

Hypoglycemic potential of *Sargassum* spp.: A review of bioactive compounds for diabetes management

Muhamad Firdaus, Ahmad Faris Priambodo

Faculty of Fisheries and Marine Sciences, Universitas Brawijaya, Malang, Indonesia.

Doi: <http://doi.org/10.7324/JAPS.2026.234652>

SUPPLEMENTARY MATERIAL

Supplementary Table S1 SYRCLE Risk of Bias Assessment

No.	Study	Sequence generation	Baseline characteristics	Allocation concealment	Random housing	Caregiver blinding	Outcome assessor blinding	Incomplete outcome data	Selective reporting	Other bias
1	Motshakeri et al. 2014	Unclear	Low	Unclear	Unclear	Unclear	Unclear	Low	Unclear	Unclear
2	Park et al. 2015	Low	Low	Unclear	Unclear	Unclear	Unclear	Low	Unclear	Unclear
3	Oh et al. 2016	Unclear	Low	High	Unclear	Unclear	Unclear	Low	Unclear	Unclear
4	Park et al. 2017	Low	Low	Unclear	Unclear	Unclear	Unclear	Low	Low	Unclear
5	Akbarzadeh et al. 2018	Unclear	Low	Unclear	Unclear	Unclear	Unclear	Low	Low	Unclear
6	Firdaus & Chamidah 2018	Unclear	Low	High	Unclear	Unclear	Unclear	Low	Unclear	Unclear
7	Gotama et al. 2018	Unclear	Low	High	Unclear	Unclear	Unclear	Low	Low	Unclear
8	Lee & Han 2018	Low	Low	Unclear	Unclear	Unclear	Unclear	Low	Low	Unclear
9	Renitta et al. 2020	Unclear	Low	High	Unclear	Unclear	Unclear	Low	Unclear	Unclear
10	Lindsey et al. 2021	Low	Low	Unclear	Unclear	Unclear	Unclear	Low	Unclear	Unclear
11	Murakami et al. 2021	Low	Low	High	Unclear	Unclear	Unclear	Low	Low	Unclear
12	Wu et al. 2021	Low	Low	Unclear	Unclear	Unclear	Unclear	Low	Low	Unclear
13	Firdaus et al. 2022	Unclear	Low	High	Unclear	Unclear	Unclear	Low	Unclear	Unclear
14	Lee et al. 2023	Low	Low	Unclear	Unclear	Unclear	Unclear	Low	Low	Unclear
15	Moheimanian et al. 2023	Low	Low	High	Unclear	Unclear	Unclear	Low	Unclear	Unclear

Supplementary Table S2 – Data Extraction Summary

No.	Study	Species	Dose (mg kg ⁻¹ / % feed)	Duration (days)	Preparation	Key outcomes	Mechanism summary	Dose
1	Motshakeri et al. 2014	<i>S. polycystum</i>	300 mg kg ⁻¹	22.0	Ethanol + water extracts	↓ glucose; pancreas, liver, kidney, histopath improved	antioxidant protective effects	
2	Park et al. 2015	<i>S. coreanum</i>	0.5 % feed	42.0	Crude extract	↓ glucose, insulin, HOMA-IR; ↓ hepatic G6Pase/PEPCK	gluconeogenesis suppression	
3	Oh et al. 2016	<i>S. fulvellum</i>	5% feed	112.0	Freeze-dried powder	↑ insulin sensitivity; ↓ glucose & inflammatory cytokines	Anti-inflammatory modulation	
4	Park et al. 2017	<i>S. yezoense</i>		14.0	Extract		Digestive enzyme blockage	
5	Akbarzadeh et al. 2018	<i>S. oligocystum</i>		30.0	Hydro-alcoholic extract	↓ FBG, TG, HOMA-IR; β cell regeneration ↑	ROS & adipogenesis inhibition	300 mg kg ⁻¹
6	Firdaus & Chamidah 2018	<i>S. polycystum</i>		45.0	Methanol extract	↓ glucose, HBA1c	Phenolic insulin - mimetic	150-300 mg kg ⁻¹
7	Gotama et al. 2018	<i>S. hystrix</i>		15.0	Ethanol extract	↓ glucose, TG, cholesterol; pancreatic protection	α-glucosidase inhibition; insulin mimic	600 mg kg ⁻¹
8	Lee & Han 2018	<i>S. sagamianum</i>		14.0	Extract	Hight α-G/α-A inhibition; ↓ PPHG	Carbohydrate absorption delay	200-400 mg kg ⁻¹
9	Renitta et al. 2020	<i>S. wightii</i>		15.0	Methanol extract	↓ glucose, TC, LDL, TG; ↑ HDL	Phlorotannin lipid & glucose regulation	300 mg kg ⁻¹
10	Lindsey et al. 2021	<i>S. tenerrimum</i>		15.0	Methanol extract	↑ weight & HDL; ↓ TC, VLDL, LDL, TG; ↓ SGOT/SGPT	Enzyme inhibition against hyperglycaemia	250 mg kg ⁻¹
11	Murakami et al. 2021	<i>S. horneri</i>		91.0	Freeze-dried powder	↓ weight gain; ↓ serum glucose; ↑ faecal TG excretion	Pancreatic lipase inhibition; fucoidan/fucoxanthin	100-500 mg kg ⁻¹
12	Wu et al. 2021	<i>S. fusiforme</i>		28.0	Ethanol extract	↓ FBG; improved OGTT & lipids; gut microbiota modulation	AA metabolism & microbiota metabolism	2-6 % feed
13	Firdaus et al. 2022	<i>S. oligocystum</i>		45.0	Crude extract	↓ glucose; ↑ glucose uptake ↓ ROS; ↑ Glut 4 translocation; ↑ glycogen	PTP1B inhibition; PI3K/Akt activation	4 mL kg ⁻¹
14	Lee et al. 2023	<i>S. horneri</i>		42.0	Extract		IRS-1/Akt – Glut 4 signalling	500 mg kg ⁻¹

15	Moheimanian et al. 2023	<i>S. boveanum</i>	0.08	MeOH 80% extract	↓ Post-prandial glucose (120 min)	Competitive α -G inhibition PI3K/Akt/FOXO1 and lipid-synthesis suppression	30 mg kg ⁻¹ 50-250 mg kg ⁻¹
16	Xie et al. 2023	<i>S. pallidum</i>	28.0	Powder	↓ Hyperglycaemia, IR, oxidative stress; gut barrier ↑		
