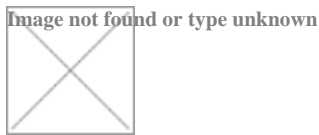


Iodine or Iodide: What's Really in Our Supplements?



April 17, 2017

What is iodine and why do we need it?

Iodine is a vital micronutrient required at all stages of life. Iodine is located mostly in the thyroid gland (70-80%), but is also stored elsewhere, such as skin, muscle and fat.¹ Iodine is essential for the synthesis of thyroid hormones triiodothyronine (T3) and thyroxine (T4), which regulate the metabolic pattern of all cells that have DNA (ie: mature red blood cells do not have DNA) and play a vital role in the process of early growth and development of most organs, especially the brain.

Because iodine is so essential to life, and deficiency seems to be widespread, supplementation is commonly recommended by physicians. Two forms of iodine are offered in iodine products, however, questions remain about label claims stating the presence of iodine (I₂), which may not be present or available after digestion. It is the purpose of this article to review a recent lab test on a product claiming to contain both iodine and iodide in its formula, and to determine the actual amounts of each ingredient.

Reviewing the Forms of Iodine: Iodine (I₂) and Iodide (I⁻)

There are two forms of iodine, elemental diatomic iodine (I₂) and ionic monoatomic iodide (I⁻). Several iodine supplement brands list both forms of iodine on their label.

I₂, elemental iodine, consists of two iodine atoms covalently bound together. In this form, iodine should never be ingested or applied directly to skin or tissue as it is highly corrosive and will cause severe damage to tissue on contact. This diatomic form is made commercially by oxidizing brine that contains iodide ions in order to precipitate iodine (I₂) crystals.²

I⁻, iodide, is essentially the only form found in nature. Iodide is the ionic state of iodine, occurring when iodine forms a salt with another element, such as potassium. In this form, iodide can be ingested or applied topically (such as with povidone iodine, an iodide). Dietary iodine, such as that found in seaweed, is present in the iodide form, as is the iodine in iodized salt (supplied either as potassium iodide, potassium iodate, sodium iodide, or sodium iodate). Iodine purchased from the local drug store is often a solution of iodine made from dissolving iodine crystals (I₂) and potassium iodide in water.

Popular Iodine Brands and the Forms Listed on their Label

Some brands claim on their label to contain a mixture of I₂ and I⁻, stating they have significant amounts of I₂ in the tablets. There are also supplements on the market that contain only iodide, in the form of potassium iodide (KI). It is the opinion of some physicians that I₂ iodine, in addition to iodide, provides superior medicinal

effects, however this has not been validated by significant clinical research.

Here are examples of various brands of iodine on the market:

Brand A Iodine (liquid)

Also known as aqueous iodine and strong iodine solution, Brand A is a medication and disinfectant which was first made in 1829.³ Brand A iodine comes in various concentrations. The label claim for Brand A iodine 15% consists of 5% (wt/v) iodine (I₂) and 10% (wt/v) [potassium iodide](#) (KI) mixed in [distilled water](#) and has a total iodine content of 126.5 mg/mL.

Brand B

Brand B is a precisely quantified tablet form prepared from Brand A solution, with its label stating it contains 5 mg iodine (I₂) and 7.5 mg iodide as the potassium salt. The iodine/iodide preparation is absorbed into a colloidal silica excipient and formed into tablets and the tablets are coated with a thin film of pharmaceutical glaze.⁴

Brand C

Brand C is a second compounded iodine/potassium iodide tablet created using the original formulation of Brand A. The rationale for the formulation of Brand C is that the administration of iodine/iodide in liquid solution is not very accurate, may stain clothing, has an unpleasant taste, and may cause gastric irritation. “Brand C 12.5” is said to be a precisely quantified tablet form offering 5 mg iodine and 7.5 mg potassium iodide.

Iodine Px

Iodine Px capsules are formulated by Restorative Formulations. The label claims include 5 mg iodine, 7.5 mg iodide as potassium iodide, and supportive nutrients including vitamin C, riboflavin, magnesium, zinc, selenium, copper and inositol.

Experimental Test Results on Brand C

The label claim on Brand C states that it contains 5 mg iodine and 7.5 mg potassium iodide. Restorative Formulations, Inc. hired a third party lab to test Brand C to determine how much iodine is in the iodide (I⁻) form and how much actually remains in the iodine (I₂) form after the tablet is dissolved in water.

First, Brand C was tested using X-ray spectrometry to find the total mass of iodine in the dry tablet — including both iodine (I₂) and iodide (I⁻) forms. Second, ion chromatography was employed on the solution of the dissolved tablet to determine the quantity of iodide (I⁻) in the solution. Ion chromatography isolates ions, like (I⁻), and quantifies those ions by measuring the electrical conductivity of the solution which is proportional to the amount of ions present. In theory, 10 mg of iodine (I₂), if all converted to iodide (I⁻), would yield 10 mg of iodide (I⁻). There would be twice the number of moles of iodide as compared to iodine, but the mass would be exactly the same.

This independent lab test results determined that *all of the iodine in Brand C was found to be present in the iodide (I⁻) form (13.5-14mg) only, after being dissolved in solution.**

Another important point to be made is that iodide (I⁻) is the form found in nature and the form the body uses.

Iodine is an oxidant and must be reduced to iodide in order to be organified to thyroglobulin, the thyroid hormone precursor. It is believed that any traces of iodine that may occur in solution would need to be reduced to iodide in order to be utilized. This puts an oxidative stress on the body. If all iodine is converted to iodide, then it is unclear if iodine truly offers exceptional benefits as compared to iodide.

Conclusion

Based on the results of the independent lab tests, it appears that 100% of the iodine in Brand C dissociates in solution to iodide. It is unclear if iodine was present in the original tablet form. The scientific support for this lab finding is that iodide helps iodine dissolve into solution by first forming triiodide, which appears to be very unstable in water and entirely dissociates into iodide.

Restorative Formulations has determined, based on the results of third party lab tests, that the iodine in Brand C (similar to Brand B tablets) is very close to 100% in the form of iodide (I⁻), once dissolved in solution. Tests on Iodine Px had similar results. Therefore, the label claim on Iodine Px, by Restorative Formulations, has been updated to reflect the findings. The label previously stated it contained both iodine and iodide, but now is listed as 12.5 mg (100%) iodide.

References

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