Supplementary materials

Table S1. Summary of effects of various biochars on methane production during the anaerobic digestion.

BC feedstock	Pyrolysis temperature (°C)	AD substrate	Effects of BC on methane production	Reference
Rice straw	500	Municipal solid waste	Methane production increased by 11.69%	[1]
Coconut shell	600	Straw and cow manure	Methane yield increased by 12.97%	[2]
Sewage sludge	300	Waste activated sludge	Methane yield increased by 4.17%	[3]
Sawdust	500	Sludge and food waste	Methane production rate increased by 22.4%-40.3%	[4]
Coconut shell	450	Citrus peel waste	Methane yield increased by 12.60	[5]
Pinewood	-	Wastewater sludge	Methane production increased by 14.42-47.80%	[6]
Dairy manure	350	Dairy manure	Methane yield increased by 24.69-26.47%	[7]

Table S2. The biotoxicity of leaching solution of AF-BC at various concentrations.

AF-BC concentration	Inhibition (%)[a]
1 g/L	4.48
5 g/L	9.91
10 g/L	17.22

[a]Inhibition (%) was calculated according to the comparison of color development between the sample and negative control (DI water).

Table S3. The physicochemical characteristics of AF and AF-BC.

	Elemental analysis (wt. %)				O/C	H/C	Proximate analysis (%, dry basis)		
	C	**H**	**O**	**N**			**Fixed Carbon**	**Volatile Carbon**	**Ash**
AF	43.9	5.8	38.5	2.4	0.7	1.6	5.5	85.1	9.4
AF-BC	68.8	4.8	14.4	4.9	0.2	0.8	34.5	58.4	7.1
	Mineral composition (wt. %)						BET surface area		
	N	P	K	Ca	Mg	Fe	(m^2/g)		
AF	2.4	0.2	2.2	1.2	0.3	<0.1	0.6		
AF-BC	4.9	0.2	0.1	1.4	0.3	0.1	3.5		

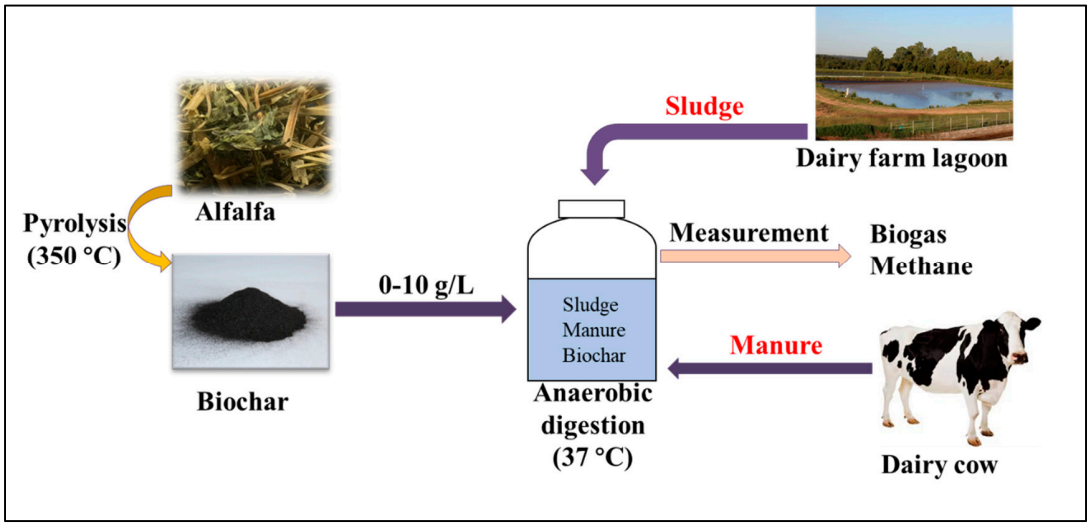

Figure S1. Experiment set-up for anaerobic digestion of dairy manure with addition of AF-BC.

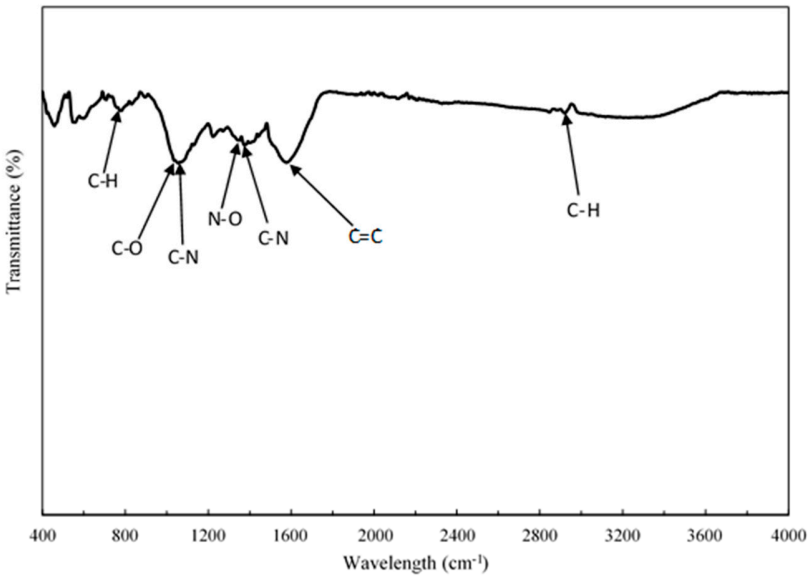

Figure S2. FT-IR spectrum of AF-BC.

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