

Preparation and characterization of highly crystalline hydroxyapatite (HAp) from the scales of an anadromous fish (*Tenualosa ilisha*): A comparative study with the freshwater fish scale (*Labeo rohita*) derived HAp

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Table S1 Crystallographic parameters of I-HAp based on XRD data

2 θ Degree	θ Degree	FWH M (β) Degree	FWHM (β) Radians	d spacin g Å	Cos θ Degree	1/Cos θ Degree	Ln(1/Cos θ) Degree	Ln β Radians	4Sin θ Degree	β (radian). Cos θ Degree
10.94	5.47	0.048	0.0008	8.08	0.9954	1.0046	0.0046	-7.0847	0.3815	0.0008
16.94	8.47	0.091	0.0016	5.23	0.9891	1.0110	0.0109	-6.4451	0.5891	0.0016
21.89	10.94	0.085	0.0015	4.06	0.9818	1.0185	0.0183	-6.5133	0.7593	0.0015
22.97	11.48	0.072	0.0013	3.87	0.9799	1.0204	0.0202	-6.6793	0.7963	0.0012
25.98	12.99	0.065	0.0011	3.43	0.9744	1.0263	0.0259	-6.7847	0.8991	0.0011
28.23	14.11	0.062	0.0011	3.16	0.9698	1.0311	0.0307	-6.8288	0.9754	0.0010
29.05	14.53	0.06	0.0010	3.07	0.9680	1.0330	0.0325	-6.8616	1.0032	0.0010
31.89	15.94	0.066	0.0011	2.80	0.9615	1.0400	0.0392	-6.7724	1.0988	0.0011
32.29	16.15	0.06	0.0010	2.77	0.9606	1.0411	0.0402	-6.8616	1.1124	0.0010
33.02	16.51	0.069	0.0012	2.71	0.9588	1.0430	0.0421	-6.7219	1.1368	0.0012
34.16	17.08	0.068	0.0012	2.62	0.9559	1.0462	0.0451	-6.7365	1.1749	0.0011
35.56	17.78	0.106	0.0019	2.52	0.9522	1.0502	0.0489	-6.2925	1.2216	0.0018
39.30	19.65	0.058	0.0010	2.29	0.9418	1.0618	0.0600	-6.8955	1.3452	0.0009
39.91	19.95	0.065	0.0011	2.26	0.9399	1.0639	0.0619	-6.7816	1.3650	0.0011
43.98	21.99	0.073	0.0013	2.06	0.9273	1.0784	0.0755	-6.6655	1.4977	0.0012
48.19	24.09	0.078	0.0014	1.89	0.9129	1.0954	0.0912	-6.5993	1.6330	0.0012
49.58	24.79	0.069	0.0012	1.84	0.9079	1.1015	0.0967	-6.7219	1.6770	0.0011
50.59	25.29	0.067	0.0012	1.80	0.9041	1.1061	0.1008	-6.7513	1.7092	0.0011
51.38	25.69	0.086	0.0015	1.78	0.9011	1.1097	0.1041	-6.5016	1.7341	0.0014
52.19	26.09	0.079	0.0014	1.75	0.8989	1.1135	0.1075	-6.5865	1.7593	0.0012
53.28	26.64	0.076	0.0013	1.78	0.8938	1.1188	0.1122	-6.6266	1.7936	0.0012
55.98	27.99	0.083	0.0014	1.64	0.8830	1.1324	0.1244	-6.5371	1.8771	0.0013

Table S2 Crystallographic parameters of R-HAp based on XRD data

2 θ Degree	θ Degree	FWH M (β) Degree	FWHM (β) Radians	d spacin g Å	Cos θ Degree	1/Cos θ Degree	Ln(1/Cos θ) Degree	Ln β Radians	4Sin θ Degree	β (radian). Cos θ Degree
10.87	5.44	0.089	0.0016	8.13	0.9955	1.0045	0.0045	-6.4673	0.3789	0.0015
21.82	10.91	0.105	0.0018	4.07	0.9819	1.0184	0.0182	-6.3020	0.7569	0.0018
22.88	11.44	0.067	0.0012	3.88	0.9801	1.0203	0.0201	-6.7513	0.7933	0.0011
25.88	12.94	0.065	0.0011	3.44	0.9746	1.0261	0.0257	-6.7816	0.8958	0.0011
28.11	14.05	0.086	0.0015	3.172	0.9701	1.0309	0.0304	-6.5016	0.9714	0.0015
28.97	14.48	0.067	0.0012	3.08	0.9682	1.0328	0.0323	-6.7513	1.0004	0.0011
31.80	15.90	0.064	0.0011	2.81	0.9617	1.0398	0.0390	-6.7971	1.0959	0.0011
32.20	16.10	0.066	0.0012	2.78	0.9608	1.0408	0.0400	-6.7663	1.1093	0.0011
33.17	16.58	0.16	0.0028	2.69	0.9584	1.0434	0.0425	-5.8808	1.1417	0.0027
34.07	17.04	0.065	0.0011	2.63	0.9561	1.0459	0.0449	-6.7816	1.1719	0.0011
35.49	17.75	0.06	0.0010	2.53	0.9524	1.0499	0.0488	-6.8616	1.2193	0.0009
39.84	19.92	0.066	0.0012	2.26	0.9402	1.0637	0.0617	-6.7663	1.3629	0.0011
43.86	21.93	0.055	0.0009	2.06	0.9277	1.0779	0.0751	-6.9486	1.4938	0.0009
48.11	24.05	0.062	0.0011	1.89	0.9132	1.0951	0.0908	-6.8288	1.6303	0.0009
49.48	24.74	0.078	0.0014	1.84	0.9082	1.1011	0.0963	-6.5993	1.6741	0.0012
50.52	25.26	0.087	0.0015	1.81	0.9044	1.1057	0.1005	-6.4901	1.7069	0.0014
51.31	25.66	0.066	0.0012	1.78	0.9014	1.1094	0.1038	-6.7663	1.7318	0.0010

52.097	26.05	0.076	0.0013	1.75	0.8984	1.1131	0.1071	-6.6252	1.7565	0.0012
53.18	26.59	0.102	0.0018	1.72	0.8942	1.1183	0.1118	-6.3310	1.7904	0.0016
55.90	27.95	0.071	0.0012	1.64	0.8833	1.1321	0.1240	-6.6933	1.8749	0.0011

Table S3 CS of I-HAp calculation using SEAM

FWHM (β) Radians	Cos θ Degree	Crystallite Size $D = \frac{k\lambda}{\beta \cos \theta}$ mm	Average Crystallite Size
0.0008	0.9954	166.26	120.19
0.0016	0.9891	88.26	
0.0015	0.9818	95.19	
0.0013	0.9799	112.59	
0.0011	0.9744	125.82	
0.0011	0.9698	132.12	
0.0010	0.9680	136.78	
0.0011	0.9615	125.95	
0.0010	0.9606	137.84	
0.0012	0.9588	120.09	
0.0012	0.9559	122.22	
0.0019	0.9522	78.71	
0.0010	0.9418	145.44	
0.0011	0.9399	130.03	
0.0013	0.9273	117.36	
0.0014	0.9129	111.57	
0.0012	0.9079	126.82	
0.0012	0.9041	131.15	
0.0015	0.9011	102.51	
0.0014	0.8989	111.97	
0.0013	0.8938	117.10	
0.0014	0.8830	108.39	

Table S4 CS of R-HAp calculation using SEAM

FWHM (β) Radians	Cos θ Degree	Crystallite Size $D = \frac{k\lambda}{\beta \cos \theta}$ nm	Average Crystallite Size
0.0016	0.9955	89.66	115.23
0.0018	0.9819	77.05	
0.0012	0.9801	120.97	
0.0011	0.9746	125.40	
0.0015	0.9701	95.23	
0.0012	0.9682	122.46	
0.0011	0.9617	129.07	
0.0012	0.9608	125.28	
0.0028	0.9584	51.81	
0.0011	0.9561	127.83	
0.0010	0.9524	139.02	
0.0012	0.9402	128.03	
0.0009	0.9277	155.71	
0.0011	0.9132	140.32	
0.0014	0.9082	112.14	
0.0015	0.9044	100.97	
0.0012	0.9014	133.53	
0.0013	0.8984	116.35	
0.0018	0.8942	87.09	
0.0012	0.8833	126.67	