

Supplementary Table S1. Physico-chemical Property Solubility of fucoidan from *S. illicifolium* in different solvents

S.NO	Solvent	Solubility
1.	Hexane	Insoluble
2.	Chloroform	Insoluble
3.	Ethyl acetate	Insoluble
4.	Acetone	Insoluble
5.	Dimethyl sulphoxide	Insoluble
6.	Dimethyl formamide	Insoluble
7.	Methanol	Insoluble
8.	Ethanol	Insoluble
9.	Water	Soluble
10.	0.1 M HCl	Soluble

Supplementary Table S2. Anticancer activity of Fucoidan from *Sargassum ilicifolium*

S.No	Concentrations µg/mL	% Cell Inhibition
1.	5	98.14
2.	10	91.50
3.	20	83.26
4.	30	79.41
5.	40	73.43
6.	50	57.50
7.	60	49.80
8.	80	33.73
9.	100	26.29

Supplementary Table S3. The molecular docking experiment was carried out for the compound fucoidan against the target protein of antioxidant and anticancer studies. Their molecular interaction, bond length with glide scores were listed.

Protein Name	Protein ID (PDB)	Amino acid interaction (3-letter code)	Bond Length	Glide Score Kcal/mol	Glide Energy Kcal/mol
Anti-oxidant					
NADPH oxidase	1DNU	ASN162(D), ASN162(C), ARG323 (C).	1.99, 2.03, (1.74, 2.65, 2.18)	-7.169	-23.864
Cytochrome p450	1OG5	GLU400(C), LYS423(B), LYS421(B), PHE419(A), LYS421(A).	(2.08, 2.39), 1.98, 2.35, (2.28, 2.33), (1.57, 1.97, 2.03).	-4.455	-25.778
Xanthine dehydrogenase/oxidase	3NRZ	LYS754, GLU761, TYR599, ILE596, PHE763	2.11, (2.36, 2.54), (1.60, 2.22, 2.17, 2.70, 2.19,2.0), 2.81, (2.17, 2.98, 2.40, 2.60)	-4.899	-12.708
Anti-cancer					
Caspase-3	1I3O	ARG286	(1.66, 2.66)	-5.062	-23.071
Nuclear factor NF-kappa-B p105 subunitS	1SVC	GLN53, ARG54, TYR241,	2.21, (1.74, 2.40), (3.43, 1.87, 3.14)	-3.219	-14.008
cellular tumor antigen p53	6XRE	HIS115, THR125, CYS124	(3.11, 2.18), 1.57, 1.97	-6.205	-36.567
Mucosal addressin cell adhesion molecule 1	1BQS	LEU17, TYR90, PHE92	2.76, 3.21, 2.09	-4.222	-21.957