

## SUPPORTING INFORMATION DOCUMENT

### Distribution and Toxicity of Dihydrobenzenes in Drinking Water Sources in Nigeria

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**Figure S1:** Images showing the adverse effect of Hydroquinone on the human skin .

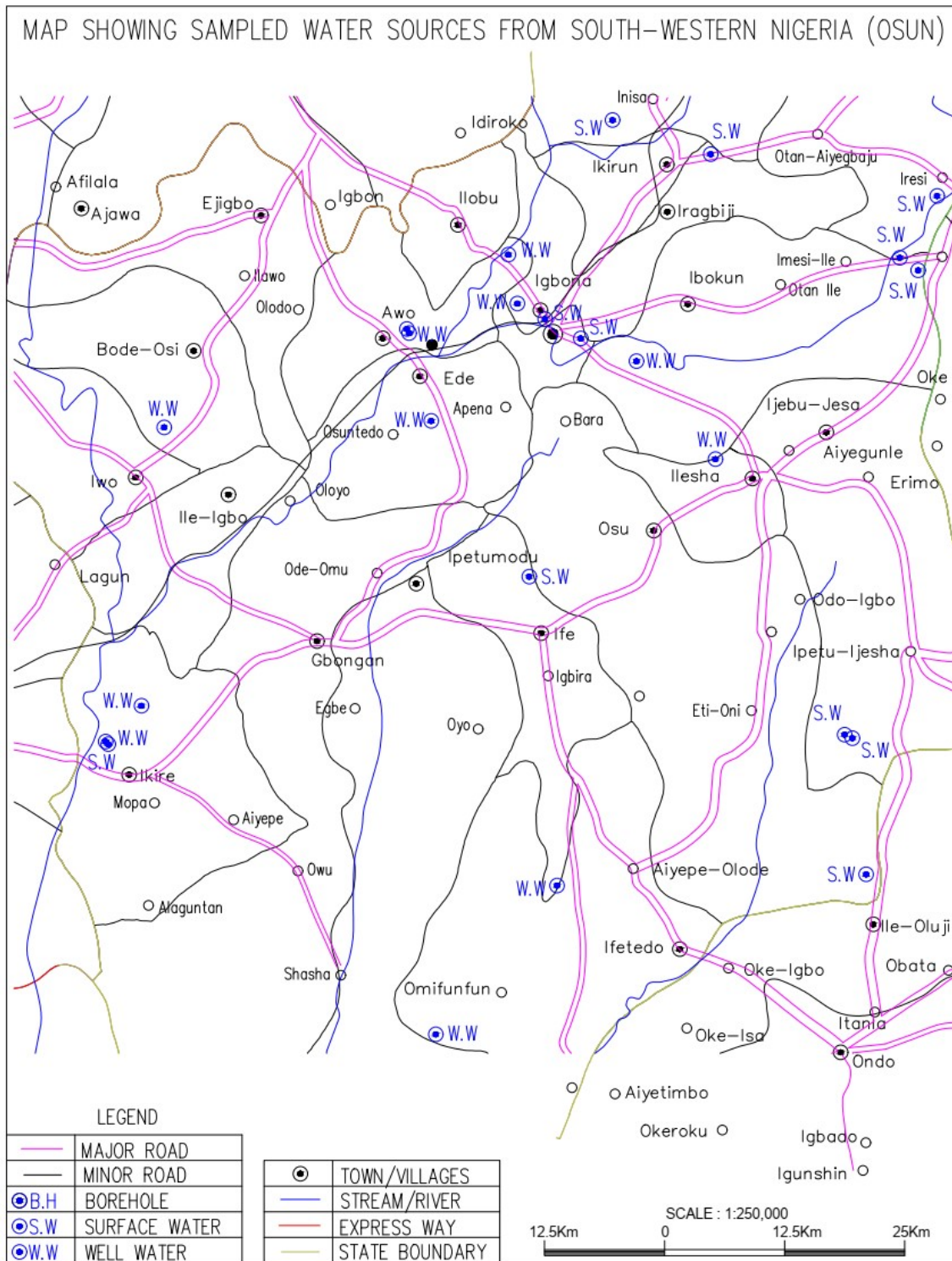
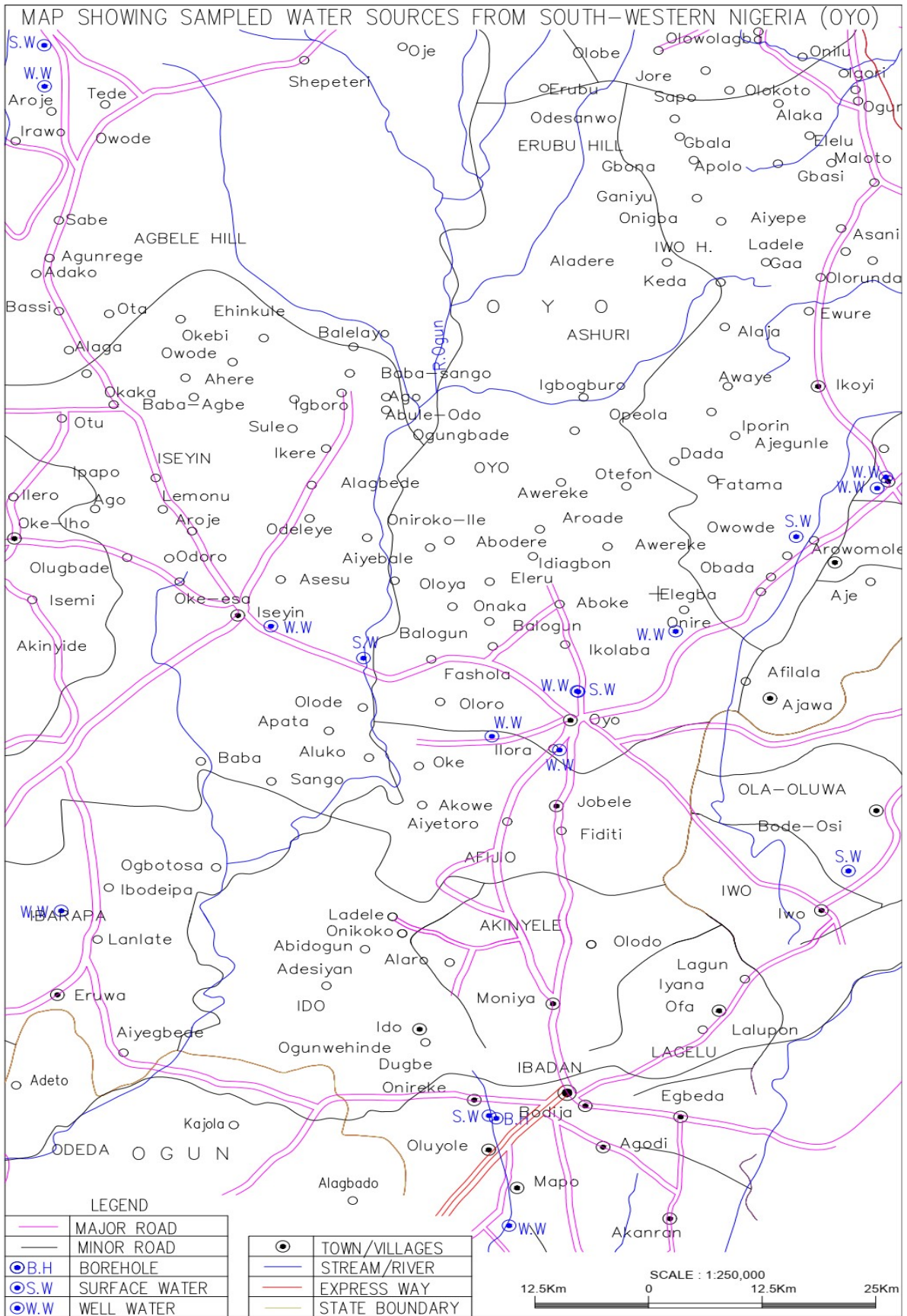
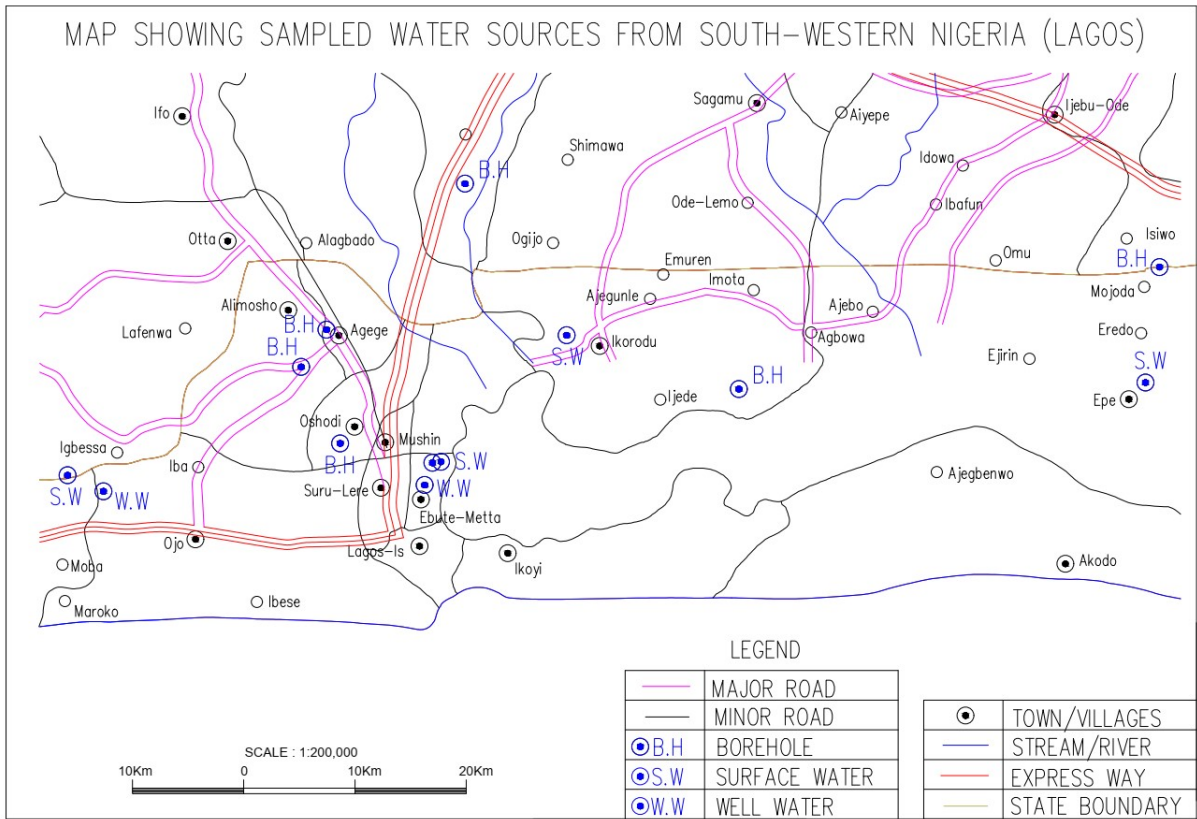


Figure S2: Geographical map showing the sampling sites for Osun State, Nigeria



**Figure S3:** Geographical map showing the sampling sites for Oyo State, Nigeria





**Figure S4:** Geographical map showing the sampling sites for Lagos State, Nigeria

**Table S1:** Ecological Risks Assessment of Groundwater and Surface water samples during the Rainy Season in the Different States

Type of water	Organism	Phenol	RQ <sub>acute</sub> range	<0.1 (%)	0.1-1.0 (%)	1-above (%)	RQ <sub>chronic</sub> range	<0.1(%)	0.1-1 (%)	1-above (%)
<b>Osun State (Rainy Season)</b>										
Groundwater	Algae	CAT	4.69-32.35	0.0	0.0	100.0	1.03-7.12	0.0	0.0	100.0
		HQ	3.14-23.05	0.0	0.0	100.0	0.31-2.29	0.0	44.4	55.6
	Daphnia	CAT	60.82-418.69	0.0	0.0	100.0	6.08-41.86	0.0	0.0	100.0
		HQ	7.73-56.74	0.0	0.0	100.0	18.19-132.58	0.0	0.0	100.0
	Fish	CAT	11.62-79.97	0.0	0.0	100.0	1.16-7.99	0.0	0.0	100.0
		HQ	1.63-11.92	0.0	0.0	100.0	15.71-115.24	0.0	0.0	100.0
<b>SURFACE WATER</b>										
Surface water	Algae	CAT	1.29-35.86	0.0	0.0	100.0	0.28-7.89	0.0	16.7	83.3
		HQ	7.14-41.72	0.0	0.0	100.0	0.74-4.17	0	25.0	75.0
	Daphnia	CAT	16.69-529.05	0.0	0	100.0	1.67-52.90	0.0	0.0	100.0
		HQ	18.76-102.73	0.0	0	100.0	42.93-241.51	0.0	0	100.0
	Fish	CAT	3.18-101.05	0.0	0	100.0	0.32-10.10	0.0	16.7	83.3
		HQ	3.85-21.57	0.0	0	100.0	37.07-208.58	0.0	0	100.0
<b>Oyo State (Rainy Season)</b>										
Groundwater	Algae	CAT	0.14-5.14	0.0	20.0	80.0	0.01-0.51	20.0	80.0	0.0
		HQ	1.63-9.62	0.0	0.0	100.0	0.16-0.96	0.0	100.0	0.0
	Daphnia	CAT	1.94-66.48	0.0	0.0	100.0	0.19-6.65	0.0	20.0	80.0
		HQ	4.04-23.70	0.0	0.0	100.0	9.49-55.73	0.0	0.0	100.0
	Fish	CAT	0.37-12.69	0.0	20.0	80.0	0.03-1.26	0.0	75.0	25.0
		HQ	0.84-4.97	8.3	0.0	91.7	8.19-48.14	0.0	0.0	100.0
<b>SURFACE WATER</b>										

Surface water	Algae	CAT	0.05-3.23	12.5	75.0	12.5	0.005-0.32	75.0	25.0	0.0
		HQ	4.31-13.62	0.0	0.0	100.0	0.43-1.36	0.0	80.0	20.0
	Daphia	CAT	0.70-22.01	0.0	12.5	87.5	0.070-4.18	12.5	62.5	25.0
		HQ	10.63-33.54	0.0	0.0	100.0	24.99-78.86	0.0	0.0	100.0
				0.0						
	Fish	CAT	0.13-7.99	0.0	50.0	50.0	0.01-0.42	0.0	50.0	50.0
		HQ	2.23-7.04	0.0	0.0	100.0	22.10-68.11	0.0	0.0	100.0
<b>Lagos State (Rainy Season)</b>										
Groundwater	Algae	CAT	3.43-9.48	0.0	0.0	100.0	0.34-0.94	0.0	100.0	0.0
		HQ	1.01-8.39	0.0	0.0	100.0	0.10-0.84	0.0	100.0	0.0
	Daphia	CAT	44.39-122.66	0.0	0.0	100.0	4.44-12.26	0.0	0.0	100.0
		HQ	2.47-20.67	33.3	55.6	11.1	5.83-48.59	0.0	0.0	100.0
	Fish	CAT	8.48-23.43	0.0	0.0	100.0	0.85-2.34	0.0	50.0	50.0
		HQ	0.52-4.34	0.0	50.0	50.0	5.03-41.96	0.0	0.0	100.0
<b>SURFACE WATER</b>										
Surface water	Algae	CAT	1.87-31.46	0.0	0.0	100.0	0.19-4.67	0.0	50.0	50.0
		HQ	25.42-101.75	0.0	0.0	100.0	2.10-10.17	0.0	0.0	100.0
	Daphia	CAT	24.19-603.90	0.0	0.0	100.0	2.41-60.39	0.0	0.0	100.0
		HQ	51.75-250.58	0.0	0.0	100.0	121.66-589.09	0.0	0.0	100.0
	Fish	CAT	4.62-115.35	0.0	0.0	100.0	0.46-11.53	0.0	16.6	82.4
		HQ	10.86-13.15	0.0	0.0	100.0	105.07-508.76	0.0	0.0	100.0

**Table S2:** Ecological Risks Assessment of Groundwater and Surface water samples during the Dry Season in the Different States

Type of water	Organism	Phenol	RQ <sub>acute</sub> range	<0.1 (%)	0.1-1.0 (%)	1-above (%)	RQ <sub>chronic</sub> range	<0.1(%)	0.1-1 (%)	1-above (%)
<b>Osun State (Dry Season)</b>										
Groundwater	Algae	CAT	0.01-3.45	16.7	16.7	66.6	0.001-0.35	33.4	66.6	0.0
		HQ	3.18-30.93	0.0	0.0	100.0	0.32-3.09	0.0	25.0	75.0
	Daphnia	CAT	0.17-44.70	0.0	16.7	83.3	0.017-4.47	16.7	16.7	66.6`
		HQ	7.83-76.16	0.0	0.0	100.0	18.42-179.06	0.0	0.0	100.0
	Fish	CAT	0.03-8.54	16.7	16.7	66.6`	0.003-0.85	33.4	66.6	0.0
		HQ	1.65-15.99	0.0	0.0	100.0	15.90-154.64	0.0	0.0	100.0
<b>SURFACE WATER</b>										
Surface water	Algae	CAT	0.63-8.97	0	14.3	85.7	0.06-0.87	14.3	85.7	0
		HQ	0.02-34.05	20.0	0.0	80.0	0.001-3.40	20.0	20.0	60.0
	Daphnia	CAT	8.15-116.08	0.0	0	100.0	0.82-11.60	0	14.3	85.7
		HQ	0.04-83.85	20.0	0.0	80.0	0.11-197.11	20.0	0.0	80.0
	Fish	CAT	1.5-22.17	0.0	0	100.0	0.15-2.22	0.0	57.2	42.8
		HQ	0.01-17.61	20.0	0.0	80.0	0.09-170.34	20.0	0.0	80.0
<b>Oyo State (Dry Season)</b>										
Groundwater	Algae	CAT	0.95-18.44	0.0	20.0	80.0	0.09-1.84	20.0	60.0	20.0
		HQ	0.97-9.90	0.0	25.0	75.0	0.09-0.99	25.0	75.0	0.0
	Daphia	CAT	12.28-238.67	0.0	0.0	100.0	1.23-23.87	0.0	0.0	100.0
		HQ	2.39-24.39	0.0	0.0	100.0	5.60-57.35	0.0	0.0	100.0
	Fish	CAT	2.35-45.58	0.0	0,0	100.0	0.23-4.56	0.0	60.0	40.0
		HQ	0.50-5.12	0.0	50.0	50.0	4.84-49.52	0.0	0.0	100.0



<b>SURFACE WATER</b>										
Surface water	Algae	CAT	6.25-37.94	0.0	0.0	100.0	0.63-3.79	0.0	42.8	57.2
		HQ	1.10-18.53	0.0	0.0	100.0	0.11-1.85	0.0	75.0	25.0
	Daphia	CAT	80.94-491.10	0.0	0.0	100.0	8.09-49.11	0.0	0.0	100.0
		HQ	2.73-45.64	0.0	0.0	100.0	6.42-107.29	0.0	0.0	100.0
				0.0						
	Fish	CAT	0.57-9.58	0.0	25.0	75.0	5.55-92.66	0.0	0.0	100.0
		HQ	0.07-7.2	8.4	8.4	83.2	0.009-1.0	8.4	83.2	20.
<b>Lagos State (Dry Season)</b>										
Groundwater	Algae	CAT	1.43-10.40	0.0	0.0	100.0	0.14-1.04	0.0	91.7	8.3
		HQ	0.65-12.14	0.0	9.1	90.9	0.06-1.21	9.1	72.7	18.2
	Daphia	CAT	18.45-134.62	0.0	0.0	100.0	1.85-13.46	0.0	0.0	100.0
		HQ	1.62-29.89	0.0	0.0	100.0	3.82-70.26	0.0	0.0	100.0
	Fish	CAT	23.52-25.71	0.0	0.0	100.0	0.35-2.57	0.0	25.0	75.0
		HQ	0.34-6.28	0.0	27.3	72.7	3.29-60.67	0.0	0.0	100.0
<b>SURFACE WATER</b>										
Surface water	Algae	CAT	0.11-42.78	0.0	14.3	85.7	0.01-4.28	0.0	71.4	28.6
		HQ	0.78-70.60	0.0	12.5	87.5	0.078-7.06	12.5	62.5	25.0
	Daphia	CAT	1.36-553.68	0.0	0.0	100.0	0.14-55.37	0.0	8.3	91.7
		HQ	1.92-39.71	0.0	0.0	100.0	4.52-408.77	0.0	0.0	100.0
	Fish	CAT	0.26-105.76	0.0	8.3	91.7	0.03-10.57	8.3	8.3	83.4
		HQ	0.40-36.52	0.0	25.0	75.0	3.91-353.04	0.0	0.0	100.0

**Table S3: Summary of the concentration of the hydroquinone and catechol in individual states.**

State	Season	Water samples		Hydroquinone	Catechol
Osun	Wet	groundwater	Mean	53	430
			Minimum	24	n.d
			Maximum	137	899
			Median	46	0
			Frequency(%)	100	42
	Surface water	Mean	47	430	
		Minimum	n.d	115	
		Maximum	76	712	
		Median	24	369	
		Frequency(%)	75	100	
Dry	groundwater	Mean	47	102	
		Minimum	n.d	n.d	
		Maximum	112	197	
		Median	n.d	26	
		Frequency(%)	42	58	
	Surface water	Mean	47	39	
		Minimum	n.d	n.d	
		Maximum	102	57	
		Median	23	0.3	
		Frequency(%)	67	55	
Oyo	wet	groundwater	Mean	22	43
			Minimum	8	n.d
			Maximum	32	113

		Median	24	0
		Frequency(%)	100	33
	Surface water	Mean	26	43
		Minimum	14	n.d
		Maximum	45	71
		Median	26	7
		Frequency(%)	100	80
	Dry groundwater	Mean	5	175
		Minimum	n.d	n.d
		Maximum	33	405
		Median	0	0
		Frequency(%)	40	36
	Surface water	Mean	9	412
		Minimum	n.d	0
		Maximum	61	834
		Median	0	158
		Frequency(%)	40	70
Lagos	wet groundwater	Mean	13	126
		Minimum	n.d	n.d
		Maximum	28	208
		Median	0	0
		Frequency(%)	25	33
	Surface water	Mean	43	123
		Minimum	n.d	n.d
		Maximum	335	1026
		Median	0	107
		Frequency(%)	30	60

Dry	groundwater	Mean	12	126
		Minimum	n.d	n.d
		Maximum	40	228
		Median	10	84
		Frequency(%)	83	67
	Surface water	Mean	13	260
		Minimum	n.d	n.d
		Maximum	233	941
		Median	10	135
		Frequency(%)	89	78

#### Reference

[1] L.M. Davids, J. Van Wyk, N.P. Khumalo, N.G.J.S.A.J.o.S. Jablonski, The phenomenon of skin lightening: Is it right to be light?, 112 (2016) 1-5.