

# In case you're interested in Iodine...

## A kitchen experiment or 'household chemistry' in Bolivia

### Introduction

September 2013, Caroline Hilari, School Health and Nutrition (SHN) Senior Specialist for Save the Children US, conducted a kitchen experiment in Bolivia to test the levels of iodine in salt. The following is her direct account of the experiment, conclusions and lessons learned.

It all started with our SHN officer in Haiti, Gerda, asking about iodine-testing kits. She couldn't get them in Haiti from UNICEF. I tried in Bolivia at UNICEF, but they didn't have them either.

My next step was to ask Alfred, our SHN officer in La Paz, Bolivia, who remembered a qualitative test for iodine. This test involves putting iodized salt on a potato, adding some lemon, and it should turn purple if there is a presence of iodine. At this mention, I remembered iodine solution turning purple when I use it to disinfect fresh fruit with a lot of sugar in it, such as strawberries. Therefore, I decided to try out the experiment.

### Conducting the Experiment

Step 1: I tried it with a raw potato, boiled potato and starch. However, the most effective result occurred when we used starch. The best approach is to use 1/2 tablespoon of starch and mix with 1 teaspoon of salt.



Step 2: Add about 5 drops of lemon juice to the starch.



Step 3: Put 1 teaspoon of salt into the starch/lemon juice. We used a bag of salt that was labeled as 'iodized salt'.



Step 4: Wait for the mixture to turn purple. And guess what: our salt was not iodized.



This outcome caused big frustration and resulted in my husband running to the store at 8 p.m. on the corner of our street, saying, “Hey, we need some *really* iodized salt; we are testing it.” To which the storekeeper, very relaxed, replied, “Oh yes, I think this other firm was fined for not really iodizing. Take this other one, it even smells of iodine.” (Which was true; it had a smell resembling fresh concrete.) So, then, with the new salt, we could finally see the purple color after repeating the steps.



### Why test for iodine in salt?

In 1991, upon my first contact with Save the Children, I visited a community mobilization program in a very rural, remote area of Bolivia. I was impressed by the program, but deeply shocked by the fact that in this area about one-third of the adults that we saw were ‘cretins’ or individuals with mental retardation and deafness due to lack iodine in their mothers during pregnancy.

I thought it extremely challenging to foster development if a significant proportion of your participants are intellectually disabled. Therefore, this is how I came to believe that micronutrients can sometimes do wonders.

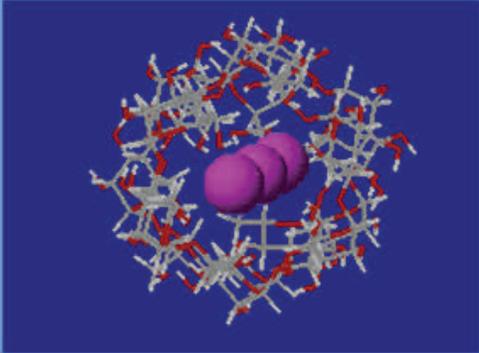
### Lessons Learned

1. Over the last few months, my family and I have, unknowingly, been consuming non-iodized salt, which has a false label on it. We have now changed salt and my husband will bring the false

salt to the Ministry of Health for a claim. I am not very optimistic, however, about this initiative.

2. Yes, the experiment works and it can be done with school children in low resource settings. Make sure you have some iodized salt and some non-iodized salt.
3. The experiment works best with starch as opposed to raw or boiled potatoes.
4. The kitchen experiment only shows that there is iodine. It doesn't tell you whether there is *enough* iodine in your salt. But, better any amount of iodine than to continue to consume untested, non-iodized salt.
5. See below: The chemistry for this experiment when using for learning in higher grades.

**Starch - Iodine Complex**

$$I_2 + I^- \longrightarrow I_3^-$$


Iodine slides into starch coil to give a blue-black color

C. Ophardt, c. 2003