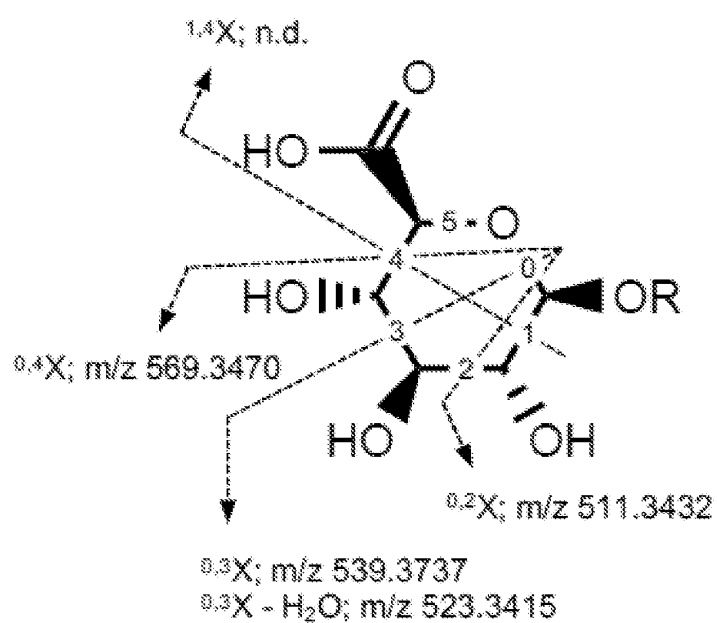


FIGURE 46E

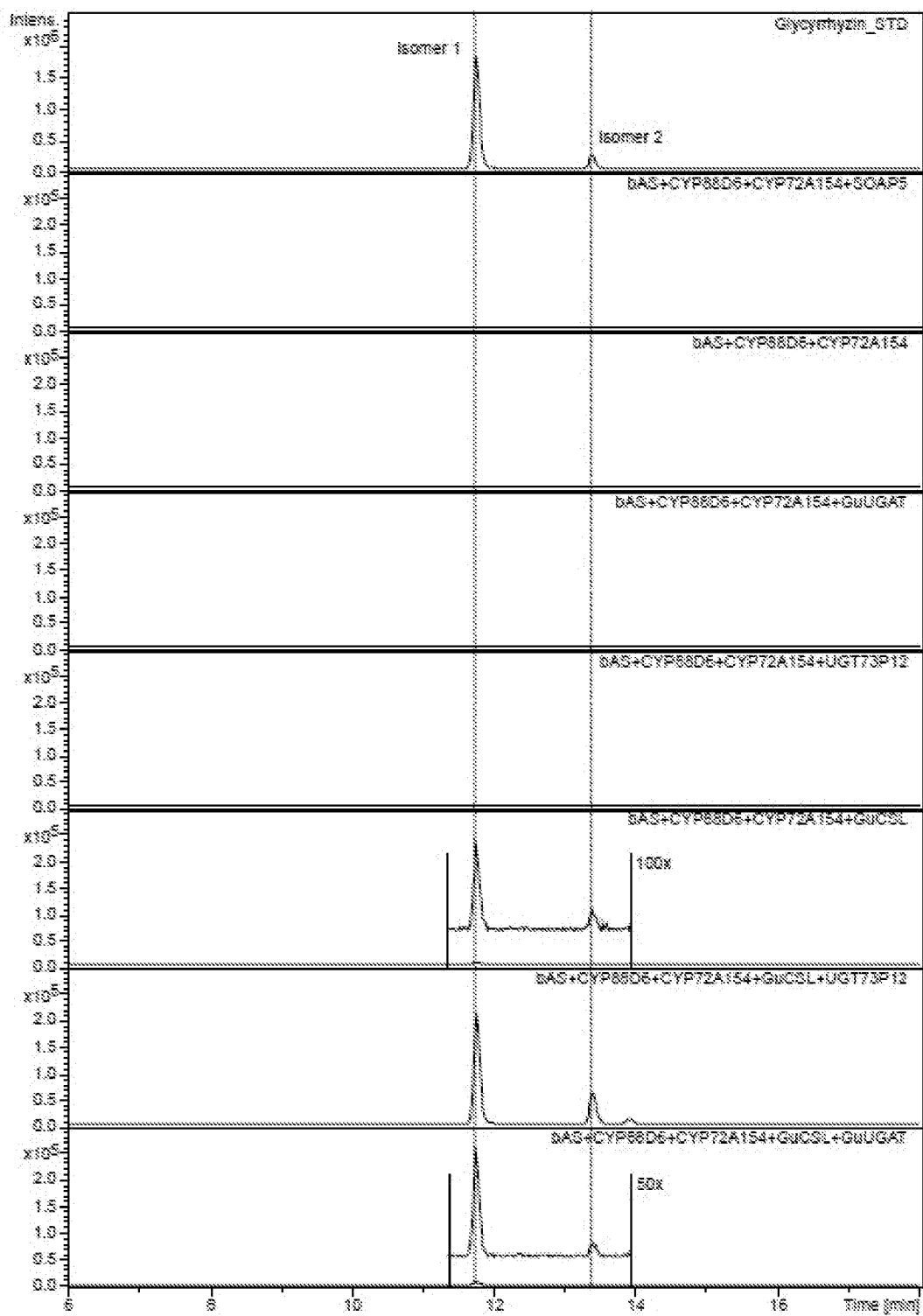


FIGURE 47A

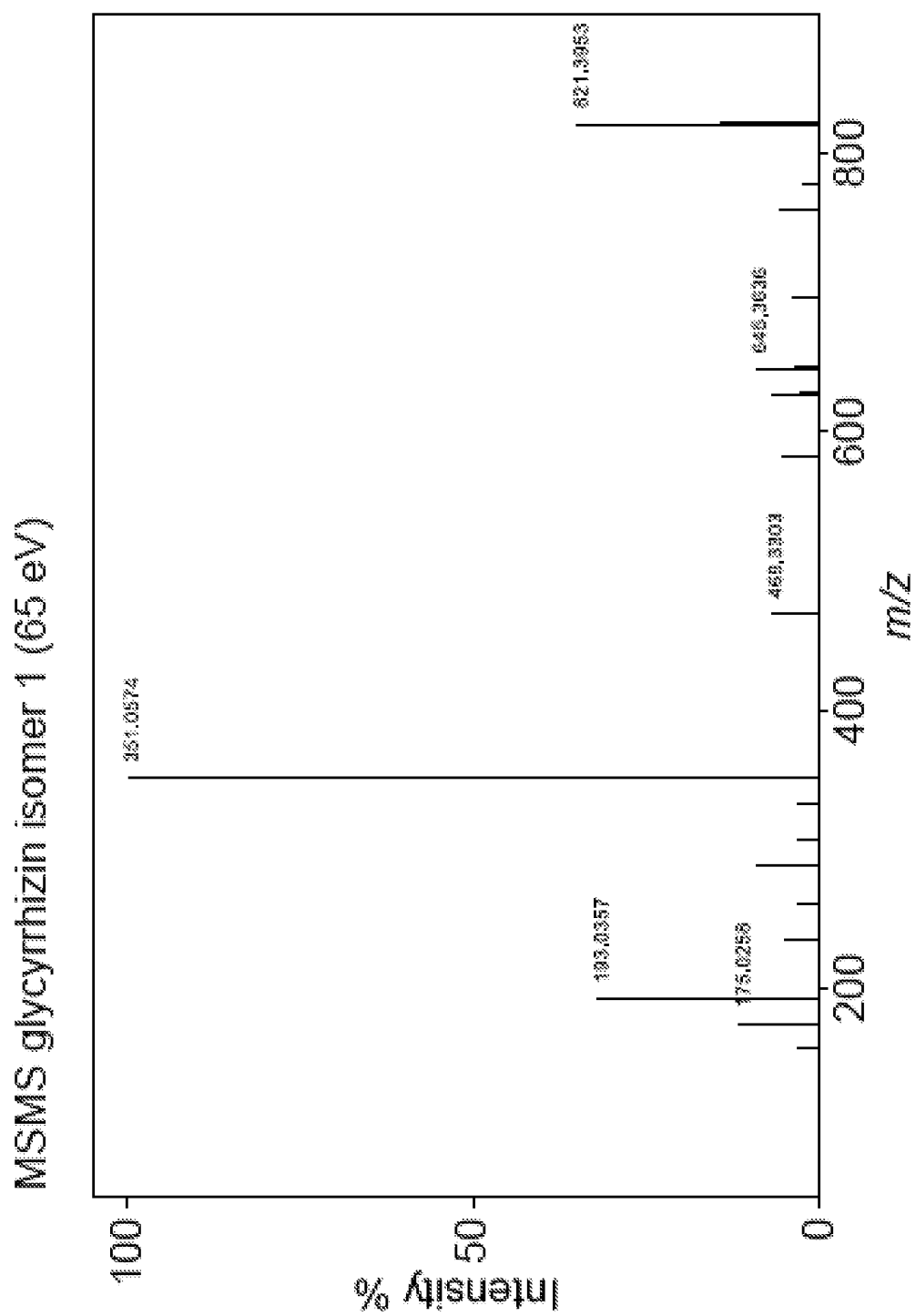


FIGURE 47B

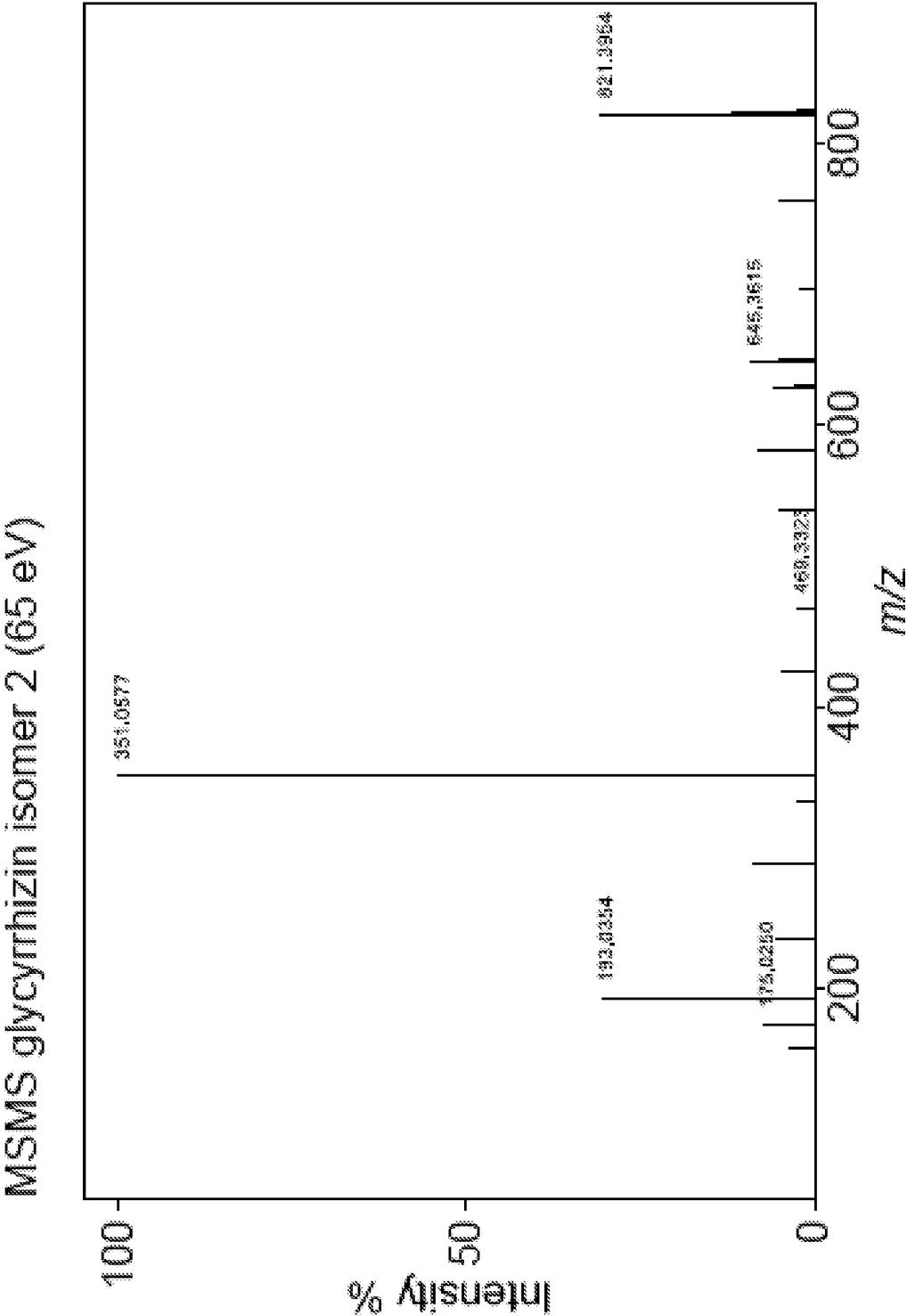


FIGURE 47C

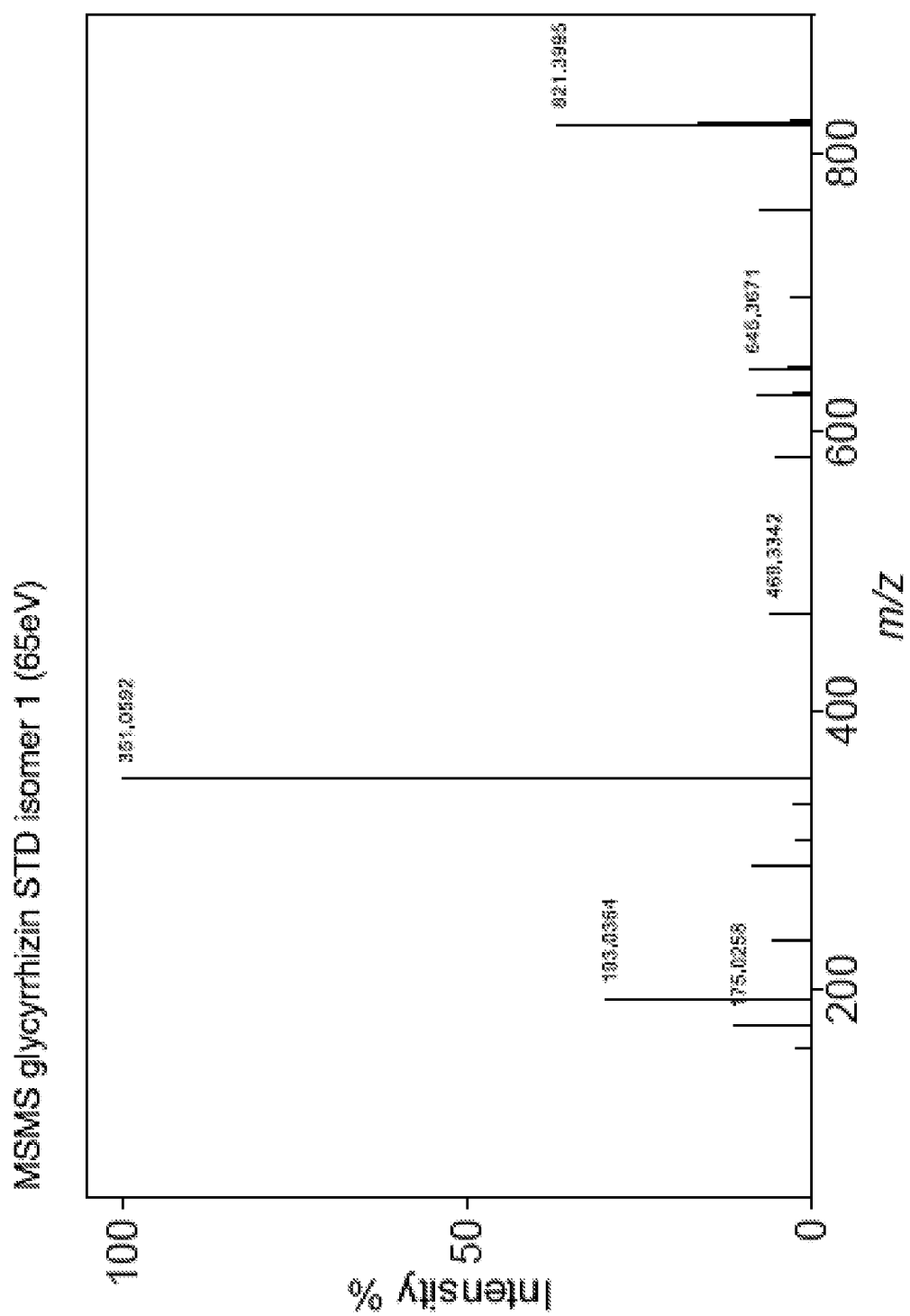


FIGURE 47D

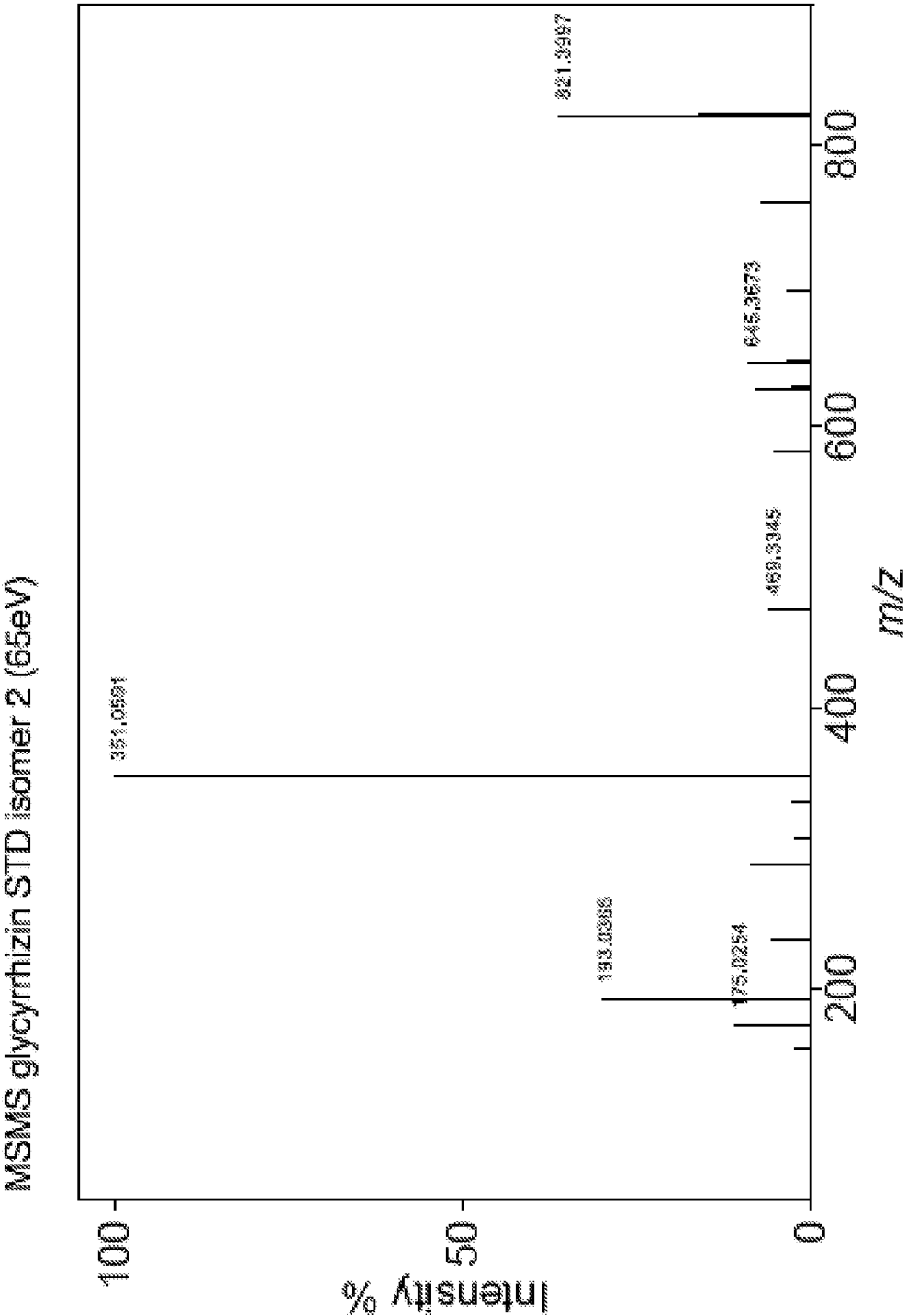


FIGURE 47E

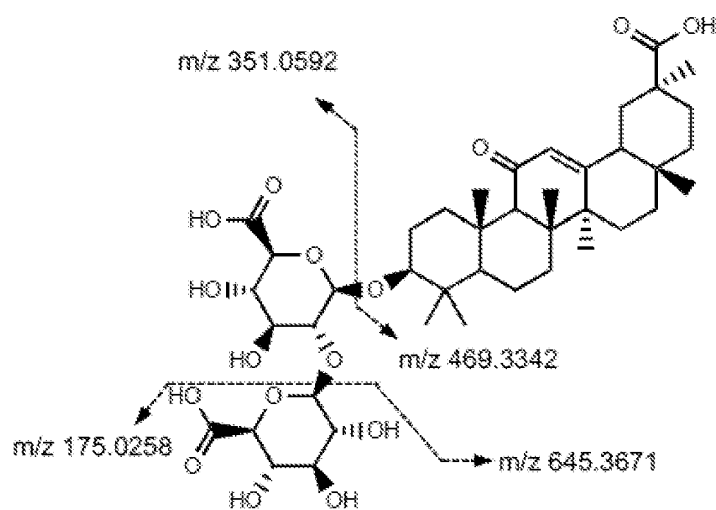


FIGURE 47F

SEQ ID NO. 67	AtCESA1		DRLAIRYDRGEPSSQLPVDVDFVSDPLKEPFLVTANTVLSILSVDPDVKVACYVS	398
SEQ ID NO. 70	Xp_021853954.1__SoCESA1		DRLAFRHREGEPSQIAPIDFVSTVDPLKEPPIITANTVLSILAVDPVKVSCYVS	400
SEQ ID NO. 68	AtCESA3		DRLAIRYDRGEPSSQLAAVGIFVSTVDPLKEPFLVTANTVLSILAVDPVKVSCYVS	379
SEQ ID NO. 71	Xp_021846548.1__SoCESA3		DRLAIRYDRGEPSSQLAAVGIFVSTVDPLKEPFLVTANTVLSILAVDPVKVSCYVS	378
SEQ ID NO. 69	AtCSLG1		EKYA-----AKPEDEPKLDVFICPADPYKEPZPMWNTALSVMAVEYPDSKISVYVS	142
SEQ ID NO. 66	SOAPS		GYES-----IKPEQLGLDVFIVTADPTKEPFLVEMNVISSSMALDIPVDRLAVYLS	133
			: : : : : * : * : * : * : * : * : * : * : * : * : * : *	
SEQ ID NO. 67	AtCESA1		GLDT-DGNELERLIYVSREKRPGFHKKKAGAMNALIRYSAVLTNGAYLLN	568
SEQ ID NO. 70	Xp_021853954.1__SoCESA1		GLDM-DGNELERLIYVSREKRPGFHKKKAGAMNALIRYSAVLTNGAYLLN	573
SEQ ID NO. 68	AtCESA3		GLDA-EGNELERLIYVSREKRPGFHKKKAGAMNALIRYSAVLTNGAYLLN	552
SEQ ID NO. 71	Xp_021846548.1__SoCESA3		GLDT-DGNELERLIYVSREKRPGFTHHKKAGAMNSLVKYSAVLTNGPFMLNI	551
SEQ ID NO. 69	AtCSLG1		EMDTRKYIMENLIYVSREKSKVSPHFHFKAGALTLLRYSVGMTNSPIILT	312
SEQ ID NO. 66	SOAPS		-QNGESDVKMELLVYVAEREKRPGRPHFRKAGALNALLRYSILMSNAPLYLVI	290
			: * : * : * : * : * : * : * : * : * : * : * : * : * : *	
SEQ ID NO. 67	AtCESA1		PATILKEAIHVISCGYEKTEWGRKELGWIGSVT	804
SEQ ID NO. 70	Xp_021853954.1__SoCESA1		PATILKEAIHVISCGYEDKSEWGKEIGWIYGSVT	809
SEQ ID NO. 68	AtCESA3		PENILKEAIHVISCGYEDKDWDGMEIGWIYGSVT	789
SEQ ID NO. 71	Xp_021846548.1__SoCESA3		POYLKEAIHVISCGYEYBTDGRIALGIYGSVT	784
SEQ ID NO. 69	AtCSLG1		AQVLSLAHWAGCIEYEYNNGWSKI GFERYGSIV	471
SEQ ID NO. 66	SOAPS		EDELIOEARNLACTYEANTLWCSEVGVSYECLE	466
			: . . : : * : * : * : * : * : * : * : * : * : * : * : *	
SEQ ID NO. 67	AtCESA1		KGSAPINLSDRIN	864
SEQ ID NO. 70	Xp_021853954.1__SoCESA1		KGSAPINLSDRIN	869
SEQ ID NO. 68	AtCESA3		KGSAPINLSDRIN	849
SEQ ID NO. 71	Xp_021846548.1__SoCESA3		KGSAPINLSDRIN	844
SEQ ID NO. 69	AtCSLG1		YGSGPKCLVDLC	530
SEQ ID NO. 66	SOAPS		LGCCTIDMKDATV	525
			* : * : * : * : * : * : * : * : * : * : * : * : * : *	

FIGURE 48

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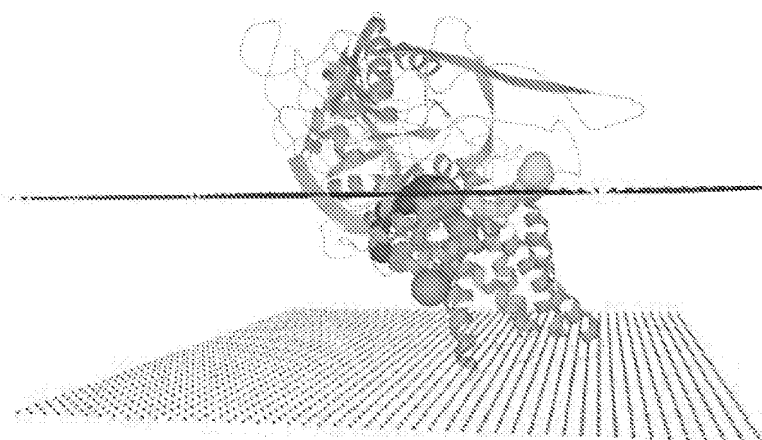


FIGURE 49A

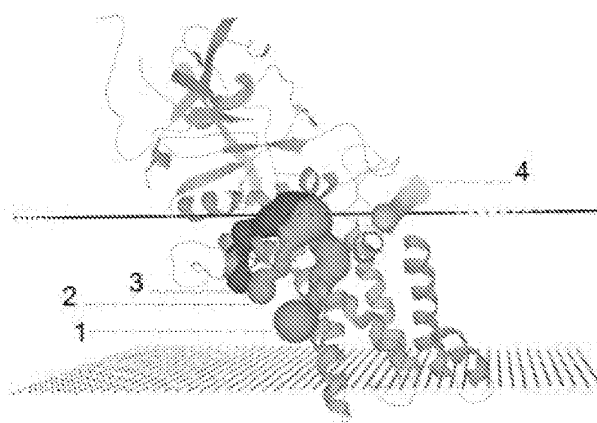


FIGURE 49B

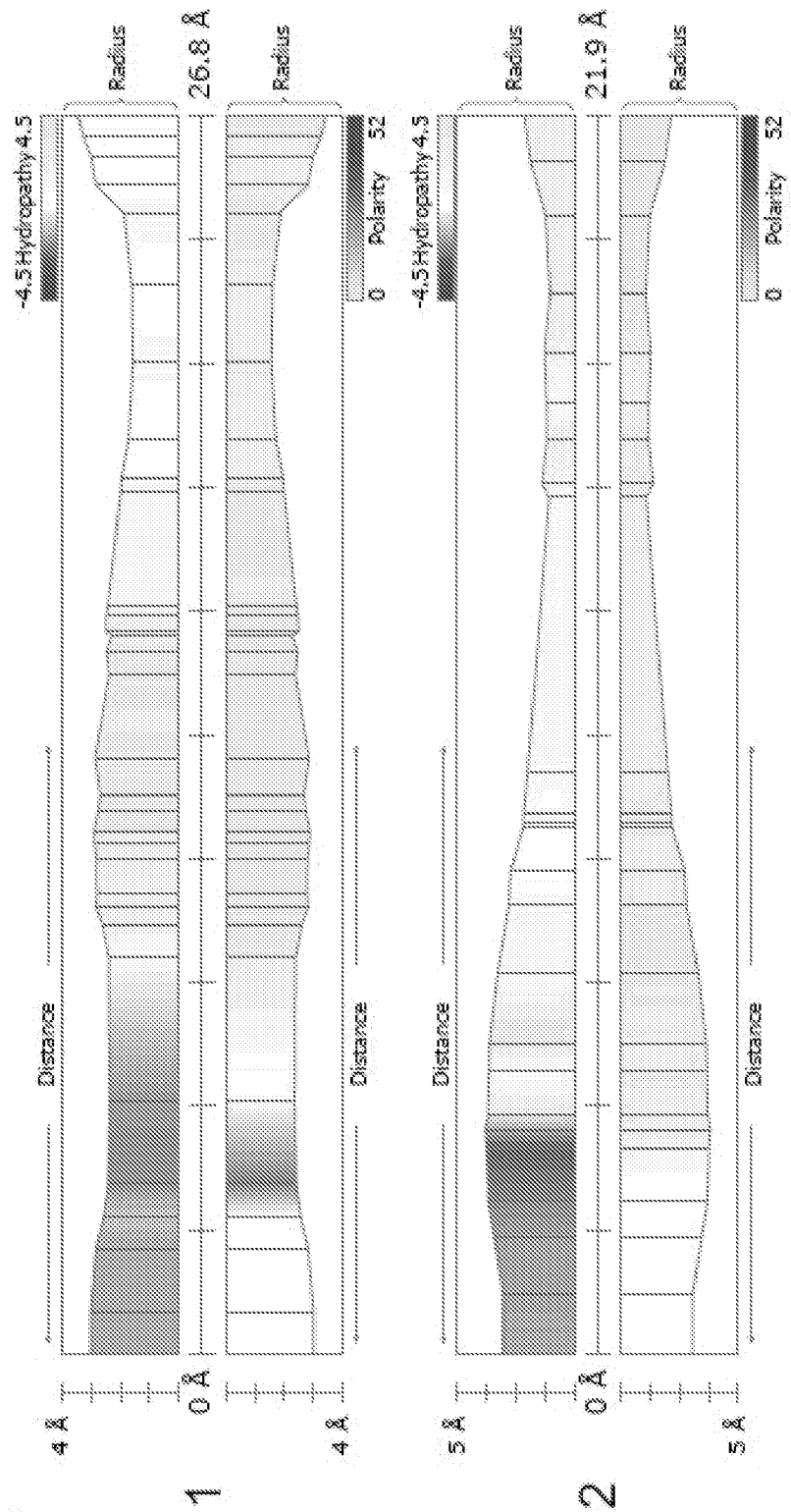


FIGURE 49C

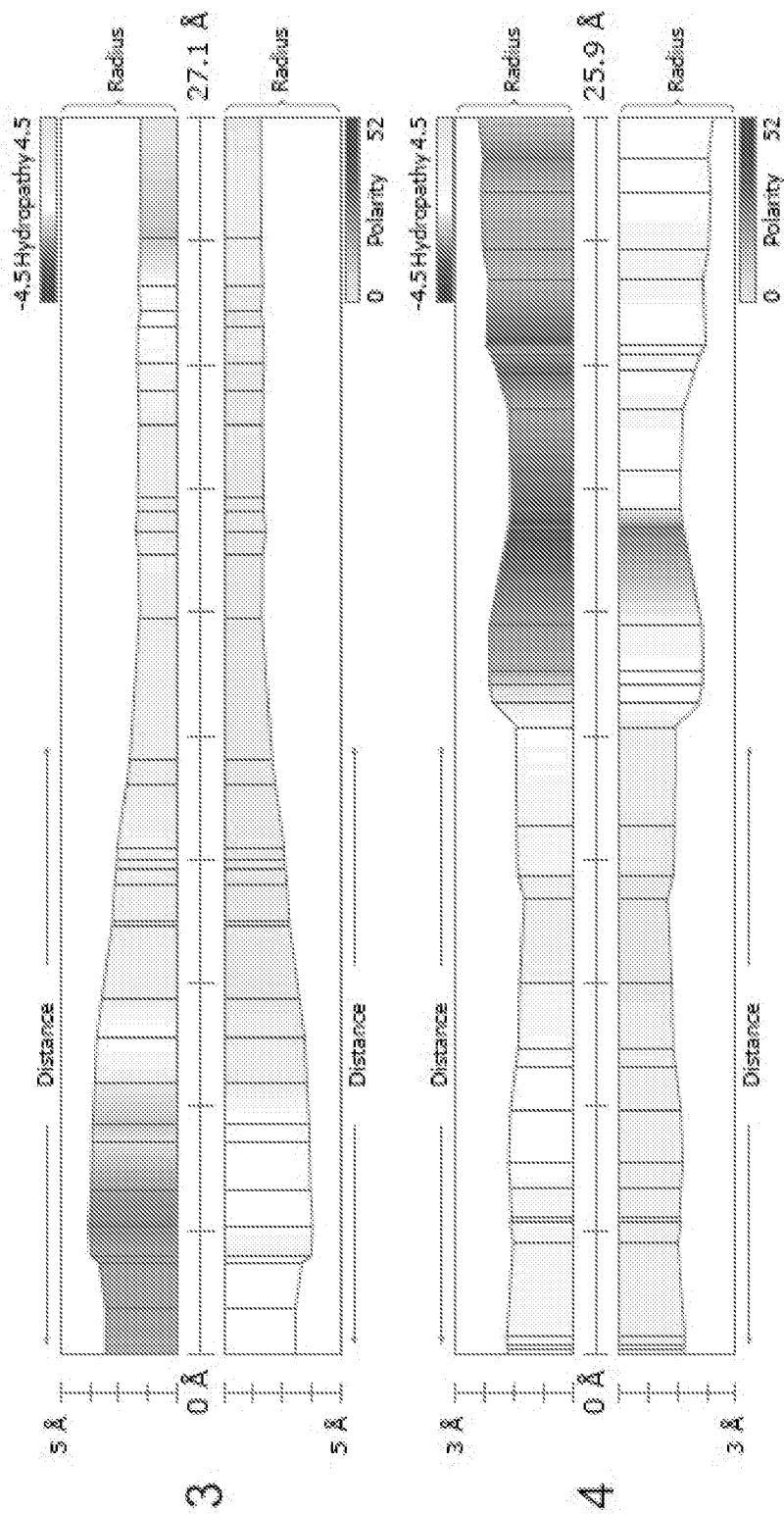


FIGURE 49C (cont.)

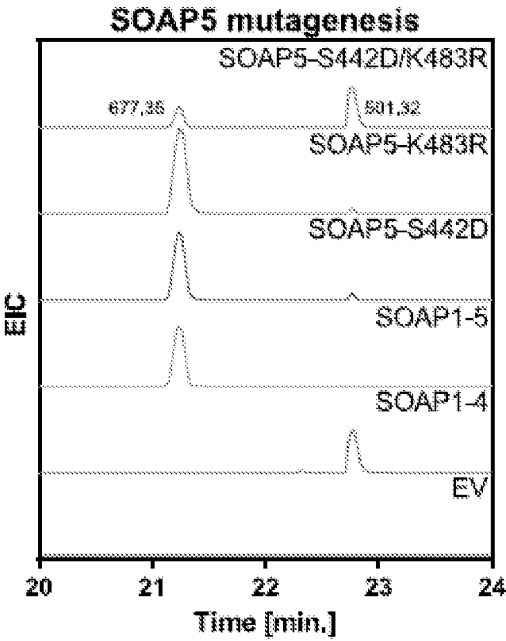


FIGURE 50A

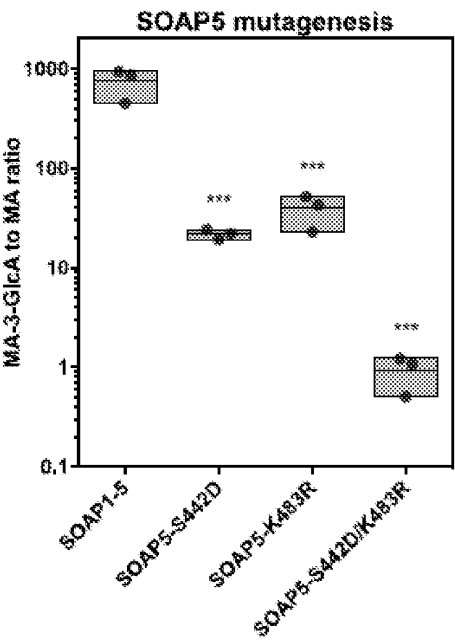


FIGURE 50B

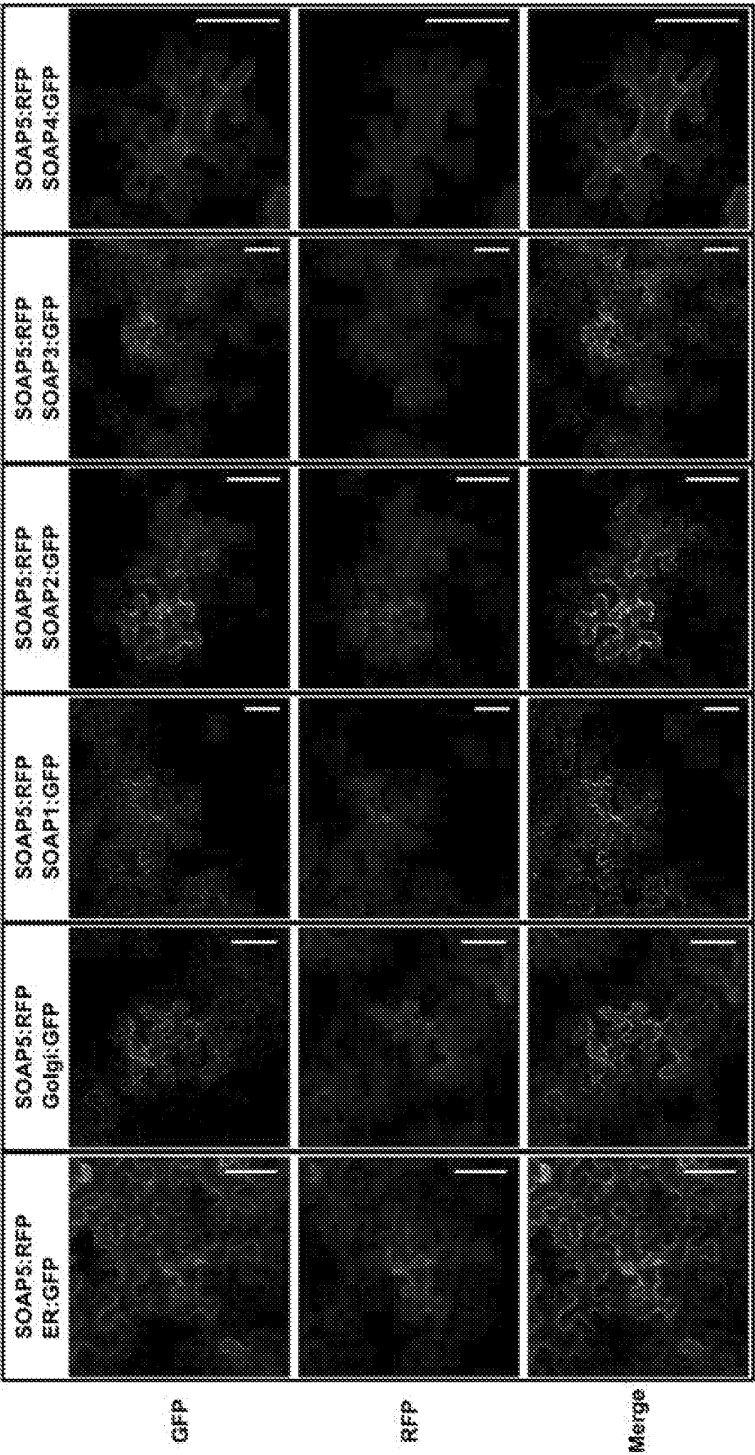


FIGURE 51A FIGURE 51B FIGURE 51C FIGURE 51D FIGURE 51E FIGURE 51F

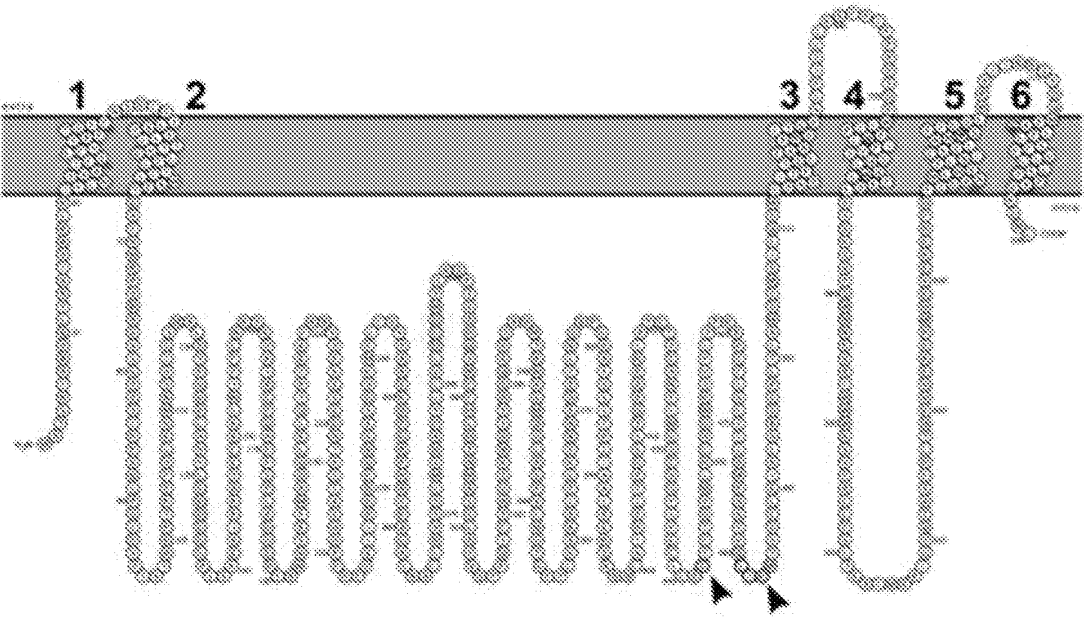


FIGURE 51G

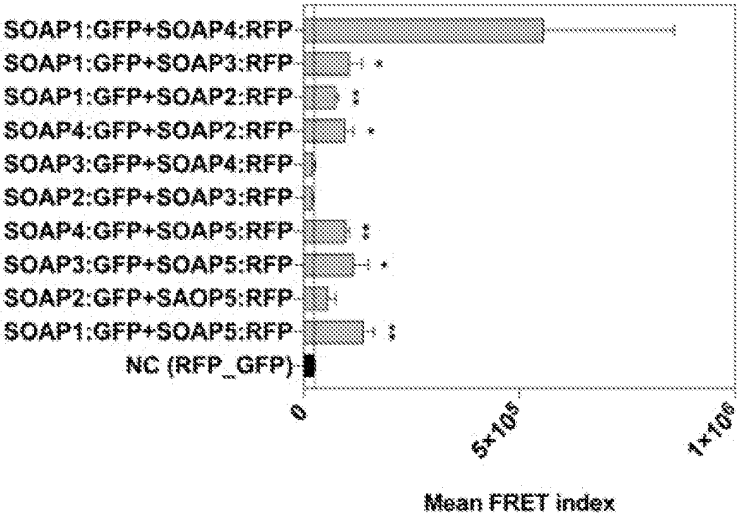


FIGURE 51H

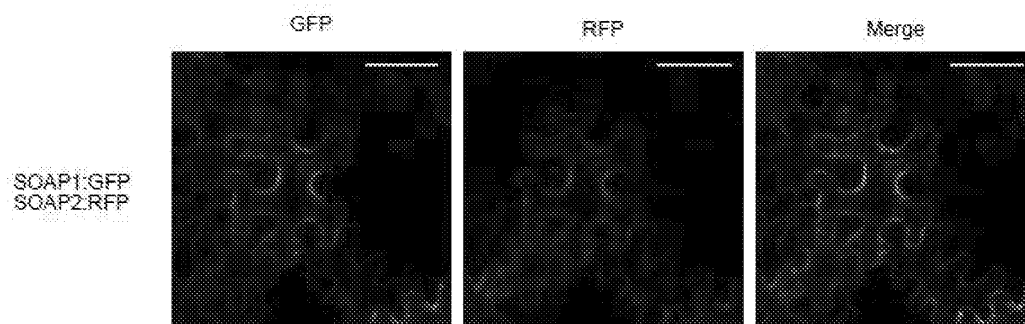


FIGURE 52A

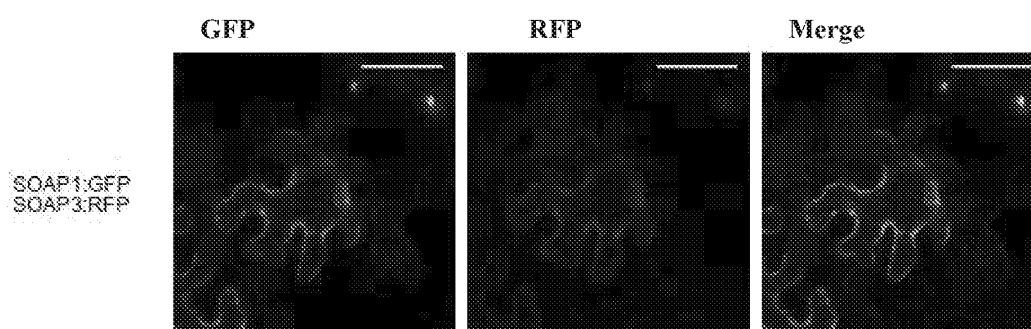


FIGURE 52B

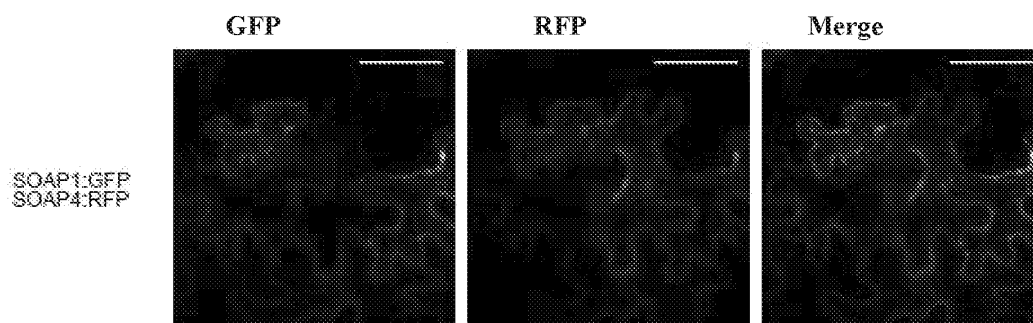


FIGURE 52C

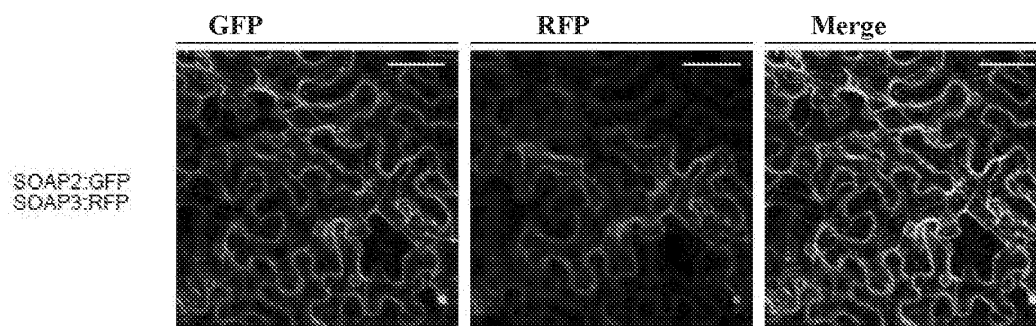


FIGURE 52D

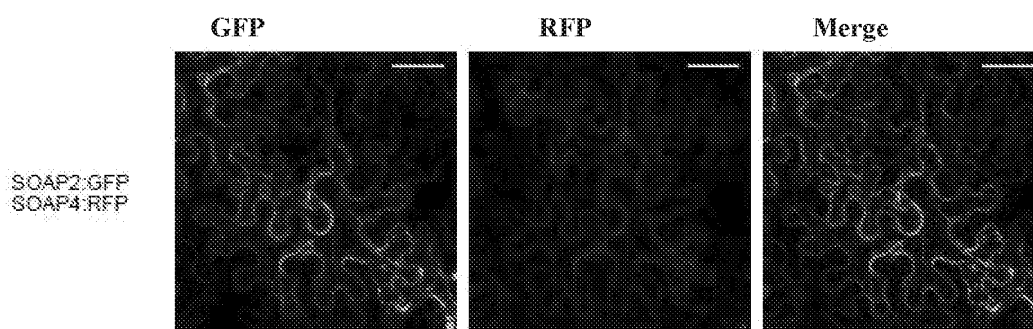


FIGURE 52E

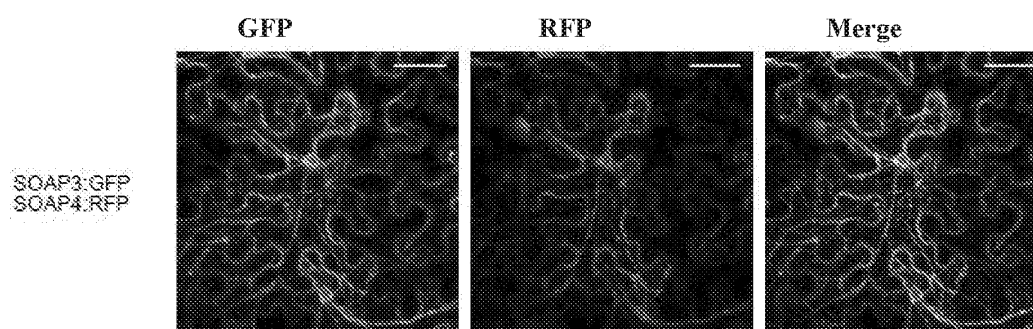


FIGURE 52F

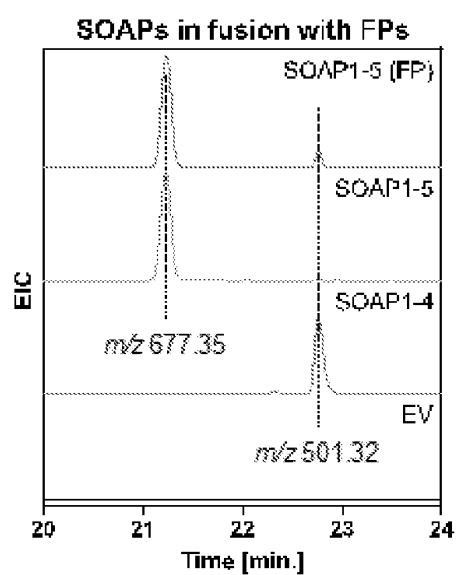


FIGURE 53

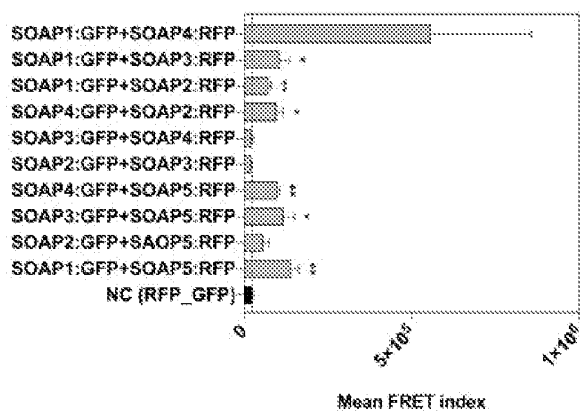


FIGURE 54A

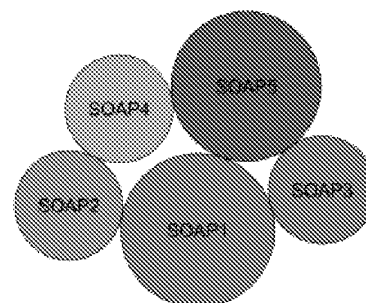


FIGURE 54B