TURMERIC // *Curcuma longa* L.

Turmeric is an herbal medicine.
Its continued consumption can potentiate adverse effects of non-steroidal anti-inflammatory drugs, such as gastrointestinal bleeding.

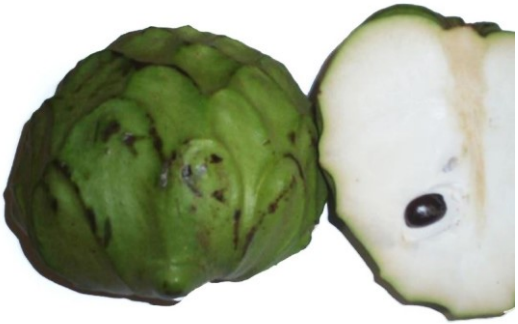
Turmeric can also influence the effectiveness of paracetamol antiaggregant, anticoagulants, antidepressants, anti-dyslipidemics, antipsychotics, antitumor drugs, among other drugs.
In addition to its anti-platelet aggregation and Central Nervous System depressant activity, it also has the ability to inhibit CYP1A2 and induce CYP2A6, enzymes involved in the elimination of drugs, which may, in the first case, increase their toxicity.

ALOE VERA // *Aloe barbadensis* Miller

Aloe Vera is an herbal medicine that can interact with antiarrhythmic drugs, antineoplastic drugs, topical corticosteroids, digoxin, diuretics, and laxatives.

When taken together with general anesthetics (sevoflurane), antiplatelet agents and oral anticoagulants, it can trigger bleeding. In addition, it can generate episodes of hypoglycemia when taken with oral antidiabetics and insulin.

It is an inhibitor of CYP 3A4 and CYP2D6, enzymes responsible for drug metabolism, and may increase the amount of drug available in the body, and its toxicity.



ANNONA // *Annona muricata* L.

Annona can have a high degree of toxicity, so it should be consumed with care.

The plant contains two neurotoxins: isoquinoline alkaloids and acetogenins (including Anonacin, which is extremely toxic to neurons).

The consumption of Annona fruits and its derivatives has been associated with cases of Atypical Parkinsonism.

BEETROOT // *Beta vulgaris* L.

Beetroot is used as a food.

It may lower blood sugar levels– interact with antidiabetic drugs – so it should be consumed with caution by diabetic or pre-diabetic patients.

In addition, due to its fiber constitution, it can induce changes in intestinal transit, reducing the absorption of orally administered drugs and, consequently, their effectiveness. Therefore, consumption of beetroot by polymedicated patients should be controlled.

MARIAN THISTLE // *Silybum marianum* L.

Marian thistle is an herbal medicine that produce an
inhibitory effect on the metabolizing enzymes CYP3A4 and CYP2C9.

Combine Marian Thistle with drugs metabolized by these enzymes may increase the plasma concentration of these drugs, therefore change their therapeutic effect and increasing adverse effects.
Examples of these drugs are: anxiolytics, oral anticoagulants (risk of bleeding), antidepressants, antidiabetics, antidyslipidemics, antiepileptics, antifungals and antihypertensives.

ORANGE // *Citrus sinensis* (L.) Osbeck

Vitamin C is recommended to help to prevent colds and flu, however daily doses more than 1000 mg can cause diarrhea and kidney stones.

The Orange, when consumed in large quantities, can induce an increase in the metabolism of some drugs and thus reduce their effect.

Some examples are medicines used to treat cancer, HIV, depression, and hypercholesterolemia (statins).

MANGOSTEEN // *Garcinia mangostana* L.

Mangosteen is a tropical fruit.

It can decrease the activity of some metabolizing enzymes and this inhibitory action put in question the normal bioavailability of some drugs, including warfarin (anticoagulant), valproic acid and phenytoin (anti-epileptics) and paclitaxel (antitumor).

PAU-D'ARCO // *Tabebuia serratifolia*

Pau d'arco is not a food or an herbal medicine.

However, it is consumed by some people. It contains substances with high toxicity, causing severe liver damage, and may alter the concentration of drugs in the blood.

Cancer patients should avoid the consumption of this herb, in due to its toxicity and harm to the efficacy and safety of the treatment.

CHIA SEEDS // *Salvia hispanica* L. Seeds

Chia seeds, which correspond to the seeds of the Salvia Hispanica plant, contain fatty acids (omega-3), vitamins and minerals. They are also rich in mucilages and fibers, soluble and insoluble, capable of adsorbing molecules such as tamoxifen and reducing their intestinal absorption, with a reduction in their therapeutic effect.

Chia seeds also contain some phenolic and polyphenolic compounds, which inhibit CYP 3A4 and 2C9 isoenzymes, both involved in the main oxidation pathway of several drugs, which may lead to an increase in plasma concentrations and, consequently, a change in the therapeutic effect, and a possible increase in toxicity.

ARTICHOKE // *Cynara scolimus* L.

Artichoke can be a food or an herbal medicine, depending on how it is used.

It can interfere with the activity of medicines, as it promotes a faster elimination of these, due to its diuretic effect.

This plant induces the enzymes of CYP3A4, CYP2B6, CYP2C9, CYP2D6, responsible for the elimination of drugs from the body, and may reduce their concentrations in the blood, with a consequent decrease in the effectiveness of treatment, for example, with statins (antidyslipidemics), warfarin (anticoagulant), nifedipine (antihypertensive), contraceptive and antitumor pills, such as paclitaxel, tamoxifen, among others.

LIQUORICE // *Glycyrrhiza glabra* L.

Liquorice is an herbal medicine used in syrup preparations and cough drops.

Liquorice consumption may interfere with medications such as digoxin, diuretics, antihypertensives, antiplatelet agents, oral anticoagulants, contraceptive pills, corticosteroids, antidepressants, antipsychotics, anxiolytics, antiarrhythmics, antifungals, cytotoxics, immunomodulators, antidyslipidemics, antibiotics, antacids, antidiabetics .

In addition to other properties, this plant is an inhibitor of CYP3A4 and CYP2B6, enzymes responsible for eliminating drugs from the body, which can increase drug concentrations in the blood.

GARLIC // *Allium sativum* L.

Garlic is used as food and as an herbal medicine.

Due to its anti-aggregating activity, it may interact with other platelet anti-aggregating agents and oral anticoagulants, increasing the risk of bleeding. Garlic can alter the therapeutic activity of drugs metabolized by the enzymes CYP3A4, CYP2C9, CYP2C19, responsible for eliminating drugs from the body, leading to an increase in their concentrations in the blood.

Drugs metabolized by the enzymes mentioned above: narcotic analgesics, anxiolytics, antiarrhythmics, antibiotics, antidepressants, oral antidiabetics, antidyslipidemics, antifungals, antihypertensives, non-steroidal anti-inflammatory drugs, antipsychotics, antiretrovirals, cytotoxics, insulin, digoxin, loperamide, contraceptive pills, among others.

CHAMOMILE // *Matricaria recutita* L.

Chamomile is used as herbal medicine.

This drug has compounds with anticoagulant activity - coumarins - so it can potentially interact with anticoagulant and platelet antiaggregants.

It also has a depressant activity on the Central Nervous System, which may potentiate the effect of anxiolytics.

Chamomile has an inhibitory effect on the metabolizing enzymes CYP1A2, CYP2C9, CYP2C19, CYP2D6 and CYP3A4, changing the efficacy and safety of the drugs metabolized by them.

GINKGO // *Ginkgo biloba* L.

Ginkgo is an herbal medicine; however, it has high potential to interact with medicines.

Concomitant use with valproic acid, alprazolam, anesthetics, antihypertensives, iron, insulin, omeprazole and paracetamol may change the activity of these drugs.

Due to its antiplatelet activity, it may also interact with antiplatelet agents and warfarin, increasing the risk of bleeding.

Ginkgo may also interact with antidepressants, antipsychotics and digoxin, increasing their adverse effects.

ASIAN GINSENG // *Panax ginseng* Meyer

Asian Ginseng is used as herbal medicine.

Its continued consumption can lead to interactions with drugs such as digoxin, furosemide, insulin, nifedipine, warfarin, oral antidiabetics, antidyslipidemics, diuretics, immunosuppressants, birth control pills and the flu vaccine.

Asian Ginseng has a potential inhibitor of CYP2C9, CYP2C19, CYP2D6 and CYP3A4 enzymes, responsible for metabolizing almost all drugs, which can increase their toxicity.

ST. JOHN´S WORT //
Hypericum perforatum L.

St. John's wort is an herbal medicine widely used for antidepressant purposes. However, taking this plant together with most medications can be dangerous.

St John's wort has an inducing effect on the metabolizing enzymes CYP3A4, CYP2C9 and CYP2C19, which are responsible for metabolizing most drugs. Therefore, the effectiveness of the therapy may be compromised, as in the case of: anxiolytics, antiplatelet agents, antianginal agents, antiasthmatics, oral anticoagulants (thromboembolic risk), antihistamines, antidyslipidemics, antidepressants, antihypertensives, antiretrovirals, contraceptive pills (risk of unwanted pregnancy) and drugs used to treat cancer.

HAWTHORNS// Crataegus oxyacantha L.

Hawthorn is an herbal medicine.

The consumption of this plant can interfere with the therapeutic activity of antianginal, antihypertensive and digoxin drugs.

In addition, it may also potentiate the increase in adverse effects when taken together with antiplatelet agents and anticoagulants, thus increasing the risk of bleeding.

TEA PLANT // *Camellia sinensis* L.

Although the term is widely used to describe numerous infusions, tea refers to the infusion of Camellia sinensis. According to the harvesting and production process, we can obtain, among others, Black, Green and White Tea.

This plant is used in several preparations, usually with a stimulating effect, since a cup of tea (150 ml) contains the same levels of caffeine as a cup of coffee.

The Tea Plant may decrease the effectiveness of antiplatelet agents, oral anticoagulants, due to its vitamin K content, and of Central Nervous System depressants, due to caffeine.

Its chronic consumption can be hepatotoxic, therefore concomitant use with other hepatotoxic drugs should be avoided.

FLAX SEEDS // *Linun isitatissimum* L.

Flax seeds are commonly used to regulate intestinal transit. It contains high fiber content that can decrease the absorbed dose of medicines taken at the same time.

The lignans that are part of its constitution have estrogenic activity and also inhibit CYP3A enzymes, which can cause an increase in the side effects of drugs in due to their dose increased in the body. Examples: antidepressants, benzodiazepines, analgesics, opioid derivatives, antiarrhythmics, antiepileptics, antifungals, antihistamines, antimalarials, antineoplastics, antiparkinsonians, antiprogestarogenics, immunosuppressants, calcium channel blockers, statins, macrolide antibiotics, antiretrovirals, pump inhibitors protons, steroids, among others.

Also some endogenous hormones go through the same metabolism pathway and their levels can be altered due to this inhibition.

OIPM, OBSERVATORY OF HERB-MEDICINE INTERACTIONS.

WHAT IS IT? WHAT IT DOES?

The OIPM is a research group based at the Faculty of Pharmacy of the University of Coimbra, whose main objectives are:

- Development of Projects within the scope of interactions between herbs and medicines: food-drug or drug-drug (herbal medicines among themselves and/or synthetic drugs);
- Creation of a database with cases of herb-medicine interactions;
- Dissemination of the data collected with clinical and scientific fundaments aiming at a global alert among the population;
- Awareness of the population to take the risk of consuming herbs and medicines at the same time, in order to avoid accidents and acting immediately and consciously.

DO NOT MIX THE NATURAL PRODUCTS WITH MEDICINES

Juices and "teas" are concentrated extracts of chemical compounds whose effect on the body can be very intense, depending on the plant from which they are made and the taken amount.

Consult your doctor or pharmacist or call the helpline

239 488 505/484 OR VISIT www.oipm.uc.pt

PROMOTER

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