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Nutritional, and Microbiological Quality Assessment of Karkade Drink: A Home-Made Beverage in Jeddah City of Kingdom of Saudi Arabia.

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Abstract

Karkade Drink is the most common and popular drink in the Kingdom of Saudi Arabia it serve as refresher during the fasting month of Ramadan. the objective of this study was to assess the nutritional, microbiological and sensory qualities of the home-made karkade. The Nutritional, safety and sensory analysis of Karkade drink were assessed. The beverage was prepared using traditional methods. Similar samples of the beverage were also brought from the vendors and compared with the laboratory prepared samples. Nutritional value of the drink evaluated by using AOAC Official Methods while Microbiological Quality analyzed using Nutrient and MacConkey agar. Sensory evaluation was carried out on the local beverage using 1 to 9 hedonic scale by 20 panelists.

Keywords: Beverage; Home-Made; Non-alcoholic beverage; Nutritional quality;

INTRODUCTION:

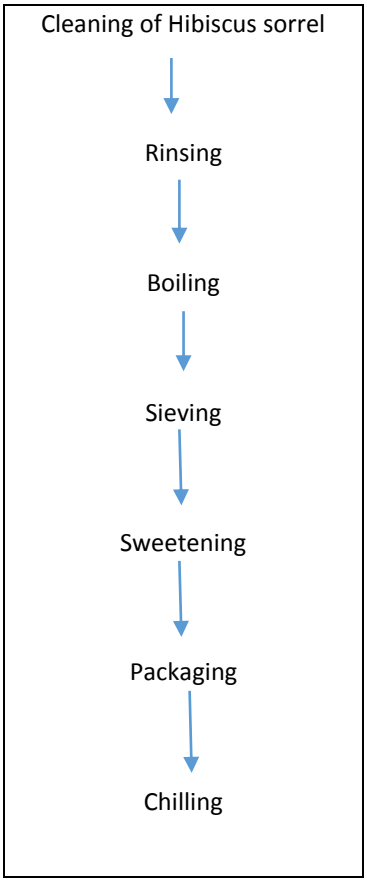
Karkade is Non alcoholic and Non Fermented Traditional home Made Beverage which is widely consumed in Saudi Arabia. Karkade is produced from the dried calyces of Hibiscus sabdariffa. H. sabdariffa belongs to Malvaceae family is an annual erect bushy branched herb usually found in tropical and semi-tropical regions of the world mainly in West Africa and the East Indies H. sabdariffa has cylindrical and dark green to red colored stem, tap root system and the leaves are green to red in colour . The flower is pale yellow with fleshy red calyces . karkade drink is having short shelf life of about 24 hours after production without refrigeration. Sabdariffa is known as karkade and drink is prepared through aqueous extraction in a certain solid-to solvent ratios, which is popularly consumed during the month of Ramadan in Arab World. In other African countries, the beverage from H. sabdariffa is called drink of the Pharaohs (Egypt), da Bilenni (Mali) The quality of karkade drink depends mainly on the physicochemical constituents of the raw materials, water used in their production and the hygienic condition of the processors. Water is a major is a major resource used in the production of these drink from their raw materials. Poor quality with regard to both physicochemical (colour, pH, turbidity, total suspended solids, total hardness, total alkalinity salinity, electrical conductivity), heavy metals (lead, cadmium, chromium, iron, zinc, copper, nickel, arsenic) and microbial (total heterotrophic bacteria, total fungi, total coliform and fecal coliforms) could also impact on the overall quality of the drink. The environment is which the drinks are processed could also influence the quality especially in the microbial perspectives. Karkade drink is a nutritional drink consumed by people in Saudi Arabia. However, the consumption of local beverages could be a potential source of transfer of zoonotic and foodborne pathogens including staphylococcus's, Salmonellosis, Brucellosis, Tuberculosis, Shigellosis, Listeriosis, E. coli, infections etc. Therefore, this paper review the quality of karkade drink prepared and consumed in City Of Jeddah Saudi Arabia.

MATERIALS AND METHODS

Production of Karkade drink:

Karkade drink was produced locally by extraction from the sorrel calyx (Hibiscus sabdariffa). The plant was rinsed properly before boiling in water for about 15 min . After boiling, it was sieved and sugar were added the drink was cooled, packaged and refrigerated.

Home preparation of karkade(flow chart) :



Nutritional analysis:

Nutrient values were evaluated using the methods of the AOAC . Bacteria counts were analysed using nutrients, MacConkey and MRS agar using pour plate method.

Three samples of karkade drink were prepared for analysis. All three samples were collected from different sellers within in Jeddah city.

RESULT AND DISCUSSION

Table (1) shows the results based on various parameters In reference to Protein content Sample K2 is having highest amount of protein as compare to rest of two samples whether difference among all three samples in not significant.

Carbohydrates content of Sample K1, K2,K3 is 8.3,8.6,8.2 respectively.

Table (1) also shows the fat content of three samples again the K2 shows the highest amount followed by K1 and K3 .

Ash is lowest in K3 while highest in K2. The Moisture content is 95.5,94.0,95.4 respectively in all three samples.

Table 1: Proximate composition of locally produced beverage (g/100 g sample).

Sample	Protein	CHO	Fat	Ash	Moisture
K1	2.3(+-0.8)	8.3(+-0.8)	6.2(+-0.8)	1.2(+-0.1)	95.2(+-0.4)
K2	2.6(+-0.6)	8.6(+-0.7)	6.5(+-0.7)	1.5(+-0.1)	94.0(+-0.5)
K3	2.2(+-0.8)	8.2(+-0.8)	6.1(+-0.8)	1.0(+-0.1)	95.4(+-0.4)

Table (2) present the mineral composition of three samples. The highest calcium content is in K3 which is 3.0(+-0.4) followed by K1 and K2.

Phosphorus values are determined sample K2 shows the highest amount of Phosphorus where K1 is having 1.7 and K3 is 1.5mg

Potassium is 2.4 in K2 and K3 while it is 2.2mg in K1like wise copper value are 0.2,0.3,and 0.5 in K1,K2and K3 respectively.

In case of Manganese content studies shows that K3 is having highest value of 1.7 whileK1 is 1.2 and K2 is 1.4

Table 2: Mineral composition of karkade drink (mg/100 g).

Sample	Calcium	Phosphorus	Potassium	Copper	Manganese
K1	2.8(+-0.3)	1.7(+-0.1)	2.2(+-0.2)	0.2(+-0.01)	1.2(+-0.1)
K2	2.6(+-0.4)	1.9(+-0.1)	2.4(+-0.3)	0.3(+-0.02)	1.4(+-0.2)
K3	3.0(+-0.4)	1.5(+-0.3)	2.4(+-0.2)	0.5(+-0.03)	1.7(+-0.3)

Microbiological analysis were conducted on all three samples received from different sellers of Jeddah city and it is revealed that total count is 1.0×10^5, 1.2×10^5, 1.6×10^5,cfu/ml respectively for sample K1 ,K2, and K3 on Mac Conkey agar while it is 1.5×10^5, 1.8×10^5, 2.1×10^5 on Nutrient agar for K1 ,K2 and K3 respectively.

Table 3: Total bacterial counts of Karkade Beverage (cfu/ml).

sample	Mac Conkey agar (cfu/ml)	Nutrient Agar(cfu/ml)
K1	1.0×10^5	1.5×10^5
K2	1.2×10^5	1.8×10^5
K3	1.6×10^5	2.1×10^5

Sensory evaluation were conducted by 20 panel members there is no significant difference observed in results and found almost all are acceptable and on the higher side of liking.

Table 4: Sensory attributes of karkade Beverage

Sample	Taste	Aroma	Colour	Consistency	Overall Acceptability
K1	7.0	6.6	7.2	7.2	7.00
K2	7.0	6..8	7.00	7.2	7.00
K3	7.3	6.8	6.8	7.2	7.03

DISCUSSION:

Nutritional quality of home-prepared fortified Karkade drink It was evident that the raw materials used in preparing the locally prepared Karkade especially Hibiscus Sorrel, are deficient in protein by the result of the proximate composition . Apart from protein, the carbohydrate, lipids, mineral and vitamin content of the beverage had been discussed and estimated. In Sensory quality of home-prepared fortified Karkade drink the sensory attributes (Taste, Aroma, colour, consistency and overall acceptability) of the beverage were discussed and it revealed that it is having good acceptability in market. Microbiological quality of home-prepared karkade Shows the presence of microorganisms observed may be from the raw materials or either right from the source or during handling and even may be present in the containers used.

CONCLUSION

In conclusion, the result of this study revealed that the home prepared traditional Karkade beverage (Z) can be the source of nutrients and it can be served as refreshing drink during the fasting period . beverage could be a source of contribution to daily nutrient intake of an individual and should be made available in all seasons to improve the Nutritional status. The local producers were counseled to produce their beverages under hygienic conditions necessary. Good water should be used with clean containers while they should improve on their packaging system.

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