

Research Brief

Needs Assessment of Bouillon Manufacturers and Regulatory Agencies

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Research Highlights

- ◆ Bouillon manufacturers do not need to engage a dedicated staff for fortification. However, they need laboratory analysts with skills to determine micronutrients levels in fortified bouillon.
- ◆ Bouillon Manufacturers representatives interviewed indicated they use iodized salt in bouillon manufacturing and fortify their bouillon products with micronutrients, including Iron. A review of bouillon labels showed that one brand was fortified with zinc.
- ◆ Barriers to the effectiveness of mandatory food fortification in Nigeria include among others, limited coordination among fortification stakeholders, ineffective premix supply chain and ineffective data and information management systems.
- ◆ No bouillon manufacturer interviewed directly fortified bouillon cubes with iodine premix. However, many bouillon labels include the claim "source of iodine".
- ◆ There is generally a weak regulatory oversight for voluntary food fortification in Nigeria.
- ◆ Manufacturers have no motivation to adopt bouillon fortification because of the associated cost if it remains voluntary.

Key Objective

To document the capacity needs of private-sector bouillon manufacturing industries regarding fortification of bouillon with micronutrients and the regulatory capacity and requirements for effective monitoring of fortified bouillon

Background

Currently, micronutrient fortification of bouillon is done on voluntary basis in Nigeria, with manufacturers at will to decide the types, chemical forms and levels of the vitamins and minerals to add to the product. Although Nigeria has developed and adopted bouillon manufacturing and safety standards, there is presently no specific national guidance on voluntary micronutrient fortification of this product. The only available voluntary fortification guidelines relate to labeling of the product, which specify that if the vitamin or mineral content of a food to which vitamin or mineral has been added, is more than 5% of the nutrient reference value (NRV) per 100g or per 100ml, then this should be declared on the label. This guidance is limited in terms of the chemical form of the vitamin or mineral that needs to be added and does not set any minimum or maximum level to be added.

Methodology

A cross-sectional qualitative approach comprising literature reviews and in-depth interviews with 34 stakeholders across 17 organizations was used. Study participants were representatives of bouillon manufacturers (n=5+1), government regulatory agencies (n=9+6) responsible for food control and food fortification, development partners (n=6), and other stakeholders, including the NFA, IPAN, analytical laboratories, and premix suppliers (n=7). Three interview guides and two costing questionnaires were developed and used to elicit information from these stakeholders. The interviews focused on understanding the process that guides bouillon fortification in Nigeria and the readiness among bouillon manufacturers who are not currently fortifying their products. Further, stakeholders' perspectives about regulatory monitoring of food fortification, including fortified bouillon, were also examined to identify lessons learned applicable to voluntary Bouillon fortification. Data were transcribed verbatim and analysed using open and axial coding.

The literature review was guided by a checklist that was developed a prior by the consultant

using core components and documented best practices of food fortification interventions globally. Three types of documents were reviewed:

- Nigerian Industrial Standards (NIS) on food fortification and bouillon manufacturing, relevant food regulations, National Policy on Food and Nutrition (NPFN, 2016), and national guidelines on Micronutrients Deficiencies Control (MNDC) in Nigeria.
- Development partners food fortification technical reports, including reports of fortification meetings.
- Published journal articles and grey literature on bouillon cube fortification and regulation.

Further, nutrition labels of selected bouillon brands were reviewed to identify the micronutrient contents and the levels of other ingredients, including Salt, Monosodium Glutamate (MSG), and Sugar.

Results

1 Technical needs and Human Resources needs for bouillon fortification in Nigeria

Required technology and changes in production or processing lines:

Most bouillon manufacturers do not anticipate any significant changes in processing or any effect on micronutrient levels. Premix used in bouillon manufacturing is powder form and requires no specialized equipment apart from industrial-scale blenders or mixers for normal processing. Manufacturers expect changes in processing lines if micronutrients premix provided in liquid or other forms are needed to fortify bouillon.

Stability and bioavailability of added

micronutrients: All the bouillon manufacturers interviewed reported that the iron form used in bouillon manufacturing is Iron/Ferric Pyrophosphate (FePP). However, FePP has limited bioavailability except when used in the micronized form. It was impossible to ascertain if bouillon manufacturers in Nigeria currently use micronized FePP because production records were not accessed. Higher fortification with FePP or increased consumption of FePP-fortified bouillon is required to contribute to up to 20–30% of Fe requirements. **Research is inconclusive on the efficacy of alternative ways to improve FePP bioavailability, including adding a stabilizer, Sodium/Tetrasodium Pyrophosphate (NaPP), to FePP fortified bouillon.** Some literature hypothesizes the possibilities of interaction of iron with iodine which can result in iodine loss.

Levels and acceptable limits of added

micronutrient: Available literature indicate that the specification of added micronutrient followed by bouillon manufacturers is a minimum of 15% recommended dietary allowance (RDA) and a maximum of 20% tolerable upper intake level (UL) per serving. Technical and cost implications limit the adoption of more than 15%–20% per serving.

The consumption of higher intakes (more than the average intake of 4g/d per capita) of FePP-fortified bouillon may also increase exposure to health risks such as diet-related non-communicable diseases.

Shelf-life of fortified-bouillon: Available literature showed that FePP –fortified bouillon showed degradation at 37°C compared to the non-fortified bouillon. **The findings imply that a shorter shelf-life is required for fortified bouillon, especially in a tropical region like Nigeria.**

Health and safety concerns: Salt, Monosodium glutamate (MSG), sugar, fat, and food starch are ingredients used in bouillon manufacturing. At 3.4g per capita consumption of bouillon in Nigeria, it is estimated that bouillon will contribute about 0.9g of sodium per day, and about 374 mg Monosodium glutamate (MSG) and 77µg iodine per day. These levels are considered within safe limits. However, stakeholders in Nigeria called for further research to establish the safety limits of bouillon sodium and MSG contents, considering the consumption of iodized salt and multiple processed food products containing salt and MSG. **Many respondents were sceptical about promoting bouillon fortification as a public health approach.** They opined that such an approach might contribute to an increase in the consumption of bouillon with a potential risk of sodium and MSG intake.

Human resources requirements: The capacity to test for micronutrients in fortified bouillon at all levels (import, processing sites. and commercial levels) is a primary need identified in this study.

2 Current Fortification Programme in Nigeria

A review of literature and stakeholder interviews showed that Nigeria currently has mandatory fortification for salt, wheat, maize and composite flour, edible vegetable oil, sugar and margarine. There are inconsistent fortification compliance data in Nigeria. Technoserve reported that 96% and 92% of Sugar and Wheat flour respectively complied with fortification standards. However, there is inadequate compliance of refined edible oils (32%) and maize flour (16%) with fortification standards.

Limited consumer awareness, inadequate coverage and consumption of fortified and fortifiable forms of mandatory staple foods also limit impact.

Other barriers to the effectiveness of mandatory food fortification in Nigeria include limited coordination among fortification stakeholders, ineffective premix supply chain and ineffective data and information management systems. There was variation between the NIS and fortification regulations regarding the chemical form of iodine for salt. The National Agency for Food and Drug Administration and Control (NAFDAC) regulation specified that mandatory iodine could be added in the form of potassium iodide, while the Nigerian Industrial Standards (NIS) established the use of potassium iodate. The NIS were also not explicit regarding packaging requirements for fortified foods. All the edible oil standards were developed in the 2000s and may require revisions to reflect current realities. Voluntary fortification in Nigeria dates to the 1990s. Several food products in Nigeria, including breakfast cereals, fruit drinks, flavoured beverage mixes, and milk, are also voluntarily fortified. However, limited guidance exists, and regulatory efforts to oversee the process is unclear.

3 Current monitoring system for bouillon

The fortification of bouillon with iron, iodine is primarily market-driven. The voluntary nature challenges regulating the safety, efficacy, and sustainability of delivering the added micronutrients claimed by manufacturers.

Although Nigeria has a Standard for bouillons Manufacturing (NIS 293:2019), it does not include explicit content on bouillon fortification.

Despite the widespread sale of fortified bouillon, there is limited regulatory guidance and inadequate capacity to monitor voluntarily fortified bouillon. The available National Agency for Food and Drugs Administration and Control (NAFDAC) food

fortification regulations, 2019, was not explicit on bouillon fortification.

Respondents generally adjudged that there is weak regulatory oversight for voluntary food fortification in Nigeria. Respondents have split opinions regarding voluntary versus mandatory fortification of bouillon. The proponent of voluntary suggests it should continue while regulators develop guidelines for the fortification process. They opined that manufacturers are more likely to sustain voluntary fortification because they initiated it to derive a competitive edge for their products. Many of the respondents who hold this viewpoint consider current mandatory fortification ineffective. Therefore, adding additional food vehicles will further exacerbate existing challenges.

The proponent for mandatory fortification perceived that it could ensure a level playing field and deliver micronutrients to Nigeria's population groups.

Manufacturers have no motivation to adopt bouillon fortification because of the associated cost if it remains voluntary. However, transitioning from voluntary to mandatory fortification of bouillon cubes will rely on evidence-based data on the rationale for the inclusion of additional food vehicle to currently mandated staples.

4 Fortified bouillon cube program cost in Nigeria

The estimation of the economic costs of bouillon fortification in Nigeria is underway through a MINIMOD modelling. Literature review and stakeholders' interview with bouillon manufacturers and other fortification stakeholders identified several cost components, including the cost of fortificants, cost of quality assurance and control, cost of baseline intake survey, the development of standards and guidelines, and supervision costs.



Conclusion

- Iron-fortified bouillon cubes are commercially sold in Nigeria, with two leading and commonly consumed Maggi and Knorr brands labelled as iron and iodine sources. One brand fortified with Zinc identified.
- Iron/Ferric Pyrophosphate (FePP) the commonly reported form of iron in bouillon manufacturing have limited bioavailability, except it is in micronized form.
- There are research gaps regarding the interaction of micronutrients in bouillon, the bioavailability of iron form used in bouillon and the analytical methods for testing micronutrient in bouillon.
- Nigeria does not have a food fortification policy, and there is presently no clear regulatory framework for the voluntary fortification of bouillon. Respondents generally adjudged that there is weak regulatory oversight for voluntary food fortification in Nigeria.
- There are split opinions regarding whether to make bouillon fortification mandatory or retain the voluntary status.
- Respondents were unanimous regarding the evaluation of current fortification and generation of evidence-based data to guide the process of decision-making regarding inclusion of additional food vehicle.



Recommendations

- To select the types of micronutrients to add to bouillon, government institutions responsible for food fortification, including the Federal Ministry of Health (FMOH), Standards Organization of Nigeria (SON), and other stakeholders, should consider current MNDC programmes in determining the choice of micronutrients.
- Build the capacity of the medium scale producers to be able to test on their own. A need for more accredited laboratories.
- Studies are required to determine the levels of claimed iron and iodine in commercially available fortified bouillon. During this process, standard methods for testing micronutrient levels in bouillon can be established by comparing the methods used by bouillon manufacturers, third-party laboratories, and relevant official methods for the determination of micronutrients in bouillon.
- Develop and implement well-structured strategy for capacity development of regulatory agencies: this may include a detailed audit of current capacity regarding laboratory needs as well as current personnel capacity and gaps.
- Develop and implement a costed strategic plan for an ideal and minimum standard of regulatory monitoring activities that can be conducted sustainably in the short-to-medium term (3 to 5 years). Such a cost plan should be operationalized by ensuring it features the annual budget of the respective government institutions and advocacy to ensure the release of allocated funds.
- Advocacy and Sensitization to the Nigeria Customs to address many of the supply chain issues, especially regarding clearance of premix and analytical standards and chemicals at the port of entry.
- Advocacy to IPAN to extend current inter-laboratory tests conducted on bouillon to include determination of additional parameters, including MSG, Iron, Iodine, vitamin A, Zinc and Trans-fat.