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Supplementary material

Compositions and isotopic differences of *iso*- and *anteiso*-alkanes in black mangroves (*Avicennia germinans*) across salinity gradients in a subtropical estuary

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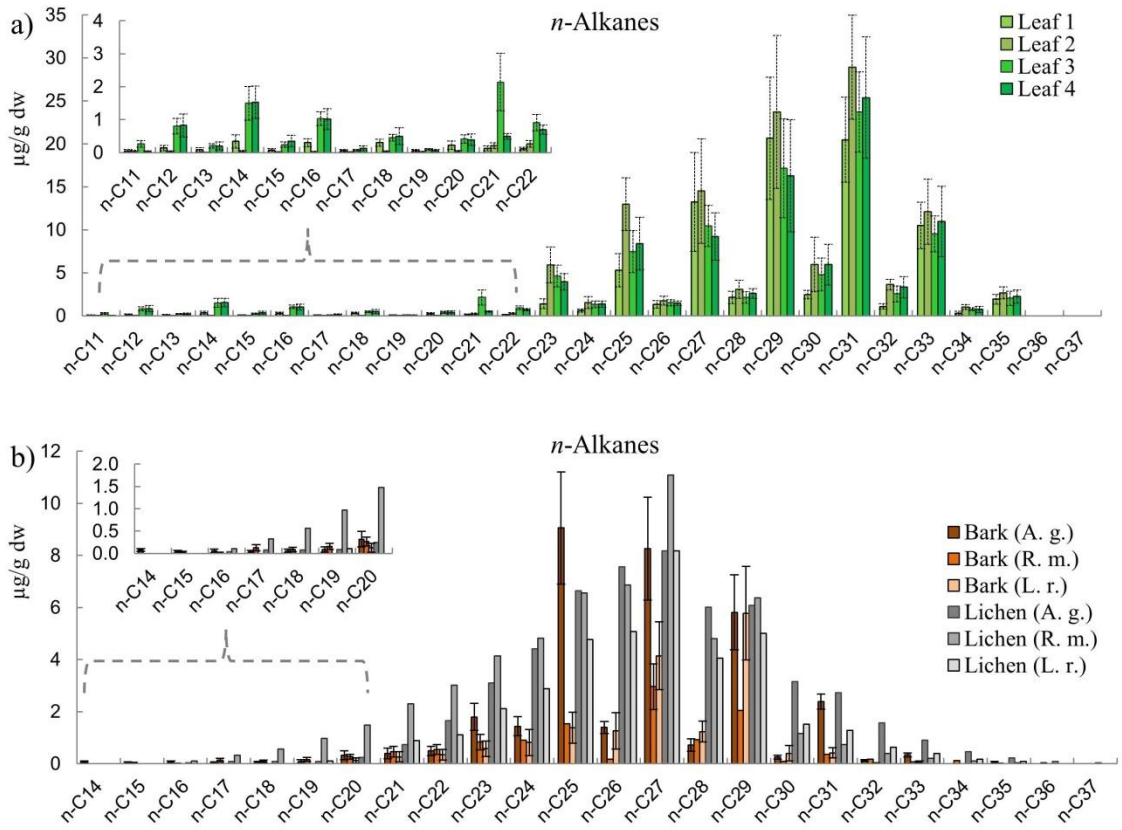

Fig. S1. Distribution and concentrations of *n*-alkanes in (a) *A. germinans* leaf, and (b) bark and lichen in *A. germinans*, *R. mangle* and *L. racemosa* respectively. Note: *A. g.*, *A. germinans*; *R. m.*, *R. mangle*; *L. r.*, *L. racemosa*.

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Table S1. Concentrations (μg g^{-1} dry weight) of *iso*- and *anteiso* (*ai*)-alkanes in the leaf, bark and lichen of *A. germinans*, *R. mangle* and *L. racemosa*

Note: RI, the Kovats Index calculated based on a Rtx-1 GC column; s.d., standard deviation; *A. g.*, *A. germinans*; *R. m.*, *R. mangle*; *L. r.*, *L. racemosa*; N.D., not detectable; MMAs, monomethylalkanes. Leaves 1 and 4 are an average of duplicate results from two separate mangrove tree leaves growing at the same location; bark of *A. g.* and *R. m.* are the average of duplicates from two bark sampled at locations 1 and 4; lichen values are composite samples from mangrove trees at locations 1, 3 and 4

MMAs	RI	Leaf 1	s.d.	Leaf 2	s.d.	Leaf 3	s.d.	Leaf 4	s.d.	Bark (*A. g*)	s.d.	Bark (*R. m*)	s.d.	Lichen (*A. g*)	Lichen (*R. m.*)	Lichen (*L. r.*)
ai-C_{14}	1371	N.D.	N.D.	N.D.	N.D.	0.05	0.02	0.05	0.01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
ai-C_{16}	1571	0.02	0.01	0.01	0.01	0.08	0.03	0.09	0.02	0.01	0.01	N.D.	N.D.	N.D.	N.D.	N.D.
ai-C_{18}	1772	0.05	0.03	0.06	0.02	0.15	0.06	0.13	0.03	0.01	0.01	0.00	0.00	N.D.	N.D.	N.D.
ai-C_{20}	1972	0.04	0.01	0.05	0.02	0.13	0.04	0.12	0.02	0.01	0.00	0.00	0.00	N.D.	N.D.	N.D.
ai-C_{22}	2172	0.07	0.05	N.D.	N.D.	0.08	0.04	0.06	0.02	0.01	0.00	0.01	0.01	N.D.	N.D.	N.D.
iso-C_{23}	2266	0.05	0.04	0.08	0.03	0.07	0.03	0.06	0.03	0.01	0.00	0.00	0.00	N.D.	N.D.	N.D.
iso-C_{24}	2366	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.07	0.03	0.03
ai-C_{24}	2373	N.D.	N.D.	N.D.	N.D.	0.11	0.04	0.04	0.02	0.01	0.00	N.D.	N.D.	N.D.	N.D.	0.01
iso-C_{25}	2464	N.D.	N.D.	N.D.	N.D.	0.29	0.17	0.02	0.01	0.05	0.02	N.D.	N.D.	0.14	0.05	0.07
ai-C_{25}	2472	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.01	0.00	N.D.	N.D.	0.07	0.03	0.03
iso-C_{26}	2564	N.D.	N.D.	N.D.	N.D.	0.04	0.02	N.D.	N.D.	0.09	0.03	N.D.	N.D.	0.29	0.09	0.12
ai-C_{26}	2573	N.D.	N.D.	N.D.	N.D.	0.08	0.06	0.03	0.01	0.23	0.05	0.02	N.D.	0.15	0.05	0.06
iso-C_{27}	2665	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.28	0.04	0.01	0.01	0.27	0.10	0.13
ai-C_{27}	2671	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.01	0.00	0.02	0.01	0.20	0.08	0.11
iso-C_{28}	2763	N.D.	N.D.	0.03	0.02	0.06	0.03	0.03	0.01	0.02	0.01	0.00	0.00	0.30	0.12	0.14
ai-C_{28}	2771	0.51	0.24	0.45	0.21	0.41	0.14	0.41	0.08	0.02	0.01	0.14	0.08	0.17	0.07	0.09
iso-C_{29}	2862	0.84	0.18	1.01	0.31	0.52	0.18	1.13	0.21	0.01	0.00	0.04	0.03	0.27	0.10	0.12
ai-C_{29}	2870	0.12	0.08	0.17	0.05	0.23	0.09	0.11	0.04	0.00	0.00	0.01	0.01	0.21	0.07	0.09
iso-C_{30}	2961	0.08	0.05	0.20	0.11	0.23	0.12	0.15	0.10	N.D.	N.D.	N.D.	N.D.	0.33	0.09	0.14
ai-C_{30}	2974	11.40	3.99	11.53	5.22	6.72	1.89	6.95	3.79	0.03	0.01	0.59	0.27	0.17	0.05	0.08
iso-C_{31}	3059	4.10	1.98	9.00	2.19	6.99	3.11	7.08	2.57	0.07	0.02	0.06	0.07	0.16	0.05	0.08
ai-C_{31}	3069	0.40	0.29	0.70	0.30	0.40	0.17	0.43	0.19	N.D.	N.D.	0.04	0.03	0.17	0.06	0.07
iso-C_{32}	3161	0.25	0.10	0.13	0.04	0.12	0.05	0.08	0.04	N.D.	N.D.	N.D.	N.D.	0.11	0.03	0.06
ai-C_{32}	3172	15.90	5.97	25.23	7.21	21.07	4.89	17.14	5.77	0.03	0.01	0.34	0.10	0.15	0.03	0.05
iso-C_{33}	3261	0.47	0.17	2.07	0.84	1.55	0.32	1.60	0.71	0.03	0.01	0.02	0.02	0.06	0.02	0.02
ai-C_{33}	3272	0.06	0.03	0.18	0.10	0.15	0.09	0.14	0.08	N.D.	N.D.	0.01	0.01	0.09	0.03	0.04
ai-C_{34}	3373	0.80	0.04	3.13	0.91	2.22	0.78	1.81	0.80	N.D.	N.D.	1.29	0.42	N.D.	N.D.	N.D.

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MMAs	RI	Leaf 1	s.d.	Leaf 2	s.d.	Leaf 3	s.d.	Leaf 4	s.d.	Bark (*A. g*)	s.d.	Bark (*R. m*)	s.d.	Lichen (*A. g*)	Lichen (*R. m.*)	Lichen (*L. r.*)
iso-C_{35}	3461	N.D.	N.D.	0.03	0.01	0.04	0.02	0.02	0.02	0.02	0.01	0.01	0.01	N.D.	N.D.	N.D.
iso- (total)	N.A.	5.80	1.76	12.54	3.87	9.90	2.45	10.17	3.01	0.58	0.18	0.18	0.08	1.99	0.67	0.91
anteiso- (total)	N.A.	29.37	8.57	41.52	10.63	31.87	8.36	27.51	8.23	0.38	0.13	2.46	0.44	1.38	0.46	0.64
MMAs (total)	N.A.	35.17	7.23	54.06	9.21	41.77	7.71	37.68	9.07	0.97	0.24	2.64	0.52	3.37	1.13	1.55

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Table S2. $\delta^{13}C$ and δD values of the most abundant long chain *n-*, *iso-* and *anteiso*-alkanes in the leaf of *A. germinans*

All samples were measured two or three times and average values were calculated. Note: 'n_{even} av.', 'n_{odd} av.', '*iso* av.', and '*ai* av.' are average $\delta^{13}C$ or δD values of all even *n*-alkanes; odd *n*-alkanes, *iso*-alkanes and *anteiso*-alkanes in leaf of *A. germinans*; s.d., standard deviation; N.A., not accessible

Alkanes	$\delta^{13}C$ values								δD values							
	Leaf 1	s.d.	Leaf 2	s.d.	Leaf 3	s.d.	Leaf 4	s.d.	Leaf 1	s.d.	Leaf 2	s.d.	Leaf 3	s.d.	Leaf 4	s.d.
n-C_{25}	–34.3	0.3	–34.5	0.1	–35.5	0.2	–35.4	0.1	–135.8	4.7	–134.6	3.9	–137.0	2.8	–139.8	5.0
n-C_{26}	–34.8	0.4	–35.5	0.3	–35.2	0.2	–35.5	0.3	–140.1	3.7	–139.5	3.4	–152.4	3.8	–147.9	2.9
n-C_{27}	–36.4	0.1	–36.2	0.2	–36.7	0.1	–39.0	0.2	–142.9	2.6	–145.0	3.1	–143.6	3.3	–156.7	2.7
ai-C_{28}	–35.1	0.2	–35.6	0.4	–35.0	0.3	–35.8	0.2	–192.3	3.1	–195.1	4.2	–180.6	3.1	–182.8	4.2
n-C_{28}	–37.2	0.3	–37.5	0.3	–36.9	0.4	–39.8	0.4	–166.4	2.3	–160.8	5.0	–173.4	4.2	–165.3	6.0
iso-C_{29}	–34.0	0.1	–34.3	0.2	–34.8	0.1	–33.9	0.3	–187.6	3.8	–190.9	3.1	–184.9	2.3	–182.5	4.1
n-C_{29}	–35.3	0.2	–35.6	0.1	–37.5	0.2	–38.2	0.1	–157.7	2.5	–161.1	2.8	–161.2	1.8	–176.5	2.2
ai-C_{30}	–33.8	0.1	–33.6	0.3	–35.4	0.1	–34.6	0.2	–241.1	3.3	–245.8	2.5	–226.2	2.4	–246.8	3.1
n-C_{30}	–36.2	0.3	–35.7	0.4	–38.0	0.3	–38.8	0.3	–187.9	4.2	–195.3	4.4	–191.7	2.5	–196.9	3.0
iso-C_{31}	–33.1	0.2	–32.4	0.2	–35.3	0.1	–34.2	0.2	–230.8	3.0	–234.4	2.2	–226.6	1.8	–234.7	2.4
n-C_{31}	–34.7	0.2	–34.5	0.3	–35.6	0.3	–36.7	0.2	–180.2	1.9	–185.7	2.5	–183.0	2.1	–198.5	4.7
ai-C_{32}	–33.2	0.3	–32.6	0.2	–33.7	0.3	–33.6	0.1	–249.0	2.2	–248.1	2.8	–252.0	3.0	–259.1	2.7
n-C_{32}	–34.4	0.5	–34.9	0.4	–34.7	0.5	–35.5	0.3	N.A.	N.A.	–204.7	4.6	N.A.	N.A.	–224.2	4.0
iso-C_{33}	–33.8	0.2	–34.2	0.1	–33.4	0.1	–34.8	0.2	–225.7	3.5	–239.4	2.4	–211.6	3.1	–219.6	1.8
n-C_{33}	–35.1	0.1	–35.3	0.3	–36.1	0.2	–35.0	0.2	–178.4	4.1	–184.3	3.2	–182.4	2.7	–197.6	3.3
ai-C_{34}	–33.8	0.4	–34.4	0.4	–34.1	0.3	–34.1	0.4	–252.9	2.9	–256.4	2.7	–265.5	3.7	–248.4	4.2
n-C_{34}	N.A.	N.A.	–35.3	0.4	–34.8	0.3	–35.1	0.4	N.A.	N.A.	–199.3	4.7	–226.1	3.5	–212.8	3.9
n-C_{35}	–35.5	0.4	–36.5	0.4	–36.0	0.5	–35.8	0.2	–157.9	4.6	–159.4	5.0	–170.8	4.3	–171.9	4.4
n_{even} av.	–35.2	0.7	–35.4	0.8	–36.2	0.8	–36.7	1.6	–158.8	18.0	–161.7	20.5	–163.0	19.5	–173.5	22.9
n_{odd} av.	–35.7	1.3	–35.8	1.0	–35.9	1.5	–36.9	2.2	–164.8	23.9	–179.9	28.4	–185.9	31.2	–189.4	32.1
iso av.	–33.6	0.5	–33.6	1.0	–34.5	1.0	–34.3	0.5	–214.7	23.6	–221.6	26.7	–207.7	21.1	–212.3	26.8
ai av.	–34.0	0.8	–34.1	1.3	–34.6	0.8	–34.5	0.9	–233.8	28.1	–236.4	27.9	–231.1	37.4	–234.3	34.8