

Supplementary material

Table S1. Volatile organic compounds distinguished from all samples of white rhino dung odour. Compound identification criteria and notes: a = comparison of MS with published data; b = comparison of MS and retention time with published data; c = comparison of MS and retention time with authentic standard.

Compound name	Functional group	Retention time	CAS #	KOVA TS index
Acetic acid ^c	Hydrocarbon acid	1.681	64-19-7	645
Propanoic acid ^b	Hydrocarbon acid	2.514	79-09-4	710
Isobutyric acid ^b	Hydrocarbon acid	3.396	79-31-2	765
Butyric acid ^b	Hydrocarbon acid	4.019	107-92-6	789
3-Methylbutyric acid ^b	Hydrocarbon acid	4.976	503-74-2	848
2-Methylbutyric acid ^b	Hydrocarbon acid	5.397	116-53-0	863
Pentanoic acid ^b	Hydrocarbon acid	5.800	109-52-4	841
Butylacetic acid ^b	Hydrocarbon acid	8.038	1070-83-3	952
Butylethylacetic acid ^b	Hydrocarbon acid	11.129	149-57-5	1123
Nonanoic acid ^b	Hydrocarbon acid	14.126	112-05-0	1273
Undecanoic acid ^b	Hydrocarbon acid	19.561	112-37-8	1561
Hexadecanoic acid ^b	Hydrocarbon acid	25.602	112-39-0	1870
Octadecanoic acid ^b	Hydrocarbon acid	28.380	57-11-4	2171
Octanoic acid ^a	Hydrocarbon acid	29.666	124-07-2	-
Butan-1-ol ^b	Hydrocarbon alcohol	2.272	71-36-3	653
3-Methyl-2-butanol ^a	Hydrocarbon alcohol	2.764	598-75-4	-
3-Methyl-1-butanol ^b	Hydrocarbon alcohol	3.159	123-51-3	737
Pentan-1-ol ^b	Hydrocarbon alcohol	3.665	71-41-0	766
(3E)-3-Hexen-1-ol ^b	Hydrocarbon alcohol	5.238	544-12-7	845
Hexan-1-ol ^b	Hydrocarbon alcohol	5.637	111-27-3	860
6-Methyl-3-heptanol ^b	Hydrocarbon alcohol	8.352	589-98-0	991
(2E)-2-Nonen-1-ol ^a	Hydrocarbon alcohol	9.695	31502-14-4	-
3-Nonanol ^a	Hydrocarbon alcohol	9.909	624-51-1	-

Nonan-2-ol ^b	Hydrocarbon alcohol	10.939	628-99-9	1100
Undecan-1-ol ^a	Hydrocarbon alcohol	11.005	112-42-5	-
Nonan-1-ol ^b	Hydrocarbon alcohol	12.432	112-42-5	1169
2-Methyl-1-undecanol ^a	Hydrocarbon alcohol	15.881	10522-26-6	-
2-Butyl-1-octanol ^a	Hydrocarbon alcohol	16.220	3913-02-8	-
(9E)-9-Hexadecen-1-ol ^a	Hydrocarbon alcohol	27.377	64437-47-4	-
Pentanal ^b	Hydrocarbon aldehyde	2.645	110-62-3	693
Hexanal ^c	Hydrocarbon aldehyde	4.234	66-25-1	776
(2E)-2-Hexanal ^b	Hydrocarbon aldehyde	5.253	6728-26-3	850
Heptanal ^c	Hydrocarbon aldehyde	6.256	111-71-7	901
(2Z)-2-Heptenal ^b	Hydrocarbon aldehyde	7.445	57266-86-1	952
Octanal ^c	Hydrocarbon aldehyde	8.449	124-13-0	1003
(2E)-2-Nonanal ^a	Hydrocarbon aldehyde	9.912	18829-56-6	-
Nonanal ^c	Hydrocarbon aldehyde	10.976	124-19-6	1103
Decanal ^c	Hydrocarbon aldehyde	13.166	112-31-2	1205
Tetradecanal ^b	Hydrocarbon aldehyde	20.409	124-25-4	1574
(9Z)-9-Octadecenal ^b	Hydrocarbon aldehyde	27.830	2423-10-1	-
(9Z)-9-Hexadecenal ^b	Hydrocarbon aldehyde	30.430	56219-04-6	-
2-Methylpentane ^b	Hydrocarbon alkane	1.882	107-83-5	560
3-Methylpentane ^b	Hydrocarbon alkane	1.962	96-14-0	570
Hexane ^c	Hydrocarbon alkane	1.927	110-54-3	600
Methylcyclopentane ^b	Hydrocarbon alkane	2.265	96-37-7	635
3-Ethylhexane ^c	Hydrocarbon alkane	4.180	619-99-8	772.9
2,4-Dimethylheptane ^b	Hydrocarbon alkane	4.649	2213-23-2	820
4-Methyloctane ^b	Hydrocarbon alkane	5.475	2216-34-4	862.85
Nonane ^c	Hydrocarbon alkane	6.411	111-84-2	900
Decane ^c	Hydrocarbon alkane	8.658	124-18-5	1000
4-Methyldecane ^b	Hydrocarbon alkane	9.004	2847-72-5	1059
6-Methyloctadecane ^a	Hydrocarbon alkane	11.506	10544-96-4	-
3-Methyldecane ^a	Hydrocarbon alkane	12.340	13151-34-3	-
2-Methylundecane ^b	Hydrocarbon alkane	12.194	7045-71-8	1163
2,3-Dimethyldecane ^a	Hydrocarbon alkane	12.497	17312-44-6	-
Undecane ^c	Hydrocarbon alkane	13.099	629-59-4	1100

Dodecane ^c	Hydrocarbon alkane	13.222	112-40-3	1200
2,6-Dimethylundecane ^b	Hydrocarbon alkane	13.376	17301-23-4	1213
Pentadecane ^a	Hydrocarbon alkane	14.120	629-62-9	-
2,3-Dimethylundecane ^a	Hydrocarbon alkane	14.432	17312-77-5	-
2-Methyldecane ^a	Hydrocarbon alkane	14.347	6975-98-0	-
Nonadecane ^a	Hydrocarbon alkane	14.517	629-92-5	-
Tridecane ^c	Hydrocarbon alkane	15.217	629-50-5	1300
2,6,10-Trimethyldodecane ^a	Hydrocarbon alkane	18.233	3891-98-3	-
Pentadecane ^c	Hydrocarbon alkane	18.935	629-62-9	-
Hexadecane ^c	Hydrocarbon alkane	20.636	544-76-3	-
Heptadecane ^c	Hydrocarbon alkane	22.288	629-78-7	-
Octadecane ^c	Hydrocarbon alkane	23.858	593-45-3	-
Isopropyl Myristate ^b	Hydrocarbon alkane	23.649	110-27-0	1827
Isopropyl Palmitate ^b	Hydrocarbon alkane	27.008	142-91-6	1981
Tetracosane ^b	Hydrocarbon alkane	31.307	646-31-1	2400
Pentacosane ^b	Hydrocarbon alkane	32.684	630-02-4	2500
Hexacosane ^b	Hydrocarbon alkane	34.319	630-01-3	2600
(E)-Oct-2-ene ^b	Hydrocarbon alkene	4.319	111-67-1	810
(Z)-Oct-2-ene ^b	Hydrocarbon alkene	4.379	7642-04-8	815
X-Octene	Hydrocarbon alkene	4.485	-	-
X-Octene	Hydrocarbon alkene	4.601	-	-
(3E)-1,3-Octadiene ^b	Hydrocarbon alkene	4.784	1002-33-1	827
Non-1-ene ^a	Hydrocarbon alkene	6.215	124-11-8	-
(3E)-3-Nonene ^a	Hydrocarbon alkene	6.228	20063-77-8	-
(4E)-2,4-Dimethyl-2,4-heptadiene ^a	Hydrocarbon alkene	5.850	74421-05-9	-
(3E)-3-Decene ^a	Hydrocarbon alkene	7.773	19150-21-1	-
Undec-1-ene ^a	Hydrocarbon alkene	10.734	821-95-4	-
(3Z)-3-Dodecene ^a	Hydrocarbon alkene	13.055	7239-23-8	-
Tridecene-1 ^b	Hydrocarbon alkene	15.060	2437-56-1	1291
Acetic acid, butyl ester ^b	Hydrocarbon ester	4.515	123-86-4	813
Octadecanoic acid, phenylmethyl ester ^c	Hydrocarbon ester	10.932	637-55-8	-
Butyl n-hexanoate ^b	Hydrocarbon ester	12.825	626-82-4	1186
Dodecanyl acetate ^b	Hydrocarbon ester	20.290	122-66-3	1606

Pentan-2-one ^b	Hydrocarbon ketone	2.432	107-87-9	690
Hexan-2-one ^b	Hydrocarbon ketone	4.029	591-78-6	7-90
5-Methylhexan-2-one ^a	Hydrocarbon ketone	5.991	110-12-3	
1-Octen-3-one ^b	Hydrocarbon ketone	8.112	4312-99-6	980
beta-Nonanone ^b	Hydrocarbon ketone	10.644	821-55-6	1090
Undecan-2-one ^b	Hydrocarbon ketone	14.953	112-12-9	1292
Dodecan-2-one ^a	Hydrocarbon ketone	14.608	6175-49-1	-
Toluene ^c	Benzenoid	3.726	108-88-3	762
alpha-Methyltoluene ^b	Benzenoid	5.561	100-41-4	855
1,4-Dimethyl benzene ^c	Benzenoid	5.696	106-42-3	862
Styrene ^c	Benzenoid	6.224	100-42-5	895
4-Ethylbenzoic acid, cyclopentyl ester ^a	Benzenoid	6.522		-
1-Ethyl-3-methylbenzene ^b	Benzenoid	7.622	98-82-8	958
Benzaldehyde ^c	Benzenoid	7.769	100-52-7	947
Carbamic acid, methyl-, phenyl ester ^a	Benzenoid	7.975	1943-79-9	-
Trimethyl benzene ^b	Benzenoid	8.110	95-63-6	990
Acetophenone ^c	Benzenoid	10.137	98-86-2	1062
p-Cresol ^c	Benzenoid	10.717	106-44-5	1077
m-Cresol ^c	Benzenoid	10.525	108-39-4	-
1-Isopropenyl-2-methylbenzene ^a	Benzenoid	10.492	7399-49-7	-
Phenylethyl Alcohol ^c	Benzenoid	11.180	60-12-8	1121
Benzenepropanol ^b	Benzenoid	13.401	122-97-4	1237
1-Isopropyl-2-methoxy-4-methylbenzene ^a	Benzenoid	13.721	1076-56-8	-
3-Propylphenol ^a	Benzenoid	14.195	621-27-2	-
Benzaldehyde, 3-hydroxy-4-methoxy ^a	Benzenoid	16.978	621-59-0	-
Diethyltoluamide ^a	Benzenoid	20.208	134-62-3	-
5-Isopropenyl-2-methylcyclohexanol ^a	Miscellaneous	7.457	18675-33-7	-
(3E)-2,6-Dimethyl-1,3,7-octatriene ^a	Miscellaneous	7.898	6876-07-9	-
1-Propynylcyclohexane ^a	Miscellaneous	7.930	18736-95-3	-
(2E)-3,7-Dimethyl-2-octene ^a	Miscellaneous	7.951	-	-
5,7-Dimethyl-1,6-octadiene ^a	Miscellaneous	8.152	85006-04-8	-

1-Methyl-3-{2-methyl-2-propenyl)cyclopentane ^a	Miscellaneous	8.113	75873-00-6	-
6-Methyl-5-heptene-2-one ^b	Miscellaneous	8.232	110-93-0	984
(6E)-2,6-Dimethyl-2,6-octadiene ^b	Miscellaneous	8.332	2609-23-6	1004
1,2-Dimethyl-1-cyclooctene ^a	Miscellaneous	8.335	54299-96-6	-
1-Isopropyl-2-methyl-3-(1-methylethylidene)cyclopropane ^a	Miscellaneous	8.451	24524-52-5	-
(6Z)-2,6-Dimethyl-2,6-octadiene ^a	Miscellaneous	8.636	2492-22-0	-
(3E)-3-Ethyl-2-methyl-1,3-heptadiene ^a	Miscellaneous	8.562	61142-35-6	-
Pentylidenecyclopentane ^a	Miscellaneous	8.869	53366-55-5	-
(3E)-3-Ethyl-2,5-dimethyl-1,3-hexadiene ^a	Miscellaneous	8.922	62338-07-2	-
2-Ethylhexan-1-ol ^a	Miscellaneous	9.060	104-76-7	-
m-Menth-3(8)-ene ^a	Miscellaneous	9.218	13828-34-7	-
m-Menth-1(7)-ene ^a	Miscellaneous	9.223	13837-71-3	-
(3-Methylbutylidene)cyclopentane ^a	Miscellaneous	9.253	53366-51-1	-
(5E)-4-Methyl-1,5-heptadiene ^a	Miscellaneous	9.813	998-94-7	-
(6E)-2,6-Dimethyl-2,6-octadiene ^b	Miscellaneous	9.780	2792-39-4	990
3-Ethyl-1,5-octadiene ^a	Miscellaneous	9.872	-	-
1-Isopropenyl-2-methylcyclohexane ^a	Miscellaneous	10.003	15193-25-6	-
(2E,6E)-4-Methyl-2,6-octadiene ^a	Miscellaneous	10.078	74498-94-5	-
4,8-Dimethyl-1,7-nonadiene ^a	Miscellaneous	10.099	62108-28-5	-
2,5-Dimethyloctahydropentalene ^a	Miscellaneous	9.973	28588-55-8	-
6,6-Dimethylbicyclo[3.1.1]hept-2-ene-2-carbaldehyde ^b	Miscellaneous	11.088	564-94-3	1151
2-Ethylcyclohexanone ^a	Miscellaneous	11.410	4423-94-3	-
1,2-Dimethyl-1,3-cyclopentadiene ^a	Miscellaneous	11.691	4784-86-5	-
4-Trifluoroacetoxytridecane ^a	Miscellaneous	12.404	-	-
p-Menthan-3-one ^a	Miscellaneous	12.415	1196-31-2	-
1-Methyl-4-(1-hydroxy-1-methylethyl)benzene ^b	Miscellaneous	12.828	1197-01-9	1186
alpha-Ionene ^a	Miscellaneous	13.468	475-03-6	-
Hexyl 2-methylbutanoate ^b	Miscellaneous	13.792	10032-15-2	1234

Guanidineacetic acid ^a	Miscellaneous	13.845	352-97-6	-
6,7-Dodecanedione ^a	Miscellaneous	13.845	13757-90-9	-
Quinoline ^a	Miscellaneous	13.984	91-22-5	-
p-Mentha-6,8-dien-2-one ^a	Miscellaneous	14.050	2244-16-8	-
p-Menth-1-en-3-one ^a	Miscellaneous	14.278	89-81-6	-
(3E)-4-(2-Hydroxy-2,6,6-trimethylcyclohexyl)-3-buten-2-one ^a	Miscellaneous	15.679	55955-46-9	-
Bicyclo[10.1.0]tridec-1-ene ^a	Miscellaneous	17.092	54766-91-5	-
(5E)-2,3,5,8-Tetramethyl-1,5,9-decatriene ^a	Miscellaneous	17.128	230646-72-7	-
1,5,9-Undecatriene, 2,6,10-trimethyl- ^a	Miscellaneous	17.161	62951-96-6	-
6,11-Dimethyl-2,6,10-dodecatrien-1-ol ^a	Miscellaneous	17.642	-	-
(5E)-6,10-Dimethyl-5,9-undecadien-2-one ^a	Miscellaneous	17.959	3796-70-1	1445
2-Hexyl-1-decanol ^a	Miscellaneous	18.126	2425-77-6	-
(4E,8E)-5,9,13-Trimethyl-4,8,12-tetradecatrienal ^a	Miscellaneous	19.137	66408-55-7	-
(6E)-3,7,11-Trimethyl-1,6,10-dodecatrien-3-ol ^a	Miscellaneous	19.597	7212-44-4	1561
2,3,6-Trimethylnaphthalene ^a	Miscellaneous	19.943	829-26-5	1548
1-[2-(Isobutyryloxy)-1-methylethyl]-2,2-dimethylpropyl 2-methylpropanoate ^a	Miscellaneous	20.472	74381-40-1	-
3,7,11-Trimethyl-1-dodecanol ^a	Miscellaneous	23.169	6750-34-1	-
6,10,14-Trimethyl-2-pentadecanone ^a	Miscellaneous	24.441	502-69-2	1848
(2E)-3,7,11,15-Tetramethyl-2-hexadecene ^b	Miscellaneous	24.487	14237-73-1	-
1,2-Benzenedicarboxylic acid, dibutyl ester ^b	Miscellaneous	25.569	84-74-2	1897
1-(Octyloxy)octane ^a	Miscellaneous	26.179	629-82-3	-
(2E)-3,7,11,15-Tetramethyl-2-hexadecen-1-ol ^b	Miscellaneous	27.708	150-86-7	2112

2-Ethylhexyl (2E)-3-(4-methoxyphenyl)-2-propenoate ^a	Miscellaneous	28.855	5466-77-3	-
(9Z)-9-Octadecenyl (9Z)-9-hexadecenoate ^a	Miscellaneous	32.353	22393-98-2	-
1,7,7-Trimethyltricyclo[2.2.1.0,2,6]heptane ^a	Monoterpene	6.983	508-32-7	924
2,7-Dimethyl-1,7-octadiene ^a	Monoterpene	7.069	59840-10-7	-
alpha-Pinene ^c	Monoterpene	7.264	80-56-8	932
3,7-Dimethyl-1,6-octadiene ^a	Monoterpene	7.395	10281-55-7	-
3,7-Dimethyl-1,6-octadiene ^a	Monoterpene	7.541	2436-90-0	-
Camphene ^b	Monoterpene	7.615	79-92-5	946
beta-Pinene ^c	Monoterpene	8.275	127-91-3	980
alpha-Terpinolene ^a	Monoterpene	8.722	586-62-9	-
2-Carene ^a	Monoterpene	8.764	554-61-0	-
alpha-Phellandrene ^b	Monoterpene	8.898	99-83-2	1007
alpha-Terpine ^c	Monoterpene	9.110	99-86-5	-
Cymene ^a	Monoterpene	9.257	527-84-4	-
Limonene ^c	Monoterpene	9.405	1461-27-4	1039
3,7,7-Trimethylbicyclo[4.1.0]hept-3-ene ^a	Monoterpene	9.939	13466-78-9	-
gamma-Terpinen ^a	Monoterpene	10.031	99-85-4	-
Geranial ^a	Monoterpene	10.371	141-27-5	-
Linalool ^c	Monoterpene	10.637	78-70-6	1096
p-Mentha-1,4(8)-diene ^a	Monoterpene	10.668	586-62-9	-
1,7,7-Trimethylbicyclo[2.2.1]heptan-2-ol ^b	Monoterpene	12.591	507-70-0	1174
Indole ^c	Nitrogen compound	14.670	120-72-9	1295
Benzyl nitrile ^a	Nitrogen compound	14.822	140-29-4	-
3-Methyl-1H-indole ^c	Nitrogen compound	16.846	83-34-1	-
Allo-Aromadendrene ^a	Sesquiterpene	16.312	25246-27-9	-
alpha-Longipinene ^b	Sesquiterpene	16.418	5989-08-2	1353
2,3-Dimethyldodecane ^a	Sesquiterpene	16.441	6117-98-2	-
Farnesane ^a	Sesquiterpene	16.666	3891-98-3	-

(+)-Cyclosativene ^a	Sesquiterpene	16.733	22469-52-9	-
gamma-Muurolene ^a	Sesquiterpene	16.813	30021-74-0	-
alpha-Copaene ^a	Sesquiterpene	16.817	3856-25-5	1392
alpha-Bourbonene ^a	Sesquiterpene	16.997	-	-
beta-Elemene ^a	Sesquiterpene	17.074	515-13-9	-
4,11,11-Trimethyl-8-methylenebicyclo[7.2.0]undec-4-ene ^a	Sesquiterpene	17.431	118-65-0	1413
alpha-Santalene ^a	Sesquiterpene	17.220	512-61-8	1420
beta-Caryophyllene ^c	Sesquiterpene	17.715	87-44-5	1440
Germacrene D ^a	Sesquiterpene	17.841	23986-74-5	1464
2,6-Dimethyl-6-(4-methyl-3-pentenyl)bicyclo[3.1.1]hept-2-ene ^a	Sesquiterpene	17.459	17699-05-7	1436
beta-Gurjunene ^a	Sesquiterpene	17.914	17334-55-3	1427.7
alpha-Caryophyllene ^a	Sesquiterpene	18.357	6753-98-6	1459
Aromadendrene ^a	Sesquiterpene	18.458	109119-91-7	1460
alpha-Muurolene ^b	Sesquiterpene	18.619	10208-80-7	-
alpha-Amorphene ^a	Sesquiterpene	18.650	483-75-0	1468
beta-Farnesene ^a	Sesquiterpene	18.788	18794-84-8	1458
1-Methyl-4-(5-methyl-1-methylene-4-hexenyl)-1-cyclohexene ^a	Sesquiterpene	18.748	495-61-4	1501.2
Calamenene ^a	Sesquiterpene	19.059	483-77-2	1516
delta-Cadinene ^a	Sesquiterpene	19.400	483-76-1	-
alpha-Panasinsen ^a	Sesquiterpene	19.495	56633-28-4	-
alpha-Calacorene ^a	Sesquiterpene	19.814	21391-99-1	-
(Methyldisulfanyl)methane ^a	Sulphur compound	3.322	624-92-0	745
Isopropyl isothiocyanate ^a	Sulphur compound	-	2253-73-8	-
3-(Allylsulfanyl)-1-propene ^a	Sulphur compound	5.441	592-88-1	860.3
1-Isothiocyanto-2-methylpropane ^a	Sulphur compound	7.353	591-82-2	-
Thiacyclopentan-2-one ^a	Sulphur compound	8.406	1003-10-7	-
3-(Allyldisulfanyl)-1-propene ^a	Sulphur compound	10.250	2179-57-9	1085