Journal of Nutrition and Food Security
Shahid Sadoughi University of Medical Sciences
School of Public Health
Department of Nutrition
Nutrition & Food Security Research Center

eISSN: 2476-7425 pISSN: 2476-7417 JNFS 2022; 7(3): 265-267 Website: jnfs.ssu.ac.ir

The Role of Foods and Beverages in the Effectiveness of Drugs

Ameneh Marzban; PhD[1], Abdolrazagh Marzban; PhD[*2], Fateme Sadeghi-Nodoushan; MSc[3] & Payam Emami; MSc[4]

[1] *Department of Health in Disasters and Emergencies, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran.*
[2] *Razi Herbal Medicines Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran.*
[3] *Department of Nutrition, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.*
[4] *Department of Emergency Medical Sciences, School of Paramedical Sciences, Kurdistan University of Medical Sciences, Sanandaj, Iran.*

ARTICLE INFO

EDITORIAL ARTICLE

Article history:
Received: 21 Oct 2021
Revised: 2 Nov 2021
Accepted: 15 Dec 2021

Corresponding author:
marzban86@gmail.com
Razi Herbal Medicines Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran.

Postal code: 6813833946
Tel: +98-9164011432

Introduction

Foods and nutrients in them are one of the most important and variable factors affecting the bioavailability and function of oral drugs in the body (Huang *et al.*, 2019). Foods affect the effectiveness of drugs in different ways. Just as medications often reduce the absorption of nutrients, foods often reduce the effectiveness of medications; food in the stomach delays the absorption of penicillin and amoxicillin and antihypertensive drugs, such as captopril. The presence of food in the stomach and prolonged contact of stomach acid with captopril and erythromycin cause the drug to break down faster (Koziolek *et al.*, 2019).

Minerals in some foods, such as iron, by binding to antibiotics, such as tetracycline and ciprofloxacin reduce drug absorption and blood concentration.

Dairy products reduce the effects of tetracycline and ciprofloxacin, so calcium supplements should be taken at least 2 hours after taking these antibiotics. Otherwise, the blood concentration of antibiotics will not reach the required level (Veerman *et al.*, 2020).

Consumption of fiber from cereals, bran, legumes, and oxalate rhubarb and spinach reduces the absorption of calcium tablets.

Simultaneous consumption of tea and coffee, beans, eggs and dairy products with iron supplement (ferrous sulfate), makes it an insoluble complex and prevents its absorption (Meyboodi *et al.*, 2020).

Antifungal drugs, such as griseofulvin and fluconazole, which are fat-soluble, are better absorbed when consumed with fatty foods (Koziolek *et al.*, 2019).

Some foods alter the metabolism of drugs by intensifying or inhibiting the function of enzymes

This paper should be cited as: Marzban A, Marzban A, Sadeghi-Nodoshan F, Emami P. ***The Role of Foods and Beverages in the Effectiveness of Drugs.*** *Journal of Nutrition and Food Security (JNFS)*, 2022; 7(3): 265-267.

[DOR: 20.1001.1.24767417.2022.7.3.14.7]
[DOI: 10.18502/jnfs.v7i3.10191]

that affect them

Grapefruit is the most important example of this, which slows down the metabolism of many drugs by inhibiting the enzyme that breaks down drugs. It should be noted that the effect of grapefruit remains in the body even up to 24 hours after consumption. Medications that can interact with grapefruit are: Anti-cholesterol drugs from the family of statins (lustatin and atrostatin), especially if people are using them for the first time, because grapefruit juice can easily double the effect of these drugs. Also patients who use cisapride, sertraline, buspirone, diazepam, terbazolam, midazolam carbamazepine, antihypertensive drugs, such as losartan, antiarrhythmic drugs, antianginal, immunosuppressive drugs, antidepressants, such as probiotics, myrodine, and prodrug, should strictly refrain from consuming grapefruit (Chen *et al.*, 2018).

Non-nutritious compounds in foods, such as indole compounds in the cabbage family, flavonoids in citrus fruits and compounds made directly from charcoal increase the metabolism of drugs, such as the simultaneous consumption of red roasted meat (Zawiah *et al.*, 2020).

Acidic compounds in fruit juices can reduce the effectiveness of antibiotics (such as penicillin). At the same time, taking quinidine with citrus juice increases the effect of the drug due to the reduction of drug metabolism in the body.

Foods increase or decrease the excretion rate of drugs by changing the acidity of the administration

Some medications require a more acidic environment for excretion, and if the urine is not acidic enough, they are absorbed more by the kidneys, such as the antibiotic gentamicin and the antiarrhythmic drug procainamide. Excessive consumption of fruit juice, low protein intake in the diet and consumption of antacids can cause this condition (Deng *et al.*, 2017).

Reducing the effect of the drug: Licorice compounds, alcoholic beverages, bananas, chocolate, cheese, figs, liver, fish, pickles, pineapple, yeast, and malt may reduce the effect of antihypertensive drugs due to amines that increase blood pressure. However, consuming licorice compounds once a day will not be a problem.

Green leafy vegetables (lettuce, spinach, cabbage, turnips, and soy) reduce the effect of warfarin. Consumption of hot liquids at the same time as taking the drug will eliminate the drug and reduce the effect of the drug. High carbohydrates reduce drug absorption (Alqahtani, 2020).

Increasing the effect of the drug: Drinking 3 to 4 cups of tea or coffee a day may increase the effect of dexamethasone and photothiazine. Consumption of alcoholic beverages simultaneously with sedatives and hypnotics increases the weakening effect of the nervous system (hypnotism, coma, and death) of these drugs (Albassam and Markowitz, 2017).

Other effects: Consumption of milk and dairy products or foods containing calcium at the same time as taking cardiac glycosides may cause arrhythmias. Glycyrrhizin induces hypokalemic expression and causes digoxin poisoning (Dong *et al.*, 2018).

These effects are very complex due to the presence of various compounds of minerals, organic matter, proteins, and vitamins in foods as well as drug formulations and in many cases are not predictable. Therefore, it is very difficult to prevent food-drug interactions, and because of this complexity, more studies have been conducted by research centers and pharmaceutical companies on drug-drug interactions than food-drug interactions.

Authors' contributions

Marzban A. and Emami P. conceived the original idea and designed the project. Marzban AR. and Sadeghi-Nodoshan F. collected the data and wrote the draft of manuscript. Two authors read and approved the final version of the manuscript.

References

Albassam AA & Markowitz JS 2017. An appraisal of drug-drug interactions with green tea (Camellia sinensis). *Planta medica.* **234 (06)**: 496-508.

[DOR: 20.1001.1.24767417.2022.7.3.14.7]
[DOI: 10.18502/jnfs.v7i3.10191]

Alqahtani NS 2020. Public knowledge and awareness about food–drug interactions in the northern border region, Saudi Arabia. *King Khalid University journal of health sciences.* **5 (2)**: 82.

Chen M, Zhou S-y, Fabriaga E, Zhang P-h & Zhou Q 2018. Food-drug interactions precipitated by fruit juices other than grapefruit juice: An update review. *Journal of food and drug analysis.* **26 (2)**: S61-S71.

Deng J, et al. 2017. A review of food–drug interactions on oral drug absorption. *Drugs.* **77 (17)**: 1833-1855.

Dong J, et al. 2018. Glycyrrhizin has a high likelihood to be a victim of drug–drug interactions mediated by hepatic organic anion-transporting polypeptide 1B1/1B3. *British journal of pharmacology.* **175 (17)**: 3486-3503.

Huang Y, et al. 2019. Cost-effectiveness of the US Food and Drug Administration added sugar labeling policy for improving diet and health. *Circulation.* **139 (23)**: 2613-2624.

Koziolek M, et al. 2019. The mechanisms of pharmacokinetic food-drug interactions–A perspective from the UNGAP group. *European journal of pharmaceutical sciences.* **134**: 31-59.

Meyboodi M, Mohammadpour AH, Emami SA & Karbasforooshan H 2020. Drug Interactions of Green Tea. *Journal of pharmaceutical care.* 196-203.

Veerman GM, et al. 2020. Clinical implications of food–drug interactions with small-molecule kinase inhibitors. *Lancet oncology.* **21 (5)**: e265-e279.

Zawiah M, et al. 2020. Food-drug interactions: Knowledge among pharmacists in Jordan. *PloS one.* **15 (6)**: e0234779.

[DOR: 20.1001.1.24767417.2022.7.3.14.7]

[DOI: 10.18502/jnfs.v7i3.10191]