

### Acceptability of Multiple Micronutrient-Fortified Bouillon Cubes Among Women in 2 Districts in the Northern Region of Ghana

Sika Kumordzie,<sup>1</sup> Ryan Wessells,<sup>1</sup> Emily Becher,<sup>1</sup> Jennie Davis,<sup>1</sup> Charles Arnold,<sup>1</sup> Xiuping Tan,<sup>1</sup> Stephen Vosti,<sup>1</sup> Katherine Adams,<sup>1</sup> Marjorie Haskell,<sup>1</sup> Seth Adu-Afarwuah,<sup>2</sup> and Reina Engle-Stone<sup>1</sup>

<sup>1</sup>University of California, Davis and <sup>2</sup>University of Ghana

**Objectives:** To evaluate the acceptability of two different multiple micronutrient-fortified bouillon cube formulations, compared to an iodine-only fortified bouillon cube.

**Methods:** We conducted a double-blind randomized controlled study in the Tolon (2 urban, 1 rural cluster) and Kumbungu (1 urban, 1 rural cluster) districts of the Northern region of Ghana (n = 84 women). Two formulations of multiple micronutrient-fortified bouillon cubes containing iron, zinc, folic acid, vitamins A and B12, and iodine at “upper” (45 - 125% of CODEX) or “lower” (15-50% of CODEX) concentrations, and a control cube that contained iodine only (50% of CODEX) were evaluated. Cubes were prepared specifically for this trial and similar to cubes commercially available at the site. Baseline data included household composition, bouillon use, and bouillon knowledge, attitude and practices. Women subsequently

participated in 2 days of center-based sensory testing (acceptance, preference, discrimination); using a randomized crossover design, women evaluated all three formulations of bouillon cubes as both raw cubes and cubes prepared in two common dishes (okra soup and jollof rice). For acceptance testing, the raw cubes and dishes were rated on a 5-point Likert scale (1 = dislike very much, 5 = like very much).

**Results:** All participants reported using bouillon cubes; 92.9% reported using them at least twice per day. Mean overall liking of the three different raw cubes ranged from 4.3–4.5 on the 5-point Likert scale (p = 0.17); approximately 90% of respondents rated the 3 cubes as either “like” (4) or “like very much” (5). There were no differences in the liking of appearance, feel, aroma, or taste among the cubes, although one of the cubes was rated lower for crumble compared to the other cubes (85% vs. ≥ 94%; p = 0.03). There were no differences in overall liking or specific attributes (appearance, color, taste, aftertaste, saltiness) among the 3 cubes when they were used in the 2 dishes.

**Conclusions:** All three cubes were well-liked by respondents, suggesting that any of the 3 cubes would be acceptable for use in future research to investigate the efficacy of multiple micronutrient-fortified bouillon cubes for improving micronutrient status.

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