Development of ready to serve drink from gotukola (*Centella asiatica)*

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Introduction

Gotukola (*Centellaasiatica*) is one of the valuable medicinal herbs and it has several food and beverage applications in many countries of the world. It is used by Sri Lankan people mainly as a leafy vegetable. *C. asiatica* is a good source of antioxidants and famous for its neuroprotective effect (Hashim, 2011). In addition, this herb is also used for treating in numerous kinds of diseases due to its rich phytochemical composition mainly asiaticoside, asiatic acid, madecassoside and madecassic acid (Tiwari et al., 2011). However, there is no any value added product in Sri Lankan market purely produced from Gotukola. Ready to serve drinks (RTS) are becoming popular recently in all over the world. This is an effort to develop leaf based ready to serve drink from Gotukola with acceptable quality standards. Creeping typeGotukola (HeenGotukola) was used for this study due to its nutritional value and to reduce its wastage by introducing a value added product.

Materials and Methods

Current study was carried out at Food Research Unit, Gannoruwa, Peradeniya. Laboratory analysis was conducted at Laboratories of UvaWellassa University and laboratories of Veterinary Research Institute, Gannoruwa. Six preliminary trials were carried out to develop four different recipes by changing the percentage of leaf amount by mass as 5%, 7.5%, 10% and 12.5% with constant amount of other ingredients. First quality leaves were selected with stalk and washed properly. Leaves were dipped in Clorox (Sodium Hypochlorite / NaClO) added water for one minute. Then leaves were washed from pure water and leaf extract was separated after grinding. Leaf extract was mixed with prepared sugar syrup and heated up to 80˚C. Citric acid was added while preparing the sugar syrup. In each recipe quality standards of RTS drink like pH, brix and titratable acidity were tested according to SLS 729: 2010, to ensure whether product is fulfilled the quality requirements of RTS drink. Sensory evaluation was carried out using 5 point hedonic scale to select the best recipe from the developed four recipes. It was conducted for colour, taste, odour, mouth feel and overall acceptability using 25 semi trained panelists. Proximate analysis was carried out according to the method of AOAC for the product selected through sensory evaluation. Total polyphenol content was determined according to the method of ISO 14502 -1. Determination of yeast and mold, *Escherichia coli* and total plate count test were carried out under the microbial analysis of the final product. Shelf life evaluation for the final product was carried out for one month period under refrigerated storage conditions.

Total plate count test and sensory evaluation were conducted weakly as a part of that procedure. In addition to that, pH, brix and titratable acidity values were tested weakly.

Result and Discussion

Recipe with 7.5% of leaf amount by mass was selected as the best recipe from sensory evaluation. Percentage of polyphenol in the final product was 0.0712 mg / ml GAE.Proximate composition of the final product is shown in the Table 01. According to that, zero percentage of ash reveals the product is free from heavy metal contaminations. There is comparatively high amount of crude fiber than fat and crude protein.

Table 010: Proximate composition of the final product

Parameter	Moisture	Ash	Crude protein	Fat	Crude fiber
Composition	97.1%	0%	0.1%	0.1%	0.4%

Brix, pH and percentage of tiratable acidity values of the final product are shown in the Table 02. According to that, both brix and pH values are inaccordance with the requirements for a RTS drink by Sri Lanka Standard Institute.Only percentage of titratable acidity is somewhat deviated from that. But pH value was mainly concerned in case of product safetythan percentage of titratable acidity and it was maintained at optimum level.

Table 02: Results of physicochemical properties of the final product

Test	Mean Value
pH	3.8
Brix	12.5
Titratable acidity (%)	0.5

According to the Table 03, yeast, mold and *Escherichia coli* in the final product are zero in 1 mL of the product. It is complied with the microbiological limits for a RTS drink by Sri Lanka Standard (SLS). Therefore product is safe for consumption.

Table 03: Results of microbial tests

Test	Colony Count
Yeast and mold test	0 CFU / 1 mL
Escherichia coli	0 CFU / 1 mL

Shelf life evaluation of the final product was conducted for one month period by evaluating the change in physicochemical properties and microbiological changes.Results of change in physicochemical properties are shown in Table 04. According to that, pH value has increased gradually during the first three weeks. In the fourth week there is a slight increase and fifth week there is no change in pH value. In order to prevent the microbial growth in the product, pH value should be lower than 4.2. That requirement for a RTS drink has not violated according to the pH values of the product during the one month period.Therefore product is microbiologically safe for consumption. A gradual decrease can be seen in percentage of titratable acidity of the final product. Brix value has not changed for first two weeks. It has increased gradually during last three weeks of the month. But the change in brix value has occurred within the acceptable range (12-16) according to the requirements of Sri Lanka Standard (SLS) for a RTS drink.

Table 04: Change in physicochemical properties of the product under shelf life evaluation

	Physicochemical properties		
Days	pH	Brix	Titratable acidity (%)
0	3.7	12	0.52
7	3.8	12	0.48
14	4	12.3	0.41
21	4.1	13	0.36
28	4.1	13.6	0.34

Results of total plate count test conducted for three weeks under shelf life evaluation are shown in Table 05. According to that,there is a gradual increase in total plate count for three weeks. But that change complied with the requirements of Sri Lanka Standard (SLS) of total plate count (TPC) for RTS drink (Less than 50 in 1 mL of the product).Therefore product is safe for consumption.

Table 05: Change in total plate count of final product for three weeks

Days	Mean plate count (CFU)
7	9×10^3
14	18×10^3
21	28×10^3

Conclusions

Product can be introduced to the consumers as a healthy leaf based beverage purely produced from Gotukola comprised with polyphenols. All the tested physicochemical and microbial parameters are fulfilled the requirements of Sri Lanka Standard (SLS) for RTS drink and therefore safe for consumption. According to the conducted shelf life evaluation,product has a one month shelf life.This is a good solution to reduce the wastage of "HeenGotukola" and to add value for this herb.

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References

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