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RESEARCH ARTICLE

IN VITRO INTERACTION OF DICLOFENAC SODIUM WITH DIETARY SUPPLEMENTS AND NUTRIENTS - A STUDY

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ABSTRACT

Objective: The aim of the study is to determine the interaction of Diclofenac sodium with different Dietary supplement because this may be harmful to the persons who are taking other nutritional therapy so it is very important to know the interaction of dietary supplements with the drug (diclofenac sodium).
Method: For experimental work different dietary supplements solution were prepared and their interference was determined by using UV spectrophotometer with diclofenac sodium standard solution.
Results: Values of percentage interference shows remarkable interaction with some dietary supplements like sodium saccharine, threonine, sarine etc.
Conclusion: The experimental work leads to conclude that there is some interference that we get from the supplements we had used in our experimental work.

Keywords: Diclofenac Sodium, Dietary Supplement, Uv Spectrophotometer.

INTRODUCTION

The term dietary supplement encompasses a broad range of products, including vitamins, minerals, herbs, and nutraceuticals. In humans, concurrent use of dietary supplements and prescription medication is common. Dietary supplements are often dispensed or purchased without medical supervision, and unlike FDA oversight of prescription and over-the-counter drugs, FDA oversight of dietary supplements is minimal. Manufacturers of dietary supplements intended for human use are not required to submit safety data before marketing their products.

CEUse of dietary supplements, including vitamins, minerals, nutraceuticals, and herbal remedies, is increasing in human and veterinary patients. As supplementation becomes more widespread, the potential for adverse interactions with prescribed medications increases. Dietary supplements may decrease the absorption of other drugs, inhibit or induce drug clearance, or exacerbate pharmacologic effects such as antiplatelet or anticoagulant activity. Research into clinically relevant drug–supplement interactions is expanding, but valid clinical data are still lagging behind dietary supplement use.

The law defines dietary supplements in part as products taken by mouth that contain a "dietary ingredient." Dietary ingredients include vitamins, minerals, amino acids, and herbs or botanicals, as well as other substances that can be used to supplement the diet.

Dietary supplements come in many forms, including tablets, capsules, powders, energy bars, and liquids. These products are available in stores. They are labeled as dietary supplements and include among others

- vitamin and mineral products
- "Botanical" or herbal products—these come in many forms and may include plant materials, algae, macroscopic fungi, or a combination of these materials.
- Amino acid products—Amino acids are known as the building blocks of proteins and play a role in metabolism.
- Enzyme supplements—Enzymes are complex proteins that speed up biochemical reactions.

People use dietary supplements for a wide assortment of reasons. Some seek to compensate for diets, medical conditions, or eating habits that limit the intake of essential vitamins and nutrients. Other people look to them to boost energy or to get a good night's sleep. But this may be harmful to the persons who are taking other drug therapy so it is very important to know the interaction of dietary supplements with the drug (diclofenac sodium).

Drug Profile (Diclofenac Sodium)

Diclofenac is a non-steroidal anti-inflammatory drug (NSAID) taken to reduce inflammation and as an analgesic reducing pain in conditions such as arthritis or acute injury. It can also be used to reduce menstrual pain, dysmenorrhea. The name is derived from its chemical name: 2-(2,6-dichloranilino)phenylacetic acid

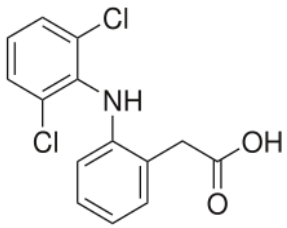


Fig.1: Diclofenac

Dietary Supplements

Methionine

Methionine assists in the breakdown and use of fats, which in turn yields a higher testosterone rate. Together with Zinc, that's how ZMA does its thing. It also eliminates excess fat from the bloodstream, resulting in less potential adipose (fat) tissue. It is key in digestion and the removal of heavy metals from the stomach and liver.

Valine

Repair and growth of muscle tissue yet again, as commonly attributed to BCAAs. It maintains the nitrogen balance and preserves the use of glucose. Use to bodybuilders: In combination with Isoleucine and Leucine.Medical Uses: None, not separately Sources: Dairy, meat, grain, mushrooms, soy, peanuts

Threonine

Essential amino acid that is not manufactured within the body ever. Since its main sources are an animal (dairy and meat) this doesn't bode well to vegans. It's found in heart, skeletal muscle and nerve tissue in the central nervous system. Threonine is involved in liver functioning, lipotropic functions (when combined with aspartic acid and Methionine) and in the maintenance of the immune system by helping in the production of antibodies and promoting growth and activity of the thymus.

Tryptophan

Tryptophan is an essential amino acid. Tryptophan is a routine constituent of most protein-based foods or dietary proteins. It is particularly plentiful in chocolate, oats, dried dates, milk, yogurt, cottage cheese, red meat, eggs, fish, poultry, sesame, chickpeas, sunflower seeds, pumpkin seeds, spirulina, and peanuts Many people found tryptophan to be a safe and reasonably effective sleep aid, probably due to its ability to increase brain levels of serotonin (a calming neurotransmitter when present in moderate levels and/or melatonin (a sleep-inducing hormone secreted by the pineal gland in response to darkness or low light levels).

Sodium Saccharine

Saccharin is an artificial sweetener. The basic substance, benzoic sulfimide, has effectively no food energy and is much sweeter than sucrose, but has an unpleasant bitter or metallic aftertaste, especially at high concentrations. In countries where saccharin is allowed as a food additive, it is used to sweeten products such as drinks, candies, medicines, and toothpaste.

Citric Acid

Citric acid is a weak organic acid, and it is a natural preservative and is also used to add an acidic or sour, taste to foods and soft drinks. Citric acid exists in greater than trace amounts in a variety of fruits and vegetables, most notably citrus fruits. Lemons and limes have particularly high concentrations of the acid; it can constitute as much as 8% of the dry weight of these fruits (about 47 g/L in the juices [3]). The concentrations of citric acid in citrus fruits range from 0.005 mol/L for oranges and grapefruits to 0.30 mol/L in lemons and limes. Within species, these values vary depending on the cultivar and the circumstances in which the fruit was grown.

MATERIALS AND METHODS

Material

Diclofenac sodium

As a gift sample from zydus Cadila.

UV spectrophotometer

Model 1800, double beam, 1cm quartz cells UV spectrophotometer.

Amino acid kit

LOBA chemie Pvt. Ltd, Mumbai

Citric acid and sodium saccharine

S. D fine chemicals limited, 315 – 317, Industrial Estate, worli road Mumbai

Methanol

S. D fine chemicals limited, 315 – 317, Industrial Estate, worli road Mumbai

Preparation of Standard Solutions

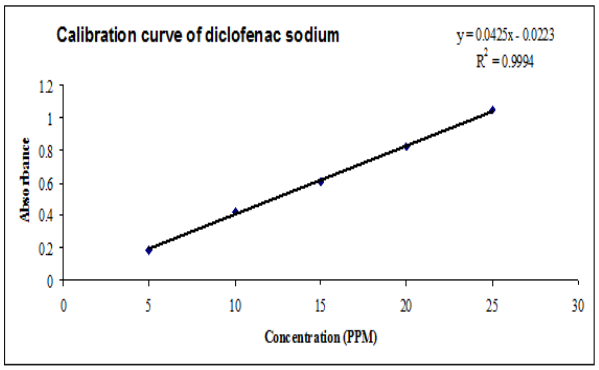
- 10 mg is dissolved in 10 ml of methanol and then 1 l of it is taken into new 10 ml volumetric flask and volume is make up to 10 ml now it is 100 ppm solution and from it 0.5, 1, 1.5, 2, 2.5 ml are taken into 10-10 ml volumetric flask separately sand then volume is make up to 10 ml this will give out 5, 10,15,20,25 ppm of solutions.
- Amino acid solutions – 10 mg of amino acid is weighed and dissolve in 10 ml of methanol, now 0.2 ml of it is taken into two 10-10 ml volumetric flask and one is filled with methanol and in other add 2 ml of 100 ppm of diclofenac sodium solution and then volume is make up to 10 ml this is a test solution.
- Sodium saccharine and citric acid solution - 10 mg of a sample was dissolved in 10 ml of methanol, now 0.2 ml of it is taken into two 10-10 ml volumetric flask and one is filled with methanol and in other add 2 ml of 100 ppm of diclofenac sodium solution and then volume is makeup to 10 ml this is a test solution.

Constructing a Calibration Curve of Diclofenac Sodium

- Record the ultraviolet spectrum of each of the 5 standards with METHANOL in the reference cuvette.
- Record the wavelength of peak absorbance for diclofenac sodium

Diclofenac Calibration Curve

S.no	Concentration (ppm)	absorbance
1	5	0.187
2	10	0.415
3	15	0.608
4	20	0.822
5	25	1.047



Method

The solutions are prepared as above are now tested for their absorbance in UV spectroscopy by filling the cuvette up to 2/3 and taking the absorbance in between wavelength 200-400 nm .The following solutions were tested.

RESULT AND DISCUSSION

The experimental work leads to conclude that there are some interferences that we get from the supplements we had used in our experimental work, which is as follow (Table 1).

Table 1: % interference of different dietary supplements with Diclofenac sodium.

Sr. No.	Excipient	Absorbance on UV spectrophotometer			% Interference	Fig. No.
		Excipient (20ppm)	Drug (20ppm)	Drug + Excipient (20ppm)		
1	Methionine	-0.012	0.530	0.362	31.698	2
2	Tryptophan	0.3	0.530	0.66	25.66	3
3	Serine	-0.017	0.530	0.782	47.547	4
4	α amino butyric acid	-0.040	0.530	0.326	38.490	5
5	Threonine	-0.018	0.530	0.805	51.886	6
6	Citric acid	-0.012	0.530	0.324	38.867	7
7	Sodium saccharine	0.162	0.530	0.969	82.83	8

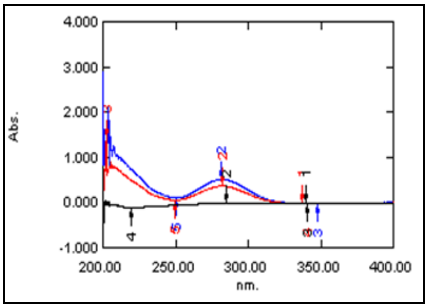


Fig.2: Methionine

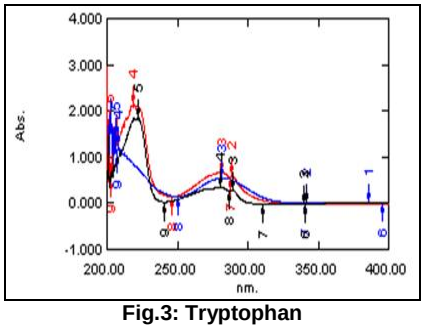


Fig.3: Tryptophan

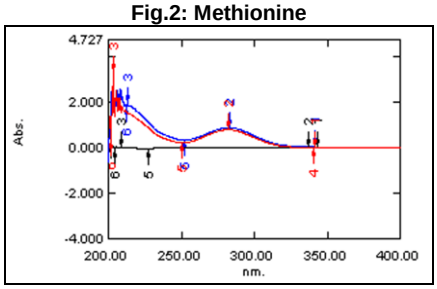


Fig.4: Serine

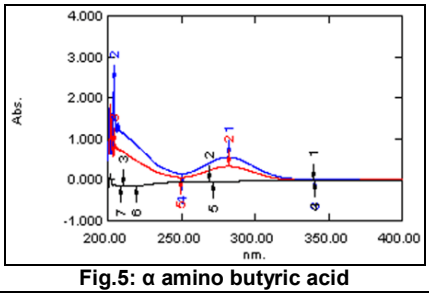


Fig.5: α amino butyric acid

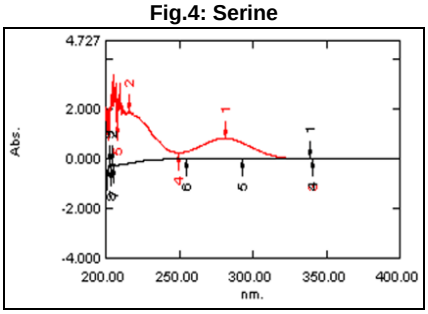


Fig.6: Threonine

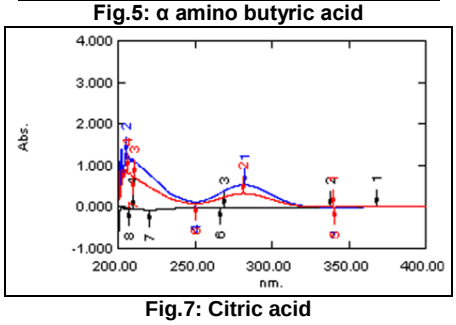


Fig.7: Citric acid

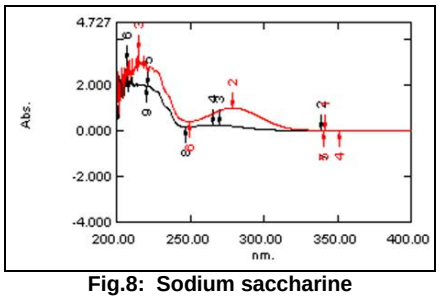


Fig.8: Sodium saccharine

CONCLUSIONS

The experimental work leads to conclude that there are some interferences that we get from the supplements we had used in our experimental work.

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