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Title	Methods of assessment of zinc status in humans: an updated review and meta-analysis
Type	Article
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DOI	https://doi.org/10.1093/nutrit/nuae072
Date	2025
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Creators	Ceballos Rasgado, Marena, Brazier, Anna, Gupta, Swarnim, Moran, Victoria Louise, Pierella, Elisa, Fekete, Katalin and Lowe, Nicola M

It is advisable to refer to the publisher's version if you intend to cite from the work.
<https://doi.org/10.1093/nutrit/nuae072>

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Supplemental Information 1, search strategy

Contents

Update Search September 2020	1
Medline.....	1
EMBASE.....	2
Cochrane Library.....	2
Update search August 2021	3
Medline.....	3
Embase	4
Cochrane Library.....	5
Update Search July 2022	6
Medline.....	6
Embase	6
Cochrane Library.....	7

Update Search September 2020

Medline

Date Run:	14/09/2020	
ID	Search	Hits
1	exp Zinc/	60203
2	exp Zinc Compounds/ or Zinc Acetate/	13209
3	(zinc or zn).ti,kf,kw.	63442
4	(zinc or zn).ab. /freq=2	74813
5	or/1-4	123942
6	Dietary Supplements/	57724
7	exp Biofortification/	171
8	exp Food, Fortified/	9363
9	exp clinical trial/ or feasibility studies/ or pilot projects/	1015302
10	interven*.mp.	1094590
11	supplement*.mp.	349271
12	(biofortif* or bio fortif*).mp. ((fortif* or enrich* or enhanc* or boost*) adj2 (food* or rice or flour or corn or wheat or semolina or pulse* or bread* or sauce* or beverage* or maize or oat* or sugar or salt or oil* or fat* or condiment* or seasoning* or spice* or milk or dairy or juice* or nectar* or cereal* or biscuit* or drink\$1 or diet* or beverage* or meal*))).mp.	1277
13	or/6-13	33673
14	((zinc* or zn*) adj5 deplet*).mp.	2275616
15	14 or 15	1058
16		2276447

17	5 and 16	11771
18	exp animals/ not humans.sh.	4733412
19	17 not 18	8630
20	limit 19 to yr="2007 -Current"	5123

EMBASE

Date Run:	14/09/2020	
ID	Search	Hits
1	(zinc or zn).ti,kw.	73401
2	(zinc or zn).ab. /freq=2	88336
3	1 or 2	116253
4	interven*.mp.	1530456
5	supplement*.mp.	484729
6	(biofortif* or bio fortif*).mp.	1516
	((fortif* or enrich* or enhanc* or boost*) adj2 (food* or rice or flour or corn or wheat or semolina or pulse* or bread* or sauce* or beverage* or maize or oat* or sugar or salt or oil* or fat* or condiment* or seasoning* or spice* or milk or dairy or juice* or nectar* or cereal* or biscuit* or drink\$1 or diet* or beverage* or meal*))).mp.	33512
7	4 or 5 or 6 or 7	1993338
8	((zinc* or zn*) adj5 deplet*).mp.	1227
9	8 or 9	1994278
10	3 and 10	12046
11	exp animal/ not human.sh.	4821510
12	11 not 12	8446
13	limit 13 to yr="2007 -Current"	5496

Cochrane Library

Data base:	Cochrane Library	
Search		
Name:	SR3. Biomarkers for zinc	
Date Run:	14/09/2020	
ID	Search	Hits
1	MeSH descriptor: [Zinc] explode all trees	1625
2	MeSH descriptor: [Zinc Compounds] explode all trees	536
3	MeSH descriptor: [Zinc Acetate] this term only	24
4	zinc or zn	8459
5	{OR #1-#4}	8459
6	MeSH descriptor: [Dietary Supplements] explode all trees	12252
7	MeSH descriptor: [Biofortification] explode all trees	2
8	MeSH descriptor: [Food, Fortified] explode all trees	1405

9	MeSH descriptor: [Clinical Trial] explode all trees	140
	MeSH descriptor: [Feasibility Studies] this term	
10	only	6031
11	MeSH descriptor: [Pilot Projects] this term only	19388
12	interven*	404715
13	supplement*	88063
14	biofortif* or (bio NEXT fortif*)	162
	(fortif* or enrich* or enhanc* or boost*) NEAR/2	
	(food* or rice or flour or corn or wheat or semolina	
	or pulse* or bread* or sauce* or beverage* or	
	maize or oat* or sugar or salt or oil* or fat* or	
	condiment* or seasoning* or spice* or milk or	
	dairy or juice* or nectar* or cereal* or biscuit* or	
15	drink* or diet* or beverage* or meal*)	5498
16	{OR #6-#15}	481662
17	(zinc* or zn*) NEAR/5 deplet*	30
18	#16 OR #17	481669
19	#5 AND #18	4232
20	MeSH descriptor: [Animals] explode all trees	584579
21	MeSH descriptor: [Humans] explode all trees	584493
22	#20 NOT #21	86
23	#19 NOT #22	4232
	#19 NOT #22 with Cochrane Library publication	
24	date from Jan 2007 to present	3445
	#24 - Cochrane Reviews, Cochrane Protocols,	
	Clinical Trials (not clinical answers, editorials or	
25	special collections)	3401

Update search August 2021

Medline

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations and Daily <1946 to August 31, 2021>

1	exp Zinc/	62511
2	exp Zinc Compounds/ or Zinc Acetate/	14260
3	(zinc or zn).ti,kf,kw.	67465
4	(zinc or zn).ab. /freq=2	79447
5	or/1-4	131100
6	Dietary Supplements/	64331
7	exp Biofortification/	263
8	exp Food, Fortified/	9720
9	exp clinical trial/ or feasibility studies/ or pilot projects/	1065670

- 10 interven*.mp. 1205815
- 11 supplement*.mp. 377390
- 12 (biofortif* or bio fortif*).mp. 1561
- 13 ((fortif* or enrich* or enhanc* or boost*) adj2 (food* or rice or flour or corn or wheat or semolina or pulse* or bread* or sauce* or beverage* or maize or oat* or sugar or salt or oil* or fat* or condiment* or seasoning* or spice* or milk or dairy or juice* or nectar* or cereal* or biscuit* or drink* or diet* or beverage* or meal*)).mp. 36486
- 14 or/6-13 2447745
- 15 ((zinc* or zn*) adj5 deplet*).mp. 1109
- 16 14 or 15 2448620
- 17 5 and 16 12580
- 18 exp animals/ not humans.sh. 4880312
- 19 17 not 18 9247
- 20 limit 19 to yr="2020 -Current" 1172

Embase

<1974 to 2021 August 31>

- 1 (zinc or zn).ti,kw. 77490
- 2 (zinc or zn).ab. /freq=2 93831
- 3 1 or 2 123213
- 4 interven*.mp. 1681988
- 5 supplement*.mp. 521686
- 6 (biofortif* or bio fortif*).mp. 1791
- 7 ((fortif* or enrich* or enhanc* or boost*) adj2 (food* or rice or flour or corn or wheat or semolina or pulse* or bread* or sauce* or beverage* or maize or oat* or sugar or salt or oil* or fat* or condiment* or seasoning* or spice* or milk or dairy or juice* or nectar* or cereal* or biscuit* or drink* or diet* or beverage* or meal*)).mp. 36551
- 8 4 or 5 or 6 or 7 2179493
- 9 ((zinc* or zn*) adj5 deplet*).mp. 1278
- 10 8 or 9 2180480
- 11 3 and 10 12900
- 12 exp animal/ not human.sh. 4971690
- 13 11 not 12 9062
- 14 limit 13 to yr="2020 - 2021" 1052

Cochrane Library

Search Name: SR3 Cochrane

Date Run: 02/09/2021 22:51:19

Comment:

ID	Search	Hits
#1	MeSH descriptor: [Zinc] explode all trees	1681
#2	MeSH descriptor: [Zinc Compounds] explode all trees	556
#3	MeSH descriptor: [Zinc Acetate] this term only	27
#4	zinc or zn	9041
#5	{OR #1-#4}	9041
#6	MeSH descriptor: [Dietary Supplements] explode all trees	13460
#7	MeSH descriptor: [Biofortification] explode all trees	4
#8	MeSH descriptor: [Food, Fortified] explode all trees	1474
#9	MeSH descriptor: [Clinical Trial] explode all trees	141
#10	MeSH descriptor: [Feasibility Studies] this term only	6750
#11	MeSH descriptor: [Pilot Projects] this term only	21005
#12	interven*	460387
#13	supplement*	95182
#14	biofortif* or (bio NEXT fortif*)	188
#15	(fortif* or enrich* or enhanc* or boost*) NEAR/2 (food* or rice or flour or corn or wheat or semolina or pulse* or bread* or sauce* or beverage* or maize or oat* or sugar or salt or oil* or fat* or condiment* or seasoning* or spice* or milk or dairy or juice* or nectar* or cereal* or biscuit* or drink* or diet* or beverage* or meal*)	5875
#16	{OR #6-#15}	541960
#17	(zinc* or zn*) NEAR/5 deplet*	31
#18	#16 OR #17	541967
#19	#5 AND #18	4616
#20	MeSH descriptor: [Animals] explode all trees	617483
#21	MeSH descriptor: [Humans] explode all trees	617424
#22	#20 NOT #21	59
#23	#19 NOT #22	4616
#24	#19 NOT #22 with Cochrane Library publication date Between Sep 2020 and Sep 2021, in Trials	361

Update Search July 2022

Medline

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations and Daily <1946 to July 29, 2022>

- 1 exp Zinc/ 65015
- 2 exp Zinc Compounds/ or Zinc Acetate/ 15756
- 3 (zinc or zn).ti,kf,kw. 71996
- 4 (zinc or zn).ab. /freq=2 84374
- 5 or/1-4 138694
- 6 Dietary Supplements/ 70061
- 7 exp Biofortification/ 330
- 8 exp Food, Fortified/ 9984
- 9 exp clinical trial/ or feasibility studies/ or pilot projects/ 1117304
- 10 interven*.mp. 1312196
- 11 supplement*.mp. 405790
- 12 (biofortif* or bio fortif*).mp. 1856
- 13 ((fortif* or enrich* or enhanc* or boost*) adj2 (food* or rice or flour or corn or wheat or semolina or pulse* or bread* or sauce* or beverage* or maize or oat* or sugar or salt or oil* or fat* or condiment* or seasoning* or spice* or milk or dairy or juice* or nectar* or cereal* or biscuit* or drink* or diet* or beverage* or meal*)).mp. 38973
- 14 or/6-13 2615565
- 15 ((zinc* or zn*) adj5 deplet*).mp. 1139
- 16 14 or 15 2616464
- 17 5 and 16 13361
- 18 exp animals/ not humans.sh. 5033212
- 19 17 not 18 9840
- 20 ("20210831" or 202109* or 20211* or 2022*).dt,ez,da. 1954105
- 21 19 and 20 840

Embase

Embase <1974 to 2022 July 29>

- 1 (zinc or zn).ti,kw. 73927

2 (zinc or zn).ab. /freq=2 98517
3 1 or 2 124325
4 interven*.mp. 1821943
5 supplement*.mp. 556149
6 (biofortif* or bio fortif*).mp. 2068
7 ((fortif* or enrich* or enhanc* or boost*) adj2 (food* or rice or flour or corn or wheat or semolina or pulse* or bread* or sauce* or beverage* or maize or oat* or sugar or salt or oil* or fat* or condiment* or seasoning* or spice* or milk or dairy or juice* or nectar* or cereal* or biscuit* or drink* or diet* or beverage* or meal*)).mp. 38860
8 4 or 5 or 6 or 7 2351172
9 ((zinc* or zn*) adj5 deplet*).mp. 1316
10 8 or 9 2352188
11 3 and 10 13523
12 exp animal/ not human.sh. 5119587
13 11 not 12 9518
14 limit 13 to dc=20210831-20220729 745

Cochrane Library

Search Name: SR3 Cochrane

Date Run: 01/08/2022 08:38:59

Comment:

ID	Search	Hits
#1	MeSH descriptor: [Zinc] explode all trees	1732
#2	MeSH descriptor: [Zinc Compounds] explode all trees	573
#3	MeSH descriptor: [Zinc Acetate] this term only	28
#4	zinc or zn	9395
#5	{OR #1-#4}	9395
#6	MeSH descriptor: [Dietary Supplements] explode all trees	14594
#7	MeSH descriptor: [Biofortification] explode all trees	6
#8	MeSH descriptor: [Food, Fortified] explode all trees	1518
#9	MeSH descriptor: [Clinical Trial] explode all trees	141
#10	MeSH descriptor: [Feasibility Studies] this term only	7370
#11	MeSH descriptor: [Pilot Projects] this term only	22663

#12 interven* 497185

#13 supplement* 99794

#14 biofortif* or (bio NEXT fortif*) 202

#15 (fortif* or enrich* or enhanc* or boost*) NEAR/2 (food* or rice or flour or corn or wheat or semolina or pulse* or bread* or sauce* or beverage* or maize or oat* or sugar or salt or oil* or fat* or condiment* or seasoning* or spice* or milk or dairy or juice* or nectar* or cereal* or biscuit* or drink* or diet* or beverage* or meal*) 6046

#16 {OR #6-#15} 582065

#17 (zinc* or zn*) NEAR/5 deplet* 31

#18 #16 OR #17 582072

#19 #5 AND #18 4831

#20 MeSH descriptor: [Animals] explode all trees 652285

#21 MeSH descriptor: [Humans] explode all trees 652263

#22 #20 NOT #21 22

#23 #19 NOT #22 4831

#24 #19 NOT #22 with Cochrane Library publication date Between Jul 2022 and Aug 2022, in Trials 10

#25 #19 NOT #22 with Cochrane Library publication date Between Jul 2021 and Aug 2022 328

**Note: From those 328

Cochrane reviews: 24

Cochrane protocols: 6

Trials: 296

Clinical Answers:2

Only trials N=296 were downloaded into Endnote.