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Evaluation of Ascorbic acid contents in *Hibiscus rosa-sinensis* flowers and *Citrus sinensis* fruits.

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ABSTRACT

Hibiscus rosa-sinensis and *Citrus sinensis* are well recognized medicinal herbs for its high ascorbic acid contents were estimated. Titration procedure was applied for determine the ascorbic acid content in percentage. Flowers and fruits of *Hibiscus rosa-sinensis* and *Citrus sinensis* were washed, pilled, blended using blender and sieved using sieve white cloth. The flowers of *Hibiscus rosa-sinensis* and fruit of *Citrus sinensis* were contained 26.48±1.44mg/100g and 53.59±0.96mg/100g of ascorbic acid respectively. The high ascorbic acid contents in fruit of *Citrus sinensis* showed that they are highly rich in vitamin C and good for the prevention and treatment of scurvy.

Keywords: ascorbic acid; *Hibiscus rosa-sinensis*; *Citrus sinensis*; vitamin C.

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INTRODUCTION

Hibiscus Rosa sinensis are native to tropical Asia. A native of south eastern Asia (China), the plant is commonly found throughout the tropics and as a house plant throughout the world. Leaves and stems contain β-sitosterol, stigma sterol, taraxeryl acetate and three cyclo propane compounds and their derivatives. Flowers contain cyaniding diglucoside, flavonoids and vitamins, thiamine, riboflavin, niacin and ascorbic acid [1]. Quercetin-3-diglucoside, 3,7-diglucoside, cyanidin-3,5-diglucoside and cyanidin-3- sophoroside-5-glucoside have been isolated from deep yellow flowers; all above compounds and kaempferol-3-xylosylglucoside have been isolated from ovary white flowers. Vitamin is an organic substance which is needed in trace quantity for normal cell functions. The vitamins that cannot be synthesized internally by an organism are called essential vitamins, in their absence in the external medium, the cells cannot survive. A typical example of this is ascorbic acid which has trade name of vitamin C. Ascorbic acid functions in a number of biochemical reactions, mostly involving oxidation. Vitamin C has the chemical name ascorbic acid. It is a water soluble vitamin. Although it is important for good health, humans do not have the ability to make their own vitamin C and must obtain it through diet or take it in vitamin supplements. Citrus fruits, potatoes and some green plants are known to be good sources of vitamin C. Plants synthesize the compound for the growth, development, and protection of the plant. The exact pathway for its synthesis is not well understood. Ascorbic acid that can act as a reducing as well as a capping agent in biosynthesis of silver nanoparticles synthesis from plant extracts[2]. The objective of this study was to determine the amount of ascorbic acid content in *Hibiscus rosa-sinensis* flower and *Citrus sinensis* fruit.

MATERIALS AND METHODS

Materials: The *Hibiscus rosa-sinensis* flower and *Citrus sinensis* fruit were collected from garden of our institute in the month of January, 2017.

Reagents: The analytical grade reagents used for this research work included; 2.6 dichlorophenbolindophenol (blue dye), 20% glacial acetic acid, standard L-ascorbic acid and distilled water.

Sample preparation: Flowers and fruits were washed, pilled, blended using blender and sieved using sieve white cloth. The samples were dried at room temperature and finely powdered with the help of a hand grinding mill. About 100 g of the powder was exhaustively extracted with ethanol. The extract was concentrated to a residue. The crude extract were stored in sterilized bottle and kept in a refrigerator for further use. 10 ml of each filtrate was mixed with 20% glacial acetic acid in a 100 ml standard flask which was made up to 100 ml with distilled water.

Dye preparation: The standard dye solution was prepared by dissolving 50mg of blue dye in 50 ml of distilled water. The mixture was diluted to 200ml, filtered and kept.

Preparation of standard ascorbic acid solution: This was prepared by dissolving 100mg crystalline ascorbic acid in 50 ml of 20% glacial acetic acid and diluted to 100 ml with distilled water.

Titration procedures: 10 ml of the ascorbic acid solution was titrated with the dye solution. Each drop of the dye in contact with the solution turns pink. The end point was reached when the pink colour lasts for 10 seconds. Similarly, 10 ml of each sample prepared was in turn titrated with the due and the titre values were noted.

RESULT AND DISCUSSION

Ascorbic acid percentage in *Hibiscus rosa-sinensis* flower and *Citrus sinensis* fruit were significantly influenced by plant parts and their interactions (table 1). It is evident from table 1 that ascorbic acid percentage in *Citrus sinensis* fruit was statistically higher 53.59mg/100g; as compared to *Hibiscus rosa-sinensis* flower 26.48mg/100g contained 27% lower ascorbic acid percentage.

Ascorbic acid estimations: 6.5 ml of the dye solution was needed to titrate 10 ml of the standard ascorbic acid solution which contained 1 mg of ascorbic acid per ml.

That is; 6.5ml blue dye solution needed to titre 10mg ascorbic acid

Therefore, 1ml ≡ (10/6.5) = **1.54mg.**

Hibiscus rosa-sinensis* flower extract*: Flower extract of *Hibiscus rosa-sinensis*, the average ml of the dye used was 1.72ml.

That is; 1.72ml ≡1.54×1.72

10 ml of the *Hibiscus rosa-sinensis* flower extract contained 2.648mg ascorbic acid.

Therefore, 100 ml of *Hibiscus rosa-sinensis* flower extract contain= **26.98mg/100g ascorbic acid.**

Citrus sinensis* fruit extract*: Fruit extract of *Citrus sinensis*, the average ml of the dye used was 3.48ml.

That is; 3.48ml ≡1.54×3.48

10 ml of the *Citrus sinensis* fruit extract contained 5.359mg ascorbic acid.

Therefore, 100 ml of *Citrus sinensis* fruit extract contain= **53.59mg/100g ascorbic acid.**

Table 1. Estimation of mean ± SE values of ascorbic acid (mg/100g) in extract of *Hibiscus rosa-sinensis* flower and *Citrus sinensis* fruit.

S. No.	Samples	Average titre volume (ml)	Ascorbic acid mg/10ml	Ascorbic acid mean ± SE (mg/100g)
1	*Hibiscus rosa-sinensis* flower	1.72	2.648±1.59	26.48±1.44
2.	*Citrus sinensis* fruit	3.48	5.359±0.58	53.59±0.96

This finding is in agreement with that the *I. candida* contains higher phenolic compounds in leaves 1.423% compared to stem 0.516% [3] and the higher phenolic content in leaves than in stems of *A. paniculata* [4]. Furthermore, the highest initial flavonoid content is attributed to young leaves, followed by young stems and also confirmed that phenolic content was higher in early growth stage compared with matured stages [5]. Ascorbic acid content in *Hibiscus rosa-sinensis* flower and *Citrus sinensis* were compared and found the lowest amount of ascorbic acids in flowers. This finding is in concord with that of the ascorbic acid content of three herbs such as parsley (*Petroselinum crispum*), dill (*Anethumgra veolens*) and lovage (*Levisticum officinale*) were affected by storage duration [6]. It is well known *Citrus sinensis* contain a range of key nutrients with medicinal value including vitamin C. It has been reported that the ascorbic acid in the body aids in iron absorption from the intestines. It is important for connective metabolism especially the scar tissue, bones and teeth [7]. In addition to its physiological functions, it is necessary as an anti-stress and protector against cold, chills and damp [8]. It prevents muscle fatigue and scurvy that is characterized by skin hemorrhages, bleeding gums, fragile bones, anemia and pains in joints and defects in skeletal calcification [8]. The function of ascorbic acid also accounts for its requirement for normal wound healing [9]. It acts also as antioxidants in the skin by scavenging and quenching free radical generated by ultra violet radiation stabilization. The production of collagens is also dependent on vitamin C. It helps in the promotion and restoration of skin and improvement of fine wrinkles [10]. Thus, our research findings confirm that *Hibiscus rosa-sinensis* and *Citrus sinensis* are well recognized medicinal herbs for its high ascorbic acid contents and a good source of ascorbic acid that may be harvested freshly from fruit of *Citrus sinensis* for high amount and flowers of *Hibiscus rosa-sinensis* for low amount getting vitamin C.

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