Supplementary Materials

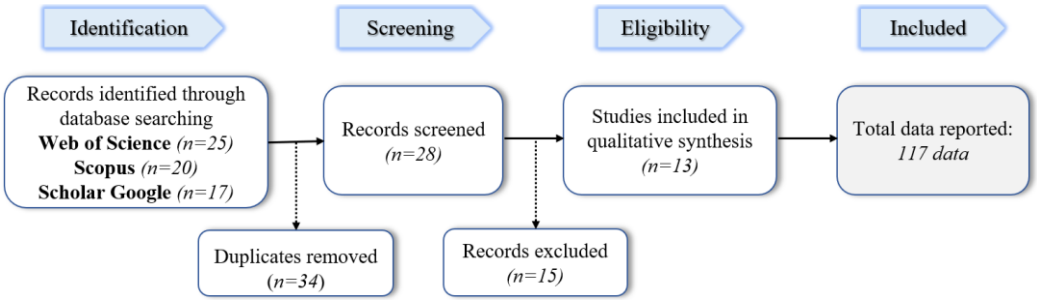

Figure S1. Flow diagram summarizing quantitatively the selection of studies from the systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA, http://www.prisma-statement.org/). n= number of articles

Table S1. Global production of fiber waste from the textile industry and volatile solids (VS) and total solids (TS) content.

Parameters	Fiber waste		unit
	Polyester	Cotton	
World waste production	42	11,7	million tonnes per year
VS%	99,4	79	%TS
TS%	97,5	98,7	%

Table S2. Summary of raw data from studies used to perform meta-analysis of evaluation of pre-treatments applied to different sources of textile waste.

	Textile Waste	Reactor conditions	Pretreatment conditions	CH_4 Yield (mL/g)[3]			Reference
				Average Control	Average Pretrated	Change (%)	
Biological							
	Wool textile[1]	Batch; 37°C; 50 days;	Alkaline Endopeptidase (Kilo Novo Protease Unit)	43,5	78	79	[1]
	Wool textile[1]	Batch; 55°C; 46 days;	Alkaline Endopeptidase (Kilo Novo Protease Unit)	19,5	300	1438	[2]
Chemical							
	Wool textile[1]	Batch; 37°C; 50 days;	Inorganic macronutrients + trace nutrients	43,5	62	42	[1]
	Blue jeans[1]	CSTR – UASB; 55°C – 24°C; 30 days;	N-methyl- morpholine-N-oxide (NMMO) soluion concentrated to 85%	179,1	250,5	40	[8]
	Cotton Waste[1]	Batch; 38°C;	Microaeration [Oxygen Flow Rates (OFR): 0.5 – 4.6 mL/h]	653,3	197,3	-70	[6]
	Cotton Waste[1]	Batch; 38°C; 30 days	Microaeration [OFR: 0.5 – 4.6 mL/h]	653,3	160,4	-75	[10]
	Textile dyeing sludge[2]	35°C; 15 days;	NaOH [pH 10]	0,1	33,3	33200	[4]
	Textile dyeing sludge[2]	35°C; 15 days;	HCl [pH 2]	0,1	21,1	21000	[4]
	Fresh biosludge	Batch; 35°C; 30 days;	Ozonization [0.005 – 0.01 g O_3/g COD]	246	286,5	16	[7]
Physical							
	Wool textile[1]	Batch; 55°C; 46 days	Autoclave [120°C for 10 min]	19,5	130	567	[2]
	Wool textile[1]		Liquid Nitrogen (LN_2)	34	129,7	281	[9]
	Cotton Waste[1]	Semicontinuous anaerobic digesters; 37°C; 40 days;	Autoclave [120°C for 10 min]	157,5	203,9	29	[3]
	Textile dyeing sludge[2]	35°C; 15 days;	Thermal [water bathing at 70°C for 10h]	0,1	56,1	56000	[4]

	Textile dyeing sludge[2]	Batch; 35°C; 23 days;	Thermal [60°C – 100°C]	82,1	169,1	106	[5]
	Fresh biosludge[2]	Batch; 35°C; 30 days;	Sonication [51 kH±6% frequency, 120 watts 30 – 60min]	246	278,5	13	[7]
	Textile dyeing sludge[2]		Sonication [4 kHz, 255 W, 0.73 W/mL and 15 min]	113	125	10	[11]
	Textile dyeing wastewater[2]	Batch; 37°C;	UV photodegradation	8,9	15,5	74	[12]
	Textile dyeing sludge[2]	Batch; 35°C; 25 days;	90°C for 1h	288,9	347,7	20	[13]
Chemical+Physical							
	Cotton Waste[1]	Semicontinuous anaerobic digesters; 37°C; 40 days;	[Na_2CO_3 + 150°C 120 min]	157,5	253,8	61	[3]
	Textile dyeing sludge[2]	35°C; 15 days;	Thermal [water bathing at 90°C for 10h + NaOH]	0,1	23,6	23500	[4]
	Cotton Waste[1]	Batch; 38°C; 30 days;	Microaeration [OFR: 1.0 – 4.6 mL/h+ H_2SO_4]	653,3	246,6	-62	[10]

1 Solid Fraction

2 Liquid Fraction

3 mL/gVS or mL/gCOD

Reference number of the article in Table S3 shown in square brackets.

Table S3. Studies included in the meta-analysis.

n	Article Title	Authors	Year	DOI
1	Dry anaerobic digestion of lignocellulosic and protein residues	Kabir, M.M., Taherzadeh, M.J., Sárvári Horváth, I.	2015	10.18331/BRJ2015.2.4.5
2	Enhanced methane production from wool textile residues by thermal and enzymatic pretreatment	Kabir, MM; Forgacs, G; Horvath, IS	2013	10.1016/j.procbio.2013.02.029
3	Enhancing energy production from waste textile by hydrolysis of synthetic parts	Hasanzadeh, E; Mirmohamadsadeghi, S; Karimi, K	2018	10.1016/j.fuel.2018.01.035
4	Anaerobic digestion of recalcitrant textile dyeing sludge with alternative pretreatment strategies	Xiang, X., Chen, X., Dai, R., Luo, Y., Ma, P., Ni, S., Ma, C.	2016	10.1016/j.biortech.2016.09.098
5	Effect of low temperature of thermal pretreatment on anaerobic digestion of textile dyeing sludge	Chen, X., Xiang, X., Dai, R., Wang, Y., Ma, P	2017	10.1016/j.biortech.2017.06.138
6	Rapid hydrogen generation from cotton wastes by mean of dark fermentation	Solowski, G; Konkol, I; Shalaby, M; Cenian, A	2020	10.1007/s42452-020-03247-3
7	Effect of Ozonation and Sonication on Biochemical Methane Potential of Biosludge from Textile Mill Effluent	Desiana, D., Setiadi, T.	2009	10.1007/s11267-009-9239-5
8	High-rate biogas production from waste textiles using a two-stage process	Jeihanipour, A; Aslanzadeh, S; Rajendran, K; Balasubramanian, G; Taherzadeh, MJ	2013	10.1016/j.renene.2012.10.042
9	Effect of liquid nitrogen pre-treatment on various types of wool waste fibres for biogas production	Kuzmanova, E., Zhelev, N., & Akunna, J. C.	2018	10.1016/j.heliyon.2018.e00619
10	Methane and hydrogen production from cotton waste by dark fermentation under anaerobic and micro -aerobic conditions	Solowski, G; Konkol, I; Cenian, A	2020	10.1007/978-3-030-13068-8_71
11	Co-digestion Potential of Industrial Sludges with Municipal Sludge	Aksu Bahçeci, H., Sanin, S.L., Sanin, F.D.	2021	10.1007/s12649-021-01409-x
12	Integrated UV photodegradation and anaerobic digestion of textile dye for efficient biogas production using zeolite	Apollo, S., Onyango, M.S., Ochieng, A.	2014	10.1016/j.cej.2014.02.027
13	Optimization and system energy balance analysis of anaerobic co-digestion process of pretreated textile dyeing sludge and food waste	Zhou, WZ; Tuersun, N; Zhang, YZ; Wang, Y; Cheng, C; Chen, XG	2021	10.1016/j.jece.2021.106855