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Determination of the saccharin content in some ice creams available in market

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Abstract
The saccharin is used in a wide variety of food products including baked goods, beverages, soft drinks, sugar preserves and confectionery, alcoholic drinks, vinegar, pickles and sauces other food products. It is also used in cosmetic industries and in manufacturing of toothpaste. Ice-Cream: is a smooth, sweet, cold food prepared from a frozen mixture of milk products and flavourings, containing a minimum of 10 percent milk fat and eaten as a snack or desert. In the present study the saccharin content in some ice creams available in Market was determined quantitatively using ultra violet spectrophotometric method. Total 10branded and unbrandede ice cream sample were analyzed. The concentration of saccharin in these samples ranged between 22.0mg/Kg – 72.0mg/Kg. From the findings of this work, continuous consumption of these ice creams may result in adverse health conditions.

Keywords: saccharin, ice cream, sweeteners, UV spectrophotometer

Introduction
Ice cream can be defined as a smooth, sweet, cold dessert food prepared from a frozen mixture of milk products and flavorings, containing a minimum of 10% milk fat (Karaman *et al*., 2014) [2]. The mixture is homogenized after pasteurization and aged to improve the physical properties before the freezing process. Ice cream is a representative frozen dairy product enjoyed by people of all ages due to its cooling effect in the mouth. Nowadays, manufacturers continue to develop formulations of ice cream mixtures according to consumer demands, resulting in the creation of various brand names (Sun-Waterhouse *et al*., 2013) [7].
Sodium Saccharin (benzoic sulfimide) is an artificial sweetener with effectively no food energy that is about 300–400 times as sweet as sucrose but has a bitter or metallic aftertaste, especially at high concentrations. It is used to sweeten products such as drinks, candies, cookies, and medicines. Saccharin derives its name from the word "saccharine", meaning "sugary". The word saccharine is used figuratively, often in a derogative sense, to describe something "unpleasantly over-polite" or "overly sweet" (Sardesai and Waldshan, 1991) [6].
The artificial sweetner saccharin is a weak bladder carcinogen and causes risk to human and animal. When saccharin is given in diet it causes cancer of the urinary tract, when it is inserted in bladder as an implant saccharin, it causes bladder cancer). Recent studies suggested that high doses of saccharin and sodium saccharin produces cytotoxicity of the urothelium and consequently regeneration hyperplasia. It enhanced cell proliferation and promote tumor (Murasaki and Cohen, 1981) [4]. Due to its possible carcinogenic effects its use in food products is prohibited. So, due to medical and legal aspects the determination of saccharin and other non-fattening artificial sweetners in dietary products has an economical and social relevance (4). Due to its wide use in food products such as canned fruit juices, vegetables, cookies, other backery products, flavouring extracts, gelatin, pudding, frozen desserts, imitation jams, jellies, marmalades and salad dressing etc. and beverages, literature contains numerous methods for the determination ot saccharin in various food products, beverages and pharmaceuticals (Vianna-soares and Seferin-Martins, 2001) [8].
In the past, saccharin was used in a variety of applications. It was first used as an antiseptic and preservative to retard fermentation in food. Later on, saccharin was used in the plastic industry as an antistatic agent and as a brightener in nickel plated automobile bumpers (Ramappa and Naik, 1983) [5]. This study was aimed at determining the level of saccharin content in some commonly consumed ice creams. The assay covered both the conventional and locally manufactured ice creams.

Materials Method
Collection of samples
The total 20 Ice cream samples were purchased local market of Mumbai City. All the samples were analysed for concentration of saccharin by UV Spectrophotometer (UV–2500) at 425nm (Matthew *et al.*, 2006) [3].

Preparation of sample
25grams of each sample were weighed and transferred to 100ml volumetric flask with small amount of water. Enough boiling water was added to make up 75ml; the mixture was allowed to stand for one hour shaking occasionally. Then 3ml ethanoic acid was added and mixed thoroughly; followed by excess (5ml) of 20% neutral lead (II) acetate solution. Cold water was added to mark, stirred to complete homogenization and the mixture was allowed to stand for 20mins and filtered using Whatman 25mm filter paper. 25ml of filtrate was transferred into a separator, followed by 3ml HCl. Saccharin

in the filtrate was extracted using 1:1 (v/v) of Ethoxyethane and Petroleum Ether. The extract was concentrated and the absorbance measured in the UV Spectrophotometer at 425nm using Nessler's reagent for colour development. Saccharin forms blue colour complex with Nessler's reagent in a slightly acidic medium of Lead (II) Acetate - Ethanoic Acid buffer. Prior to sample analysis, a calibration curve was developed from absorbance readings of serial dilutions of a standard solution of saccharin (AOAC, 1990) [1].

Table 1: The absorbance and Concentration of Saccharin in different Ice Cream samples

Samples No.	1 Reading	2nd Reading	3rd Reading	Con.(Mg/Kg)
B1	0.025	0.024	0.025	49.00
B2	0.032	0.032	0.031	58.00
B3	0.012	0.013	0.012	22.00
B4	0.022	0.023	0.023	44.00
B5	0.040	0.043	0.043	72.00
UB1	0.014	0.014	0.013	29.00
UB2	0.016	0.016	0.015	38.00
UB3	0.030	0.030	0.031	56.00
UB4	0.033	0.034	0.034	66.00
UB5	0.014	0.015	0.016	32.00

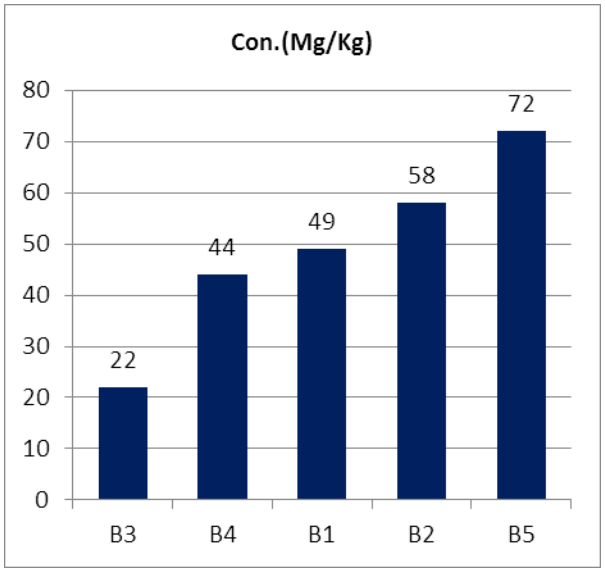

Fig 1: Concentration of Saccharin in Branded Ice Cream samples

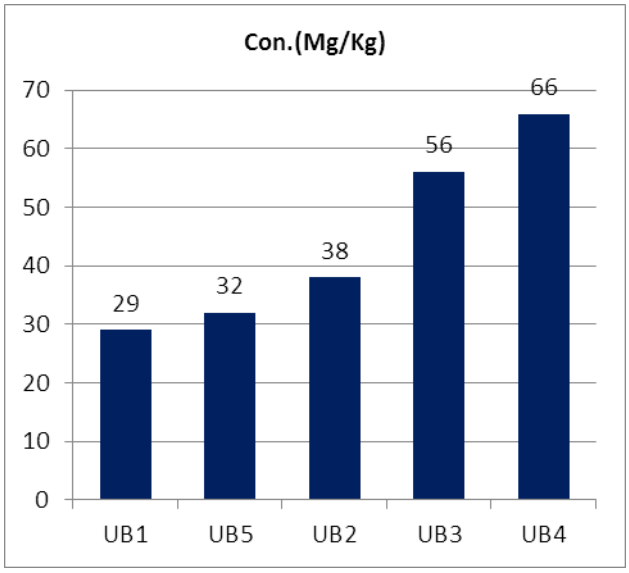

Fig 1: Concentration of Saccharin in Unbranded Ice Cream samples

Fig 1: Concentration of Saccharin in different Ice Cream samples

The concentrations of saccharin in the various ice cream samples were determined. B-1, B-2 and B-3 represent three branded ice creams respectively while UB-1, UB-2 and UB-3 are three different unbranded ice creams. The amounts of saccharin contents determined from the ten samples of ice cream indicate different levels of saccharin. The saccharin content in these ice creams ranged between 22.0mg/kg – 72.0mg/kg. Interestingly, a branded ice cream, B1 recorded the lowest concentration of saccharin (22.0mg/Kg).

When the saccharin concentrations in the studied ice creams were compared to the World Health Organizatio permissible dose of 5mg/kg/day, they all exceeded it. The implication of this finding is that, both local ice creams and conventional ice creams are prepared without considering safe level of saccharin consumption. Children are most likely the largest consumers of ice cream especially the unbranded and affordable ones. This may increase the susceptibility of life hazards, as reported in a study of bladder cancer patients, where a possible link between the disease and use of saccharin has been established (WHO, 1993) [9].

Conclusion

The concentration of saccharin in all the ice cream samples is alarmingly high including the branded ones. While the association between saccharin consumption and bladder cancer risk is still controversial, many health groups still believe that it's used should be limited in infants, children and pregnant women. It is therefore recommended that, if saccharin must be used as an artificial sweetening agent in foods, recommended dietary standards should be complied with different regulatory bodies in the country should work in synergy to enforce and ensure compliance with existing national and international standards.

References

1. AOAC. Official methods of analysis. JAOAC. 1990; 56:162.
2. Karaman S, Toker ÖS, Yüksel F, Çam M, Kayacier A,

Dogan M. Physicochemical, bioactive, and sensory properties of persimmon-based ice cream: Technique for order preference by similarity to ideal solution to determine optimum concentration. J Dairy Sci. 2014; 97:97-110
3. Matthew SB, Pillai AK, Gupta VK. Spectrophotometric method for the determination of saccharin in food and pharmaceutical products. Indian Journal of Pharmaceutical Science. 2006; 68:821.
4. Murasaki G, Cohen SM. Effect of dose of sodium saccharin on the induction of rat urinary bladder proliferation. Cancer Res. 1981; 41(3):942-4.
5. Ramappa PG, Nayak NA. Rapid Spectrophotometric determination of saccharin in soft drinks and pharmaceuticals using Azure B as reagent, Analyst. 1983; 108:966-970.
6. Sardesai VM, Waldshan TH. Natural and synthetic Intense sweeteners. J Nutr. Biochem. 1991; 2:236-44.
7. Sun-Waterhouse D, Edmonds L, Wadhwa SS, Wibisono R. Producing ice cream using a substantial amount of juice from kiwifruit with green, gold or red flesh. Food Res. Int. 2013; 50:647-656.
8. Vianna-soares CD, Seferin-Martins JL. Saccharin analysis in Pharmaceutical and cosmetic preparations by derivative ultra violet spectrophotometry. Revista Brasileira de ciencia farmaceuticas DOI: 10.1590,2002.
9. World Health Organization Evaluation of Certain Food Additives and Contaminants (WHO Technical Report), Geneva. 1993; 837:17-19.