EFFECTS OF IODIZED SALT AND OTHER IODINE COMPOUNDS ON THE QUALITY OF PROCESSED VEGETABLES

DISSERTATION

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By

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SUMMARY AND CONCLUSION

Preliminary studies carried out at Michigan State College (3) in 1937, and later studies at The Ohio State University (64, 65) in 1955 enabled the authors, respectively, to recommend the use of iodized salt instead of the ordinary non-iodized one in the processing of some fruits and vegetables, without danger of adversely affecting some quality characteristics of the products. Only iodized salt had been tested by the first group (3). The second group studied the effect of both iodized and iodated salts (64, 65). In the present study an iodide (KI), a stabilizer to affect its stabilization (sodium thiosulfate), an iodine-iodide mixture (Battelle, a preparation containing free iodine), an iodophore (a sanitizer containing both free and organically bound iodine), namely, "Iosan," were investigated. The following findings and conclusions, which might further establish the possible use of those compounds as the source of iodine in the investigated products have been found.

1. The use of (Morton) iodized salt instead of the use of ordinary non-iodized salt did not unfavorably affect the flavor, color, texture, or nutritive value (ascorbic acid content) of the three products investigated; namely, whole kernel sweet corn, tomato juice and sauerkraut.

2. Potassium iodide, at concentrations up to 200 p.p.m., and the use of sodium thiosulfate (pure and commercial) at two concentrations of 50 and 100 p.p.m., did not adversely affect the flavor of the three vegetables investigated.

3. The iodine-iodide mixture (Battelle) at considerably high concentrations (100 p.p.m.) did not affect the flavor of canned sauerkraut, but the application of still higher concentrations (200 p.p.m.) of the same mixture did cause a significant deteriorative effect on the flavor of canned tomato juice.

4. The application of "Iosan" at concentrations up to 200 p.p.m. in tomato juice and up to 100 p.p.m. in sauerkraut did not adversely affect the flavor of either tomato juice or canned sauerkraut.

5. Potassium iodide, iodine-iodide mixture and "Iosan" at varying concentrations (0.5 to 200 p.p.m.) did not adversely affect the color of all the three vegetable products tested.

6. The use of the above mentioned chemicals or mixtures (iodide, thiosulfate, iodine-iodide mixture or Iosan) did not particularly enhance any deterioration in the color of the packed products on prolonged periods of storage.

7. The addition of potassium iodide and sodium thiosulfate (in two concentrations of two types) for its stabilization, the iodine-iodide mixture, the iodophore "Iosan" or iodized salt as compared with the use of ordinary non-iodized salt did not significantly affect either the course of fermentation or the final total lactic acid content in the finished fermented sauerkraut.

8. No free iodine (I_2) could be detected in any of the products treated at the varying concentrations of the different iodine compounds indicating that such form of iodine has combined in one way or the other with other organic compounds in the packed

products. This fact suggests the possible dispensability of iodine-stabilizers, especially when they prove to be of some harmful effect. The effectiveness of such binding compounds needs further investigation depending on finding an easy and sensitive method for the determination of organically bound iodine.

9. The application of the different treatments investigated did not affect the texture of sauerkraut significantly either during processing or during storage.

10. Both pure and commercial sodium thiosulfate did affect significantly the discoloration or corrosion of the inner surfaces of the walls of the cans during different periods of storage.

11. The immediate cause of such discolorative or corrosive effect on the cans was the thiosulfate itself, not the impurities usually accompanying the commercial salt used in the industry for stabilizing potassium iodide in iodized salt.

12. The three tested products (whole kernel sweet corn, tomato juice and sauerkraut) were found to contain reducing sugars (inherent-stabilizer) to affect the stabilization of added iodine compounds (more than the required 0.05 per cent concentration). Thus the use of any other harmful stabilizer (thiosulfate) can be avoided.

13. If the medical safety of such iodine preparations as the iodine-iodide mixture and "Iosan" can be established, their use for fortifying different processed fruits and vegetables with iodine could be recommended. This could be very easily affected by automatically dispensing either one of those two compounds, potassium iodide or even iodized salt, directly in the cans on the processing

line. This could very readily be done especially after the introduction of liquid salt dispensers in the industry. In such a case there would be no need for the addition of any harmful stabilizers as to stabilize the iodide in the processed product, a necessary measure in the stabilization of the iodide in the production and packaging of iodized salt.

14. Iodized salt when applied to the products did not affect their ascorbic acid content as compared with ordinary non-iodized salt.

15. Different iodine compounds (potassium iodide, iodine-iodide mixture and "Iosan") added at varying concentrations did not significantly affect the ascorbic acid content of the products investigated. But when sodium thiosulfate was added to stabilize the iodide, and discoloration or corrosion was induced by its presence, then, a loss of ascorbic acid in the canned products took place. This was due to the catalytic action induced by the liberation of iron ions in the products.