

West Africa Bouillon Fortification Initiative

Condiment Micronutrient Innovation Trial (CoMIT) Project

Objective

The objective of this research study is to evaluate the impact of household use of multiple micronutrient-fortified bouillon cubes on micronutrient status (iron, zinc, iodine, vitamin A, folic acid, vitamin B12) among women and young children in Northern Ghana

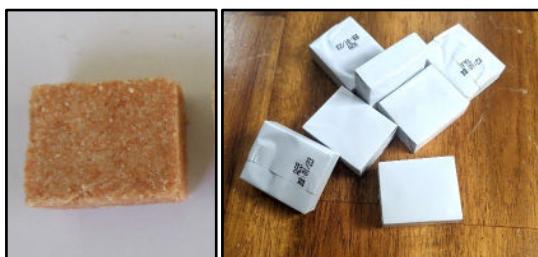
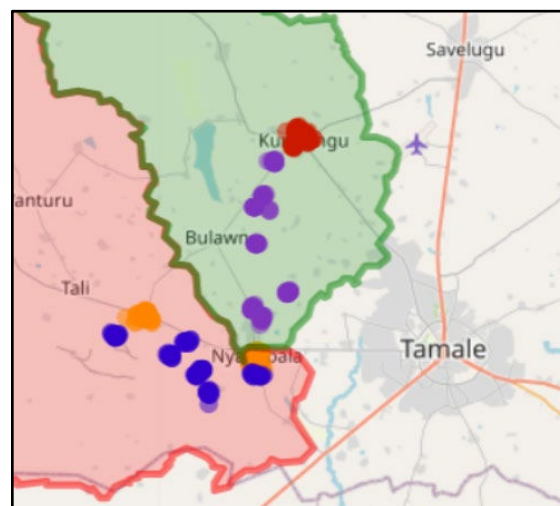
Rationale

Micronutrients are critical for health, growth, and development. Micronutrient deficiencies are common throughout West Africa, especially among women and young children. In Ghana, the National Micronutrient Survey found that 13.7% of nonpregnant women and 21.5% of children 6-59 months had iron deficiency, 6.9% of women had vitamin B12 deficiency and 53.8% had folate deficiency. Bouillon cubes are a promising new candidate for micronutrient fortification in West Africa due to their widespread consumption.

Methods

The study will recruit approximately 690 children, 690 lactating women, and 1028 nonpregnant, nonlactating women of reproductive age (WRA). Participants who are eligible and consent to participate will receive household rations of one of two formulations of bouillon cubes: 1) multiple micronutrient-fortified bouillon cubes (containing iron, zinc, iodine, vitamin A, folic acid, and vitamin B12), or 2) bouillon cubes fortified with iodine only (control group). Bouillon rations will be delivered biweekly for 9 months (children and WRA) or 3 months (lactating women). Measures of micronutrient status will be assessed before and after the intervention period; data collection will also include assessment of dietary intake, morbidity, growth, and child development.

Map of study location: Kumbungu and Tolon Districts in Northern Ghana



Expected outcome

This study will provide the first evidence regarding the potential impacts of micronutrient-fortified bouillon on micronutrient status of population groups vulnerable to micronutrient deficiencies and their health consequences.

Partners

The study is a collaboration between the University of Ghana and the University of California, Davis, with support from Helen Keller Intl through the Bill & Melinda Gates Foundation. The project is part of the larger West Africa Bouillon Initiative, which includes Country Working Groups in Nigeria, Burkina Faso, and Senegal, research partners at CSIRO and RI.SE, and a consortium of industry partners.

What have we learned so far?

Prevalence of micronutrient deficiency: A pilot survey was conducted in 2020 to assess the prevalence of micronutrient deficiencies among women and children in Kumbungu and Tolon districts, Northern Region. Table 1 shows the prevalence of deficiency. In addition, urinary iodine was low-adequate among women and children (median 105, 94 mg/L), and 8% of women had low breast milk vitamin A and 41% had low breast milk vitamin B12.

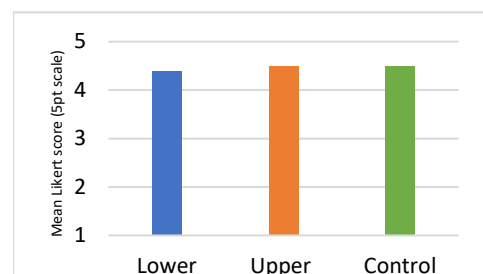
Prevalence of anemia and micronutrient deficiencies among women and children in Kumbungu and Tolon districts, 2020

	Nonpregnant, nonlactating women 15-49 years	Children 2-5 years
Anemia	31%	36%
Iron deficiency	45%	57%
Zinc deficiency	79%	67%
Vitamin A deficiency	1%	29%
Folate insufficiency	98%	n/a
Low vitamin B12	12%	19%

Anemia: hemoglobin <12 g/L (women) or <11 g/L (children); Iron: inflammation-adjusted ferritin <15 ug/L (women) or <12 ug/L (children); Zinc: plasma zinc < IZiNCG cutoffs; vitamin A: retinol <0.7 umol/L; Folate: RBC folate <906 nmol/L; vitamin B12: plasma B12 <221

Acceptability of micronutrient-fortified cubes: An acceptability study was conducted to test whether multiple micronutrient-fortified bouillon cubes would be well-liked by women and their households in Northern Ghana. The study tested 3 formulations of shrimp bouillon cubes: 1 cube fortified with iodine only (control), and 2 cubes fortified with iodine in addition to different levels of iron, zinc, vitamin A, folic acid, and vitamin B12.

Overall acceptability of 3 bouillon formulations after 2 wk home use



Acceptability study: key results

- All formulations of cubes were well-liked: >90% of respondents reported they “like” or “like very much” all 3 formulations
- When participants were allowed to take the cubes home and use them in their home cooking, there was no difference by group in the amount of bouillon used.
- The results suggested that any of the formulations would be suitable for use in further research to test the impact of micronutrient-fortified bouillon on micronutrient status.

Further information

This study is registered as Ghana FDA trial FDA/CT/2213, and with PACTR202206868437931 and NCT05177614. For more information, contact: Pr. Seth Adu-Afarwuah (sadu-afarwuah@ug.edu.gh) or Dr. Reina Engle-Stone (renglestone@ucdavis.edu).