

Table S1 The basic information and reasons of exclusion of some literature

Author	Publish time	Study type	Population	Intervention	Reasons of exclusion
Mashhadi et al.	2018	RCT	Participants with type 2 diabetes	Astaxanthin	1. Not possible to identify whether the study subjects were overweight or obese. 2. Study subjects with metabolic diseases
Mikami et al.	2017	RCT	Japanese adult men and women with BMI $\geq 22$ kg/m <sup>2</sup>	Fucoxanthin	Not all study participants were overweight or obese.
Markovits et al.	2009	RCT	Obese patients and a control group	A mixture of lycopene, tocopherols, phytoene and phytofluene, etc.	A mixture of carotenoids and other antioxidants
Iwamoto et al.	2012	One-arm trial	Postmenopausal obese women	A beverage containing $\beta$ -cryptoxanthin, vitamin C, etc	1. One-arm trial; 2. A mixture of carotenoids and other antioxidants;

**RCT:** Randomized Controlled Trial; **BMI:** Body Mass Index; **LCD:** Low Calorie Diet

Table S1 The basic information and reasons of exclusion of some literature(continued)

Author	Publish time	Study type	Population	Intervention	Reasons of exclusion
McEneny et al.	2013	RCT	Men and women with a BMI between 18.5 and 35 kg/m <sup>2</sup> .	Lycopene-rich diet and lycopene supplement	1.Not all study participants were overweight or obese; 2.Pre and post intervention weight data not available
Xu et al.	2013	RCT	Atherosclerosis patients	Lutein	Not possible to identify whether the study subjects were overweight or obese.
Nouri et al.	2020 Apr.	RCT	Infertile men with oligozoospermia	Lycopene	1.Not possible to identify whether the study subjects were overweight or obese; 2.Pre and post intervention weight data not available
C. L. Shen et al.	2018	RCT	Postmenopausal women	Tocotrienol	1.Interventions do not contain carotenoids 2. Not possible to identify whether the study subjects were overweight or obese;
Stonehouse et al.	2016	RCT	Type 2 diabetes patients with 20–45 kg/m <sup>2</sup>	TRF-80 (tocotrienol + tocopherol), CC-60 (carotenes)	1.Not possible to identify whether the study subjects were overweight or obese; 2. Subjects with metabolic diseases

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Author	Publish time	Study type	Population	Intervention	Reasons of exclusion
Beynon et al.	2019	RCT	Men with raised PSA levels (but prostate cancer-free)	Lycopene and green tea intervention	Pre and post intervention weight data not available
Hajizadeh- Sharafabad et al.	2020 Dec.	RCT	Healthy men and postmenopausal women (BMI= 30-45 kg/m <sup>2</sup> )	Lutein with LCD	1.Mixture of carotenoids and other slimming substances; 2. Pre and post intervention weight data not available 3. Exceeding time limits (we searched databases up to September 2020)
Nishimura et al.	2019	RCT	Healthy Japanese subjects with low-density lipoprotein cholesterol levels	Lycopene	1.Not possible to identify whether the study subjects were overweight or obese; 2.Pre and post intervention weight data not available;
N. E. Chalyk et al.	2017	One-arm trial	Healthy volunteer with normal and excess weight	Astaxanthin	1.Not all study participants were overweight or obese; 2.Pre and post intervention weight data not available; 3. One-arm trial

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