THE EXCRETION PROFILES OF VITAMIN C FROM VITAMIN C AND ESTER-C® TABLETS IN HUMAN URINE

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ABSTRACT

Purpose: *The purpose of this research is to study the excretion profile of vitamin C in urine.* **Methods:** *Urine samples from six volunteeres were collected in the interval of 0, 2, 4, 8, 10, 15, 20, and 24 hours after the volunteers have been given vitamin C and Ester-C® tablets, orally. The method of analysis used was visible spectrophotometry (UV/Visible Ultrospec 3000 pro) with dichlorophenol indophenol as the reagent.* **Result:** *Result showed that the total percentage of vitamin C in urine after administration of vitamin C tablet was 9.44% (of 240.64 mg dosage), with the highest concentration of excretion was at the 6th hour. The total percentage of vitamin C in urine after administration of Ester-C® tablet was 1.30% (of 236.925 mg dosage), with the highest concentration of excretion was at the 15th hour. The accuracy and precision of this method were proven fulfilled the criteria of validation.*

Keywords: *vitamin C, ester C, excretion profile*

1. Introduction

Vitamin C is a water soluble compound that stored at minimum level in the body. Vitamin C reacts with free radicals in the body, therefore it can be classified as antioxidant. It has been known that this compound strengthened immunity system, and reduce the risk of heart attack, stroke, cataract, and several kinds of cancer (15).

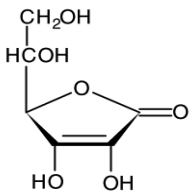


Figure 1. Chemical structure of vitamin C

The characteristic of vitamin C: A white or almost white, crystalline powder or colourless crystals, becoming discolored on exposure to air and moisture, freely soluble in water, soluble in alcohol, practically insoluble in ether. It melts at about 190°C, with decomposition.

In the body vitamin C is oxidized into dehydroascorbic acid. Both forms are important in the oxidation-reduction reactions. Vitamin C has an important role in the metabolism of folic acid, in the metabolism of iron and is used to fight infection

Ester-C® is a mixture of ascorbic acid and its natural metabolite. Clinical study performed on human and animals of Ester-C® showed that this compound was absorbed faster and in higher level and eliminated slower when compared with vitamin C.

Soluble water compounds are excreted through several paths, the main path is elimination through urine. Vitamin C is absorbed in low level in the body. The minimum intake of vitamin C based on WHO criteria (for healthy adult) is 60 mg/day. In the body vitamin C is oxidized reversiblically into dehydro ascorbic acid. Another part of vitamin C is metabolized into inactive compound such as ascorbic-2-sulphate and oxalic acid, and excreted.

Ester C® consists of the mixture of ascorbic acid and threonate, its natural metabolite. Verlangieri compared the absorption of Ester C® with vitamin C in rats, and concluded that Ester C®

was absorbed twice as much in 20 minutes than vitamin C (6).

The purpose of this research is to study the excretion profile of vitamin C in urine.Vitamin C tablet and Ester-C® were chosen as the samples to be analyzed because these supplements were widely used and were excreted in ascorbic acid form.

2. Experimental method

Materials: Materials used in this research were ascorbic acid (Farmakope Indonesia reference standard), glacial acetic acid (E. Merck), metaphosphoric acid (E.Merck), 2,6 dichlorophenol-indophenol (E.Merck), bicarbonate sodium (E.Merck), vitamin C tablet (PT Kimia Farma), Ester C® tablet (Holisti Care).

Instrument: Instruments used in this research were digital analytical balance (*Mettler Toledo AB104-S)*, ultraviolet-visible spectrophotometer (*Ultrospec 3000 pro).*

Experimental method: Six healthy male volunteers (age 22-23 years, BMI 20-25, 55-65 kg of body weight) were carantined a day before the testing was carried out. They were given vitamin C tablet (PT Kimia Farma) and the urine samples were collected in the interval of 0, 2, 4, 8, 10, 15, 20, and 24 hours. This procedure was repeated for Ester C tablet. The samples were kept in dark bottles and were analyzed spectrophotometrically. The reagent used was 2,6 - dichlorophenol indophenol.

3. Results and Discussion

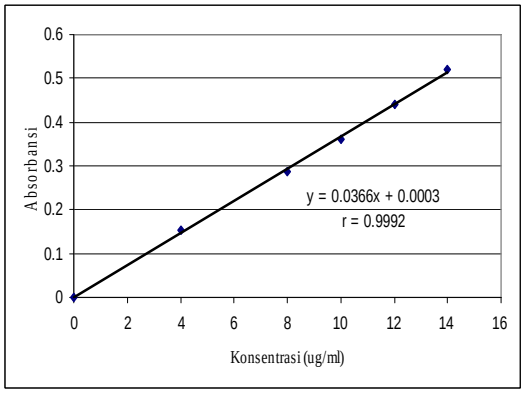


Figure 2. Calibration curve of vitamin C

The excretion profile of vitamin C from vitamin C tablet and Ester C tablet was showed in Figure 3 and 4.

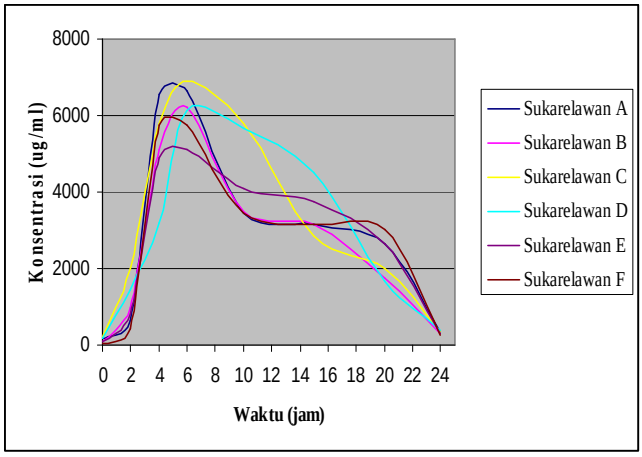
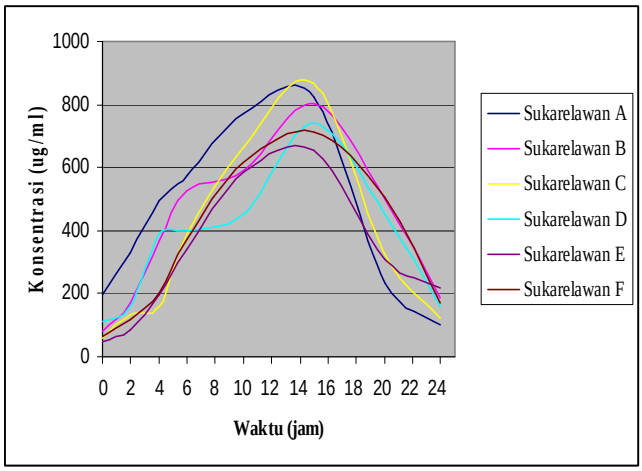


Figure 3. Excretion profile of vitamin C (from vitamin C tablet) in human urine



Figuer 4. Excretion profile of vitamin C (from Ester C tablet) in human urine

Results showed that the excretion peak of vitamin C was at sixth hour (vitamin C tablet-Figure 3) and fifteenth hour (Ester C tablet-Figure 4) . It indicated that vitamin C from Ester C was eliminated slower than ordinary vitamin C. The

total percentage of vitamin C in urine after administration of vitamin C tablet was 9.44% (of 240.64 mg dosage), whereas the total percentage of vitamin C in urine after administration of Ester-C® tablet was 1.30% (of 236.925 mg dosage).

The data of this research proved that threonate metabolite of vitamin C helped to retain the vitamin C in the body, and made it excreted slower.

4. Conclusions

The excretion profile of vitamin C from vitamin C and Ester C tablets in human urine showed that vitamin C in Ester C was excreted in smaller concentration and slower time than ordinary vitamin C.

Acknowledgment

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