

Physico-chemical and acceptability of citrus juice from Orange, Tangerine and Grape blends

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ABSTRACT

Citrus juice produced from blends of orange, tangerine, and grape in proportion of 2:1:1 or 50:25:25 and 100% orange juice was the reference sample. The samples were coded ORA, GOT, TOG and OTG depicting 100% orange juice, 50 grape: 25 tangerine: 25 orange, 50 tangerine: 25 orange: 25 tangerine and 50 orange: 25 grape: 25 tangerine respectively. Physicochemical properties and sensory evaluation were carried out on the samples. Samples TOG and OTG recorded the higher the pH and titratable acidity than samples ORA and GOT. Samples ORA and TOG had the highest vitamin C content 18.40mg/100g. The total soluble solid of sample ORA (10°Brix) was higher than other samples, they had almost the same value. Sample ORA is most accepted. For blended samples TOG and OTG were preferable to sample GOT. The results show that juice produced from blends of citrus fruits is of good quality and a valuable source of health promoting constituents.

Keywords: *Physico-chemical, Citrus juice, Orange, Tangerine, Grape blends*

INTRODUCTION

Citrus fruits are *hesperidia* berry fruit of the citrus having rind and juicy pulp. Citrus genus comprises of five important fruits such as orange (*Citrus sinensis*), grape (*Citrus paradisi*), tangerine (*Citrus tangerina*), Lemon (*Citrus limon*) and lime (*Citrus aurantifolia*). Citrus fruit is very popular in many parts of the world due to its distinctive flavor, taste, and aroma as well as multiple health benefits associated with it. The consumption of citrus fruits or their products is believed to have beneficial effects against different diseases, the main reason being the presence of important bioactive compounds (Pellegrini *et al.*, 2003; Peterson *et al.*, 2006). It is now widely known that vitamin C (ascorbic acid) and carotenoids are found in abundance in citrus fruits (Dhuique-Mayer *et al.*, 2005), which play an important role primarily in causing resistance against many diseases. Citrus fruits are seasonal and highly perishable. The large quantities of the fruits are traditionally and commercially processed into different products such as wine, fruit juice, soft drinks, carbonated beverages and alcoholic drinks help to prevent post-harvest loss. Juice is known as presses of fruit (Tresler, 1971). Citrus juice is an unfermented food product from citrus fruit which are produced by mechanically squeezing of the fruit. Citrus fruit juice contains considerable amounts of vitamins, acids, sugars, polysaccharides, pectin, cellulose, polyphenols and minerals (Gorinstein *et al.*, 2004).

The formulation of orange, tangerine and grape will increase their utilization and add more value to the fruit. Blending of these citrus fruits would give a unique product that is completely different from market. This would go a long way reducing the problems associated with vitamin C. The aim of this research work was to determine the physicochemical properties of citrus juice prepared in different proportions and to assess consumer's preference for different juice blends.

MATERIALS AND METHODS

Sweet orange, tangerine and grapes were purchased from Eke market, Oko. Sweet orange, tangerine and grapes were sorted for wholesomeness, washed, in clean water to

remove contaminants reduced microbial load. Fruit were peeled, squeezed to extract the juice, sieved, pasteurized at 85°C for 5min cooled and filled in the bottles. Vitamin C, titratable acidity, total soluble solid and pH were determined using the method of AOAC (2010). Sensory evaluation was conducted using ten panelists. Citrus juice were evaluated for taste, colour, flavor and general acceptability using 9- point hedonic point (9=like extremely; 1= dislike extremely) Sensory evaluation were subjected to ANOVA, Duncan multiple range test is used to determined mean differ significantly.

Citrus fruits (Grape, Tangerine and Sweet orange)

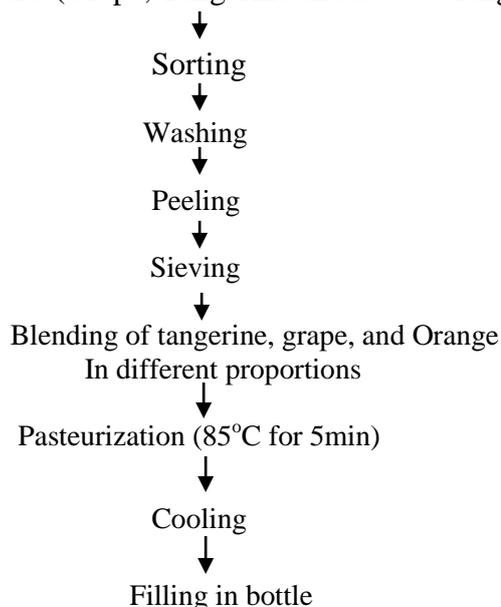
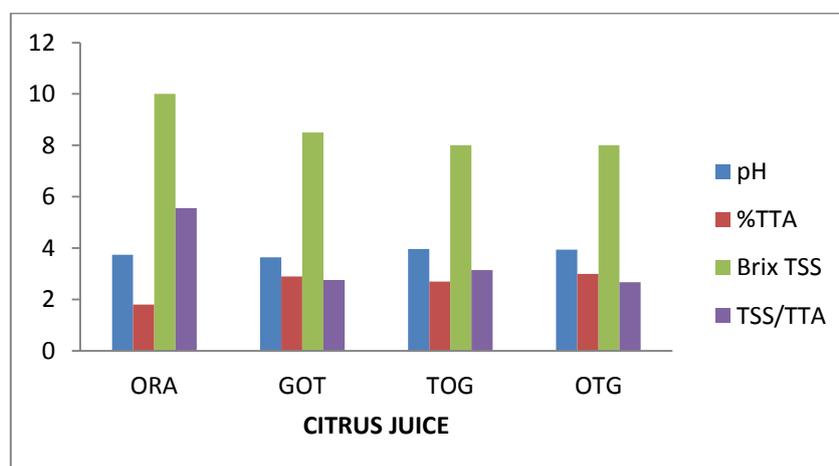


Fig. 1: Flow chart for production of Citrus juice.

RESULTS AND DISCUSSION

The result in Fig. 1 show that pH ranged from 3.64 to 3.64. This is in line with the finding of Nwakocho and Akobundu (2012). The low pH of the all the samples turned more acidic, this may be attributed to increased in the hydrogen ion concentration. The pH of value of 3-4 may give the juice a good potential of inhibiting the growth of pathogenic bacteria (Jay, 2000; Hatcher, *et al.*, 1992) although mould, yeast and pathogenic microorganism can tolerate this and cause spoilage (Brown and Brooth, 1991). The pH is the main factor affecting the stability of vitamin C thus high value pH favoring the oxidation processes of vitamin C.



key

ORA= 100% Orange,

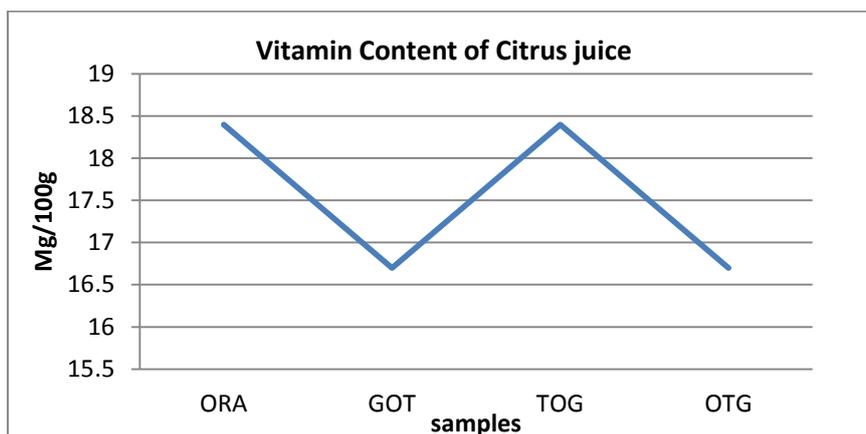
GOT= 50% grape, 25% orange and 25% tangerine,

TOG=50% tangerine, 25% Orange and 25% grape

OTG= 50% orange, 25% tangerine and 25% grape

Titrateable acidity is the measure of total acid present in juice. Orange juice has lowest value of 1.80% when blended with the tangerine and grape the acid level was between 2.70% and 3.00%. The predominant acid occur in citrus is citric acid while in grape tartaric acid but small amount of malic acid may be found. It was observed that orange juice is less acidic

reflecting its considerable sweetness. The total solid is an indication of sugar level in the samples and apparent high level is recorded in sample ORA (100% orange) and other samples have the same value of 8°Brix. TSS/TTA ratio, which is among important quality attributes of juices, was higher in the orange juice (5.56), however, the blended citrus juice that had the highest value was sample TOG(50% tangerine 25% orange and 25% grape) (3.15) and sample OTG (50% orange, 25% grape and 25% tangerine) had the lowest (2.67) values.



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OTG= 50% orange,25% tangerine and25% grape

The content of vitamin C is an important parameter for assessing the nutritional value of the food because it is by far the least stable nutrient; it is highly sensitive to oxidation and leach into water-soluble media (Davey *et al.*, 2000; Franke *et al.*, 2004). The result show that Samples A and C have the highest value of vitamin C 18.40mg/100g, samples GOT and OTG have the same value of 16.70 mg /100g . Vitamin C is an important anti-oxidant, helps protect against cancers, heart disease, stress, it is part of the cellular chemistry that provides energy, it is essential for sperm production, and for making the collagen protein involved in the building and health of cartilage, joints, skin, and blood vessels (Rasanu *et al.*, 2005)

Table 1

Means Sensory Scores of Samples

Samples	Taste	Flavour	Colour	Overall Acceptability
ORA	7.40±1.80 ^a	7.40±1.70 ^a	7.60±1.50 ^a	7.60±1.80 ^a
GOT	5.60±0.40 ^c	5.70±1.10 ^c	6.40±1.25 ^b	5.80±1.20 ^c
TOG	5.90±1.40 ^c	6.30±1.50 ^b	6.60±1.30 ^b	6.30±1.30 ^b
OTG	6.00±1.50 ^b	5.90±1.30 ^c	6.10±1.20 ^b	6.40±1.40 ^b
LSD	0.35	0.24	1.25	0.98

Mean in the same column with the same superscript are not significantly different ($p < 0.05$)

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All blended samples were overall accepted because their mean scores ranged from 5.8- 6.40. Sample A scored highest in all organoleptic attributes and overall accepted thus most accepted.

CONCLUSION

The result of this research work reveals that juice from locally grown citrus fruit is of good quality and it can be blended in different proportion to obtain the varieties of product different from exist one. High content value of vitamin C shows that citrus juice is a valuable source of health promoting constituent. Hence it can be effectively used for production of different food products. The result encourages cultivation of different kinds of citrus fruits in the local environment of this country.

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