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S1: Search Strategy

Database search: Medline (Ovid)

Resource: Ovid MEDLINE(R) Epub Ahead of Print, In Process & Other Non-Indexed Citations, Ovid MEDLINE (R) Daily, and Ovid MEDLINE (R) 1946-Present

Date: 11 Dec 2023

No.	Key Words	Results
1	exp Probiotics/	25111
2	probiotic*.tw.	38707
3	1 or 2	43206
4	exp Diarrhea/	58155
5	(diarrhe* or diarrhoe* or diarhe* or diarhoe*).tw.	128373
6	4 or 5	143295
7	exp "Systematic Review"/	246546
8	(systematic adj2 review$).tw.	322573
9	(systematic adj review).tw.	283779
10	exp Meta-Analysis as Topic/	28733
11	exp Meta-Analysis/	191086
12	meta-analys$.tw.	282781
13	(meta adj1 analys$).tw.	282836
14	7 or 8 or 9 or 10 or 11 or 12 or 13	491306
15	3 and 6 and 14	361

Database search: Embase (Ovid)

Resource: Embase 1980 to 2023 Week 49

Date: 11 Dec 2023

No.	Key Words	Results
1	exp Probiotics/	54442
2	probiotic*.tw.	47297
3	1 or 2	63560
4	exp Diarrhea/	311641
5	(diarrhe* or diarrhoe* or diarhe* or diarhoe*).tw.	187649
6	4 or 5	359916
7	exp "Systematic Review"/	441289
8	(systematic adj2 review$).tw.	389638
9	(systematic adj review).tw.	340143
10	exp Meta-Analysis as Topic/	54317
11	exp Meta-Analysis/	298879
12	meta-analys$.tw.	354393
13	(meta adj1 analys$).tw.	354452
14	7 or 8 or 9 or 10 or 11 or 12 or 13	739983
15	3 and 6 and 14	925

Database search: CDSR (Ovid)

Resource: EBM Reviews - Cochrane Database of Systematic Reviews 2005 to December 6, 2023

Date: 11 Dec 2023

No.	Key Words	Results
1	[exp Probiotics/]	0
2	probiotic*.tw.	178
3	1 or 2	178
4	[exp Diarrhea/]	0
5	(diarrhe* or diarrhoe* or diarhe* or diarhoe*).tw.	1696
6	4 or 5	1696
7	[exp "Systematic Review"/]	0
8	(systematic adj2 review$).tw.	9849
9	(systematic adj review).tw.	8048
10	[exp Meta-Analysis as Topic/]	0
11	[exp Meta-Analysis/]	0
12	meta-analys$.tw.	9624
13	(meta adj1 analys$).tw.	9625
14	7 or 8 or 9 or 10 or 11 or 12 or 13	10400
15	3 and 6 and 14	103

Table S2: Excluded studies and reason for exclusion

Author year (ref)	Reason
Pillai A et al., 2008[1] Ref	Small data set
Sun X et al.,2023[2] Ref	Small data set
Mc Farland et al.[3], 2006	Inadequate information

Table S3: Description of probiotic

Sl No.	Author, Year	Population	Intervention	Definition for probiotics (by author)	Dose
1.	Agamennone V et al., 2018[4]	Any age group	Probiotic dairy products	Dairy products routinely sold in food stores and evaluated as probiotic by the Dutch association Natuur- en Gezondheidsproducten Nederland (NPN, Amersfoort, The Netherland).	NA
2.	Agamennone V et al., 2018[4]	Any age group	Probiotic food supplements (Non dairy products)	Food supplements include Probioticum (Wapiti), Winbiotic Pro-AD (Winclove), Probactiol Duo (Metagenics), Advanced Multi-Billion Dophilus (Solgar), and Imutis (Trenker) evaluated as probiotic by the Dutch association Natuur- en Gezondheidsproducten Nederland (NPN, Amersfoort, The Netherland).	NA
3.	Blaabjerg S et al.,2017[5]	Outpatients of any age group	Any Probiotics	Probiotics included *Lactobacilli spp., Lactococcus spp., Bacillus spp., Bifidobacterium spp., Saccharomyces spp., Leuconostoc cremoris, Clostridium spp*., or *Streptococcus spp.* and used a combination of two or more probiotic strains as intervention.	NA
4.	Blaabjerg S et al.,2017[5]	Outpatients of any age group	Any Probiotics	Probiotics included *Lactobacilli spp., Lactococcus spp., Bacillus spp., Bifidobacterium spp., Saccharomyces spp., Leuconostoc cremoris, Clostridium spp.*, or *Streptococcus spp.* Placebo and used a combination of two or more probiotic strains as intervention.	NA
5.	Hempel S et al., 2012[6]	Any age group	Any Probiotics	Probiotics included the genera *Lactobacillus, Bifidobacterium, Saccharomyces, Streptococcus, Enterococcus*, and/or *Bacillus* alone or in combination, using live (active or lyophilized) microorganisms in probiotic or synbiotic preparations.	NA
6.	Hempel S et al., 2012[6]	Any age group	Genus, *Bacillus*	NA	55 million CFU/capsule
7.	Hempel S et al., 2012[6]	Any age group	Genus, *Enterococcus*	NA	0.75 billion CFU/capsule
8.	Jafarnejad S et al., 2016[7]	Inpatients	Any Probiotics	Probiotics included *Lactobacilli* (*acidophilus, casei, reuteri, bulgaricus, paracasei, plantarum, rhamnosus, salivarius), Bifidobacteria (bifdum, lactis, longum, breve, clausii, infantis),*	6–60 million CFU/d

				Enterococci (faecium), Streptococci (thermophiles), and the yeast *S.boulardii* (alone or in combination with one another).	
9.	Jafarnejad S et al., 2016[7]	Elderly	Any Probiotics	Probiotics included *Lactobacilli (acidophilus, casei, reuteri, bulgaricus, paracasei, plantarum, rhamnosus, salivarius), Bifidobacteria (bifdum, lactis, longum, breve, clausii, infantis), Enterococci (faecium), Streptococci (thermophiles)*, and the yeast *S.boulardii* (alone or in combination with one another).	6–60 million CFU/d
10.	Kale-Pradhan P B et al., 2010[8]	Pediatric and adult patients	*Lactobacillus*	NA	2 billion – 40 billion CFU
11.	Ritchie M L etal., 2012[9]	Any age group	Any Probiotics	The type of probiotic used were VSL#3, *LGG, S. boulardii, B. infantis, L. acidophilus, L. casei, C. butyricum, E. faecum, L.plantarium, B. lactis* and *L. acidophilus* combined with *B. infantis.*	NA
12.	Szajewska H et al., 2005[10]	Adults and children	*Saccharomyces boulardii*	NA	200mg- 1 gram
13.	Videlock E J et al., 2012[11]	Any age group patients treated with antibiotics	Any Probiotics	Probiotic species such as *Lactobacillus, S. boulardii, Saccaromyces, LGG* and *Bifidobacterium*.	NA
14.	Guo Q et al.,2019[12]	Pediatric patients treated with antibiotics	Any Probiotics	Probiotics (of any specified strain or dose) including *Bacillus spp., Bifidobacterium spp., Clostridium butyricum, Lactobacilli spp.* , *Lactococcus spp., Leuconostoc cremoris* , *Saccharomyces spp.,* or *Streptococcus spp*	NA
15.	Guo Q et al.,2019[12]	Pediatric patients treated with antibiotics	Any Probiotics	Probiotics (of any specified strain or dose) including *Bacillus spp., Bifidobacterium spp., Clostridium butyricum, Lactobacilli spp.* , *Lactococcus spp., Leuconostoc cremoris* , *Saccharomyces spp.,* or *Streptococcus spp*	5 billion CFU
16.	Kale-Pradhan P B et al., 2010[8]	Pediatrics (Age < 18 yrs)	*Lactobacillus*	NA	2 billion – 40 billion CFU
17.	Szajewska H et al., 2006[13]	Pediatric inpatients or outpatients	Any probiotics	Any probiotics at any dose	32.2 DDD per 1000 inhabitants per day

18.	Videlock E J et al., 2012[11]	Pediatric patients treated with antibiotics	Any probiotics	Probiotic species such as *Lactobacillus, S. boulardii, Saccaromyces, LGG* and *Bifidobacterium*.	NA
19.	Zhang L et al., 2022[14]	Elderly on antibiotics	Any probiotic	Any probiotic including *Saccharomyces boulardii, Lactobacillus acidophilus* and *Lactobacillus casei, S. thermophilus*, and *L. bulgaricus, bifdobacterium* and *Shirota* strain.	NA
20.	Zhang L et al., 2022[14]	Elderly inpatients	Any probiotic	Any probiotic including *Saccharomyees boulardii, Lactobacillus acidophilus* and *Lactobacillus casei, S. thermophilus,* and *L. bulgaricus, bifdobacterium* and *Shirota* strain.	NA
21.	Zhang L et al., 2022[14]	Elderly inpatients	Probiotic given during antibiotic treatment	Any probiotic including *Saccharomyees boulardii, Lactobacillus acidophilus* and *Lactobacillus casei, S. thermophilus*, and *L. bulgaricus, bifdobacterium* and *Shirota* strain.	NA
22.	Avadhani A et al., 2010[15]	Adult hospitalized population	Any probiotic	Any probiotics at any dose	NA
23.	Avadhani A et al., 2010[15]	Adult hospitalized population	Any probiotic	Any probiotics at any dose	NA
24.	Liao W et al., 2020[16]	Adult inpatients and outpatients	Any probiotic	The probiotics species studied in the trials primarily included *Lactobacillus, Saccharomyces, Bifidobacterium*, and *Streptococcus.*	NA
25.	Jafarnejad S et al., 2016[7]	Adults	Any probiotic	Probiotics included *Lactobacilli (acidophilus, casei, reuteri, bulgaricus, paracasei, plantarum, rhamnosus, salivarius), Bifidobacteria (bifdum, lactis, longum, breve, clausii, infantis), Enterococci (faecium), Streptococci (thermophiles)*, and the yeast *S. boulardii* (alone or in combination with one another).	6–60 million CFU/d
26.	Videlock E J et al., 2012[11]	Adult patients treated with antibiotics	Any probiotic	Probiotic species such as Lactobacillus, S. boulardii, Saccaromyces, LGG and Bifidobacterium.	NA

Table S4: GRADE Meta-analyses

Sl No.	Author, year	Population	Intervention	Outcome	No of cases	No of studies	RR (95% CI)	ROB	Indirectness	Inconsistency	Imprecision	Publication bias	Large effect	GRADE	AMSTAR
1	Agamennone V et al., 2018[4]	Any age group	Probiotic dairy products	AAD	74	7	1.01 (0.95-1.07)	Serious	Very serious	NA	Serious	NA	No	Very low (+)	Critically low
2	Agamennone V et al., 2018[4]	Any age group	Probiotic food supplements (Non-dairy products)	AAD	393	25	0.64 (0.63-0.65)	Serious	Serious	Not serious	Not serious	NA	No	Low (++)	Critically low
3	Blaabjerg S et al.,2017[5]	Outpatients of any age group	Any Probiotics	AAD	147	17	0.49 (0.36-0.66)	Serious	Not serious	Not serious	Not serious	No	No	Moderate (+++)	Low
4	Blaabjerg S et al.,2017[5]	Outpatients of any age group	*Saccharomyces boulardii*	AAD	48	5	0.41 (0.3-0.57)	Very serious	Not serious	Not serious	Serious	No	Large	Low (++)	Low
5	Blaabjerg S et al.,2017[5]	Outpatients of any age group	*Lactobacillus acidophilus* and *Bifidobacterium lactis*	AAD	23	2	0.79 (0.47-1.33)	Not serious	Serious	Not serious	Serious	No	No	Low (++)	Low
6	Blaabjerg S et al.,2017[5]	Outpatients of any age group	Any Probiotics	AAD (WHO defined diarrhea)	55	7	0.54 (0.36-0.82)	Serious	Not serious	Not serious	Serious	No	No	Low (++)	Low
7	Cremonini F et al.,2002[17]	Any age group	*Lactobacillus GG*, *Saccharomyces boulardii*	AAD	NA	7	0.3966 (0.275-0.591)	Not serious	Series	Not serious	Serious	No	Very large	Moderate (+++)	Critically low
8	Hempel S et al., 2012[6]	Any age group	Any Probiotics	AAD	584	63	0.58 (0.5-0.68)	Serious	Not serious	Not serious	Not serious	No	No	Moderate (+++)	Moderate
9	Hempel S et al., 2012[6]	Any age group	Genera blends	AAD	164	25	0.66 (0.49-0.88)	Serious	Not serious	NA	Not serious	Yes	No	Low (++)	Moderate
10	Hempel S et al., 2012[6]	Any age group	Genus, *Bacillus*	AAD	29	2	0.45 (0.26-0.79)	Serious	Not serious	NA	Serious	No	Large	NA	Moderate
11	Hempel S et al., 2012[6]	Any age group	Genus, *Enterococcus*	AAD	61	3	0.51 (0.38-0.68)	Not serious	Not serious	NA	Serious	Yes	No	Low (++)	Moderate
12	Hempel S et al., 2012[6]	Any age group	Genus, *Lactobacillus*	AAD	174	17	0.64 (0.47-0.86)	Serious	Not serious	NA	Not serious	No	No	Low (++)	Moderate
13	Hempel S et al., 2012[6]	Any age group	Genus, *Saccharomyces*	AAD	142	15	0.48 (0.35-0.65)	Serious	Not serious	NA	Not serious	No	Large	Low (++)	Moderate
14	Jafarnejad S et al., 2016[7]	Inpatients	Any Probiotics	AAD	439	22	0.67 (0.58-0.77)	Serious	Not serious	Serious	Not serious	No	No	Low (++)	Low
15	Jafarnejad S et al., 2016[7]	Elderly	Any Probiotics	AAD	194	5	0.94 (0.76-1.15)	Very serious	Serious	Serious	Serious	No	No	Very low (+)	Low
16	Jafarnejad S et al., 2016[7]	Adults	*Lactobacillus sp.*	AAD	392	22	0.66 (0.57-0.77)	Serious	Not serious	Serious	Not serious	No	No	Low (++)	Low
17	Jafarnejad S et al., 2016[7]	Adults	*Saccharomyces boulardii*	AAD	282	11	0.5 (0.38-0.64)	Serious	Not serious	Not serious	Not serious	No	No	Moderate (+++)	Low
18	Jafarnejad S et al., 2016[7]	Adults	*Bifidobacteria sp.*	AAD	113	13	0.77 (0.65-0.92)	Serious	Not serious	Serious	Not serious	No	No	Low (++)	Low
19	Kale-Pradhan P B et al., 2010[8]	Paediatric and adult patients	*Lactobacillus*	AAD	74	10	0.35 (0.19-0.67)	Serious	Not serious	Very serious	Serious	Yes	Very large	Very low (+)	Moderate
20	Ritchie M L etal., 2012[9]	Any age group	Any Probiotics	CDAD	NA	6	0.6 (0.41-0.86)	NA	Serious	NA	Not serious	Yes	No	NA	High

21	Szajewska H et al., 2005[10]	Adults and children	*Saccharomyces boulardii*	AAD	NA	5	0.43 (0.23-0.78)	NA	Not serious	NA	Serious	NA	Large	NA	High
22	Szajewska H et al., 2015[18]	Adults and children	*Lactobacillus rhamnosus GG*	AAD	80	12	0.49 (0.29-0.83)	Serious	Not serious	Serious	Serious	No	Large	Low (++)	High
23	Videlock E J et al., 2012[11]	Any age group patients treated with antibiotics	Any Probiotics	AAD	306	34	0.53 (0.44-0.63)	Serious	Not serious	Serious	Not serious	No	No	Low (++)	Moderate
24	Guo Q et al.,2019[12]	paediatric patients treated with antibiotics	Any Probiotics	AAD	857	33	0.45 (0.36-0.56)	Serious	Not serious	Serious	Not Serious	No	No	Moderate (+++)	High
25	Guo Q et al.,2019[12]	paediatric patients treated with antibiotics	Any Probiotics 5 billion CFU	AAD	624	20	0.37 (0.30-0.46)	Serious	Not serious	Serious	Not Serious	No	No	Moderate (+++)	High
26	Guo Q et al.,2019[12]	paediatric patients treated with antibiotics	*Lactobacillus rhamnosus (strains: GG, ATCC53103 and E/N, Oxy, Pen)*	AAD	103	6	0.37 (0.24-0.55)	Serious	Not serious	Not serious	Not Serious	NA	No	NA	High
27	Kale-Pradhan P B et al., 2010[8]	Paediatrics	*Lactobacillus*	AAD	23	4	0.44 (0.18-1.08)	NA	Not serious	Very serious	Very serious	Yes	Large	NA	Moderate
28	Szajewska H et al., 2015[18]	Children	*Lactobacillus rhamnosus GG*	AAD	19	4	0.52 (0.25-1.05)	Serious	Not serious	Serious	Very serious	No	No	Very low (+)	High
29	Szajewska H et al., 2006[13]	Paediatric inpatients or outpatients	Any probiotics	AAD	40	6	0.44 (0.25-0.77)	Serious	Not serious	Serious	Serious	NA	Large	Low (++)	High
30	Videlock E J et al., 2012[11]	Paediatric patients treated with antibiotics	Any probiotics	AAD	71	10	0.48 (0.35-0.65)	Serious	Not serious	Not serious	Serious	No	Large	High (++++)	Moderate
31	Xu H B et al., 2017[19]	Paediatrics	Bifidobacterium	AAD	NA	30	0.33 (0.29-0.39)	Serious	Not serious	Not serious	Not serious	No	Very large	Moderate (+++)	Critically low
32	Zhang L et al., 2022[14]	Elderly on antibiotics	Any probiotic	AAD	311	8	0.99 (0.85-1.14)	Not serious	Not serious	Serious	Very serious	NA	No	Very low (+)	Moderate
33	Zhang L et al., 2022[14]	Elderly inpatients	Any probiotic	AAD	46	6	0.71 (0.5-1)	Not serious	Not serious	Serious	Very serious	NA	No	Very low (+)	Moderate
34	Zhang L et al., 2022[14]	Elderly inpatients	Probiotic given during antibiotic treatment	AAD	30	5	0.59 (0.39-0.89)	Not serious	Not serious	Serious	Serious	NA	No	Low (++)	Moderate
35	Avadhani A et al., 2010[15]	Adult hospitalized population	Any probiotic	AAD	78	8	0.56 (0.44-0.71)	Serious	Not serious	Very serious	Serious	NA	No	Very low (+)	Moderate
36	Avadhani A et al., 2010[15]	Adult hospitalized population	Any probiotic	CDAD	NA	4	0.29 (0.18-0.46)	Serious	Not serious	Very serious	Serious	Yes	Very large	Very low (+)	Moderate
37	Liao W et al., 2020[16]	Adult inpatients and outpatients	Any probiotic	AAD	605	36	0.62 (0.51-0.74)	Very serious	Not serious	Serious	Not serious	Yes	No	Very low (+)	Low
38	Jafarnejad S et al., 2016[7]	Adults	Any probiotic	AAD	301	25	0.47 (0.4-0.56)	Serious	Not serious	Serious	Not serious	No	Large	Moderate (+++)	Low

39	Videlock E J et al., 2012[11]	Adult patients treated with antibiotics	Any probiotic	AAD	242	24	0.53 (0.43-0.66)	Very serious	Not serious	Serious	Not serious	No	No	Very low (+)	Moderate

Table S5: Sensitivity analysis

Author, year	Primary analysis			Sensitivity analysis					
	No of studies	RR (95%CI); I^2	GRADE	Excluding high ROB trials			Excluding small-sized studies (i.e., <25th percentile)		
				No of studies	RR (95%CI); I2	GRADE	No of studies	RR (95%CI); I2	GRADE
Videlock E J et al., 2012[11]	10	0.48 (0.44, 0.63); 36%	High (++++)	7	0.42 (0.32, 0.52); I2=0%	High	7	0.49 (0.34, 0.72) I2=54.7%	Moderate

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