Effect of Banana on the Metabolism of Vitamin B6 in the Male Rats.

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**ABSTRACT**

For years it has been known that certain fruits interact with certain drugs. The co-administration of the drugs with those fruits can elevate drug bioavailability and can change pharmakintic and pharmacodinamic parameters of the drugs.(1) This phenomenon depends mainly on the inhibition of cytochrome 450 3A4 in the cells of small intestine leading to reduction of drug pre-systemic metabolism.(2) In addition to that it has been presumed that fruit in turn inhibits P-glycoprotein which is a carrier that transport drug from the cells of the intestine back to the intestinal lumen , a process that increases the amount of drug absorbed.(3) In this experiment we aim to know effect of banana juice on the metabolism of vitamin B6 in the rats male. Thirty male rats were divided into three groups. Two groups were administered vit. B6 dissolved in water for one of them, and in banana juice for the other group, while the third group received banana juice without vit. B6, after three hours of administrating there were significant differences in the concentration of plasma vit. B6 among the groups (P<0.01).

**INTRODUCTION**

Pyridoxine (vitamin B6)

Vit.B6 is a water-soluble vitamin that exists in three major chemical forms; pyridoxine, pyridoxamineaained and pyridoxal,(4) It performs a wide variety of functions in the body and is essential for good health.

Vitamin B6 is needed for more than 100 enzymes involved in protein metabolism. It is also essential for red blood cell metabolism. The nervous and immune systems need vit.B6 to function efficiently, and it is also needed for the conversion of tryptophan to niacin.(5)

Vitamin B6 is needed for making hemoglobin. It also helps increase the amount of oxygen carried by hemoglobin.(6)

Deficiency symptoms

The classical symptoms and signs of vitamin B6 deficiency are a microcytic, hypochromic anemia, seizure activity, seborrheic dermatitis confusion and depression.
Vitamin B6 deficiency primarily results in cheilosis (chapping and fissuring of the lips), glossitis (inflammation of the tongue), stomatitis (inflammation of the oral mucosa), anemia, irritability, confusion and depression (7).

Vit.B6 also helps maintain the blood glucose within a normal range. When caloric intake is low body needs vit.B6 to help convert stored carbohydrate or other nutrients to glucose to maintain blood sugar levels (8).

Banana; Banana is useful fruit for human health due to contain too much vitamins and minerals such as; (K,Mg,vit.B6,vit.E). Banana contain sufficient amount sugars like fructose and glucose- combined with fiber, banana gives an instant, sustained and substantial source of energy (9).

Material and methods
30 male rats (20-25 weeks age) were used and divided into three groups. The animals were fasted for night (12 hours).
After that and by using esophageal tube each animal of the first group was given 0.2mg of vitamin B6 dissolved in one ml of water.
By the same method the second group was drenched one ml of banana juice for each animal.
Each animal of the third group was given 0.2mg vit. B6 dissolved in one ml of banana juice. After approximately three hours of administration blood sample (one ml) was collected from each animal in heparinized tube, then after six hours additional blood sample collected again. The blood was centrifuged at 2500 rpm for 10 min. Plasma was maintained in deep freezing Measuring of vitamin B6 plasma concentration was carried out on highly performance liquid chromatography (HPLC) equipped with a 119V.V detector.
A shim-pack CLC-ODS (6.0×150) column was used for the separation of vit. B6. The statistical analysis was performed by T-test and Pearson Bravos correlation coefficients respectively (10). The statistical analysis showed significant differences in the vit. B6 plasma levels among the groups (P<0.01) for the first sample (collected after three hours of blood. Vitamin B6 concentration was higher significantly in the third group in comparison with first and second group. Also there was a significant difference (p<0.1) in the vitamin concentration between the first and second group.
The analyses presented no significant differences among the groups for the second sample (after six hours of drenching)

Result
Result showed a significant increase (p<0.01) in vit.B6 plasma level in the third group that received vit.B6 dissolved in banana juice in comparison with the first group (vit.B6 dissolved in water) and also in comparison with the second group (banana juice). Figure–I shows a significantly higher difference between vit.B6 plasma level in the third group and the other groups, after 3hrs of administration, also there was a significant difference in vit.B6 concentration between first group and second group (p<0.1).
In the same time statistical analysis showed no significant differences in the vitamin B6 plasma concentration for the second sample of the blood (P<0.01)

Figure (2): Columns represent vit.B6 plasma concentration (nM) for each group in the second sample of blood
DISCUSSION
It is known that cytochrome P-450 (CYP450) is enzymatic protein that catalyze the oxidation of substrate molecules. A large number of drugs are metabolized by cytochrome P-450.

The main mechanism to enhance the bioavailability of drugs by fruits juice is the inhibition of cytochrome P-450 in the small intestine, which causes a large reduction of drug pre systemic metabolism. It has been found that only intestinal cytochrome P-450) is inhibited by fruit juice while liver (cytochrome P-450) is not effected (11).

According to the previous facts, it is likely that banana juice has also inhibited the cytochrome P-450 of the enterocyte that allowed a high amount of B6 to enter the blood, increasing the concentration of B6. It is also known that certain transporters which are called multiple drug resistance (MDR) these transporters carry the drugs from the intestinal cells and return them back into the intestinal lumen. The P-glycoprotein is the most prominent one of these carrier that reduces the fraction of drug absorbed.

Many researcher observed that fruit juice inhibit activity of this type of multiple drug resistance (MDR) (12), according to this fact banana juice might have reduced activity of reversed transport of drugs by inhibiting the (MDR).

References