

Supplementary Materials

Tart cherry intake and serum uric acid: Meta-analysis of randomized controlled trials and evidence from network pharmacology

Zhenzhen Zhang MSc, Zhiyuan Feng PhD, Wei Yan PhD, Tianyu Wu PhD, Jiayue Xia PhD, Junhui Yu PhD, Jingyi Yang MSc, Yuanyuan Wang PhD, Guiju Sun PhD

Key Laboratory of Environmental Medicine and Engineering of Ministry of Education, Department of Nutrition and Food Hygiene School of Public Health, Southeast University, Nanjing, China

Corresponding Author:

Prof. Guiju Sun, Key Laboratory of Environmental Medicine and Engineering of Ministry of Education, Department of Nutrition and Food Hygiene, School of Public Health, Southeast University, Gulou District, Dingjiaqiao 87#, Nanjing, Jiangsu 210009, China

Tel: 86-13951928860.

Email: gjsun@seu.edu.cn

Manuscript received 15 December 2025. Initial review completed 22 January 2026. Revision accepted 20 March 2026.

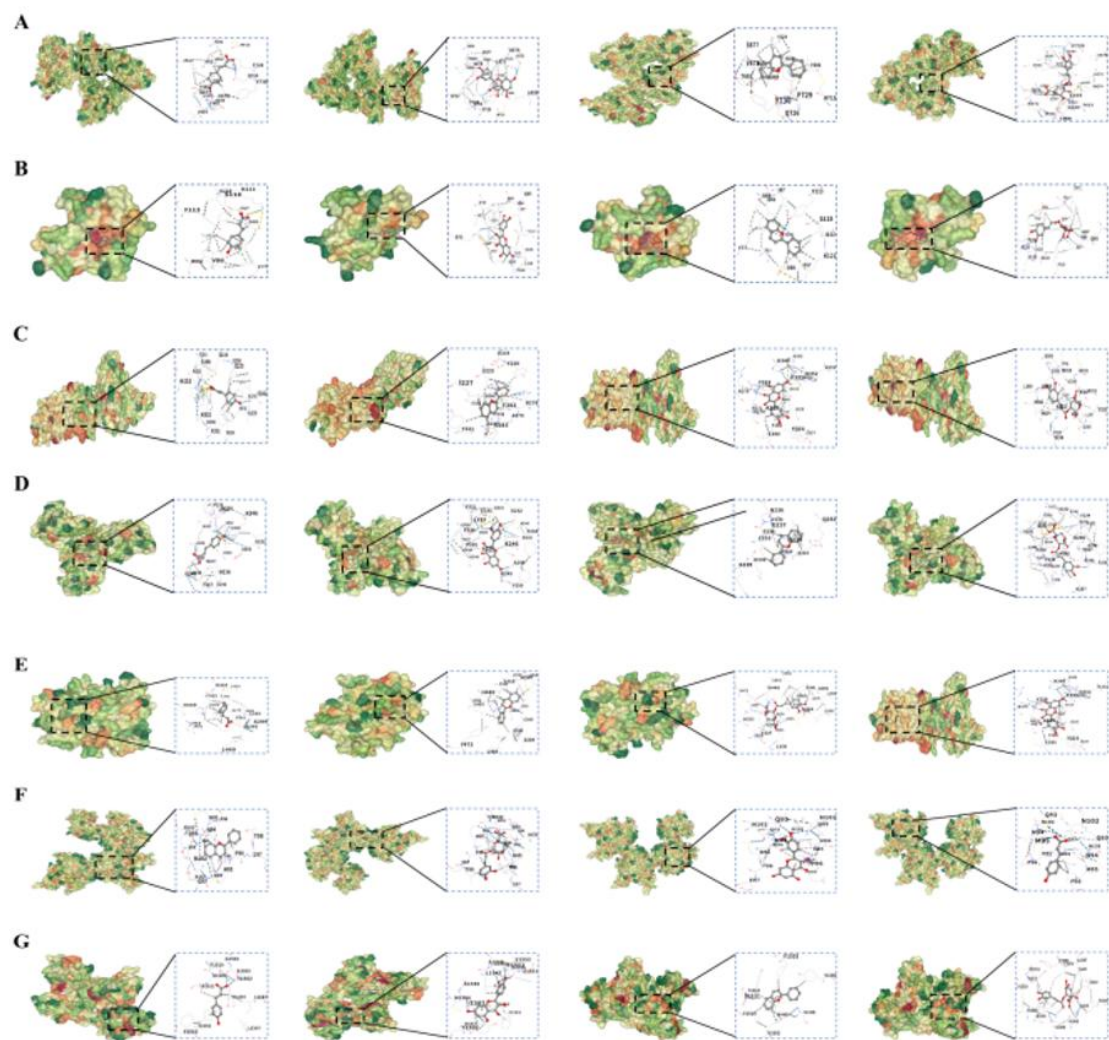
doi: [10.6133/apjcn.202606_35\(3\).0008](https://doi.org/10.6133/apjcn.202606_35(3).0008)

Supplementary Table 1. Search strategy

Database of data	A search term or search term	Number of articles	
		Total amount	
Cochrane library	(Vitamin C OR Ascorbic acid) in Title Abstract Keyword AND (Oral Administration OR Administrations, Oral OR Oral Administrations OR Oral OR Administration*) in Title Abstract Keyword AND skin in Title Abstract Keyword - (Word variations have been searched)	3	
PubMed	((Acid, Uric OR 2,6,8-Trihydroxypurine OR Trioxopurine OR Ammonium Acid Urate OR Acid Urate, Ammonium OR Urate, Ammonium Acid OR Potassium Urate OR Urate, Potassium OR Sodium Urate Monohydrate OR Monohydrate, Sodium Urate OR Urate Monohydrate, Sodium OR Monosodium Urate OR Urate, Monosodium OR Monosodium Urate Monohydrate OR Monohydrate, Monosodium Urate OR Urate Monohydrate, Monosodium OR Sodium Acid Urate OR Acid Urate, Sodium OR Urate, Sodium Acid OR Sodium Acid Urate Monohydrate OR Sodium Urate OR Urate, Sodium OR Urate) OR ("Uric Acid"[Mesh])) AND ((Prunus cerasus) OR (Prunus cerasus OR Pie Cherry OR Cherries, Pie OR Cherry, Pie OR Pie Cherries OR Sour Cherry OR Cherries, Sour OR Cherry, Sour OR Sour Cherries))	13	
Medline	((Acid, Uric OR 2,6,8-Trihydroxypurine OR Trioxopurine OR Ammonium Acid Urate OR Acid Urate, Ammonium OR Urate, Ammonium Acid OR Potassium Urate OR Urate, Potassium OR Sodium Urate Monohydrate OR Monohydrate, Sodium Urate OR Urate Monohydrate, Sodium OR Monosodium Urate OR Urate, Monosodium OR Monosodium Urate Monohydrate OR Monohydrate, Monosodium Urate OR Urate Monohydrate, Monosodium OR Sodium Acid Urate OR Acid Urate, Sodium OR Urate, Sodium Acid OR Sodium Acid Urate Monohydrate OR Sodium Urate OR Urate, Sodium OR Urate) OR (Uric Acid)) AND (Prunus cerasus OR Pie Cherry OR Cherries, Pie OR Cherry, Pie OR Pie Cherries OR Sour Cherry OR Cherries, Sour OR Cherry, Sour OR Sour Cherries)	10	
Embase	('prunus cerasus':ti,ab,kw OR 'pie cherry':ti,ab,kw OR 'cherries, pie':ti,ab,kw OR 'cherry, pie':ti,ab,kw OR 'pie cherries':ti,ab,kw OR 'sour cherry':ti,ab,kw OR 'cherries, sour':ti,ab,kw OR 'cherry, sour':ti,ab,kw OR 'sour cherries':ti,ab,kw) AND 'uric acid':ti,ab,kw	2	
EBSCO	((Acid, Uric OR 2,6,8-Trihydroxypurine OR Trioxopurine OR Ammonium Acid Urate OR Acid Urate, Ammonium OR Urate, Ammonium Acid OR Potassium Urate OR Urate, Potassium OR Sodium Urate Monohydrate OR Monohydrate, Sodium Urate OR Urate Monohydrate, Sodium OR Monosodium Urate OR Urate, Monosodium OR Monosodium Urate Monohydrate OR Monohydrate, Monosodium Urate OR Urate Monohydrate, Monosodium OR Sodium Acid Urate OR Acid Urate, Sodium OR Urate, Sodium Acid OR Sodium Acid Urate Monohydrate OR Sodium Urate OR Urate, Sodium OR Urate) OR (Uric Acid)) AND (Prunus cerasus OR Pie Cherry OR Cherries, Pie OR Cherry, Pie OR Pie Cherries OR Sour Cherry OR Cherries, Sour OR Cherry, Sour OR Sour Cherries)	21	
OVID	(Acid, Uric OR 2,6,8-Trihydroxypurine OR Trioxopurine OR Ammonium Acid Urate OR Acid Urate, Ammonium OR Urate, Ammonium Acid OR Potassium Urate OR Urate, Potassium OR Sodium Urate Monohydrate OR Monohydrate, Sodium Urate OR Urate Monohydrate, Sodium OR Monosodium Urate OR Urate, Monosodium OR Monosodium Urate Monohydrate OR Monohydrate, Monosodium Urate OR Urate Monohydrate, Monosodium OR Sodium Acid Urate OR Acid Urate, Sodium OR Urate, Sodium Acid OR Sodium Acid Urate Monohydrate OR Sodium Urate OR Urate, Sodium OR Urate) OR (Uric Acid) AND (Prunus cerasus OR Pie Cherry OR Cherries, Pie OR Cherry, Pie OR Pie Cherries OR Sour Cherry OR Cherries, Sour OR Cherry, Sour OR Sour Cherries)	19	
SCIENCEDIRECT	Title, abstract, keywords: Uric Acid AND (Prunus cerasus OR Sour Cherry)	1	
WEB OF SCIENCE	(TS=((Acid, Uric OR 2,6,8-Trihydroxypurine OR trioxypurine OR Ammonium Acid Urate OR Acid Urate, Ammonium OR Urate, Ammonium Acid OR Potassium Urate OR Urate, Potassium OR Sodium Urate Monohydrate OR Monohydrate, Sodium Urate OR Urate Monohydrate, Sodium OR Monosodium Urate OR Urate, Monosodium OR Monosodium Urate Monohydrate OR Monohydrate, Monosodium Urate OR Urate Monohydrate, Monosodium OR Sodium Acid Urate OR Acid Urate, Sodium OR Urate, Sodium Acid OR Sodium Acid Urate Monohydrate OR Sodium Urate OR Urate, Sodium OR Urate) OR (Uric Acid))) AND TS=((Prunus cerasus) OR (Prunus cerasus OR Pie Cherry OR Cherries, Pie OR Cherry, Pie OR Pie Cherries OR Sour Cherry OR Cherries, Sour OR Cherry, Sour OR Sour Cherries))	28	
			101

Supplementary Table 2. Study on the relationship between tart cherry supplementation and outcome indicators

Author, Year	Type of Study	Number of cases	Study subjects and age	Intake	Results	Impact on disease
Martin, 2019	Randomized, placebo-controlled, crossover study	N=26	Healthy volunteers, aged 30-60 years	During the experimental period, participants received 8 oz of tart cherry concentrate or an equivalent placebo drink. A clearance period of 4 weeks was set between the two experimental trials. Each cycle lasted for 44 weeks	Tacid cherry concentrate significantly reduced serum uric acid concentration, and decreased C-reactive protein and inflammatory factor levels	Long-term 100% tart cherry concentrate can reduce serum uric acid levels in gout patients
Stamp, 2020	A parallel, double-blind, randomized, placebo-controlled trial was conducted	N=50	Fifty patients with confirmed gout and serum uric acid levels > 0.36 mmol/L, aged 50-65 years	The patients were divided into placebo group, 7.5 mL tart cherry concentrate group, 15 mL tart cherry concentrate group, and 30 mL tart cherry concentrate group, twice daily for 28 days	The cherry concentrate dose had no significant effect on the reduction in the area of serum urate under the curve, urinary urate excretion, changes in urinary anthocyanins between days 0 and 28, or the frequency of gout attacks	Tart cherry concentrate had no effect on blood uric acid or urate excretion
Gonzalez, 2024	Randomized, double-blind, crossover, placebo-controlled	N=25	Volunteers aged 30-50 years with elevated fasting uric acid levels	Participants received either capsules containing 960 mg of placebo (PLA) or concentrated sour cherry powder containing 20.7 mg of proanthocyanidin, followed by a soup containing 3 g of purines. Blood samples were collected at 0, 60, 120, 180, and 240 minutes after ingestion of the supplements and soup. A clearance period of 14 days was set and the experiment was repeated	No differences were observed between tacid cherry concentrate intake and placebo intake in uric acid levels or pharmacokinetic curves	A 1-week tacid cherry concentrate supplement did not affect uric acid levels in individuals consuming a high-purine diet
Wang, 2022	This was a prospective, randomized, open-label, parallel controlled trial	N=280	Male volunteers between the ages of 18 and 70 years diagnosed with gout, with fasting urine pH ≤6	They were randomly assigned in a 1:1:1 ratio to either the sodium bicarbonate group (sodium bicarbonate 1 g, three times a day) or the citrate mixture group (citrate mixture: Citric acid 50%, sodium citrate 10%, potassium citrate 10%, sodium carbonate 20% and vehicle 10%, 3.5 g twice daily) or sour cherry mixture group (mixture: Sour cherry powder 25%, citric acid 30%, sodium citrate 2%, potassium citrate 2%, sodium carbonate 30% and excipient 11%, 3.5 g, twice daily)	The serum uric acid level of each group decreased, and the difference was not statistically significant. However, patients in the tacid cherry mixture group had significantly lower urinary protein/creatinine ratio and C-reactive protein levels	Tart cherry mixture supplements reduce uric acid with similar effects as sodium bicarbonate and citrate supplementation, but tart cherry mixture supplements may provide additional benefits for renal protection and reduce inflammation in gout



Supplementary Figure 1. Molecular docking results (A) IL6 and anthocyanins, chlorogenic acid, p-coumaric acid and quercetin; (B) AKT1 and anthocyanins, chlorogenic acid, p-coumaric acid, quercetin; (C) ADIPOQ and anthocyanins, chlorogenic acid, p-coumaric acid, quercetin; (D) INS and anthocyanins, chlorogenic acid, p-coumaric acid, quercetin; (E)PPARG and anthocyanins, chlorogenic acid, p-coumaric acid and quercetin; (F) TNF and anthocyanins, chlorogenic acid, p-coumaric acid, quercetin; (G) TP53 and anthocyanins, chlorogenic acid, p-coumaric acid, quercetin