Supplements

2. Material and Methods

2.3. Isolation of lipids

The extraction procedure was based on the method of Bligh and Dyer [14], except that 2-propanol was substituted for methanol, since 2-propanol does not serve as a substrate for phospholipases [38]. The alcohol-water mixture was cooled, one part chloroform was added and the lipids from the lyophilized cells of different cultivations of yeasts were extracted for 30 min. Insoluble material was separated by centrifugation and the supernatant was separated into two phases. The aqueous phase was aspirated off and the chloroform phase was washed three times with two parts 1 M KCl each. The resulting chloroform phase was evaporated to dryness under reduced pressure.

Total lipid extracts were applied to Sep-Pak Vac Silica cartridge 35cc (Waters; with 10 grams of normal-phase silica), and TAGs were subsequently eluted from the cartridge with 40 mL of chloroform-methanol (9:1). Polar lipids were eluted from the cartridge by a mixture of 50 ml of methanol acidified with 0.1% of formic acid. The eluate of polar lipids was evaporated and the oil samples were further hydrolyzed.

2.4. FAMEs analysis

The polar lipids (~5 mg) were saponified overnight in 10% KOH-MeOH at room temperature. A fatty acid fraction obtained from saponification was partitioned between alkali solution (pH 9) and Et_2O to remove basic and neutral components. The aqueous phase containing fatty acids was acidified to pH 2 and extracted with hexane. The fatty acid fraction was methylated using CH_2N_2. GC-MS of fatty acid methyl ester (FAME) mixture was done on a Finnigan 1020 B in EI mode. Splitless injection was at 100 °C, and a fused silica capillary column (Supelcowax 10; 60 m x 0.25 mm i.d., 0.25 mm film thickness; Supelco, Prague) was used. The temperature program was as follows: 100 °C for 1 min, subsequently increasing at 20 °C/min to 180 °C and at 2 °C/min to 280 °C, which was maintained for 1 min. The carrier gas was helium at a linear velocity of 60 cm/s. All spectra were scanned within the range of *m/z* 50–500. The structures of FAMEs were confirmed by comparison of retention times and fragmentation patterns with those of the standard FAMEs (Supelco, Prague) [16, 17].

2.5. HILIC-LC/MS-ESI

The HPLC equipment consisted of a 1090 Win system, PV5 ternary pump and automatic injector (HP 1090 series, Hewlett Packard, USA), and Ascentis® Express OH5, UHPLC HILIC column (2.7 µm particle size, L × I.D. 15 cm × 2.1 mm) (Supelco, Prague,

Czech Republic) with an injection volume of 10 µL. UHPLC was performed at a flow rate of 0.33 mL/min for the polar lipids from all four cultivations (temperatures at 4 °C; 10 °C; 20 °C and 28 °C), with a linear gradient from mobile phase containing methanol/acetonitrile/aqueous 1 mM ammonium acetate (50:30:20, v/v/v) to methanol/acetonitrile/aqueous 1 mM ammonium acetate (10:70:20, v/v/v) for 60 min. Column temperature was 35 °C and a re-equilibration period between runs was 30 min. The whole UHPLC flow was introduced into the ESI source without any splitting.

LTQ Orbitrap Velos (Thermo Fisher Scientific, Bremen, Germany), a high resolution hybrid mass spectrometer equipped with a heated electrospray interface (HESI) was used. ESI–MS analysis was performed in the FT negative ion mode. MS spectra were acquired with target mass resolution of R = 30,000 at *m/z* 400. The ion spray voltage was set at -2500V and the scan range of the instruments was set at *m/z* 200-2000. Nitrogen was used as a nebulizer gas - set at 18 arbitrary units (sheath gas) and 7 arbitrary units (aux gas). Helium was used as a collision gas for CID experiments. The CID normalization energy of 35% was used for the parent ions fragmentation. The MS/MS product ions were detected by the high resolution FT mode. The H-ESI temperature was set to 250 °C.

Table 1S. Fatty acid profile (%w/w) of eight yeast strains cultivated at different temperatures.

Strain	Temp.	M[a]	14:1	15:0	P	Po	Ma	Mo	S	O	L	Ln	A	G	B	E	Lg
C. victoriae	4 °C	1.0	1.3	0.3	17.8	2.7	0.4	0.2	4.1	33.2	19.7	19.2	0.0	0.1	0.0	0.0	0.0
	10 °C	0.7	0.4	0.2	30.1	2.6	0.4	0.2	6.2	29.9	15.2	13.6	0.2	0.2	0.0	0.1	0.0
	20 °C	0.1	0.1	0.0	32.6	1.9	0.3	0.1	9.7	36.0	11.2	7.1	0.4	0.2	0.1	0.1	0.1
	28 °C	0.0	0.0	0.0	34.9	1.7	0.3	0.1	13.6	36.4	7.6	3.8	0.7	0.3	0.2	0.2	0.2
C. capitatum	4 °C	1.0	1.3	0.3	13.7	2.0	0.4	0.2	1.7	35.6	28.5	15.2	0.0	0.1	0.0	0.0	0.0
	10 °C	0.7	0.4	0.2	21.1	1.9	0.4	0.2	6.3	32.7	25.6	10.0	0.2	0.2	0.0	0.1	0.0
	20 °C	0.1	0.1	0.0	32.0	1.8	0.3	0.1	12.6	29.5	16.7	5.9	0.4	0.2	0.1	0.1	0.1
	28 °C	0.0	0.0	0.0	39.0	1.8	0.3	0.1	23.1	22.0	10.4	1.7	0.7	0.3	0.2	0.2	0.2
H. wattica	4 °C	1.0	1.3	0.3	16.8	2.0	0.4	0.2	0.7	41.3	23.0	12.9	0.0	0.1	0.0	0.0	0.0
	10 °C	0.7	0.4	0.2	21.1	2.0	0.4	0.2	2.9	40.2	23.8	7.6	0.2	0.2	0.0	0.1	0.0
	20 °C	0.1	0.1	0.0	22.2	0.9	0.3	0.1	9.6	39.9	23.8	2.1	0.4	0.2	0.1	0.1	0.1
	28 °C	0.0	0.0	0.0	22.6	0.8	0.3	0.1	18.9	35.5	19.5	0.7	0.7	0.3	0.2	0.2	0.2
K. malvinella	4 °C	1.0	1.3	0.3	24.3	1.4	0.4	0.2	0.4	24.4	33.5	12.7	0.0	0.1	0.0	0.0	0.0
	10 °C	0.7	0.4	0.2	25.5	1.8	0.4	0.2	6.5	27.2	24.8	11.8	0.2	0.2	0.0	0.1	0.0
	20 °C	0.1	0.1	0.0	36.4	4.5	0.3	0.1	9.7	28.7	14.3	4.9	0.4	0.2	0.1	0.1	0.1
	28 °C	0.0	0.0	0.0	42.0	6.2	0.3	0.1	12.5	27.8	6.5	3.0	0.7	0.3	0.2	0.2	0.2
M. aquatica	4 °C	1.0	1.3	0.3	14.1	0.5	0.4	0.2	1.8	23.8	42.1	14.4	0.0	0.1	0.0	0.0	0.0
	10 °C	0.7	0.4	0.2	19.1	0.8	0.4	0.2	2.2	34.6	31.7	9.2	0.2	0.2	0.0	0.1	0.0
	20 °C	0.1	0.1	0.0	22.2	0.8	0.3	0.1	6.6	48.4	15.8	4.7	0.4	0.2	0.1	0.1	0.1
	28 °C	0.0	0.0	0.0	27.3	1.0	0.3	0.1	10.3	52.7	5.0	1.7	0.7	0.3	0.2	0.2	0.2
M. cryoconiti	4 °C	1.0	1.3	0.3	11.5	2.9	0.4	0.2	1.8	41.7	33.4	5.4	0.0	0.1	0.0	0.0	0.0
	10 °C	0.7	0.4	0.2	22.2	2.7	0.4	0.2	5.2	54.3	11.4	1.8	0.2	0.2	0.0	0.1	0.0
	20 °C	0.1	0.1	0.0	22.3	2.4	0.3	0.1	7.6	63.9	1.2	1.1	0.4	0.2	0.1	0.1	0.1
	28 °C	0.0	0.0	0.0	21.1	1.4	0.3	0.1	8.0	66.0	0.8	0.7	0.7	0.3	0.2	0.2	0.2
R. lignophila	4 °C	1.0	1.3	0.3	10.1	2.4	0.4	0.2	5.5	38.5	32.3	7.9	0.0	0.1	0.0	0.0	0.0
	10 °C	0.7	0.4	0.2	19.5	3.0	0.4	0.2	8.4	30.8	30.7	5.2	0.2	0.2	0.0	0.1	0.0
	20 °C	0.1	0.1	0.0	26.7	3.7	0.3	0.1	10.2	27.9	26.4	3.6	0.4	0.2	0.1	0.1	0.1
	28 °C	0.0	0.0	0.0	37.4	4.0	0.3	0.1	15.9	21.2	18.1	1.4	0.7	0.3	0.2	0.2	0.2
T. aggtelekiense	4 °C	1.0	1.3	0.3	15.2	8.2	0.4	0.2	1.6	35.4	25.9	10.4	0.0	0.1	0.0	0.0	0.0
	10 °C	0.7	0.4	0.2	23.7	7.3	0.4	0.2	4.1	33.4	21.4	7.7	0.2	0.2	0.0	0.1	0.0
	20 °C	0.1	0.1	0.0	45.0	5.4	0.3	0.1	4.4	33.4	9.2	1.1	0.4	0.2	0.1	0.1	0.1
	28 °C	0.0	0.0	0.0	47.6	2.1	0.3	0.1	6.4	38.6	2.6	0.7	0.7	0.3	0.2	0.2	0.2

[a] Abbreviations: M-myristic; 14:1-tetradecenoic; 15:0-pentadecenoic; P-palmitic; Po-palmitoleic; Ma-margaric; Mo-heptadecenoic; S-stearic; O-oleic; L-linoleic; Ln-linolenic; A-arachidic; G-gadoleic; B-behenic; E-erucic; Lg-lignoceric acids

Table 2S. Lipidomics of eight strains of yeast grown at different temperatures - phosphatidylcholine.

	C. victoriae				C. capitatum				H. wattica				K. malvinella				M. aquatica				M. cryoconiti				R. lignophila				T. aggtelekiense			
mol spec PC	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C
Ln/L	5.4	3.2	1.0	0.3	5.6	2.4	1.6	0.5	4.7	2.9	1.9	0.6	7.2	3.9	1.3	0.4	5.0	3.0	1.0	0.3	8.3	5.3	1.0	0.3	7.3	3.6	1.0	0.3	9.1	5.6	3.7	1.2
Po/Ln	0.5	0.7	0.5	0.4	0.5	0.7	0.4	0.4	0.4	0.6	0.4	0.4	0.5	0.6	0.4	0.4	0.4	0.7	0.5	0.4	0.5	0.7	0.4	0.4	0.4	0.6	0.4	0.4	0.4	0.6	0.4	0.4
Po/Po	0.1	0.1	0.4	0.8	0.1	0.1	0.4	0.7	0.1	0.1	0.4	0.8	0.1	0.1	0.4	0.7	0.1	0.1	0.4	0.7	0.1	0.1	0.4	0.7	0.1	0.1	0.4	0.7	0.1	0.1	0.4	0.6
M/M	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Po/L	1.2	1.4	1.2	0.8	1.3	1.4	1.2	0.8	1.1	1.3	1.1	0.8	1.2	1.3	1.2	0.7	1.1	1.4	1.2	0.8	1.2	1.4	1.2	0.7	1.1	1.3	1.1	0.7	1.1	1.3	1.1	0.7
M/L+Po/Po	1.2	0.9	0.2	0.1	1.2	0.9	0.2	0.1	1.0	0.8	0.2	0.1	1.2	0.8	0.2	0.1	1.1	0.8	0.2	0.1	1.2	0.8	0.2	0.1	1.0	0.8	0.2	0.1	1.0	0.8	0.2	0.1
L/L	15.3	8.7	5.2	0.6	13.0	7.9	4.0	1.3	14.2	7.3	2.9	0.6	18.0	8.8	3.3	0.8	16.5	7.6	2.1	0.5	16.2	8.1	5.0	1.3	15.3	8.2	2.9	1.3	15.1	9.1	4.6	2.3
15:0/Po	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1
Mo/L	0.6	0.6	0.2	0.1	0.6	0.6	0.2	0.1	0.5	0.6	0.2	0.1	0.6	0.5	0.2	0.1	0.6	0.6	0.2	0.1	0.6	0.6	0.2	0.1	0.5	0.5	0.2	0.1	0.5	0.5	0.2	0.1
P/Ln	3.6	4.8	2.1	1.4	5.6	6.3	3.0	2.7	6.3	8.8	5.8	2.8	5.2	6.2	3.1	2.4	5.0	6.1	2.1	1.3	6.3	6.8	3.0	2.6	5.4	6.5	1.9	2.1	4.6	5.6	2.8	2.3
Po/O	0.9	1.6	2.4	3.2	0.9	1.5	2.3	3.0	0.8	1.4	2.2	3.1	0.9	1.4	2.3	2.9	0.8	1.5	2.4	3.0	0.9	1.5	2.3	2.9	0.8	1.4	2.2	2.9	0.8	1.4	2.1	2.6
P/Po+M/O	0.9	1.5	3.0	4.7	0.9	1.5	2.9	4.5	0.8	1.3	2.8	4.7	0.9	1.3	2.9	4.3	0.8	1.4	3.0	4.5	0.9	1.4	2.9	4.4	0.8	1.3	2.8	4.3	0.8	1.3	2.7	3.9
O/L	12.6	7.9	5.2	2.8	9.3	6.3	6.0	2.7	11.0	7.3	5.8	2.8	11.9	8.3	6.4	3.0	8.6	6.1	5.1	2.7	9.0	6.8	5.0	2.6	11.6	9.3	8.6	3.9	10.7	8.4	5.5	2.3
M/P	0.9	0.9	0.6	0.6	0.9	0.9	0.6	0.6	0.8	0.8	0.6	0.6	0.9	0.8	0.6	0.6	0.8	0.5	0.3	0.6	0.9	0.8	0.6	0.6	0.7	0.8	0.5	0.6	0.7	0.8	0.5	0.5
15:0/L	0.7	0.6	0.2	0.1	0.7	0.6	0.2	0.1	0.6	0.6	0.2	0.1	0.7	0.5	0.2	0.1	0.6	0.6	0.2	0.1	0.7	0.6	0.2	0.1	0.6	0.5	0.2	0.1	0.6	0.5	0.2	0.1
P/L	11.7	6.3	5.2	2.8	14.8	9.4	8.0	5.4	12.8	7.3	7.7	2.8	13.8	8.9	8.0	4.5	13.4	10.6	10.3	5.4	12.6	7.6	6.0	3.9	13.2	9.3	8.6	5.2	11.5	8.4	7.4	4.7
Mo/O	0.4	0.7	0.5	0.5	0.5	0.7	0.5	0.4	0.4	0.6	0.4	0.5	0.4	0.6	0.4	0.4	0.4	0.6	0.5	0.4	0.4	0.6	0.5	0.4	0.4	0.6	0.4	0.4	0.4	0.6	0.4	0.4
P/Mo+15:0/O	0.9	1.3	1.0	1.1	1.0	1.3	1.0	1.1	0.8	1.2	1.0	1.1	0.9	1.2	1.0	1.0	0.8	1.2	1.0	1.1	0.9	1.2	1.0	1.1	0.8	1.2	0.9	1.0	0.8	1.1	0.9	1.0
P/15:0	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.4	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.4	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.4	0.6	0.5	0.6	0.4	0.5	0.5	0.5
Ma/L	0.7	0.7	0.3	0.1	0.7	0.7	0.3	0.1	0.6	0.6	0.3	0.1	0.7	0.6	0.3	0.1	0.7	0.7	0.3	0.1	0.7	0.7	0.3	0.1	0.6	0.6	0.3	0.1	0.6	0.6	0.2	0.1
S/Ln	0.3	1.9	0.9	0.8	0.3	1.9	0.9	0.8	0.2	1.7	0.9	0.8	0.3	1.7	0.9	0.7	0.3	1.8	0.9	0.8	0.3	1.8	0.9	0.7	0.2	1.7	0.8	0.7	0.2	1.7	0.8	0.7
O/O	10.8	15.1	11.4	13.0	13.1	15.6	11.0	10.8	12.6	12.4	11.6	8.4	9.8	14.6	12.4	11.5	14.2	15.0	10.3	9.4	10.8	13.6	13.9	10.3	11.6	13.6	11.5	11.6	13.0	13.8	13.8	13.0
P/O	14.4	14.3	20.6	15.6	12.0	12.4	18.9	16.2	13.4	15.3	18.4	16.9	9.7	13.7	19.6	17.2	12.5	13.6	19.5	18.8	11.7	12.9	18.9	18.2	10.8	11.5	18.3	16.8	12.2	12.7	17.6	19.9
P/P	11.0	10.9	16.6	25.6	11.1	11.0	16.0	24.4	11.8	12.4	15.5	27.5	9.2	9.6	15.0	25.7	10.9	10.6	17.4	25.7	9.9	11.3	15.7	25.8	11.9	12.2	17.2	24.3	11.1	11.2	15.7	23.0
S/L	0.7	3.8	2.4	1.5	0.7	3.8	2.3	1.5	0.6	3.5	2.2	1.5	0.7	3.5	2.3	1.4	0.7	3.7	2.4	1.5	0.7	3.7	2.3	1.4	0.6	3.5	2.2	1.4	0.6	3.4	2.1	1.3
Ma/O	0.5	0.8	0.6	0.6	0.5	0.8	0.5	0.5	0.5	0.7	0.5	0.6	0.5	0.7	0.5	0.5	0.5	0.7	0.6	0.5	0.5	0.7	0.5	0.5	0.5	0.7	0.5	0.5	0.4	0.7	0.5	0.5
Ma/P	0.5	0.7	0.7	0.8	0.5	0.7	0.7	0.8	0.5	0.7	0.7	0.8	0.5	0.7	0.7	0.8	0.5	0.7	0.7	0.8	0.5	0.7	0.7	0.8	0.4	0.7	0.7	0.8	0.4	0.6	0.6	0.7
S/O	0.5	2.5	6.3	6.0	0.5	2.5	6.0	5.7	0.5	2.3	5.8	5.9	0.5	2.3	5.9	5.4	0.5	2.5	6.2	5.6	0.5	2.4	6.0	5.5	0.5	2.3	5.8	5.4	0.4	2.2	5.6	4.9
P/S	0.5	2.6	5.9	8.9	0.5	2.6	5.7	8.5	0.5	2.4	5.5	8.8	0.5	2.4	5.6	8.1	0.5	2.5	5.9	8.5	0.5	2.5	5.7	8.2	0.4	2.4	5.5	8.1	0.4	2.3	5.3	7.3
A/L	0.5	0.6	0.3	0.2	0.5	0.6	0.3	0.2	0.4	0.6	0.3	0.2	0.5	0.5	0.3	0.2	0.5	0.6	0.3	0.2	0.5	0.6	0.3	0.2	0.4	0.5	0.3	0.2	0.4	0.5	0.3	0.1
Ma/G	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O/E+G/G	0.4	0.6	0.5	0.5	0.4	0.6	0.5	0.5	0.3	0.6	0.4	0.5	0.4	0.6	0.4	0.5	0.3	0.6	0.5	0.5	0.4	0.6	0.5	0.5	0.3	0.5	0.4	0.5	0.3	0.5	0.4	0.4
S/G+P/E	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.2	0.0	0.1	0.2	0.3	0.0	0.1	0.2	0.2	0.0	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.0	0.1	0.2	0.2	0.0	0.1	0.2	0.2
A/O	0.4	0.7	0.6	0.7	0.4	0.7	0.6	0.7	0.3	0.6	0.6	0.7	0.4	0.6	0.6	0.7	0.3	0.6	0.6	0.7	0.4	0.6	0.6	0.7	0.3	0.6	0.6	0.7	0.3	0.6	0.5	0.6
S/S+A/P	0.0	1.1	1.7	2.8	0.0	1.1	1.6	2.6	0.0	1.0	1.6	2.8	0.0	1.0	1.6	2.5	0.0	1.1	1.7	2.6	0.0	1.1	1.6	2.6	0.0	1.0	1.6	2.5	0.0	1.0	1.5	2.3
B/L	0.5	0.5	0.3	0.1	0.5	0.5	0.2	0.1	0.4	0.5	0.2	0.1	0.5	0.5	0.2	0.1	0.5	0.5	0.2	0.1	0.5	0.5	0.2	0.1	0.4	0.4	0.2	0.1	0.4	0.4	0.2	0.1
M/B	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O/B	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.3	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.3	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.3	0.5	0.4	0.5	0.3	0.5	0.4	0.4
S/A+P/B	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.3	0.0	0.1	0.2	0.3	0.0	0.1	0.2	0.3	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.3	0.0	0.1	0.2	0.3	0.0	0.1	0.2	0.3
O/Lg	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.3	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.3	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.3	0.5	0.4	0.5	0.3	0.5	0.4	0.4

Table 3S. Lipidomics of eight strains of yeast grown at different temperatures - phosphatidylethanolamine.

	C. victoriae				C. capitatum				H. wattica				K. malvinella				M. aquatica				M. cryoconiti				R. lignophila				T. aggtelekiense			
mol spec PE	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C
Ln/Ln	5.3	2.5	0.4	0.3	3.6	1.9	1.0	0.3	3.5	1.9	1.5	0.8	4.6	2.6	0.5	0.2	5.2	2.6	2.0	1.3	4.6	2.0	2.0	0.3	5.2	3.2	1.2	0.5	4.0	1.9	1.1	0.3
Ln/L	8.3	5.3	1.3	0.4	8.3	5.4	1.3	0.4	8.2	5.4	1.2	0.4	8.3	5.2	1.3	0.4	8.1	5.5	1.3	0.4	8.6	5.6	1.3	0.4	8.7	5.3	1.3	0.4	8.4	5.3	1.4	0.4
Po/L	1.2	1.1	1.2	0.8	1.2	1.2	1.2	0.8	1.2	1.2	1.1	0.7	1.2	1.1	1.2	0.8	1.2	1.2	1.2	0.8	1.3	1.2	1.2	0.8	1.3	1.2	1.2	0.8	1.2	1.2	1.3	0.8
L/L	17.5	10.8	4.1	1.3	17.7	10.4	5.9	2.8	17.3	9.0	7.6	1.3	17.7	10.5	3.4	0.8	17.1	10.5	8.0	1.3	18.1	8.1	4.0	1.4	18.4	9.6	5.0	1.4	17.8	10.9	3.2	1.1
P/Ln	5.1	5.4	3.3	2.5	5.2	5.5	3.1	2.6	5.1	5.5	3.0	2.4	5.1	5.3	3.2	2.5	5.0	5.6	3.1	2.5	5.3	5.7	3.1	2.5	5.4	5.5	3.1	2.5	5.2	5.5	3.4	2.6
Mo/L	0.6	0.5	0.2	0.1	0.6	0.5	0.2	0.1	0.6	0.5	0.2	0.1	0.6	0.5	0.2	0.1	0.6	0.5	0.2	0.1	0.6	0.5	0.2	0.1	0.6	0.5	0.2	0.1	0.6	0.5	0.2	0.1
O/L	12.4	11.4	6.2	2.7	14.3	11.0	7.9	4.2	14.0	11.6	7.6	3.9	13.0	11.5	6.6	3.1	13.0	11.9	6.0	2.7	12.8	12.1	7.0	4.1	13.0	11.6	7.0	4.1	12.9	10.9	5.4	2.3
P/L	13.3	11.4	8.3	5.4	12.5	11.6	7.9	7.0	13.1	11.0	8.5	6.5	12.9	10.8	8.3	4.7	10.4	11.2	8.0	4.0	12.8	12.1	8.9	4.1	12.1	10.9	8.0	4.6	13.5	11.6	6.5	3.4
P/Po	0.9	1.2	3.0	4.5	0.9	1.2	2.9	4.7	0.9	1.2	2.8	4.4	0.9	1.2	3.0	4.5	0.9	1.2	2.9	4.5	0.9	1.2	2.9	4.6	0.9	1.2	2.9	4.5	0.9	1.2	3.1	4.7
Po/O	0.9	1.2	2.4	3.0	0.9	1.3	2.3	3.1	0.9	1.3	2.2	2.9	0.9	1.2	2.4	3.0	0.9	1.3	2.3	3.0	0.9	1.3	2.3	3.0	0.9	1.3	2.3	3.0	0.9	1.3	2.5	3.1
Ma/L	0.7	0.6	0.3	0.1	0.7	0.6	0.3	0.1	0.7	0.6	0.3	0.1	0.7	0.6	0.3	0.1	0.7	0.6	0.3	0.1	0.7	0.6	0.3	0.1	0.7	0.6	0.3	0.1	0.7	0.6	0.3	0.1
O/O	8.8	12.6	12.4	10.8	8.9	12.8	11.8	8.4	7.9	12.3	11.4	11.8	9.6	12.5	12.8	12.1	8.7	11.9	12.0	13.4	8.2	12.1	12.9	12.3	7.4	12.7	12.1	13.5	10.3	12.2	12.9	11.3
S/Ln	0.3	1.5	0.9	0.8	0.3	1.5	0.9	0.8	0.3	1.5	0.8	0.7	0.3	1.5	0.9	0.8	0.3	1.6	0.9	0.8	0.3	1.6	0.9	0.8	0.3	1.5	0.9	0.8	0.3	1.5	1.0	0.8
P/O	10.6	11.4	19.8	18.9	8.9	11.8	19.4	14.2	9.6	12.5	18.0	17.0	9.4	11.8	20.3	18.1	10.7	11.2	18.1	17.8	10.1	10.8	18.9	17.7	9.3	11.7	19.8	16.2	8.1	11.6	20.4	18.3
P/P	8.8	10.2	18.7	26.7	10.7	10.4	17.7	27.8	11.4	11.6	18.0	25.9	9.5	11.1	18.7	27.0	12.1	9.9	17.0	25.8	9.5	11.4	17.4	26.0	10.5	10.3	18.0	25.7	9.9	10.9	19.4	28.0
S/L	0.7	3.1	2.4	1.5	0.7	3.1	2.3	1.5	0.7	3.1	2.2	1.4	0.7	3.0	2.4	1.5	0.7	3.2	2.3	1.5	0.7	3.3	2.3	1.5	0.7	3.1	2.3	1.5	0.7	3.1	2.5	1.5
O/G	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.6	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.6	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.6
Ma/O	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.7	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.6	0.6
E/L	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1	0.5	0.5	0.2	0.1	0.5	0.5	0.2	0.1	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1
P/G	0.4	0.5	0.7	0.8	0.4	0.5	0.6	0.8	0.4	0.5	0.6	0.8	0.4	0.5	0.6	0.8	0.4	0.5	0.6	0.8	0.4	0.5	0.6	0.8	0.4	0.5	0.6	0.8	0.4	0.5	0.7	0.8
S/O	0.5	1.8	3.8	5.7	0.5	1.8	3.6	5.9	0.5	1.8	3.4	5.5	0.5	1.7	3.7	5.7	0.5	1.8	3.6	5.6	0.5	1.9	3.6	5.7	0.5	1.8	3.6	5.7	0.5	1.8	3.9	5.9
S/P	0.5	3.2	5.9	8.5	0.5	3.2	5.6	8.8	0.5	3.2	5.4	8.2	0.5	3.1	5.8	8.5	0.5	3.3	5.7	8.4	0.5	3.3	5.7	8.5	0.5	3.2	5.7	8.5	0.5	3.2	6.1	8.8
A/L	0.5	0.5	0.3	0.2	0.5	0.5	0.3	0.2	0.5	0.5	0.3	0.2	0.5	0.5	0.3	0.2	0.5	0.5	0.3	0.2	0.5	0.5	0.3	0.2	0.5	0.5	0.3	0.2	0.5	0.5	0.3	0.2
O/E	0.4	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5
S/S	0.0	0.9	1.7	2.6	0.0	0.9	1.6	2.8	0.0	0.9	1.5	2.6	0.0	0.9	1.6	2.6	0.0	0.9	1.6	2.6	0.0	0.9	1.6	2.7	0.0	0.9	1.6	2.7	0.0	0.9	1.7	2.8
B/L	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1	0.5	0.4	0.2	0.1
S/G	0.0	0.1	0.2	0.2	0.0	0.1	0.2	0.3	0.0	0.1	0.2	0.2	0.0	0.1	0.2	0.2	0.0	0.1	0.2	0.2	0.0	0.1	0.2	0.2	0.0	0.1	0.2	0.2	0.0	0.1	0.2	0.3
B/O	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.5

Table 4S. Lipidomics of eight strains of yeast grown at different temperatures - phosphatidylinositol.

	C. victoriae				C. capitatum				H. wattica				K. malvinella				M. aquatica				M. cryoconiti				R. lignophila				T. aggtelekiense			
mol spec PI	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C	4°C	10°C	20°C	28°C
M/Mo	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Po/L	2.1	1.6	1.4	1.1	2.0	1.7	1.4	1.2	2.0	1.6	1.4	1.1	2.0	1.6	1.4	1.1	2.1	1.7	1.4	1.1	2.0	1.7	1.4	1.2	2.0	1.8	1.4	1.1	2.0	1.6	1.3	1.2
P/Ln	11.2	7.3	3.5	2.7	11.8	8.6	4.8	4.1	10.7	8.2	5.8	5.2	11.6	7.7	3.7	3.6	11.7	7.0	3.3	3.2	12.6	7.5	4.7	2.7	11.6	7.1	2.4	2.1	12.8	7.8	4.8	4.8
Po/Po	0.1	0.2	0.5	1.1	0.1	0.2	0.5	1.1	0.1	0.2	0.5	1.1	0.1	0.2	0.5	1.1	0.1	0.2	0.5	1.1	0.1	0.2	0.5	1.1	0.1	0.2	0.5	1.1	0.1	0.2	0.5	1.1
Mo/Po	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
M/Po	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
M/M	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
O/L	22.1	16.4	9.5	5.3	19.4	15.2	7.2	4.1	20.4	15.4	8.1	6.5	21.2	16.3	7.7	4.5	21.0	16.9	7.1	4.0	20.5	17.1	9.4	2.7	21.1	14.3	10.9	6.7	20.2	16.1	10.9	4.2
Po/O	1.5	1.8	2.7	4.5	1.5	1.9	2.8	4.6	1.5	1.8	2.7	4.3	1.5	1.8	2.7	4.3	1.5	1.8	2.7	4.5	1.4	1.8	2.7	4.5	1.5	2.0	2.8	4.5	1.5	1.7	2.5	4.7
P/L	17.8	13.7	9.5	5.3	18.3	15.2	8.4	6.8	19.3	15.4	10.4	6.5	18.9	15.5	9.6	6.8	19.9	14.1	10.6	6.7	17.8	14.9	11.5	8.1	20.0	16.3	10.9	8.0	19.2	16.0	10.9	7.0
M/O	1.5	1.1	0.5	0.6	1.4	1.1	0.5	0.6	1.4	1.1	0.5	0.6	1.4	1.1	0.5	0.6	1.5	1.1	0.5	0.6	1.4	1.1	0.5	0.6	1.4	1.2	0.5	0.6	1.4	1.0	0.5	0.6
Mo/S	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.3
P/Po	1.5	1.7	3.5	6.7	1.5	1.8	3.5	6.8	1.5	1.7	3.4	6.5	1.5	1.7	3.5	6.5	1.5	1.7	3.4	6.7	1.4	1.7	3.4	6.7	1.4	1.9	3.5	6.7	1.5	1.6	3.2	7.0
Mo/P	1.3	0.8	0.7	0.7	1.2	0.9	0.7	0.7	1.2	0.8	0.7	0.7	1.2	0.8	0.7	0.7	1.3	0.9	0.7	0.7	1.2	0.8	0.7	0.7	1.2	0.9	0.7	0.7	1.2	0.8	0.6	0.7
M/P	1.5	1.0	0.7	0.5	1.4	1.1	0.7	0.5	1.4	1.0	0.7	0.5	1.4	1.0	0.7	0.5	1.5	1.0	0.7	0.5	1.4	1.0	0.7	0.5	1.4	1.1	0.7	0.5	1.4	1.0	0.6	0.5
O/O	15.6	18.1	14.2	10.7	16.1	17.1	15.6	9.6	15.0	18.0	12.7	10.4	15.7	18.1	14.9	10.1	15.5	17.5	15.3	10.7	15.8	18.6	12.9	9.4	14.8	18.7	14.7	8.0	17.0	17.7	16.2	9.8
S/L	1.2	4.4	4.0	2.2	1.2	4.6	4.1	2.2	1.2	4.4	3.9	2.1	1.2	4.4	4.0	2.1	1.2	4.6	4.0	2.2	1.1	4.5	4.0	2.2	1.1	4.9	4.1	2.2	1.2	4.3	3.7	2.3
S/Po	0.1	0.5	1.0	2.1	0.1	0.5	1.0	2.1	0.1	0.5	1.0	2.0	0.1	0.5	1.0	2.0	0.1	0.5	1.0	2.1	0.1	0.5	1.0	2.1	0.1	0.5	1.0	2.1	0.1	0.4	0.9	2.2
P/O	15.6	18.1	22.4	21.3	16.2	17.2	23.8	20.5	15.1	17.2	22.4	18.8	15.6	17.0	23.6	21.3	14.5	18.2	23.1	21.5	15.7	16.9	23.4	22.9	14.8	16.3	21.8	21.4	13.9	16.0	20.7	19.4
P/P	5.6	10.0	20.1	26.3	6.5	9.5	19.2	26.0	7.9	9.4	20.2	25.0	5.4	9.1	19.8	26.1	5.3	9.4	20.0	25.5	6.3	8.4	17.5	25.6	6.3	9.2	18.2	25.4	5.3	10.6	17.4	25.2
S/O	0.9	2.9	5.4	8.4	0.9	3.0	5.4	8.6	0.8	2.9	5.2	8.2	0.8	2.8	5.3	8.2	0.9	3.0	5.3	8.4	0.8	2.9	5.3	8.5	0.8	3.2	5.5	8.4	0.8	2.8	4.9	8.8

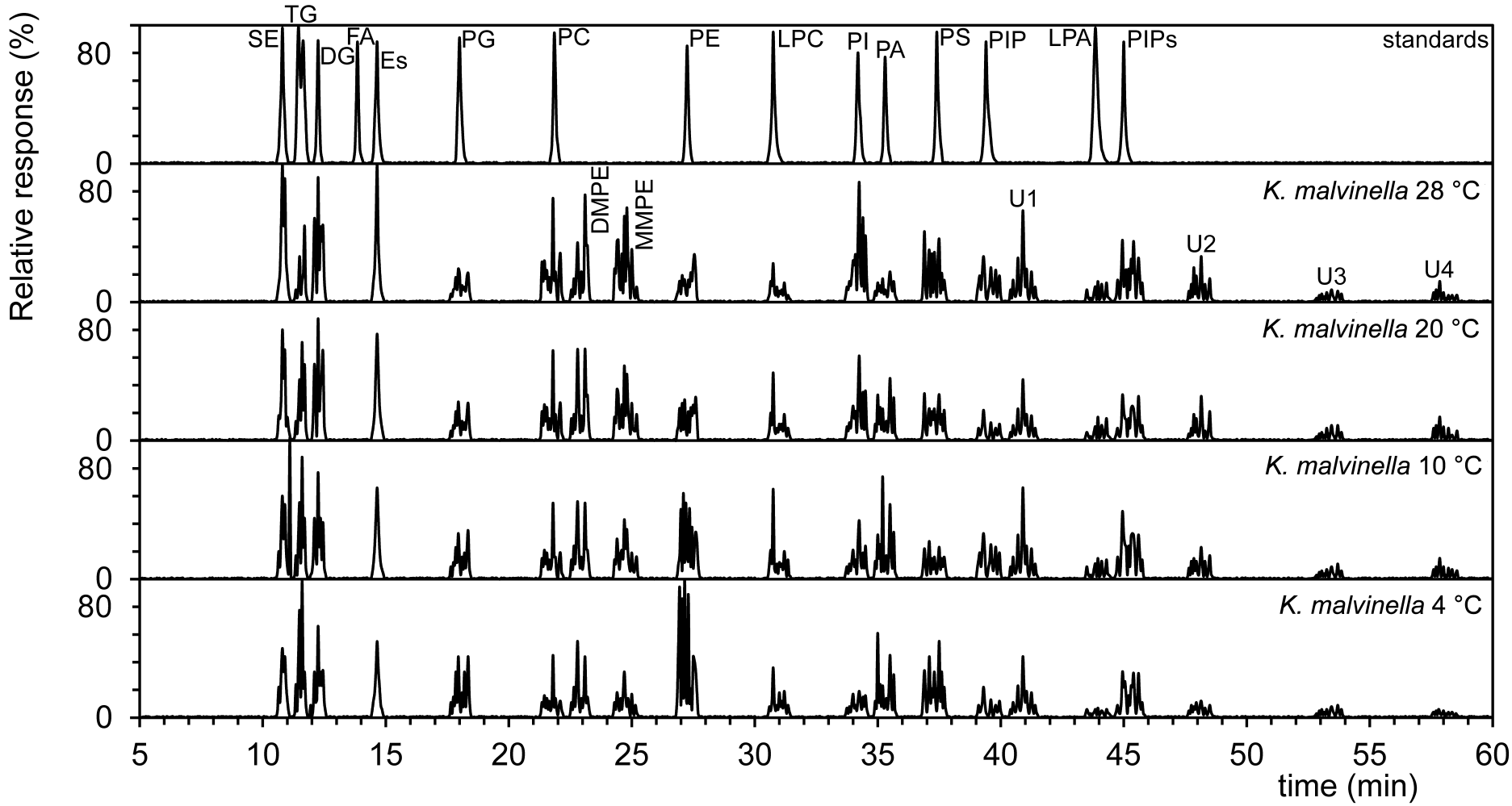
Fig. 1S. HPLC/ESI-MS separation of standards and major lipid classes of *Kondoa malvinella* cultivated at 10 °C. For experimental conditions, see ‘‘Material and Methods“. Abbreviations are explained in the text.

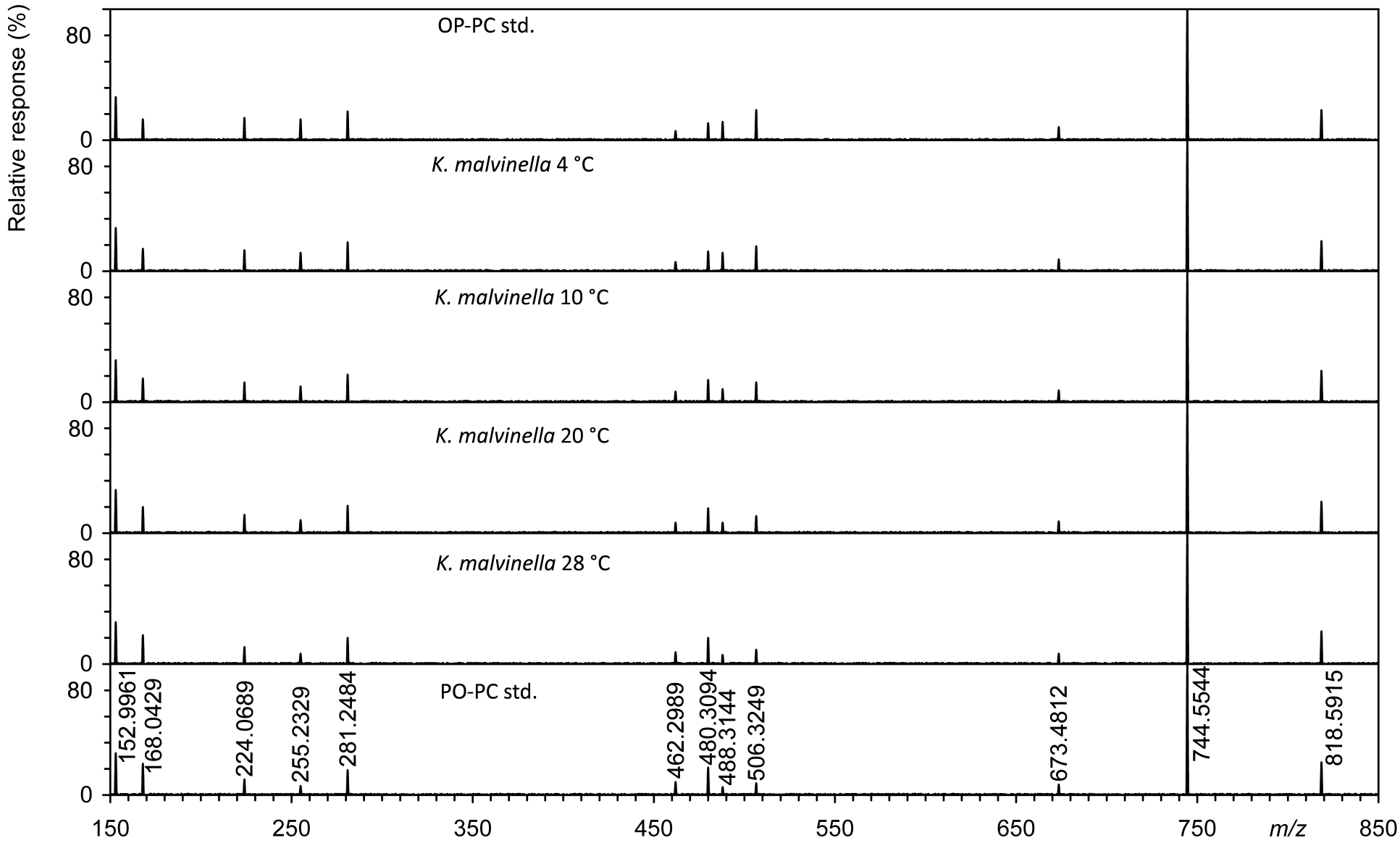
Fig. 2S. Tandem mass spectrum of natural PC of *K. malvinella* cultivated at different temperatures and two commercial standards, i.e., molecular species 1-palmitoyl-2-oleyl-phosphatidylethanolamine and (PO-PC) and 1-oleyl-2-palmitoyl-phosphatidylethanolamine (OP-PC), respectively.

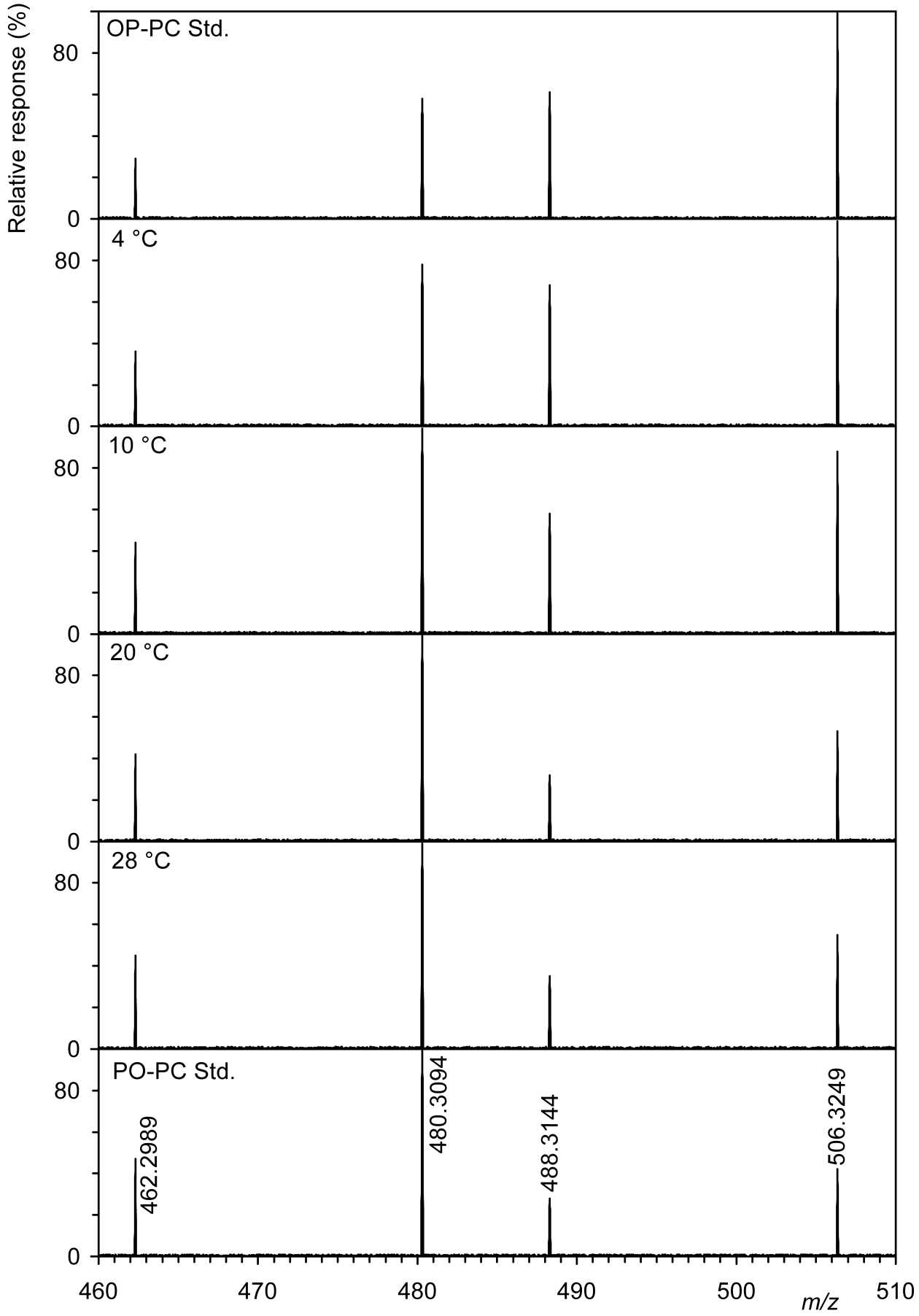
Fig. 3S. Cutout from figure 2S.

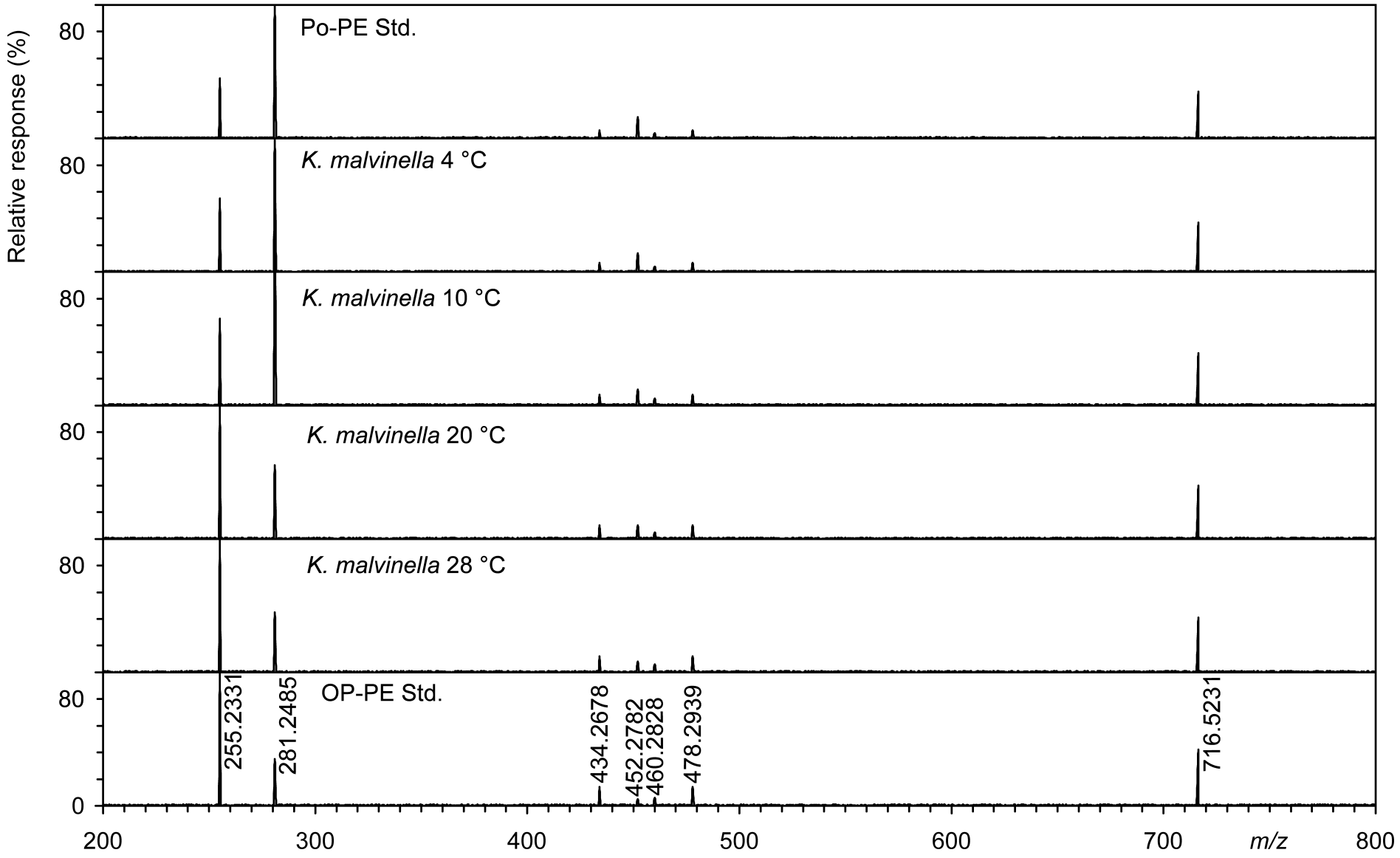
Fig. 4S. Tandem mass spectrum of natural PE of *K. malvinella* cultivated at different temperatures and two commercial standards, i.e., molecular species 1-palmitoyl-2-oleyl-phosphatidylcholine and (PO-PE) and 1-oleyl-2-palmitoyl-phosphatidylcholine (OP-PE), respectively.

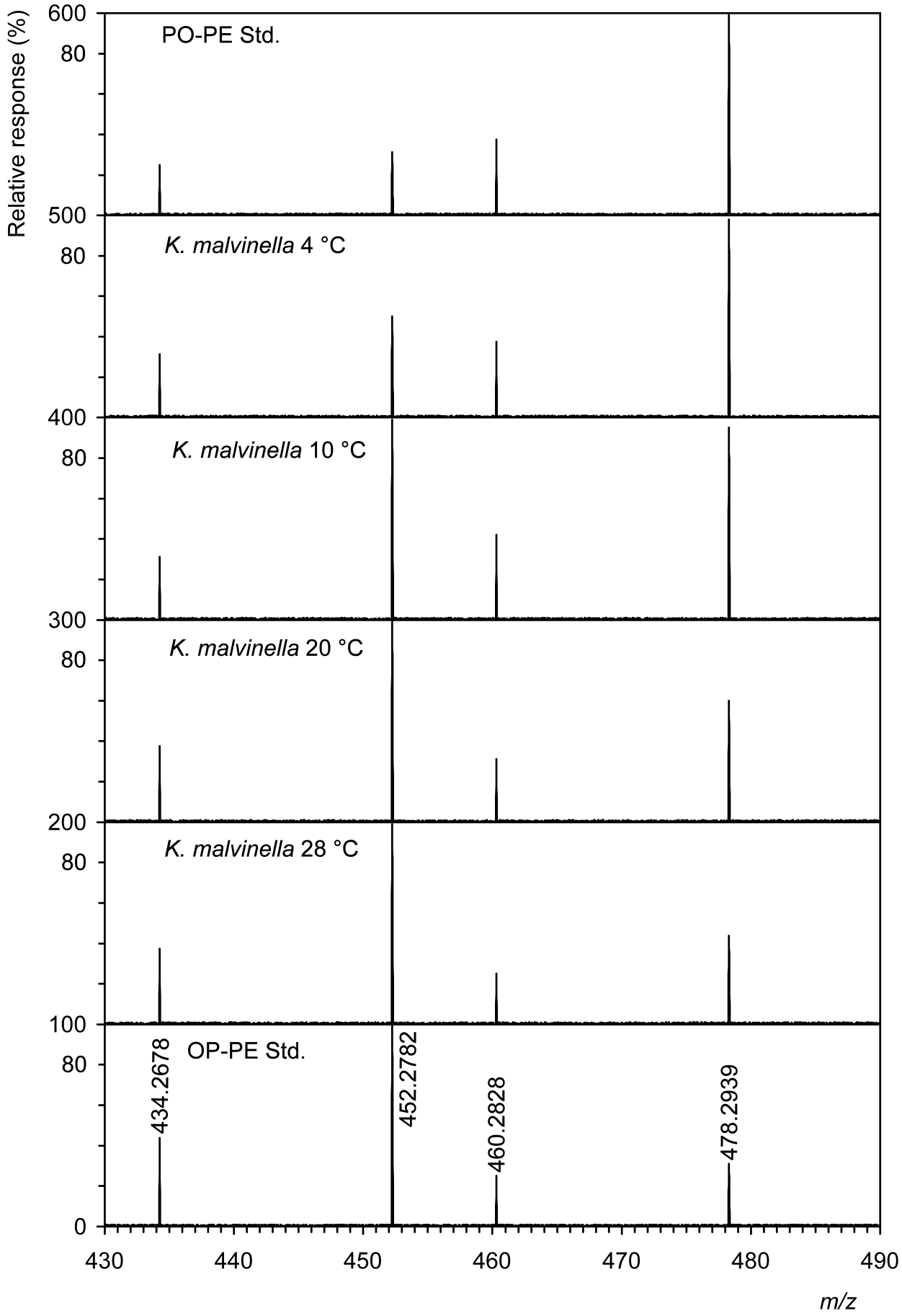
Fig. 5S. Cutout from figure 4S.


Relative response (%)
80
0
SE
TG
DG
FA
Es
PG
PC
PE
LPC
PI
PA
PS
PIP
LPA
PIPs
standards
DMPE
MMPE
U1
U2
U3
U4
K. malvinella 28 °C
K. malvinella 20 °C
K. malvinella 10 °C
K. malvinella 4 °C
5
10
15
20
25
30
35
40
45
50
55
60
time (min)


Relative response (%)
OP-PC std.
K. malvinella 4 °C
K. malvinella 10 °C
K. malvinella 20 °C
K. malvinella 28 °C
PO-PC std.
80
0
152.9961
168.0429
224.0689
255.2329
281.2484
462.2989
480.3094
488.3144
506.3249
673.4812
744.5544
818.5915
150
250
350
450
550
650
750
m/z
850


Relative response (%)
OP-PC Std.
4 °C
10 °C
20 °C
28 °C
PO-PC Std.
80
0
462.2989
480.3094
488.3144
506.3249
460
470
480
490
500
510
m/z


Relative response (%)
Po-PE Std.
K. malvinella 4 °C
K. malvinella 10 °C
K. malvinella 20 °C
K. malvinella 28 °C
OP-PE Std.
255.2331
281.2485
434.2678
452.2782
460.2828
478.2939
716.5231
80
0
200
300
400
500
600
700
800
m/z


Relative response (%)
PO-PE Std.
K. malvinella 4 °C
K. malvinella 10 °C
K. malvinella 20 °C
K. malvinella 28 °C
OP-PE Std.
434.2678
452.2782
460.2828
478.2939
600
80
500
80
400
80
300
80
200
80
100
80
0
430
440
450
460
470
480
490
m/z