DETERMINATION OF ASCORBIC ACID AND EFFECT OF CHILLED AND FROZEN STORAGE ON ASCORBIC ACID CONTENT IN EDIBLE BAMBOO SHOOTS

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ABSTRACT

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This study was conducted to determine the content of ascorbic acid in four selected species edible bamboo shoots. Each of the specie was divided into top and bottom portions and stored at chilled and frozen temperatures. There were two methods that were used for ascorbic acid determination, which were the titration method and UV Spectrophotometer method. The results obtained indicated that for top and bottom portions of bamboo shoots stored at chilled and frozen temperatures, *buluh betong (Dendrocalamus asper)* and/or *buluh beting (Gigantochloa levis)* had significantly higher amounts of ascorbic acid than those in *buluh berang (Gigantochloa brang)* and *buluh semantan (Gigantochloa scortechinii)* ($p \leq 0.05$). It was found that were significant differences in ascorbic acid content between the bottom and top portions ($p \leq 0.05$). At the fourth week at chilled temperature, ascorbic acid content for the bottom portions of *buluh beting (Gigantochloa levis)* (8.89 mg/100g) was significantly higher than the top portion (7.78 mg/100g). Storage time had an effect on the content of ascorbic acid in all bamboo shoots species when determined by the titration method. For example, ascorbic acid content for the top portion of *buluh betong (Dendrocalamus asper)* when stored at frozen temperature in week 0 (day 2) was 12.22 mg/100g and the value decreased to 6.95 mg/100g at week 10. Storage temperature also had an effect on ascorbic acid content in four species of bamboo shoots for top and bottom portions from week 0 (day 2) until week 10. The results indicated that all bamboo shoots species stored under frozen temperature contained more ascorbic acid than those stored under chilled temperature. There were significant differences between ascorbic acid content obtained by titration and UV spectrophotometer method ($p \leq 0.05$). As an example, ascorbic acid content at chilled temperature in *buluh betong (Dendrocalamus asper)* for top portion by using the titration method was 7.22 mg/100g while the UV spectrophotometer method gave 6.26 mg/100g for the same portion. From this study, it can be concluded that UV spectrophotometer method gave similar results to those of the titration method. Therefore the UV Spectrophotometer method can be adopted for the routine determination of ascorbic acid in bamboo shoots and possibly in other food samples.

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CHAPTER 1

INTRODUCTION

Vitamin C has long been recognized as an important nutrient in several food products. The reduced form of the vitamin C is referred as ascorbic acid (AA), and the oxidized form is referred to as dehydroascorbic acid (DHAA). In humans, both are biologically active. The total vitamin C is the sum of both forms (Dodson et al., 1992).

Numerous methods for the analysis of ascorbic acid in foodstuff have been describes. These included the indicator-dye reduction method with dichlorophenolindophenol, the ketone derivatization method with dinitrophenylhydrazine, fluorometric methods by condensation of DHAA with OPDA, an enzymatic method using ascorbate oxidase, and HPLC methods with UV detection, fluorescence detection and electrochemical detection. Ascorbic acid also can be determined by using ultraviolet/visible spectrophotometer method (Speek et al., 1984).

Ascorbic acid is present in all animals and higher plants, but only humans and few other vertebrates have specific requirements. Other species synthesize the compound. Vegetables and fruits are the primary dietary sources for the human. Citrus and various vegetables including peppers, tomatoes, potatoes and leafy greens are