

Supplementary results

In Figure S1, images of the growth of *Cladosporium* species on plates supplemented with PBSA, PBAT and LDPE and the negative control (SDS) after 35 days of incubation at 20 ± 1 °C in the dark were reported. All the *Cladosporium* species promoted the formation of a wider putative fungal degradation area (PFDA) on plates with PBSA and PBAT than the ones with LDPE. In the case of PBSA, *C. pseudocladosporioides* and *C. cladosporioides* showed a zone of clearance covering the whole plate surface, whereas *C. velox*, *C. austrohemisphaericum* and *C. psychrotolerans* did not show a comparable clearance pattern. In the case of PBAT, *C. cladosporioides* and *C. velox* grew on the whole plate surface. In the case of LDPE plates, no significant differences among fungal strains were evidenced.

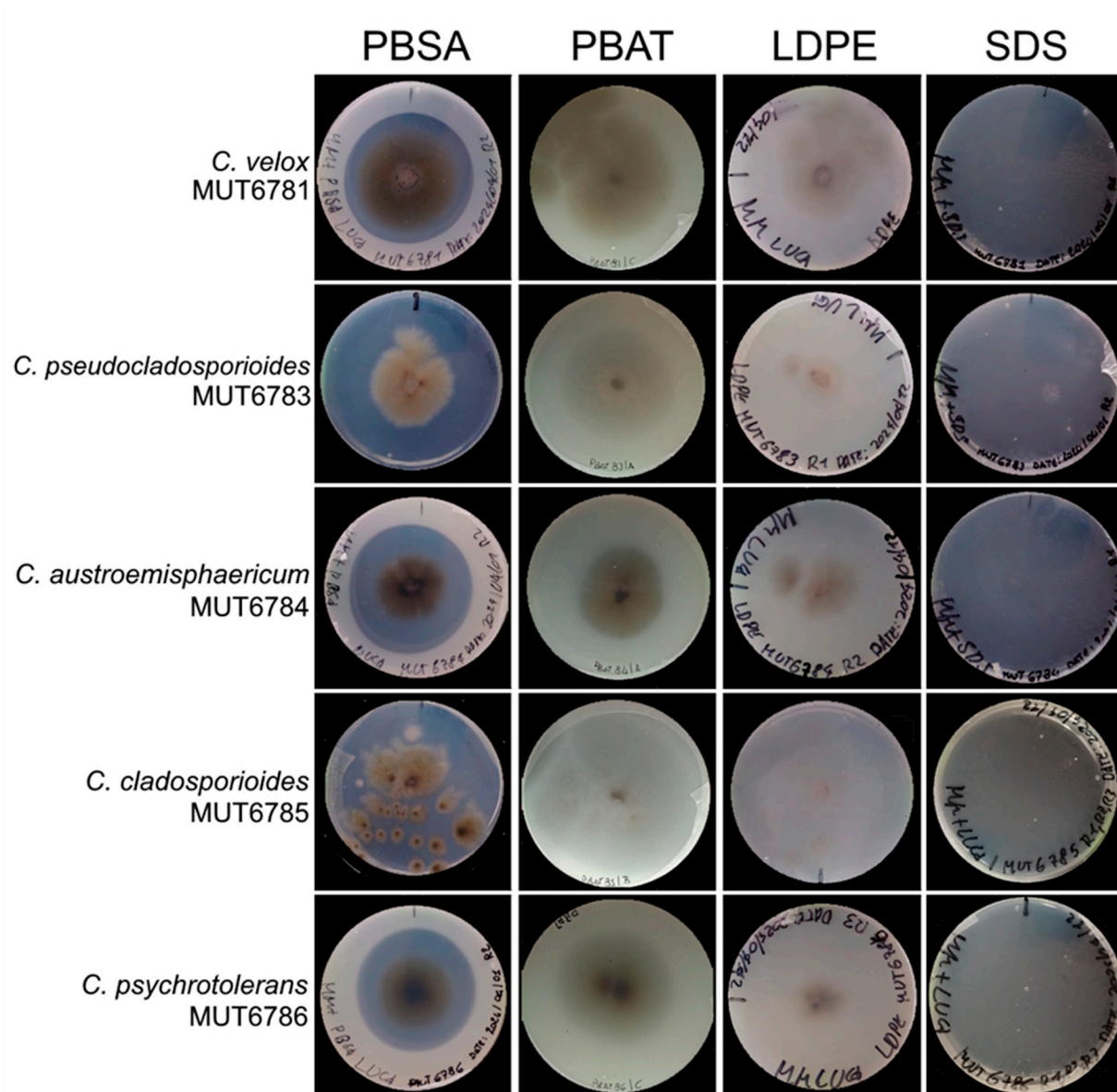


Figure S1. Images of *Cladosporium* sps growth on MM agar plates supplemented with PBSA, PBAT and LDPE and the negative control (SDS) after 35 days of incubation at 20 ± 1 °C in the dark.

Raw data on Putative Fungal Degradation Activity

Table S1. Monitoring the fungal growth in liquid MM and MYE supplemented with anionic and non-ionic surfactants. Incubation conditions: 7 days at 20°C in the dark. “x”= growth “-“= no growth.

Fungal strains	Surfactant	Minimal Agar Medium (MM)				Minimal Agar Medium + 1g/L of yeast extract (MYE)			
		Surfactant final concentration (mg/L)				Surfactant final concentration (mg/L)			
		0	0.2	20	2000	0	0.2	20	2000
<i>Cladosporium velox</i> MUT6781	Sarcosyl	-	-	-	-	x	x	-	-
	SDS	-	-	-	-	x	x	x	-
	Triton X-100	-	-	-	-	x	x	x	x
	Tween80	-	-	-	x	x	x	x	x
	Ramnlipids	-	-	-	x	x	x	x	x
<i>Cladosporium pseudocladosporioides</i> MUT6783	Sarcosyl	-	-	-	-	x	x	x	-
	SDS	-	-	-	-	x	x	x	-
	Triton X-100	-	-	-	-	x	x	x	x
	Tween80	-	-	-	x	x	x	x	x
	Ramnlipids	-	-	-	x	x	x	x	x
<i>Cladosporium austroemisphaericum</i> MUT6784	Sarcosyl	-	-	-	-	x	x	x	-
	SDS	-	-	-	-	x	x	x	-
	Triton X-100	-	-	-	-	x	x	x	x
	Tween80	-	-	-	x	x	x	x	x
	Ramnlipids	-	-	-	x	x	x	x	x
<i>Cladosporium cladosporioides</i> MUT6785	Sarcosyl	-	-	-	-	x	x	x	-
	SDS	-	-	-	-	x	x	x	-
	Triton X-100	-	-	-	-	x	x	x	x
	Tween80	-	-	-	x	x	x	x	x
	Ramnlipids	-	-	-	x	x	x	x	x
<i>Cladosporium psychrotolerans</i> MUT6786	Sarcosyl	-	-	-	-	x	x	x	-
	SDS	-	-	-	-	x	x	x	-
	Triton X-100	-	-	-	-	x	x	x	x
	Tween80	-	-	-	x	x	x	x	x
	Ramnlipids	-	-	-	-	x	x	x	-

Table S2 – raw Putative Fungal Degradation Activities measures

strain	plastic	time	rep	area
C.pseudocladosporioides MUT6783	SDS	0	A	0
C.pseudocladosporioides MUT6783	SDS	0	B	0
C.pseudocladosporioides MUT6783	SDS	0	C	0
C.austrohemisphaericum MUT6784	SDS	0	A	0
C.austrohemisphaericum MUT6784	SDS	0	B	0
C.austrohemisphaericum MUT6784	SDS	0	C	0
C.velox MUT6781	SDS	0	A	0
C.velox MUT6781	SDS	0	B	0
C.velox MUT6781	SDS	0	C	0
C.cladosporioides MUT6785	SDS	0	A	0
C.cladosporioides MUT6785	SDS	0	B	0
C.cladosporioides MUT6785	SDS	0	C	0
C.psychrotolerans MUT6786	SDS	0	A	0
C.psychrotolerans MUT6786	SDS	0	B	0
C.psychrotolerans MUT6786	SDS	0	C	0
C.pseudocladosporioides MUT6783	SDS	7	A	0
C.pseudocladosporioides MUT6783	SDS	7	B	0
C.pseudocladosporioides MUT6783	SDS	7	C	0
C.austrohemisphaericum MUT6784	SDS	7	A	0
C.austrohemisphaericum MUT6784	SDS	7	B	0
C.austrohemisphaericum MUT6784	SDS	7	A	0
C.velox MUT6781	SDS	7	A	0
C.velox MUT6781	SDS	7	B	0
C.velox MUT6781	SDS	7	C	0
C.cladosporioides MUT6785	SDS	7	B	0
C.cladosporioides MUT6785	SDS	7	C	0,049667
C.cladosporioides MUT6785	SDS	7	A	0
C.psychrotolerans MUT6786	SDS	7	A	0
C.psychrotolerans MUT6786	SDS	7	B	0
C.psychrotolerans MUT6786	SDS	7	C	0
C.pseudocladosporioides MUT6783	SDS	14	B	0
C.pseudocladosporioides MUT6783	SDS	14	C	0

C.pseudocladosporioides MUT6783	SDS	14	A	0
C.austrohemisphaericum MUT6784	SDS	14	B	0
C.austrohemisphaericum MUT6784	SDS	14	C	0
C.austrohemisphaericum MUT6784	SDS	14	A	0,073
C.velox MUT6781	SDS	14	B	0
C.velox MUT6781	SDS	14	C	0
C.velox MUT6781	SDS	14	A	0
C.cladosporioides MUT6785	SDS	14	B	0
C.cladosporioides MUT6785	SDS	14	C	0,048333
C.cladosporioides MUT6785	SDS	14	A	0
C.psychrotolerans MUT6786	SDS	14	A	0
C.psychrotolerans MUT6786	SDS	14	B	0
C.psychrotolerans MUT6786	SDS	14	C	0
C.pseudocladosporioides MUT6783	SDS	21	B	0
C.pseudocladosporioides MUT6783	SDS	21	C	0
C.pseudocladosporioides MUT6783	SDS	21	A	0
C.austrohemisphaericum MUT6784	SDS	21	C	0
C.austrohemisphaericum MUT6784	SDS	21	A	0
C.austrohemisphaericum MUT6784	SDS	21	B	0,073
C.velox MUT6781	SDS	21	B	0
C.velox MUT6781	SDS	21	A	0
C.velox MUT6781	SDS	21	B	0
C.cladosporioides MUT6785	SDS	21	C	0
C.cladosporioides MUT6785	SDS	21	A	0,029333
C.cladosporioides MUT6785	SDS	21	B	0
C.psychrotolerans MUT6786	SDS	21	B	0
C.psychrotolerans MUT6786	SDS	21	C	0
C.psychrotolerans MUT6786	SDS	21	A	0
C.pseudocladosporioides MUT6783	SDS	28	C	0,076333
C.pseudocladosporioides MUT6783	SDS	28	A	0,027667
C.pseudocladosporioides MUT6783	SDS	28	B	0
C.austrohemisphaericum MUT6784	SDS	28	C	0
C.austrohemisphaericum MUT6784	SDS	28	A	0
C.austrohemisphaericum MUT6784	SDS	28	B	0,073

C.velox MUT6781	SDS	28	C	0
C.velox MUT6781	SDS	28	A	0
C.velox MUT6781	SDS	28	B	0
C.cladosporioides MUT6785	SDS	28	C	0
C.cladosporioides MUT6785	SDS	28	A	0,027667
C.cladosporioides MUT6785	SDS	28	B	0
C.psychrotolerans MUT6786	SDS	28	B	0
C.psychrotolerans MUT6786	SDS	28	C	0
C.psychrotolerans MUT6786	SDS	28	A	0
C.pseudocladosporioides MUT6783	SDS	35	C	0,076333
C.pseudocladosporioides MUT6783	SDS	35	A	0,027667
C.pseudocladosporioides MUT6783	SDS	35	B	0
C.austrohemisphaericum MUT6784	SDS	35	C	0
C.austrohemisphaericum MUT6784	SDS	35	A	0
C.austrohemisphaericum MUT6784	SDS	35	B	0,073
C.velox MUT6781	SDS	35	C	0
C.velox MUT6781	SDS	35	A	0
C.velox MUT6781	SDS	35	B	0
C.cladosporioides MUT6785	SDS	35	C	0
C.cladosporioides MUT6785	SDS	35	A	0,027667
C.cladosporioides MUT6785	SDS	35	B	0
C.psychrotolerans MUT6786	SDS	35	B	0
C.psychrotolerans MUT6786	SDS	35	C	0
C.psychrotolerans MUT6786	SDS	35	A	0
C.pseudocladosporioides MUT6783	PBSA	0	A	0
C.pseudocladosporioides MUT6783	PBSA	0	B	0
C.pseudocladosporioides MUT6783	PBSA	0	C	0
C.austrohemisphaericum MUT6784	PBSA	0	A	0
C.austrohemisphaericum MUT6784	PBSA	0	B	0
C.austrohemisphaericum MUT6784	PBSA	0	C	0
C.velox MUT6781	PBSA	0	A	0
C.velox MUT6781	PBSA	0	B	0
C.velox MUT6781	PBSA	0	C	0
C.cladosporioides MUT6785	PBSA	0	A	0,019333
C.cladosporioides MUT6785	PBSA	0	B	0
C.cladosporioides MUT6785	PBSA	0	C	0
C.psychrotolerans MUT6786	PBSA	0	A	0

C.psychrotolerans MUT6786	PBSA	0	B	0
C.psychrotolerans MUT6786	PBSA	0	C	0
C.pseudocladosporioides MUT6783	PBSA	7	A	1,367333
C.pseudocladosporioides MUT6783	PBSA	7	B	0,801333
C.pseudocladosporioides MUT6783	PBSA	7	C	1,836
C.austrohemisphaericum MUT6784	PBSA	7	B	1,788667
C.austrohemisphaericum MUT6784	PBSA	7	C	0,385333
C.austrohemisphaericum MUT6784	PBSA	7	A	1,197667
C.velox MUT6781	PBSA	7	A	0,443
C.velox MUT6781	PBSA	7	B	1,463
C.velox MUT6781	PBSA	7	C	0
C.cladosporioides MUT6785	PBSA	7	B	0,501667
C.cladosporioides MUT6785	PBSA	7	C	0,766
C.cladosporioides MUT6785	PBSA	7	A	4,193667
C.psychrotolerans MUT6786	PBSA	7	A	0
C.psychrotolerans MUT6786	PBSA	7	B	0,18733
C.psychrotolerans MUT6786	PBSA	7	C	0,16933
C.pseudocladosporioides MUT6783	PBSA	14	B	11,702
C.pseudocladosporioides MUT6783	PBSA	14	C	8,601
C.pseudocladosporioides MUT6783	PBSA	14	A	10,63167
C.austrohemisphaericum MUT6784	PBSA	14	B	9,783
C.austrohemisphaericum MUT6784	PBSA	14	C	7,583333
C.austrohemisphaericum MUT6784	PBSA	14	A	10,43733
C.velox MUT6781	PBSA	14	B	6,438
C.velox MUT6781	PBSA	14	C	8,301667
C.velox MUT6781	PBSA	14	A	7,038333
C.cladosporioides MUT6785	PBSA	14	B	10,33067
C.cladosporioides MUT6785	PBSA	14	C	16,60733
C.cladosporioides MUT6785	PBSA	14	A	38,01567
C.psychrotolerans MUT6786	PBSA	14	A	2,63067
C.psychrotolerans MUT6786	PBSA	14	B	2,56333
C.psychrotolerans MUT6786	PBSA	14	C	3,084
C.pseudocladosporioides MUT6783	PBSA	21	B	25,74267
C.pseudocladosporioides MUT6783	PBSA	21	A	22,81333
C.pseudocladosporioides MUT6783	PBSA	21	B	22,95933

C.austrohemisphaericum MUT6784	PBSA	21	C	16,29567
C.austrohemisphaericum MUT6784	PBSA	21	A	15,10233
C.austrohemisphaericum MUT6784	PBSA	21	B	17,49667
C.velox MUT6781	PBSA	21	C	13,78833
C.velox MUT6781	PBSA	21	A	13,55933
C.velox MUT6781	PBSA	21	B	16,05833
C.cladosporioides MUT6785	PBSA	21	C	50,27267
C.cladosporioides MUT6785	PBSA	21	A	42,698
C.cladosporioides MUT6785	PBSA	21	B	55,27833
C.psychrotolerans MUT6786	PBSA	21	B	8,08633
C.psychrotolerans MUT6786	PBSA	21	C	7,35067
C.psychrotolerans MUT6786	PBSA	21	A	8,114
C.pseudocladosporioides MUT6783	PBSA	28	C	47,48967
C.pseudocladosporioides MUT6783	PBSA	28	A	40,25
C.pseudocladosporioides MUT6783	PBSA	28	B	41,42133
C.austrohemisphaericum MUT6784	PBSA	28	C	26,13433
C.austrohemisphaericum MUT6784	PBSA	28	A	24,814
C.austrohemisphaericum MUT6784	PBSA	28	B	26,56167
C.velox MUT6781	PBSA	28	C	23,02533
C.velox MUT6781	PBSA	28	A	23,40133
C.velox MUT6781	PBSA	28	B	26,827
C.cladosporioides MUT6785	PBSA	28	C	63,23233
C.cladosporioides MUT6785	PBSA	28	A	52,94867
C.cladosporioides MUT6785	PBSA	28	B	64,30667
C.psychrotolerans MUT6786	PBSA	28	B	17,934
C.psychrotolerans MUT6786	PBSA	28	C	17,456
C.psychrotolerans MUT6786	PBSA	28	A	17,1073
C.pseudocladosporioides MUT6783	PBSA	35	C	63,6
C.pseudocladosporioides MUT6783	PBSA	35	A	46,67467
C.pseudocladosporioides MUT6783	PBSA	35	B	49,37833
C.austrohemisphaericum MUT6784	PBSA	35	C	30,91667
C.austrohemisphaericum MUT6784	PBSA	35	A	29,419
C.austrohemisphaericum MUT6784	PBSA	35	B	31,55667
C.velox MUT6781	PBSA	35	C	28,46767
C.velox MUT6781	PBSA	35	A	29,529

C.velox MUT6781	PBSA	35	B	32,779
C.cladosporioides MUT6785	PBSA	35	A	63,3
C.cladosporioides MUT6785	PBSA	35	B	63,5
C.cladosporioides MUT6785	PBSA	35	C	63,6
C.psychrotolerans MUT6786	PBSA	35	B	26,1643
C.psychrotolerans MUT6786	PBSA	35	C	25,7853
C.psychrotolerans MUT6786	PBSA	35	A	24,785
C.pseudocladosporioides MUT6783	LDPE	0	A	0
C.pseudocladosporioides MUT6783	LDPE	0	B	0
C.pseudocladosporioides MUT6783	LDPE	0	C	0
C.austrohemisphaericum MUT6784	LDPE	0	A	0
C.austrohemisphaericum MUT6784	LDPE	0	B	0
C.austrohemisphaericum MUT6784	LDPE	0	C	0
C.velox MUT6781	LDPE	0	A	0,001
C.velox MUT6781	LDPE	0	B	0,019
C.velox MUT6781	LDPE	0	C	0,019333
C.cladosporioides MUT6785	LDPE	0	A	0,069333
C.cladosporioides MUT6785	LDPE	0	B	0,115667
C.cladosporioides MUT6785	LDPE	0	C	0,040333
C.psychrotolerans MUT6786	LDPE	0	A	0
C.psychrotolerans MUT6786	LDPE	0	B	0
C.psychrotolerans MUT6786	LDPE	0	C	0
C.pseudocladosporioides MUT6783	LDPE	7	B	0,567667
C.pseudocladosporioides MUT6783	LDPE	7	C	0,886
C.pseudocladosporioides MUT6783	LDPE	7	A	0,57
C.austrohemisphaericum MUT6784	LDPE	7	B	7,595667
C.austrohemisphaericum MUT6784	LDPE	7	C	1,109333
C.austrohemisphaericum MUT6784	LDPE	7	A	2,427
C.velox MUT6781	LDPE	7	B	0,581667
C.velox MUT6781	LDPE	7	C	0,672667
C.velox MUT6781	LDPE	7	A	0,706667
C.cladosporioides MUT6785	LDPE	7	B	0,791667
C.cladosporioides MUT6785	LDPE	7	C	0,411
C.cladosporioides MUT6785	LDPE	7	A	0,157667
C.psychrotolerans MUT6786	LDPE	7	A	0,28167
C.psychrotolerans MUT6786	LDPE	7	B	0
C.psychrotolerans MUT6786	LDPE	7	C	0,38667

C.pseudocladosporioides MUT6783	LDPE	14	B	0,693333
C.pseudocladosporioides MUT6783	LDPE	14	C	2,852667
C.pseudocladosporioides MUT6783	LDPE	14	A	2,768333
C.austrohemisphaericum MUT6784	LDPE	14	B	22,942
C.austrohemisphaericum MUT6784	LDPE	14	C	4,645667
C.austrohemisphaericum MUT6784	LDPE	14	A	8,364
C.velox MUT6781	LDPE	14	B	6,723333
C.velox MUT6781	LDPE	14	C	6,082667
C.velox MUT6781	LDPE	14	A	8,419333
C.cladosporioides MUT6785	LDPE	14	B	0,549
C.cladosporioides MUT6785	LDPE	14	C	0,330333
C.cladosporioides MUT6785	LDPE	14	A	0,497667
C.psychrotolerans MUT6786	LDPE	14	B	0,80467
C.psychrotolerans MUT6786	LDPE	14	C	0,654
C.psychrotolerans MUT6786	LDPE	14	A	1,69967
C.pseudocladosporioides MUT6783	LDPE	21	C	3,227333
C.pseudocladosporioides MUT6783	LDPE	21	A	5,249
C.pseudocladosporioides MUT6783	LDPE	21	B	5,094
C.austrohemisphaericum MUT6784	LDPE	21	C	31,306
C.austrohemisphaericum MUT6784	LDPE	21	A	8,303667
C.austrohemisphaericum MUT6784	LDPE	21	B	12,41
C.velox MUT6781	LDPE	21	C	12,66467
C.velox MUT6781	LDPE	21	A	12,18933
C.velox MUT6781	LDPE	21	B	16,28533
C.cladosporioides MUT6785	LDPE	21	C	0,922667
C.cladosporioides MUT6785	LDPE	21	A	0,568
C.cladosporioides MUT6785	LDPE	21	B	0,456333
C.psychrotolerans MUT6786	LDPE	21	B	0,97
C.psychrotolerans MUT6786	LDPE	21	C	1,09867
C.psychrotolerans MUT6786	LDPE	21	A	2,81767
C.pseudocladosporioides MUT6783	LDPE	28	C	4,71
C.pseudocladosporioides MUT6783	LDPE	28	A	8,264667
C.pseudocladosporioides MUT6783	LDPE	28	B	7,163333
C.austrohemisphaericum MUT6784	LDPE	28	C	29,50567

C.austrohemisphaericum MUT6784	LDPE	28	A	12,676
C.austrohemisphaericum MUT6784	LDPE	28	B	17,95567
C.velox MUT6781	LDPE	28	C	29,385
C.velox MUT6781	LDPE	28	A	20,916
C.velox MUT6781	LDPE	28	B	28,76133
C.cladosporioides MUT6785	LDPE	28	C	1,079333
C.cladosporioides MUT6785	LDPE	28	A	0,835667
C.cladosporioides MUT6785	LDPE	28	B	0,446667
C.psychrotolerans MUT6786	LDPE	28	B	3,144
C.psychrotolerans MUT6786	LDPE	28	C	1,75767
C.psychrotolerans MUT6786	LDPE	28	A	2,90433
C.velox MUT6781	LDPE	35	A	29,548
C.velox MUT6781	LDPE	35	B	20,983
C.velox MUT6781	LDPE	35	C	28,652
C.pseudocladosporioides MUT6783	LDPE	35	A	4,836
C.pseudocladosporioides MUT6783	LDPE	35	B	8,374
C.pseudocladosporioides MUT6783	LDPE	35	C	7,254
C.austrohemisphaericum MUT6784	LDPE	35	A	29,555
C.austrohemisphaericum MUT6784	LDPE	35	B	12,965
C.austrohemisphaericum MUT6784	LDPE	35	C	18,065
C.cladosporioides MUT6785	LDPE	35	A	1,125
C.cladosporioides MUT6785	LDPE	35	B	0,966
C.cladosporioides MUT6785	LDPE	35	C	0,4478
C.psychrotolerans MUT6786	LDPE	35	A	3,24
C.psychrotolerans MUT6786	LDPE	35	B	1,852
C.psychrotolerans MUT6786	LDPE	35	C	2,964
C.velox MUT6781	PBAT	0	A	0
C.velox MUT6781	PBAT	0	B	0
C.velox MUT6781	PBAT	0	C	0
C.pseudocladosporioides MUT6783	PBAT	0	A	0
C.pseudocladosporioides MUT6783	PBAT	0	B	0
C.pseudocladosporioides MUT6783	PBAT	0	C	0
C.austrohemisphaericum MUT6784	PBAT	0	A	0
C.austrohemisphaericum MUT6784	PBAT	0	B	0
C.austrohemisphaericum MUT6784	PBAT	0	C	0
C.cladosporioides MUT6785	PBAT	0	A	0

C.cladosporioides MUT6785	PBAT	0	B	0
C.cladosporioides MUT6785	PBAT	0	C	0
C.psychrotolerans MUT6786	PBAT	0	A	0
C.psychrotolerans MUT6786	PBAT	0	B	0
C.psychrotolerans MUT6786	PBAT	0	C	0
C.velox MUT6781	PBAT	7	A	3,5
C.velox MUT6781	PBAT	7	B	0,52
C.velox MUT6781	PBAT	7	C	0,459
C.pseudocladosporioides MUT6783	PBAT	7	A	0,77
C.pseudocladosporioides MUT6783	PBAT	7	B	2,61
C.pseudocladosporioides MUT6783	PBAT	7	C	0,79
C.austrohemisphaericum MUT6784	PBAT	7	A	2,96
C.austrohemisphaericum MUT6784	PBAT	7	B	1,732
C.austrohemisphaericum MUT6784	PBAT	7	C	1,787
C.cladosporioides MUT6785	PBAT	7	A	5,2
C.cladosporioides MUT6785	PBAT	7	B	6,17
C.cladosporioides MUT6785	PBAT	7	C	6,95
C.psychrotolerans MUT6786	PBAT	7	A	1,02
C.psychrotolerans MUT6786	PBAT	7	B	2,79
C.psychrotolerans MUT6786	PBAT	7	C	2,36
C.velox MUT6781	PBAT	14	A	6,96
C.velox MUT6781	PBAT	14	B	13,62
C.velox MUT6781	PBAT	14	C	6,41
C.pseudocladosporioides MUT6783	PBAT	14	A	8,46
C.pseudocladosporioides MUT6783	PBAT	14	B	11,25
C.pseudocladosporioides MUT6783	PBAT	14	C	8,43
C.austrohemisphaericum MUT6784	PBAT	14	A	7,57
C.austrohemisphaericum MUT6784	PBAT	14	B	5,7
C.austrohemisphaericum MUT6784	PBAT	14	C	6,71
C.cladosporioides MUT6785	PBAT	14	A	15,47
C.cladosporioides MUT6785	PBAT	14	B	23,9
C.cladosporioides MUT6785	PBAT	14	C	17,43
C.psychrotolerans MUT6786	PBAT	14	A	7,72
C.psychrotolerans MUT6786	PBAT	14	B	8,39
C.psychrotolerans MUT6786	PBAT	14	C	8,34
C.velox MUT6781	PBAT	21	A	32,255
C.velox MUT6781	PBAT	21	B	38,48

C.velox MUT6781	PBAT	21	C	28,07
C.pseudocladosporioides MUT6783	PBAT	21	A	22,29
C.pseudocladosporioides MUT6783	PBAT	21	B	24,36
C.pseudocladosporioides MUT6783	PBAT	21	C	18,61
C.austrohemisphaericum MUT6784	PBAT	21	A	15,33
C.austrohemisphaericum MUT6784	PBAT	21	B	11,61
C.austrohemisphaericum MUT6784	PBAT	21	C	14,45
C.cladosporioides MUT6785	PBAT	21	A	35,24
C.cladosporioides MUT6785	PBAT	21	B	44,66
C.cladosporioides MUT6785	PBAT	21	C	38,4
C.psychrotolerans MUT6786	PBAT	21	A	17,73
C.psychrotolerans MUT6786	PBAT	21	B	17,71
C.psychrotolerans MUT6786	PBAT	21	C	18,46
C.velox MUT6781	PBAT	28	A	29,34
C.velox MUT6781	PBAT	28	B	41,07
C.velox MUT6781	PBAT	28	C	28,82
C.pseudocladosporioides MUT6783	PBAT	28	A	21,58
C.pseudocladosporioides MUT6783	PBAT	28	B	24,45
C.pseudocladosporioides MUT6783	PBAT	28	C	20,07
C.austrohemisphaericum MUT6784	PBAT	28	A	14,87
C.austrohemisphaericum MUT6784	PBAT	28	B	11,92
C.austrohemisphaericum MUT6784	PBAT	28	C	14,55
C.cladosporioides MUT6785	PBAT	28	A	35,23
C.cladosporioides MUT6785	PBAT	28	B	46,84
C.cladosporioides MUT6785	PBAT	28	C	42,17
C.psychrotolerans MUT6786	PBAT	28	A	18,56
C.psychrotolerans MUT6786	PBAT	28	B	18,17
C.psychrotolerans MUT6786	PBAT	28	C	18,58
C.velox MUT6781	PBAT	35	A	31,54
C.velox MUT6781	PBAT	35	B	41,5
C.velox MUT6781	PBAT	35	C	33,98
C.pseudocladosporioides MUT6783	PBAT	35	A	25,45
C.pseudocladosporioides MUT6783	PBAT	35	B	26,74
C.pseudocladosporioides MUT6783	PBAT	35	C	23,67

C.austrohemisphaericum MUT6784	PBAT	35	A	17
C.austrohemisphaericum MUT6784	PBAT	35	B	16,01
C.austrohemisphaericum MUT6784	PBAT	35	C	14,7
C.cladosporioides MUT6785	PBAT	35	A	38,25
C.cladosporioides MUT6785	PBAT	35	B	49,92
C.cladosporioides MUT6785	PBAT	35	C	44,86
C.psychrotolerans MUT6786	PBAT	35	A	21,45
C.psychrotolerans MUT6786	PBAT	35	B	20,99
C.psychrotolerans MUT6786	PBAT	35	C	22,06

Statistical analyses on Putative Fungal Degradation Activity

A) Linear mixed effects model paired with ANOVA

```
> model <- lmer(area ~ day + strain + plastic + (1 | identifier), data = res_selected)
```

```
> anova(model)
```

Type III Analysis of Variance Table with Satterthwaite's method

	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)	Signif
day	14931.2	14931.2	1	223.274	213.8048	< 2.2e-16	***
strain	1130.3	282.6	4	50.608	4.0462	0.006364	**
plastic	7424.9	2475.0	3	51.365	35.4396	1.484e-12	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

B) t-test comparing PDFA between polymers at 35 days of growth.

```
> t_test(area ~ plastic, p.adjust.method = "fdr", data = res_35)
```

y	group 1	group 2	n1	n2	statisti c	df	p	p.adj	p.adj.s ignif
<chr> >	<chr>	<chr>	<int> >	<int> >	<dbl>	<dbl> >	<dbl>	<dbl>	<chr>
area	PBSA	PBAT	15	15	2.43	24.9	0.023	0.023	*
area	PBSA	LDPE	15	15	5.85	25.1	0.00000418	0.00000836	****
area	PBSA	SDS	15	15	9.92	14.0	0.000000103	0.000000309	****
area	PBAT	LDPE	15	15	4.25	28.0	0.000214	0.000321	***

area	PBAT	SDS	15	15	10.0	14.0	0.0000000878	0.000000309	****
area	LDPE	SDS	15	15	3.96	14.0	0.001	0.002	**

Statistical analyses based on taxonomy and gene count

Anova to assess the significance of the differences between the *C. cladosporioides* complex and *C. sphaerospermum* complex.

```
> summary(aov(data = corr_data, area ~ taxonomy * plastic))
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)	Signif
taxonomy	1	900	900	12.36	0.0113	**
plastic	2	6477	3239	44.48	8.66e-11	***
taxonomy:plastic	2	3201	1601	21.99	4.04e-07	***
Residuals	39	2840	73			

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

T-test confronting PFDA between the *C. cladosporioides* complex and *C. sphaerospermum* complex for each plastic.

```
> corr_data %>% group_by(plastic) %>% t_test(area ~ taxonomy)
```

plastic	y	group1	group2	n1	n2	statistic	df	P
PBSA	area	<i>C. cladosporioides</i> complex	<i>C. sphaerospermum</i> complex	6	9	8.66	5.80	0.000157
PBAT	area	<i>C. cladosporioides</i> complex	<i>C. sphaerospermum</i> complex	6	9	1.91	9.40	0.0874
LDPE	area	<i>C. cladosporioides</i> complex	<i>C. sphaerospermum</i> complex	6	9	-3.03	9.97	0.127

T-test confronting total plastic related genes between *C. cladosporioides* complex and *C. sphaerospermum* complex.

```
> corr_data %>% t_test(`genes total` ~ taxonomy)
```

y	group1	group2	n1	n2	statistic	df	p
genes total	<i>C.</i> <i>cladosporioides</i> complex	<i>C.</i> <i>sphaerospermum</i> complex	6	9	7.41	12.9	0.00000535

Pearson correlation between predicted genomic traits and PDFA (area):

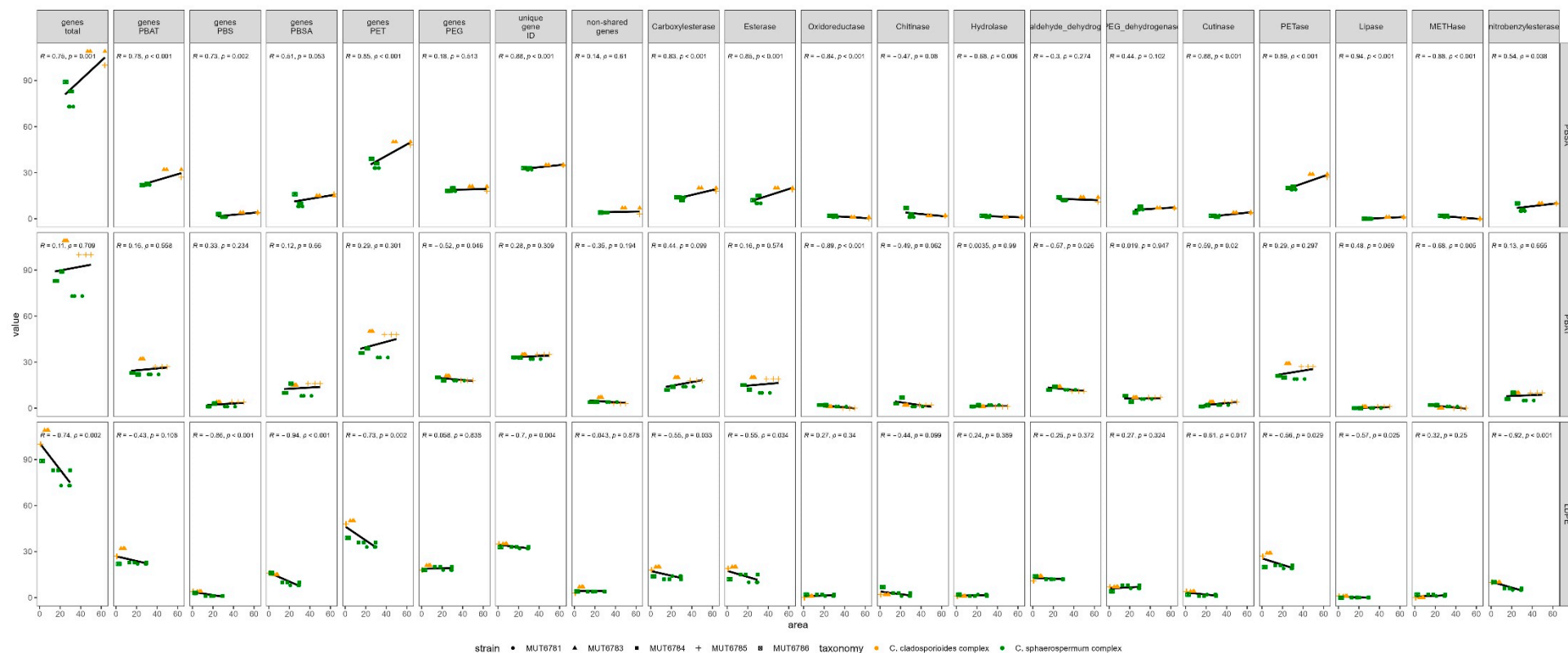


Figure S2 – Pearson correlation between area of Putative Fungal Degradation Activity and relevant genomic features. Shapes identify different *Cladosporium* species. Colours represent the *C. cladosporioides* complex and *C. sphaerospermum* complex.

Supplementary methods

Culture of *A.tonsa*, fungal isolation and identification

The marine calanoid copepod *Acartia tonsa* was cultured as described in Zhang et al. (2013). Specifically, copepods were left to develop for 20 days at 20 ± 1 °C with a 14:10 L:D photoperiod and continuous aeration. Copepod carcasses considered for the isolation of the fungal strains, were obtained by collecting fifty carcasses of *A. tonsa* from the bottom of the culture tank and transferred them into 400 mL of seawater filtered at 0.22 µm mesh net. Carcasses were then incubated for 33 days to induce the speciation of a microbial community, as described in Di Gregorio et. al (2024). The fungal strains were isolated and identified as reported in Niccolini et al. (2025). Specifically, 33-day old carcasses of *A.tonsa* were transferred onto agarised minimal medium (MM), modified from Zeng et al. (2010) (*per* L: 0.4 g KH₂PO₄, 0.6 g Na₂HPO₄, 1.0 g NH₄NO₃, 27.0 g NaCl, 0.1469 g MgSO₄, 0.0151 g CaCl₂, 0.0055 g FeSO₄ in H₂O), covered with PBSA films prepared dissolving 2 g of PBSA granules in chloroform (10 % w/v solution). Then 1.0 mL of PBSA solution was transferred on the top of MM agar plate and incubated for 2 h at room temperature to remove the chloroform. Plates with carcasses of *A.tonsa* were incubated at 20 ± 1 °C in the dark for 12 days. Nine fungal morphotypes growing on PBSA film were then isolated. Fungal isolates were identified as described in Bovio et al. [77], considering molecular and morphological approaches. Fungal morphotypes were growth in 10 mL of MM supplemented with 1.0 g L⁻¹ of yeast extract (MYE) and aerated by shaking at 20 ± 1 °C on a shaker at 150 rpm in the dark. After one week of incubation, fungal cultures were pelleted-down and the DNA was extracted with NucleoSpin® Plant II kit (Macherey–Nagel). DNA was PCR-amplified and sequenced at MacroGen Europe B.V. (Milan, Italy). Internal transcribed spacer (ITS), actin (ACT) [57], translation elongation factor (TEF-1α) (Nalim et al., 2009), and calmodulin (CAL) (Woudenberg et al., 2017) genes were multiple aligned with public nucleotide database (GenBank—NCBI database) to identify fungi. The identified fungi belonging to *Fusarium* sps., *Stemphylium* sps. and *Cladosporium* sps. genera. In particular, the following species *Cladosporium velox* MUT6781, *Cladosporium pseudocladosporioides* MUT6783, *Cladosporium austrohemisphaericum* MUT6784, *Cladosporium cladosporioides* MUT6785, *Cladosporium psychrotolerans* MUT6786 were considered in this study for the plastic degradation experiments and genome sequencing analyses.

References:

[57] Bensch K, Braun U, Groenewald JZ, Crous PW (2012) The genus *Cladosporium*. *Stud Mycol* 72:1–401. <https://doi.org/10.3114/sim0003>

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- [22] S. Di Gregorio et al., «Marine copepod culture as a potential source of bioplastic-degrading microbiome: The case of poly(butylene succinate-co-adipate)», *Chemosphere*, vol. 362, p. 142603, ago. 2024, doi: 10.1016/j.chemosphere.2024.142603.
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- [79] Woudenberg JHC, Hanse B, Van Leeuwen GCM, Groenewald JZ, Crous PW (2017) *Stemphylium* revisited. *Stud Mycol* 87:77–103. <https://doi.org/10.1016/j.simyco.2017.06.001>

Preparation of petri dishes containing polymer emulsions

1- Polymer colloidal suspension (modified from Urbanek A. K. et al., 2017 [32]):

1) Polymer dissolution with solvent:

- dissolve 0.2 g of polymer pellet (PLA, PBAT, PBS) in 6 ml of Dichlorometane
- add 10 ml of distilled sterile water (previously autoclaved at 121°C for 15 min).
- add 0.2 ml of + 2% w/v of Sodium dodecyl sulphate (SDS) solution, previously filtered at 0.22µm.

2) Homogenization and polymer emulsion formation: The mixture was sonicated for 10 min with a 15 s pulse using Vibra Cell VCX500 (Sonics & Materials, Inc., Newtown, CT, USA). The amplitude was set at 80% to mix the contents uniformly. Alternatively, a homogenizer could be used, with the following parameters: 10'000 RPM, 4 minutes.

3) Solvent evaporation, transferring the polymer emulsion into the water phase: to

remove dichloromethane the emulsion should be stirred at 80°C for 2h in a chemical hood.

4) Adjusting the pH: Adjust the final volume of the polymer emulsion to 10 ml with distilled water. Adjust the pH to 7 with KOH. (KOH solution should be autoclaved at 121°C for 15

min, pH should be modified based on the optimal conditions of the microorganisms that should be tested).

N.B: 1.0 ml of polymer emulsion will be used for each plate, considering 20 ml as the final volume for each plate.

5) Filtering the polymer emulsion with 1 um glass filter, previously autoclaved at 121°C for 15 min.

6) Agar plates preparation: prepare the minimal medium (MM) for the fungal strains, following this recipe:

Table S3. MM recipe, modified from Zeng et al., 2010.

MM agar medium	g/L
KH ₂ PO ₄	0.4
Na ₂ HPO ₄	0.6
NH ₄ NO ₃	1.0
NaCl	27.0
Agar	15.0
MgSO ₄ (146.9 g/L)*	1 mL
CaCl ₂ (15.1 g/L)*	1 mL
FeSO ₄ (5.5 g/L)*	1 mL

*= Micronutrient solutions should be prepared separately from the rest of the medium and should be filtered at 0.22 um. 1mL/L of each solutions should be added to the medium, previously autoclaved at 121°C for 15 min.

7) Add the polymer emulsion to MM agar plate medium: At the end of the autoclaving step, cool down the temperature under 100 °C and then add 1.0 ml of the polymer emulsion (PLA; PBAT, PBS) to 19 ml of MYE medium (final volume per plate= 20 ml), making a **5% v/v** polymer colloidal suspension as final concentration. Leave the plates under the biosafety hood to promote medium solidification.

8) Inoculating the MM plates embedded with the polymer emulsions (PBAT, PLA, PBS): starting from 6 -day-old fungal cultures on MYE plates, a fungal inoculum should be derived by scratching the MYE agar plate surface with a bacteriological loop and transferring the inoculum on the centre of the MM plate with the polymer emulsion. The plates should be incubated at 20°C in the dark.

References:

- [32] A. K. Urbanek, W. Rymowicz, M. C. Strzelecki, W. Kociuba, Ł. Franczak, e A. M. Mirończuk, «Isolation and characterization of Arctic microorganisms decomposing bioplastics», AMB Expr, vol. 7, fasc. 1, p. 148, lug. 2017, doi: 10.1186/s13568-017-0448-4.
- [31]J. Zeng, X. Lin, J. Zhang, e X. Li, «Isolation of polycyclic aromatic hydrocarbons (PAHs)-degrading Mycobacterium spp. and the degradation in soil», Journal of Hazardous Materials, vol. 183, fasc. 1, pp. 718–723, nov. 2010, doi: 10.1016/j.jhazmat.2010.07.085.

Genomic DNA extraction protocol

Kindly provide by the Canadian Grain Commission (Canadian Grain Commission).

Samples

Grow fungi on MM agar plates supplemented with 1.0 g L⁻¹ of yeast extract (MYE), aim for full plate coverage but a quarter plate should do. The easier mycelium peels off the agar, the more DNA you get. Note that the protocol can be used also for fungi grown on liquid medium. In that case, mycelia must be collected, strained and put at -80°C until further use. Prepare sterile tin foil wrapped Mortar and pestles and store frozen at -80 or -140°C.

Harvest mycelia and Freeze:

Note: Do one sample at a time to prevent freeze thaw of mycelia

1. Take one frozen mortar and pestle from the freezer and place in a BSC
2. Unwrap foil enough to expose mortar/pestle
3. Carefully scrape mycelia off MYE plate using a sterile scoop (or pipette tip) and place it in the mortar:
 - a) Avoid transferring agar along with mycelia.
 - b) Do not transfer the original inoculating plug if present.
4. Rewrap mortar/pestle with original foil and store at -80 or -140°C to freeze mycelia. Don't forget to label foil if doing multiple samples:
 - a) Typically freeze overnight but will likely freeze in ~ 1 hour
 - b) Samples can be stored longer term like this; place mortar and pestles might be placed into a bin or plastic bag if stored long term

Grinding and Lysis buffer:

Note: Prepare enough 10 % Bleach to soak mortar and pestles

1. Remove frozen mortar/pestle with mycelia and place in a BSC
2. Grind sample to a powder using the pestle
 - a) This is cold on hands, use paper towel/padded gloves to insulate
 - b) Try to get powder in a smaller area after grinding if possible
3. Add TES Lysis buffer (TES buffer (100 mM Tris pH 8.0, 10 mM EDTA, 2% SDS)) in increments (600 μ L) to cover powdered mycelia in mortar and quickly spread it using the pestle before it freezes. Typically, 1200-2400 μ L total.
4. Reseal mortar with foil to prevent frost in sample
 - a) If doing multiple samples, you can start another sample here while waiting
 - b) Open foil and check sample for thawing every few minutes
 - c) When slushy, try to collect the slush into a smaller area
 - d) More lysis buffer can be added at this stage, if desired
5. Once thawed, pipette the slurry into a 2 mL centrifuge tube (or two)
6. Pipet mix slurry and aliquot 500 μ L into a 2 mL tubes for DNA extraction.
7. Store excess slurry at -30°C as a back up
8. Prepare more aliquots if more DNA is required

DNA Extraction: Modified Protocol for the isolation of HMW DNA suitable for long-read Pac-Bio sequencing, Hans Schernthaner, Feb. 2018.

Notes: Preheat benchtop incubator to 37°C (with tube rack) and heat block to 65°C for use later

1. Add to the 500 μ L ground mycelia (Final volume will be 660 μ L, 1% CTAB, 700mM NaCl):
 - a. 93.3 μ L of 5M NaCl
 - b. 66.7 μ L of 10% CTAB
2. Incubate at 65°C for 10 min
 - a. Place weight on tubes so they don't pop open
3. Add 1 volume (660 μ L) of Chloroform:Isoamyl alcohol 24:1 to sample at room temperature
 - a. Mix by shaking and inverting tube
 - b. Do not chill, CTAB precipitates below ~15°C
4. Centrifuge at 13000 g for 10 min
5. Transfer 500 μ L aqueous layer (top) to new 1.5 mL tube
 - a. Avoid transferring the interphase/organic layer
6. Add at least 1 volume of 1% CTAB TE 50/10 buffer to precipitate CTAB-DNA (by reducing [NaCl] to < 35mM) and mix by inversion
 - a. I found that adding > 1 vol (~700 μ L) is better
7. Incubate at room temperature for at least 30 min (longer is fine)

8. Centrifuge at 3000 g for 5 minutes (low speed better)
 - a. Can increase speed if necessary (5000 g or even 10000 g if necessary)
9. Remove supernatant
10. Add 500 μ L TE pH 8 to CTAB-DNA pellet
 - a. Note: Pellet doesn't dissolve well, you can bring the [NaCl] up to 200 mM (RNase doesn't work >200mM). Pellet still won't dissolve
11. Add 7.5 μ L RNase (100 mg/mL, Qiagen 158922)
 - a. Note: RNase can be added after DNA elution instead but will likely need to be removed with Ampure XP beads for Nanopore Sequencing
12. Incubate at 37°C for 30 min
13. Dissolve the CTAB-DNA pellet by adding 125 μ L of 5M NaCl to bring [NaCl] up to 1M
 - a. If different than 500 μ L, divide volume by 4 to get volume of NaCl to add
14. Add 1 volume (625 μ L) of Chloroform:Isoamyl alcohol 24:1 to sample at room temperature
 - a. Mix by shaking and inverting tube
15. Centrifuge at 13000 g for 10 min
16. Transfer 500 μ L aqueous layer (top) to new 1.5 mL tube
 - a. Avoid transferring the interphase/organic layer
17. Add 300 μ L (0.6 volume) of Isopropanol at room temperature
 - a. Mix gently by inversion, DNA may or may not be visible after 20-30 inversions
18. Centrifuge at max speed (21000 g for Eppendorf) for 5 minutes
19. Carefully remove supernatant as pellet is hard to see and often doesn't stick to the tube
 - a. If concerned about losing the pellet, Transfer supernatant to another tube before discarding, invert to check
20. Add 1 mL of 70% Ethanol and invert tube to mix
 - a. Check for pellet, it should be visible floating around when mixing
21. Centrifuge at max speed for 1 minute
22. Carefully remove supernatant as pellet is hard to see and often doesn't stick to the tube
 - a. Remove as much liquid as possible without disturbing pellet
 - b. If concerned about losing the pellet, Transfer supernatant to another tube before discarding, invert to check
23. Let pellet air dry for 15 minutes (or no visible liquid)
24. Add 40 μ L of desired elution buffer (either TE, water, etc)
 - a. Use TE if storing HMW gDNA in the fridge for long periods of time

- b. If RNase was not used yet, add 1.5 μ L RNase/100 μ L elution volume, incubate 30 min at 37°C. Ampure XP bead clean up is recommended if RNase used at this point
25. Incubate at 4°C overnight

Clean up Mortar and Pestles:

1. Prepare enough 10% bleach for all mortar/pestles (and scoops)
2. Place all used mortars and pestles in a container with 10% bleach
 - a. Ensure they are submerged
3. Let soak overnight, or at least a few hours
4. Drain Bleach and rinse items and container well
5. Rinse each mortar and pestle with water
6. Let them air dry
7. Wrap mortar and pestle in tin foil and add a piece of autoclave tape
8. Autoclave (Gravity 30 min sterilizing time), ~ 1h total cycle
 - a. Let them cool down when finished
9. Store them at -80°C

References:

Isolation of HMW DNA suitable for long-read Pac-Bio sequencing, Hans Scherthaner, Feb. 2018

- Lysis Buffer: TES buffer (100 mM Tris pH 8.0, 10 mM EDTA, 2% SDS) For 100 mL: Tris HCl 1M pH 8.0 (10 mL), EDTA 0.5M (2 mL), SDS (2g), Nuclease free H₂O (88 mL)
- For 50 mL NaCl (5M): NaCl (14.61g), Nuclease free H₂O (50 mL). May need mild heat and time to dissolve NaCl
- For 50 mL 10% CTAB: CTAB (5 g), Nuclease free H₂O (50 mL). May need mild heat and time to dissolve CTAB. It may come out of solution at RT. 1% CTAB TE 50/10: (1% CTAB in 50 mM Tris pH 8, 10 mM EDTA)
- For 50 mL: CTAB (0.5g), Tris HCl 1M pH 8.0 (2.5 mL), EDTA 0.5M (1 mL), Nuclease free H₂O (46.5 mL)
- TE buffer: (10 mM Tris pH 8.0, 1 mM EDTA), Qiagen EB buffer is the same thing
- For 50 mL: Tris HCl 1M pH 8.0 (0.5 mL), EDTA 0.5M (0.1 mL), Nuclease free H₂O (49.4 mL)