AJHS
Asian Journal of Home Science
Volume 9 | Issue 2 | December, 2014 | 481-483

DOI: 10.15740/HAS/AJHS/9.2/481-483
e ISSN-0976-8351 ■ Visit us: *www.researchjournal.co.in*

Research Paper

Effect of household storage practices on iodine content of iodized salt

■ RASHMI SINGH AND R.S. RAGHUVANSHI

Received: 12.07.2014; **Revised:** 12.10.2014; **Accepted:** 25.10.2014

See end of the paper for authors' affiliations

RASHMI SINGH
Department of Food Science and Nutrition, College of Home Science, C. S.A. University of Agriculture and Technology, KANPUR (U.P.) INDIA
Email: rashmi_csau@yahoo.co.in

■ **ABSTRACT :** Iodine deficiency is amongst the most widely prevalent nutritional problems of Indian peninsula. India is one of the major iodine deficient countries in the world. Iodine deficiency is the most common cause of preventable mental retardation and brain damage. It causes goitre and decreases the production of hormones vital to growth and development. In India it is estimated that about 200 million people are at risk for iodine deficiency disorders. Iodized salt is undoubtedly the strategy for the country still iodine is not fully utilized by the people because of improper handling, usage and storage practices and the data regarding its losses in iodized salt during storage at household level are not available. Keeping the above facts in consideration, the present study was planned with the objective to determine the effect of storage place, duration, type of storage vessel on the iodine content of the salt.

■ **KEY WORDS:** Iodine, Iodized salt, Iodine deficiency disorder (IDD), Iodine loss, Storage practices

■ **HOW TO CITE THIS PAPER :** Singh, Rashmi and Raghuvanshi, R.S. (2014). Effect of household storage practices on iodine content of iodized salt. *Asian J. Home Sci.,* **9** (2) : 481-483.

Iodine deficiency is amongst the most widely prevalent nutritional problems of Indian peninsula and is the single most important preventable cause of brain damage. Iodine deficiency constitutes one of the most important nutritional groups of diseases all over the world. India has been a pioneer in both recognizing iodine deficiency as a national public health concern and providing iodized salt to its population.

Method for preventing iodine deficiency has been known since ancient times. Use of iodized salt is the best way for prevention of iodine deficiency disorders (IDD). It is the ideal way to deliver iodine to population because it is universally consumed in a consistent amount throughout the year and addition of iodine does not affect composition and taste of salt (De Maeyer *et al.*, 1979). One of the goals set by the nutrition policy was reduction of IDD below the endemic level by the year 2000 (Rangnathan, 1990).

Iodine is a volatile substance, and stability of iodine in iodized salt is affected by moisture content, impurities in the salt, humidity of the atmosphere, light, heat and acidity or alkalinity of the mixture. The stability of iodine in the iodated salt is very important since it is necessary that the salt at the point of consumption has the recommended level of iodine to have desired biological effect. Under Indian conditions, iodine loss in fortified salt has been observed to 25-30 per cent in the first three months and 40-70 per cent by one year. Therefore, poor iodine stability is one of the biggest handicaps in IDD control programmes (Patowary *et al.*, 1995).

Though iodized salt is undoubtedly the strategy for the country still iodine is not fully utilized by the people because of improper handling, usage and storage practices and the data regarding its losses in iodized salt during storage at household level are not available. Keeping the above facts in consideration, the present study was planned with the objective to determine the effect of storage place, duration, type of storage vessel on the iodine content of the salt.

■ RESEARCH METHODS

A preliminary survey using interview schedule was conducted to know the type of salt being consumed and prevailing methods for storage of salt at household level. Based

on the survey results, three brands of salt which were commonly used by the population were procured from the local market. The salt brands according to the preference were named as A, B and C. Twelve packets of each brand (A, B and C) were procured thus a total of thirty six packets of salt were purchased from the local market. Thirty six households were selected and salt was stored under different conditions *viz.*, three different places from cooking place at 1-2ft, 5-6ft and 10-12ft, in four different commonly practiced storage vessels *viz.*, masaldan, polybag, glass jar and plastic jar for a period of sixty days. Housewives were asked to open vessels and use it once a day so that it can be stored for a period of sixty days. Iodine content of salt was estimated at an interval of 15 days up to 60 days in duplicate by iodometric titration method (Tyabji, 1989). The data were analysed by split plot method considering factors *viz.*, duration of storage, distance of storage place from cooking area and type of storage vessel, separately. Average iodine loss due to each factor was calculated in terms of percentage as follows :

The effect of storage duration on the iodine content of salt was computed using the formula :

$$A = \frac{(B - C)}{B} \times 100$$

A = Average per cent iodine during a particular duration of storage.

B = Average per cent iodine content after opening the packet of the common salt.

C = Average iodine content after a particular duration of storage (15, 30, 45 and 60 days) of salt after opening the packet.

Effect of distance of storage place from cooking area on the iodine content of salt was estimated as :

$$X = \frac{(Y - Z)}{Y} \times 100$$

X = Average per cent iodine loss at a particular distance of storage place from cooking area *viz.*, at 1-2 ft, 5-6 ft and 10-12 ft.

Y = Average iodine content of salt after opening the packet and stored at a particular distance from cooking place.

Z = Average iodine content of salt after 60 days of opening the salt packet and stored at a particular distance from cooking place.

Effect of type of storage vessel on the iodine content of salt was calculated as :

$$U = \frac{(V - W)}{V} \times 100$$

where,

U = Average per cent iodine loss from a particular storage vessels *viz.*, glass jar, plastic jar, polybay, masaldan.

V = Average iodine content of salt after opening the packet and stored in a particular type of vessel.

W = Average iodine content of salt after 60 days of opening the packet and stored in a particular type of vessel.

■ RESEARCH FINDINGS AND DISCUSSION

The results of household survey revealed that 96 per cent population were aware about iodized salt and were in practice of using iodized salt whereas only 6 per cent were using white crystal salt. Survey regarding storage practices and type of salt being used by the families was conducted and the analysis of the data revealed that 99 per cent of respondents were storing salt in kitchen itself and 94 per cent respondents were using powdered salt of different brands (Table 1). Local brands of salt were also being used by the respondents. Maximum respondents (47%) were using glass jar to store the salt followed by masaldan (23%).

The iodine content of salt showed a progressive decrease in the content throughout the storage period in all the storage methods. The fortnightly estimation of the salts revealed that iodine loss increased as the duration of storage increased. After 60 days of storage about 78.5 per cent of iodine was retained in Brand A and B. Maximum loss (86%) of

Table 1 : Salt usage practice at household level

Salt usage practice at household level		Per cent (%)
Type of salt	Powdered salt	94.0
	White crystal salt	06.0
Storage place for salt	Kitchen	99.0
	Place other than kitchen	1.0
Type of vessel for storage of salt	Glass jar	47.0
	Plastic jar	27.0
	Masaldan	23.0
	Polythene packet	3.0

Table 2 : Effect of storage duration on iodine content of three different brands of salts

Duration	0 day	15 days	30 days	45 days	60 days
Brand-A	49.1	48.0 (2.24%)	44.7 (8.96%)	43.1 (12.21%)	38.8 (20.97%)
Brand-B	41.6	38.4 (7.69%)	35.7 (14.18%)	34.6 (16.82%)	32.5 (21.87%)
Brand-C	52.9	43.4 (17.9%)	30.7(41.96%)	18.0 (65.97%)	7.4 (86.0%)

Table 3 : Effect of three different distances from cooking place on iodine content of three different brands of salts

Brands of common salt	Average per cent iodine loss		
	At 1-2 ft.	At 5-6 ft.	At 10-12 ft.
Brand A	19.40%	15.94%	9.36%
Brand B	24.36%	20.33%	20.00%
Brand C	100%	89.62%	63.94%

Table 4 : Effect of different storage vessels on iodine content of three different brands of salts

Brands of common salt	Average per cent iodine loss from			
	Glass jar	Plastic jar	Polybag	Masaldan
Brand A	10.88%	9.76%	17.6%	22.87%
Brand B	13.95%	19.28%	22.09%	30.60%
Brand C	72.46%	78.23%	90.52%	92.56%

iodine was found in brand C of salt after 60 days of storage duration (Table 2). Under proper iodization and packaging condition, iodized salt has been found to retain at least 75 per cent of the iodine content after nine months of storage. The difference in iodine loss of different brands may be due to variation in the use of suitable stabilizer to improve the stability of iodine in common salt.

It was also found that storage distance from cooking area affected the iodine content of the salt. Average per cent iodine loss was found to be higher in the samples kept at 1-2 ft than at 5-6 ft and 10-12 ft distance from cooking place and decreased as the distance of storage from cooking place increased in all the three brands of common salt. Maximum iodine loss (100%) was found in brand C salt kept at distance of 1-2 ft from cooking area in 60 days of storage duration (Table 3).

The effect of nature of storage vessel on the iodine content of three brands of common salt estimated in terms of average per cent iodine loss is given in Table 4. The result of the Table 4 indicated that the average per cent iodine loss was lowest from glass jar followed by plastic jar, polybag and masaldan. Wang *et al.* (1999) also reported that the loss of iodine was greater when salt was stored in plastic bag than in glass bottle. Gebremariam *et al.* (2013) reported that availability of adequately iodized salt at household level was very low and recommended that households should be sensitized about importance of iodized salt and its proper handling at the household level.

Conclusion :

The loss of iodine content increased as the duration of storage increased in all the three brands of iodized salt. The difference in iodine loss of different brands may be due to variation in the use of suitable stabilizers to improve the stability of iodine in common salt. Average per cent iodine loss was highest in the samples kept at 1-2 ft from cooking place and decreased as the distance of storage place from cooking place increased in all the three brands of common salt. Overall maximum iodine loss was found in brand C which was a local brand. There is need to ensure the effectiveness of local salt iodization programmes, determination of iodine losses from local iodized salt under local conditions of production, climate, packaging and storage. Serious and continued efforts are required to make the programme sustainable as IDD elimination depends on continuous and regular consumption of iodized salt.

Authors' affiliations:
R.S. RAGHUVANSHI, Department of Foods and Nutrition, College of Home Science, G.B. Pant University of Agriculture and Technology, Pantnagar, UDHAM SINGH NAGAR (UTTARAKHAND) INDIA

■ REFERENCES

De Maeyer, E.M., Lowenstein, F.W. and Thilly, C.H. (1979). The control of endemic goiter. Geneva, WHO. 86 pp.

Gebremariam, H.B., Yesuf, M.E. and Koye, D.N. (2013). Availability of adequately iodized salt at household level and associated factor in Gondar town, Northwest Ethiopia. *ISRN Public Health*, Article ID 160582 p. 6.

Jayashree, S. and Naik, R.K. (2000). Iodine losses in iodized salt following different storage methods. *Indian J. Pediatrics*, **67**(8) : 559-561.

Patowary, A.C., Kumar, S., Patowary, S. and Dhar, P. (1995). Iodine deficiency disorder and iodized salt in Assam : A few observation. *Indian J. Public Health*, **39**(4) : 135-140.

Rangnathan, S. (1990). Use of stabilizers to improve the shelf-life of iodized salt. In : Proceedings of the workshop on iodised salt, National Institute of Nutrition, Hyderabad.

Tyabji, R. (1989). The use of iodinated salt in the prevention of IDD. A handbook of monitoring and quality control. UNICEF-ROSOA, New Delhi, 107-109.

Wang, G.Y., Zhou, R.H., Wang, Z., Shi, L. and Sun, M. (1999). Effects of storage and cooking on the iodine content in iodized salt and study on monitoring iodine content in iodized salt. *Biomed. Environ. Sci.*, **12**(1) : 1-9.