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CPJRPC

A tool for rapid identification of potential herbal medicine–drug interactions

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	Gastrointestinal system				Cardiovascular system							Respiratory system		Central nervous system						Endocrine system					Anti-infectives				
	Laxative agents	Anti-ulcer agents	Antacid agents	Antidiarrheal agents	Anticoagulant agents	Lipid-lowering agents	Antihypertensive agents	Beta-blockers	Diuretic agents	Cardiac glycosides	Antiarrhythmic agents	Antiasthmatic agents	Anti-allergy agents	Antiparkinson agents	Analgesic agents	Antipsychotic agents	Antiepileptic agents	Antidepressant agents	Sedative agents	Sex hormones	Corticosteroids	Hyperthyroid agents	Hypothyroid agents	Antidiabetic agents	Antifungal agents	Antibiotic agents	Anti(retro)viral agents	Nephrotoxic*	Hepatotoxic*
Alfalfa																								1					
Aloe vera																						2	3	4					
Angelica					5																								
Black cohosh							6																						
German chamomile																													
Chaste tree																													
Cranberry					7																								
Devil's claw					8																								
Echinacea																													
Ephedra						9	10	11		12	13							14			15	16	17	18					
Evening primrose							19									20													
Feverfew																													
Garlic					21		22																				23		
Ginger					24																								
Ginkgo					25		26		27															28					
Asian ginseng					29		30	31	32	33	31							34						35					
Hawthorn							36																						
Horse chestnut																													
Kava																			37										
Licorice							38		39	40											41								
Milk thistle																								42					
Peppermint																													
Saw palmetto					43		44																						
St. John's wort				45	46	47	48			49								50	51	52		53	54		55				
Tea tree oil																													
Thyme																													
Valerian																		56											
Wild yam																													
Willow					57		58																						

No reported or theoretical interactions (Caveat: Interactions are nonetheless always possible!)

Theoretical interactions based on animal or in vitro data.

Theoretical interactions extrapolated from clinical data.

Interactions supported by clinical evidence (reported in human case reports or clinical trials).

Numbers on this chart refer to interaction details described on reverse page.

*Nephrotoxic/hepatotoxic: Herbs that potentially influence liver and/or kidneys also potentially influence drug metabolism and can therefore cause general interactions.

Interaction details

1) Alfalfa has additive effects with hypoglycemic agents (case reports, animal studies).
2,3) Aloe vera can cause thyroid dysfunction (1 case report).
4) Aloe vera has additive effects with insulin and hypoglycemic agents; may lower potassium serum concentration more when taken with insulin (human and animal data).
5) Enhanced effects of warfarin when combined with angelica (1 case report).
6) Black cohosh has an additive effect with hypotensive agents (1 clinical trial, animal studies).
7) Enhanced effects of warfarin when combined with cranberry juice (1 case report).
8) Purpura were reported after taking devil's claw and warfarin concurrently (1 case report).
9) Lower concentration of triglyceride-lowering agents with concurrent use of ephedra (1 clinical trial).
10,11) Ephedra has an antagonizing effect on the activity of beta-blockers, diuretics, ACE inhibitors or calcium-channel blockers (>3 clinical trials).
12,13) Chronotropic and inotropic events have been induced by ephedra, and can go as far as causing cardiac arrest. Use caution with heart medication (several clinical trials).
14) Hypotension reported with concurrent use of ephedra and tricyclic antidepressants (1 case report).
15) Increased clearance and reduction of effectiveness of dexamethasone with ephedra (2 case reports).
16,17) Ephedra may increase serum concentration of thyroid hormones (1 trial).
18) Ephedra may cause hyperglycemia; use caution with hypoglycemic agents (several clinical studies).
19) Gamma-linolenic acid of evening primrose oil may have an additive effect with hypotensive agents (1 trial, several animal studies).
20) Seizures have been reported with concurrent use of phenothiazine antipsychotics and evening primrose oil (several case reports).
21) Bleeding possible with concurrent use of garlic and anticoagulants, antiplatelet drugs and NSAIDs (several clinical trials and case reports).
22) Additive effects of garlic reported with antihypertensives, specific details of magnitude of effect are unclear (>10 clinical trials).
23) Garlic lowers plasma concentrations of saquinavir and ritonavir (protease inhibitors) (several clinical studies).
24) Increased risk of bleeding with concurrent use of ginger and anticoagulants, antiplatelet drugs and NSAIDs (several clinical studies, 1 case report).
25) Increased risk of bleeding with concurrent use of ginkgo and anticoagulants, antiplatelet drugs, NSAIDs and pentoxifylline (2 clinical trials, several case reports).
26) Additive effects of ginkgo and antihypertensive drugs have been reported (1 case report).
27) Additive effects of ginkgo with thiazide diuretics have been reported (several clinical trials).
28) Ginkgo may increase insulin serum concentration in healthy volunteers, but decrease it in patients with type 2 diabetes (several clinical trials).
29) Risk of bleeding with concurrent use of ginseng and antiplatelet or anticoagulant drugs (1 clinical trial, 1 case report, several animal studies).
30) Ginseng may have an additive effect with antihypertensives (several clinical trials).
31) Ginseng may increase QTc interval, thus interactions with cardiac medication are possible (1 clinical trial).
32) Furosemide diuresis resistance has been reported with ginseng (1 case report).
33) Enhanced effects of digoxin with ginseng (1 clinical trial).
34) Headache, tremors and mania have been reported with concomitant use of antidepressants (including MAOIs) with ginseng (several clinical trials, case reports).
35) Additive effects reported with concurrent use of ginseng and hypoglycemic agents (several clinical trials).
36) Additive effects reported with concurrent use of hawthorn and hypotensive agents (several clinical trials).
37) Additive effects reported with concurrent use of kava and sedatives (1 case report).
38, 39, 40) Licorice can lower potassium serum concentration, additive effects with antihypertensives and increased toxicity of digoxin (case reports).
41) Increase of side effects of corticosteroid therapy with licorice (evidence unclear).
42) The silymarin in milk thistle can decrease insulin and HbA_{1C} blood concentration (1 clinical trial).
43) Increased risk of bleeding with concurrent use of saw palmetto and antiplatelets, anticoagulant drugs and NSAIDs (2 case reports).
44) Hypertension reported with use of saw palmetto (several clinical trials).
45) St. John's wort: Delirium and agitation with loperamide (1 case report).
46) St. John's wort: Reduced effects of warfarin (several case reports, 1 clinical trial).
47) St. John's wort: Reduced concentration of simvastatin (1 clinical trial).
48) St. John's wort: Reduced concentration of calcium channel blockers (1 clinical trial).
49) St. John's wort: Reduced concentration of digoxin, bigeminy (several clinical trials, several case reports).
50) St. John's wort: Reduced concentration of tricyclic antidepressants, increased concentration of MAOIs, stronger side effects of SSRIs (several clinical trials, case reports).
51) St. John's wort: Reduced concentration of benzodiazepines (several clinical trials).
52) St. John's wort: Reduced concentration of oral contraceptives, unintended pregnancies, breakthrough bleedings (several case reports, 1 clinical trial).
53) St. John's wort: Elevated TSH, reduced effects of hyperthyroid agents (1 clinical trial).
54) St. John's wort: Elevated TSH, additive effects with hypothyroid agents (1 clinical trial).
55) St. John's wort: Reduced concentration of voriconazole (1 clinical trial).
56) Agitation, obsession, self-inflicted injuries, loss of control of arm after fluoxetine/valerian concomitant intake (1 case report).
57) Additive effects with concurrent use of willow and anticoagulants (1 clinical trial).
58) Blood pressure instability with willow (1 clinical trial).

References

Barnes J, Anderson LA, Phillipson JD. *Herbal medicines*. 3rd ed. London (UK): Pharmaceutical Press; 2007.
Baxter K, editor. *Stockley's drug interactions*. 8th ed. London (UK): Pharmaceutical Press; 2008.
Natural Standard (www.naturalstandard.com)