Supplementary material

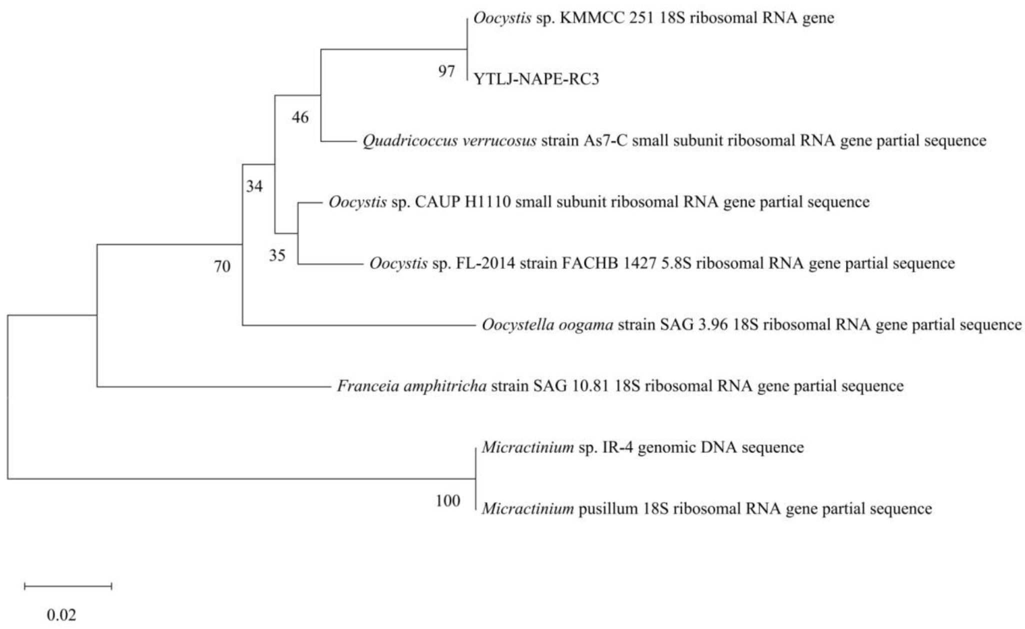

Fig. S1 Phylogenetic tree of YTLJ-NAPE-RC3.

(a)

(b)

(c)

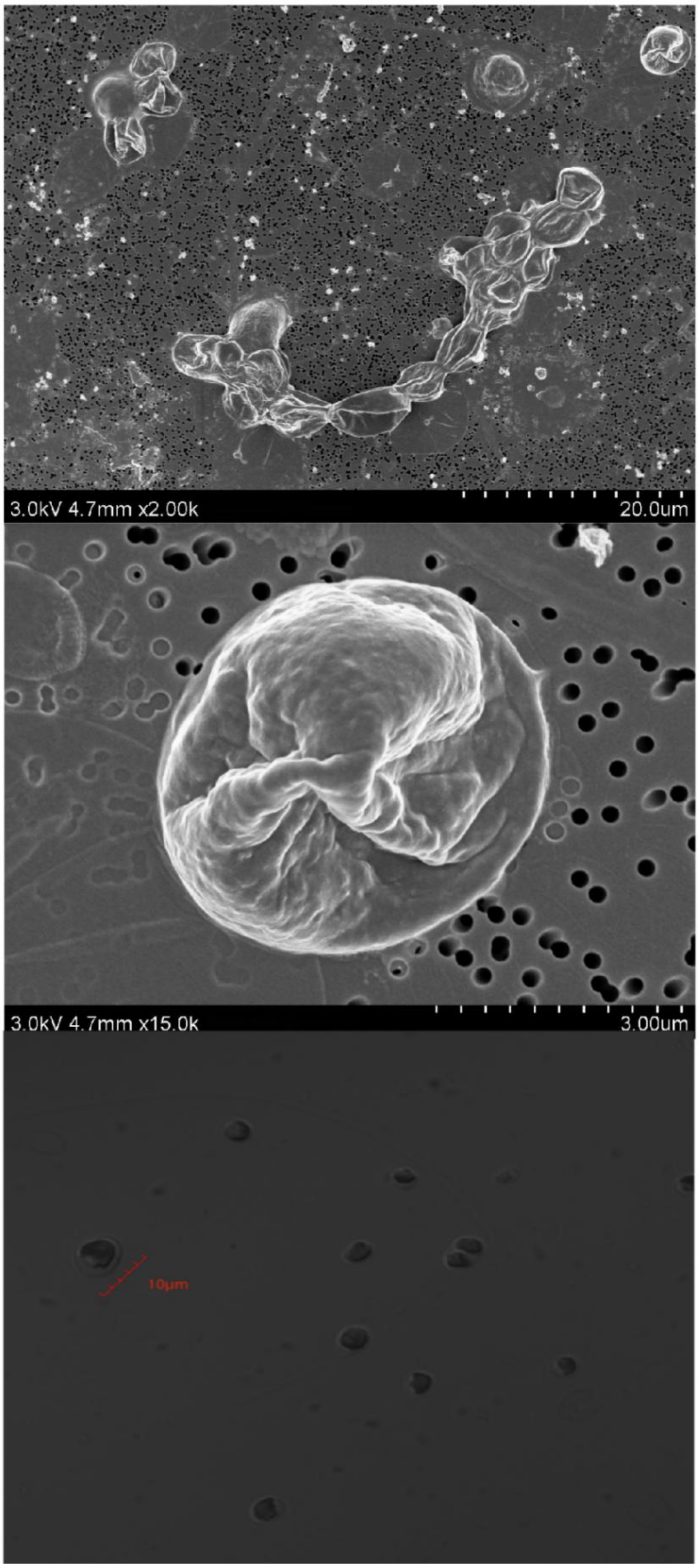

Fig. S2 Scanning electron micrographs (a, b) and confocal micrographs (c) of *Oocystis* sp. YTLJ-NAPE-RC3.

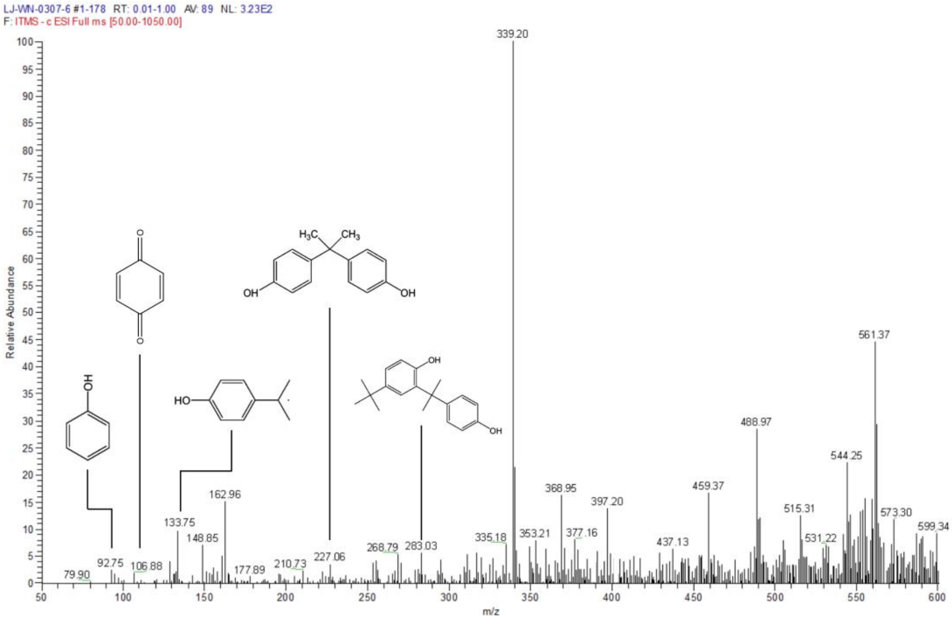

Fig. S3 Mass spectrum of intermediate products.

Table S1 Experimental setting and parameter details

Experimental setting	Parameter details
Initial BPA concentration	100, 200, 500, 1000 and 2000 μg/L
pH	5, 6, 7, 8, 9, 10 and 11
Temperature	10, 20 and 30 °C
Salinity	10‰, 20‰, and 30‰
Inoculum amount	1%, 2%, 3%, and 5% (v/v)
External carbon source	sodium bicarbonate, sodium acetate, and glucose
Light intensity	0, 3000 lx and 4000 lx

Table S2 The sample processing and BPA detection methods

Processing and detection	Details
Sample processing	Centrifuging 1 mL aliquots at 12,000 r/min for 6 minutes. Introduced the supernatant into the chromatographic system.
Detecting instrument	Ultra-performance liquid chromatography (UPLC, ACQUITY H-Class, Waters, USA)
Mobile phase	Methanol/water (60:40, v/v)
Flow rate	0.2 mL/min

Table S3 Selected significantly differentially expressed genes related to POD, SOD and CYP450 in the presence of BPA

Type	Gene_id	log2FC	Regulate	Description
POD-related	TRINITY_DN30398_c0_g1	-6.170	down	peroxiredoxin activity
	TRINITY_DN12992_c0_g1	-6.971	down	peroxidase activity
	TRINITY_DN40308_c0_g1	-8.441	down	peroxidase activity
	TRINITY_DN6511_c1_g2	0.989	up	Glutathione metabolism
	TRINITY_DN22812_c0_g1	-7.411	up	Glutathione metabolism
	TRINITY_DN35890_c0_g1	-8.517	down	response to oxidative stress
	TRINITY_DN35941_c0_g1	-5.644	down	peroxidase activity
SOD-related	TRINITY_DN28178_c0_g1	3.276	up	removal of superoxide radicals
	TRINITY_DN42913_c0_g1	-7.734	down	ribosome
	TRINITY_DN17040_c0_g1	-2.364	down	superoxide metabolic process
	TRINITY_DN32729_c0_g1	-11.437	down	removal of superoxide radicals
	TRINITY_DN2350_c0_g1	-0.296	down	superoxide dismutase activity
	TRINITY_DN18462_c0_g1	-0.959	down	superoxide dismutase activity
	TRINITY_DN9787_c0_g1	-6.296	down	superoxide dismutase activity
	TRINITY_DN6665_c0_g1	1.331	up	superoxide dismutase activity
	TRINITY_DN6665_c0_g1	1.331	up	superoxide dismutase activity
CYP450-related	TRINITY_DN5571_c0_g1	-10.819	down	oxidoreductase activity
	TRINITY_DN5545_c0_g1	-9.816	down	oxidoreductase activity, acting on paired donors, with incorporation or reduction of

			molecular oxygen
TRINITY_DN10542_c0_g1	-2.632	down	oxidoreductase activity, acting on paired donors, with incorporation or reduction of molecular oxygen
TRINITY_DN24219_c0_g2	-9.013	down	oxidoreductase activity, acting on paired donors, with incorporation or reduction of molecular oxygen
TRINITY_DN40750_c0_g1	-8.567	down	monooxygenase activity
TRINITY_DN42986_c0_g1	-5.498	down	monooxygenase activity
TRINITY_DN16762_c0_g2	-3.958	down	oxidoreductase activity
TRINITY_DN38643_c0_g1	-8.140	down	monooxygenase activity
TRINITY_DN38701_c0_g1	-10.731	down	monooxygenase activity
TRINITY_DN33572_c0_g1	-10.731	down	monooxygenase activity

Table S4 Microalgae degradation of BPA

Microalgae	Treatment conditions	Maximum removal efficiencies	Optimized culture conditions				Growth period (d)	Degradation mechanisms	Reference
			Temperature	Inoculation amount	pH	Salinity			
Oocystis sp.YTLJ-NAPE-RC3 (Green algae)	Seawater	100%	20 °C	2% (v/v)	8.0	30‰	>84	Biodegradation, conjugation	This study
Chlorella sp.GY-H6 (Green algae)	Seawater	42.8%	20 °C	-	-	30‰	56	Biodegradation, biosorption	This study
Stephanodiscus hantzschii (Diatom)	Seawater	99%	20 °C	-	-	30‰	-	Biodegradation, bioaccumulation	(Li et al., 2009)
Chlorella fusca (Green algae)	Freshwater	85%	25 °C	-	6.0	-	-	Biodegradation	(Im and Löffler, 2016)
Graesiella (Green algae)	Freshwater	52%	30 °C	-	8.4	-	-	Biodegradation, bioaccumulation, biosorption	(Ben Ouada et al., 2018b)
Picocystis(Green algae)	Freshwater	72%	30 °C	-	6.8	-	-	Biodegradation, bioaccumulation, biosorption	(Ben Ouada et al., 2018b)
Desmodesmus sp. WR1 (Green algae)	Freshwater	57%	22 °C	-	-	-	-	Biodegradation	(Wang et al., 2017)
Chlorella pyrenoidosa (Green algae)	Freshwater	43%	25 °C	-	8.0	-	-	Biodegradation	(Fu et al., 2023)
Chlorella sorokiniana (Green algae)	Freshwater	49.8%	25 °C	-	7.0	-	-	Biodegradation, biosorption	(Eio et al., 2015)
Chlorophyta Picocystis sp. (Green algae)	Freshwater	91.36%	30.7 °C	25×10^5 cells/mL	-	-	-	Biodegradation	(Ben Ali et al., 2021)

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