ABSTRACT

The objective of the study was to assess the optimal level of iodine at production level in Pakistan, by quantifying the losses of iodine in transit and storage from point of production to point of purchase.

A quantitative research study was conducted to analyze 400 samples of different types of iodized salt (30±2 mg of iodine per kg). Four factors were considered: salt type (washed and dried lake salt, refined lake salt, good quality rock salt (Punjab), poor quality rock salt (KPK), refined rock salt, sea salt, analytical grade salt); climatic zone for storage (Marine Tropical Coastland, Sub Tropical Continental Lowlands, Sub-Tropical Continental Highlands and Sub Tropical Continental Plateau); packaging type (High Density Poly-ethylene (HDPE) bags for 800g salt, Low Density Poly-ethylene (LDPE) bags for 800g salt, Laminated PE bags for 800g salt, and 40 kg Poly-propylene woven bags for bulk storage); and storage duration (measured at packaging point and 3, 6, 9 and 12 months post-packaging).

Retention of iodine over the 12 months was more than 90% for all samples. Among the packaging types, the PP 40 kg bulk packing showed the lowest iodine losses. None of the packaging types were rejected due to iodine losses, while only one type of rock salt from Khyber Pakhtunkhwa had to be rejected due to iodine loss, as it contained some substances leading to rapid losses as the sublimed iodine was deposited onto the inner walls of the impermeable packing.

The study concludes there is limited effect of climate, packaging and duration on loss of iodine from salt; it only loses <10% of total iodine. Therefore, iodization with less than 30 ppm of iodine at production level would be sufficient to provide the required level of 15 ppm at point of purchase.

METHODS

• The study aimed to investigate the influence of four factors on the stability of iodine in different types of iodized salt. A quantitative research study was conducted to analyze 400 samples of different types of iodized salt (30±2 mg of iodine per kg) comparing salt type, climatic zone, packaging type and storage duration.

• Six types of salt were sampled: washed and dried lake salt, refined lake salt, good quality rock salt (Punjab), poor quality rock salt (KPK), refined rock salt, sea salt, analytical grade salt (NaCl).

• Samples were stored in four climatic zones: Marine Tropical Coastland, Sub Tropical Continental Lowlands, Sub-Tropical Continental Highlands and Sub Tropical Continental Plateau.

• Four types of packaging were analyzed: High Density Poly-Ethylene (HDPE) bags for 800g salt, Low Density Poly-Ethylene (LDPE) bags for 800g salt, Laminated PE bags for 800g salt, and 40 kg Poly-Propylene woven bags for bulk storage.

• The total duration of storage was 12 months with iodine analyses conducted at baseline, 3 months, 6 months, 9 months and 12 months post-packaging.

BACKGROUND

In Pakistan, the law mandates that salt for human consumption must have iodine levels of more than 20 ppm at the production level and 15 ppm (or more) at the consumer level. This gap in iodine levels between production and consumption is to allow for iodine loss during transit and/or storage, and assumes that fairly large losses would occur during transit and/or storage.

The study was conducted to assess the optimal level of iodine at production level in Pakistan, by quantifying the losses of iodine in transit and storage from production to the point of consumer purchase and opening the package. We assume storage would not exceed one year prior to opening and would be consumed quickly following opening. This study did not account for losses that might occur when packages are left open to the elements for extended periods of time.

OBJECTIVES

The objective of the study was to assess the optimal level of iodine at production level in Pakistan, by quantifying the losses of iodine in transit and/or storage from production to purchase level.

The specific objectives of the study were to measure the stability/loss of iodine in different types of salt, packaging materials and storage intervals under different climatic conditions of Pakistan.

RESULTS

• Retention of iodine over the whole storage of 12 months remained more than 90%. Among the packaging types, the PP 40 kg bulk packing showed the lowest iodine losses. However, none of the packaging types could be rejected for the reason of iodine losses, except one type of rock salt from Khyber Pakhtunkhwa which had some substances leading to rapid losses as the sublimed iodine was deposited onto the inner walls of the impermeable packing.

CONCLUSIONS

• The study concludes that there is limited effect of climate, packaging and duration on loss of iodine from salt while the salt remains in the sealed packaging; losses were <10% of total iodine. Therefore, iodization with less than 30 ppm of iodine at production level would be sufficient to provide the required level of 15 ppm at point of purchase.

• Further study is needed to confirm the relative losses of iodine once packages are opened and how long open packages of salt are stored prior to final consumption.

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