



FORMULATION, PREPARATION AND PRESERVATION OF LEMON (*CITRUS LIMON L.*) CORDIAL

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Abstract

Lemon cordial was prepared and its storage conditions were studied. The prepared cordial was kept in 250 ml sterilized glass bottles, sealed and stored at ambient temperature (22°- 37°C) for 360 days. The chemical composition, keeping quality and consumers acceptability of the product was analyzed at an interval of 15 days up to 120 days and then at an interval of 30 days upto 360 days. Except vitamin C content, no noticeable change was observed during the storage.

Key words: Lemon, Cordial, Citric acid, Ascorbic acid, Reducing sugar, Non-reducing sugar

Introduction

Lemon, a citrus fruit, which is said to have originated in India, but is now largely grown in Mediterranean area (notably Sicily), in USA (California) and in Africa. It is an evergreen aromatic shrub and the trees mostly with thorny branches, distributed throughout the tropical and temperate regions of the world (Anon 1988). The composition of the juice varies considerably with the variety. It contains largely sugar and acids. The predominant acid is citric, which may amount to 5% or more on the fresh weight basis of the juice (Hawley 1977). The juice is rich in vitamin C and contains smaller amounts of B vitamin (B₁, B₂ and niacin).

In Bangladesh, a huge quantity of lemon squashes is consumed in the dry season and other times. All the squashes available in the market are synthetic products. It is beyond discussion that natural products are far better than synthetic products. In Bangladesh, about 6105 tons of lemon is produced annually (Anon 1999). Considering its economic and medicinal values, availability and acceptability, lemon cordial has been formulated, prepared, preserved and evaluated at regular intervals.

Materials and Methods

Fully mature lemon was purchased from the local market of Rajshahi, Bangladesh. Fresh and sound fruits were selected and washed thoroughly. Lemon juice was squeezed very carefully to avoid any contamination and screened through a fine cloth. The fine suspended pulp was removed by centrifuging the juice. The physical and chemical constituents like the total solids (TS) and total soluble solids (TSS) were determined with a hand refractometer (Egan *et al.* 1985). Sugar and starch were determined by colorimetric method (Jayaraman 1981). Reducing sugar was estimated following DNS method (Miller 1959), Vitamin C was determined titrimetrically using 2,6-dichlorophenolindophenol (Dobois *et al.* 1951), acidity was determined titrimetrically with the visual acid-base method (Ranganna 1986), the pH was determined with a digital pH meter and the moisture content and the dry matters were measured by oven drying method (Karmas 1980).

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The clarified lemon juice (1400 ml) was taken in a pressure cooker; sugar (920 g) was added, boiled for 8-10 minutes and filtered. In the lemon syrup 0.3% ascorbic acid, 0.08% sodium benzoate and 1.6% sodium bicarbonate were added, thoroughly mixed below 80°C. The product thus prepared was bottled in a previously sterilized 250 ml bottles and pasteurized on a water bath at a temperature 78 ±2°C for 10-15 minutes. The bottles were sealed hermetically, cooled rapidly in running tap water and stored at ambient temperature (22°-37°C) in the laboratory. The prepared cordials of lemon were analyzed on the date of preparation and then after 15 days up to 120 days then after 30 days up to 360 days.

Results and Discussion

The proximate composition of fresh lemon juice was determined as moisture (89.7%), TS (10.3%), TSS (8.7%), total sugar (4.2%), pH (2.54), citric acid (0.53%), vitamin-C (35.08 mg/100g), sugar acid ratio (7.97%) and ash (0.39%). The cordial prepared from lemon was analyzed at regular intervals and the results are presented in Table 1. During storage of lemon cordial TSS were increased but the rate was very slow. pH was decreased slowly resulting the increase of acidity. Total sugar was also decreased. The stored products prepared from lemon had pleasant flavour and odour with sweet and agreeable taste up to 300 days of storage. But after 300 days the colour started to fade and deteriorated in taste, flavour and odour developing a syrupy character. It was increased day by day and was prominent after 360 days of storage.

Table 1. The effect of storage at room temperature on the composition of lemon cordial.

Day	Citric acid (%)	Ascorbic acid (mg/100g)	Moisture (%)	Total solids (%)	Total Soluble Solids (%)	Total Sugar (%)	Non-reducing sugar (%)	Reducing sugar (%)
00	0.301	52.63	56.80	43.20	35.30	32.84	24.60	8.18
15	0.303	52.11	56.80	43.20	35.30	32.83	26.60	8.23
30	0.305	51.33	56.80	43.20	35.43	32.72	24.40	8.29
45	0.307	49.98	56.77	43.23	35.43	32.70	24.32	8.37
60	0.310	49.24	56.75	43.25	35.50	32.61	24.20	8.45
75	0.313	48.34	56.75	43.25	35.58	32.60	24.10	8.55
90	0.316	46.80	56.74	43.26	35.60	32.53	23.90	8.64
105	0.319	45.20	56.71	43.29	35.64	32.43	23.70	8.70
120	0.321	44.07	56.70	43.30	35.69	32.41	23.60	8.75
150	0.324	42.93	56.69	43.30	35.79	32.32	23.50	8.77
180	0.327	40.83	56.68	43.32	35.80	32.24	23.30	8.85
210	0.331	39.12	56.65	43.35	35.88	32.10	23.20	8.89
240	0.335	38.32	56.64	43.36	35.89	31.94	23.07	8.92
270	0.340	35.30	56.61	43.39	35.95	31.81	22.96	8.94
300	0.346	33.50	56.60	43.40	36.00	31.69	22.75	8.97
330	0.352	31.23	56.60	43.40	36.04	31.50	22.48	8.99
360	0.361	30.95	56.59	43.41	36.05	31.30	22.30	9.00

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