



World Food Programme
Programme Alimentaire Mondial
Programa Mundial de Alimentos
برنامج الأغذية العالمي

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Food Safety and Quality Assurance Unit, March 2024

Technical Expectations – Manufacturing of Fortified Date Bars

Background

Fortified Date Bars are a strategic product for WFP to use during the initial response to a rapid-onset emergency such as an earthquake or a flood. In addition to their primary use, they are also used to support people in refugee and IDP camps, and in school feeding programs to address chronic hunger and malnutrition. WFP pre-positions contingency stock of Fortified Date Bars for immediate response to a rapid-onset emergency.

Fortified Date Bars are shelf-stable, ready-to-eat foods, allowing for easy maintenance of emergency stockpiles. In a school-feeding context, they are ideal for environments with limited cooking facilities or when transitioning from 'no foods provided' to 'school meals'.

For Fortified Date Bars supplies to be sustainable, production must be operationally feasible from a manufacturing standpoint, while ensuring the safety of food during the entirety of its shelf-life. Manufacturers are not expected to maintain a dedicated fortified date bars production facility. Likewise, suppliers should not depend solely on fortified date bars production for WFP to manage costs or maintain operations. Product costs should be affordable and in line with the costs of manufacturing similar products.

Purpose

WFP technical requirements provide a technical guide for better understanding WFP's expectations of quality, safety, and process control for manufacturing these foods, and are in addition to WFP specifications for Fortified Date Bars. Conditions of the document are used for audit purposes, technical assessment, and product inspection. Not complying with these requirements may generate critical, major, or minor non-conformities and/or suspension of the Manufacturer.

Requirements

1. **Manufacturing Standards and Food Safety and Quality Management Certification**

The appropriate standards to refer to for raw materials, premixes, ingredients, packaging and the finished product are included in the [finished product technical specification](#). Specific country specifications adapted to local regulations and conditions may apply in some cases.

All Fortified Date Bar suppliers should have a [GFSI \(Global Food Safety Initiative\) recognized certification](#) for category CIV Processing of Ambient Stable Products in place (Ex. FSSC 22000, BRCGS, IFS, SQF).

2. **Manufacturing Site**

The Manufacturer shall upon request forward a copy of the Manufacturing License for the products issued by its National Regulatory Authority. Any visit / audit reports from Regulatory Authority shall be available.



3. **Compliance with WFP Specifications and Contract Conditions**

The Manufacturer must incorporate all requirements of WFP specification and contract conditions in their quality management system. The Manufacturer must establish its own final product specification and clearly state the amount and frequency of testing required for consistent quality of the final product.

4. **Pre-requisite Programs and HACCP**

The manufacturer shall have verified HACCP Plan that includes pre-requisite programs (PRPs) as per GFSI Recognized Standards (Ex. ISO/TS 22002-1, BRCGS, IFS, SQF) or minimally *Codex Alimentarius* Code of Practice CXC 1-1969 - General Principles of Food Hygiene.

HACCP hazard analysis should include, as a minimum, risk assessment of the following potential food safety hazards:

- Toxic or noxious seed contamination through wheat flour
- Over-fortification¹
- Acrylamide²
- 3-MCPD and its esters (GE)
- Mycotoxins associated to wheat flour (Deoxynivalenol/DON), date paste (Aflatoxins) and milk powder (Aflatoxin M1)
- Pesticide residues associated with raw materials
- Allergens cross-contamination (Ex. egg, nuts, soy, sesame, etc.)
- Pathogens included in WFP specification (*B. cereus*, *S. aureus*, *E. coli*, and *Salmonella* spp)
- Mold growth [and assessment of use of preservatives](#)
- Foreign bodies

Utilities, including use of potable water and ice, should be part of HACCP studies.

5. **Quality Control**

- Inspection and testing of all incoming raw materials shall be performed according to a pre-defined quality plan. Following shall be minimally included:
 - Incoming wheat flour shall be examined per delivery/batch at least for fat acidity, gluten (dry/wet), moisture, ash and parameters checked during physical inspection.
 - Incoming fat/biscuit shortening shall be examined per delivery/batch at least for Free Fatty Acid (FFA), Peroxide Value (POV), melting point, moisture, and physical inspection.
 - Incoming date paste shall be examined according to risk-based quality plan and include at least for molds/yeasts and aflatoxins
 - Incoming milk powder shall be examined according to risk-based quality plan and include at least Aflatoxin M1 and melamine

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¹ Over-fortification may cause health issues at the consumer, please see WHO document here https://www.who.int/ipcs/highlights/full_report.pdf?ua=1

² [Acrylamide Toolbox - FoodDrinkEurope : FoodDrinkEurope](#)



- Perform inspection and testing of final product according to a pre-defined quality plan. Following shall be minimally included:
 - Moisture, dimensions, broken products, and organoleptic characteristics (texture, appearance, smell, taste) once per shift.
 - Net content, codification quality, sealing quality and leak test once per shift.
 - Other parameters included in WFP specification according to risk-based quality plan. As a minimum complete testing analysis (including all macro and micronutrients, microbiological and other contaminants should be conducted at least once per year).
 - Water activity (dough and filling) according to risk-based quality plan
- Periodical analyses of water (including ice) used in contact with food (dough mixing) and for hygiene shall be performed, as defined by local regulations and risk-based quality plan defined by the factory. Analyses should minimally include microbiological parameters and heavy metals.
- All raw materials shall have certificate of analysis (CoA). All raw materials shall only be sourced/procured from approved vendors.
- Periodical analyses shall be performed for contaminants (melamine, Aflatoxin M1), pesticides and heavy metals for critical ingredients.
- Document all reports on quality control data into log sheets and/or in available digital system and shall be traceable in case of any food incident situation.

6. **Equipment and Production Requirements**

- Sieving and/or sifting system for wheat flour, sugar, and other powdered materials according to screen materials for foreign materials shall be present.
- Sugar grinder and flour sifter (pre/post stage) shall be equipped with set of strong magnets.
- Sieving/filtration system for fat/biscuit shortening, date paste, liquid glucose/invert syrup and other liquid ingredients where necessary and according to hazard analysis shall be present.
- Treatment and/or filtration system for potable water used during wet dough mixing process shall be implemented.
- Metal/X-ray detector with sensibility to detect Fe, Non-Fe, SS and/or glass (according to hazard analysis) shall be used as final defense line against foreign object. The detector ~~should~~ shall be installed after primary packaging is completed.
- Bulk storage tanks for flour, sugar, fat, and potable water shall have lid closure system. All accessories (pipes, filters, and tools) shall be kept under hygienic conditions.
- According to hazard analysis the use of preservatives for prevention of mold growth shall be implemented, considering regulations at origin and destination countries.
- Rotary molder and production aid tools shall be kept on elevated stands with protective cover.
- Laboratory equipment for determination of moisture content (oven method/infrared moisture analyzer), ash (furnace method), FFA, POV, protein and fat (titration equipment), water activity (water activity analyzer), seal check (leak tester) and other small equipment as per quality plan should be available.
- Production and laboratory scales shall be checked for accuracy daily before production and shall be calibrated by an external calibration company regularly with certification.
- Temperature shall be controlled storage for sensitive raw materials (premix, milk powder, flavors/flavours etc.)
- Storage conditions for packaging materials shall be compliant with the requirements mentioned in the packaging specifications.

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7. Quality Management and Practices

- Validation should be documented and available for the following control measures:
 - sieving and/or sifting systems used for dry and liquid materials.
 - homogeneous mixing of micronutrient, measuring coefficient of variation.
 - heat killing step i.e. baking zone core temperature to kill pathogens.
 - product colling step including time / line speed.
 - sealing machines operational conditions (temperature & dwell time of [the flow wrapper sealer](#)).
- Quarantine materials and products not meeting quality requirement shall be clearly marked.
- Periodic assessment of upstream suppliers and reporting incidents for corrective actions shall be in place.
- Releasing batch shall be cleared by the internal laboratory and quality assurance practices.
- Rework should not be used except if supplier has quality and food safety controls in place for the storage, handling, traceability, reprocessing (mixing and heat treatment) to ensure that reprocessing of the rework will not affect quality, safety, composition, shelf life and sensory acceptability of the finished product. The use of final product rework is maximum 2% of the same batch. Perform validation test for the use of rework and to define their internal controls accordingly. The supplier should also include use of rework in their HACCP risk assessment.
- Document change management and revise HACCP Plan accordingly, change shall be carried out in a manner that does not compromise on finished product specification and validation of control measures.
- [Documented complaint handling program shall be in place.](#)
- Retention samples of final product shall be kept until end of labelled shelf life.
- Fortification process shall include, as a minimum, the following requirements:
 - Premix bought from GAIN approved premix supplier
 - Fortification SOP, addition of premix as per WFP specification
 - Daily mass balance of produced date bars and premix used
 - CV performed at least once to validate the process, as per WFP requirements³
 - Controlled temperature room for premix storage (as per premix supplier instructions usually below 25°C).

8. Packaging

Packaging specification shall have demonstrated performance against WFP specification. All primary packaging materials (metallized flexible laminate) shall have certificate of compliance for food grade [material](#) (CoC) and certificate of analysis (CoA) [demonstrating full compliance with WFP specification](#). All packaging materials shall only be sourced/procured from approved vendors and food Manufacturer should ask their primary packaging suppliers to perform a self-assessment against the guideline provided by WFP. [Shelf-life of packaging materials shall be included in the specifications as well as the storage conditions.](#)

Controls at reception shall be performed and food contact material certificate for primary packaging shall be made available.

a) Controls at reception

- Check compliance against WFP specification of Certificate of analysis (CoA) from packaging suppliers (including WVTR and OTR for laminate and ECT for cartons)

³ <https://foodqualityandsafety.wfp.org/it/food-fortification-and-coefficient-of-variation-cv-calculation>



- Measure thickness of the metallized flexible material and grammage of cartons
- Visual inspection of the design/artwork (lamine, carton)
- Lamine received with foreign object or torn/exposed condition shall be rejected.

b) *In-line controls*

- Weight of the box (filled) every 2 hours
- Check printing of dates and batch number every 2 hours
- Check readability of online printing of dates and batch number
- Visual inspection of sealing quality and integrity shall be performed and recorded at least each 30 minutes (30 sachets per packing line). Statistics on seal defects should be kept, with categorization of the defects (e.g. minor, major, critical).⁴
- Leak test shall be performed during the packing process, at least every hour (depending on the speed of the line) on 3 sachets per line.⁵ If at least one sachet does not pass the test, additional tests must be performed on sachets (recommended 10) produced since the previous test. If any issue is confirmed, production must be stopped and immediate corrective actions on the line must be taken until the leak test is passed.
- Sealing quality should be checked during the packing process. The minimum seal strength of longitudinal and transversal seal of sachets produced online shall be 10N/15mm (test speed 100mm/min)⁶
- Highly recommended: Penetrant red test to be performed for microleaks detections twice per shift (at shift handover and in the middle) on 3 sachets (depending on the speed of the machine). If issue is confirmed, production must be stopped and immediate corrective actions on the line must be taken until the leak test is passed.

c) *Release controls*

- A document with pictures of examples of “good” and “bad” sachets (sealing quality, alignment, ink-jet information...) should be displayed next to each packaging machine
- Traceability markings, such as date and batch number on the pack & on the box shall be checked
- Online printing (e.g. laser, ink-jet) adhesion shall be tested during the packing process and segregation and/or rejection of sachets with double code/faded/erasable printing shall be done.
- Drop test on boxes should be performed as per principles of ISO 2248/ASTM D5276 (or equivalent) with following sequence/procedures on the same carton:
 - Edge dropping: carton is dropped from a height of 460mm on 1 edge (the angle between a prescribed surface of the package and the horizontal surface $\pm 5^\circ$)
 - Corner dropping: carton is dropped from a height of 460mm on 1 corner (the angle between a prescribed surface of the package and the horizontal surface $\pm 5^\circ$)
 - Face dropping: carton is dropped from a height of 460mm on 1 face (2° maximum angle between the impacting face and the horizontal surface)

⁴ See Annex – FB and DB packaging defects.

⁵ For vacuum leak testing or bubble leak testing the minimum pressure is -25kPa. The pressure must be hold for 1min.

⁶ WFP developed a guidance to support improvement of sealing quality of flexible packaging (see link).

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- The velocity at impact shall be within $\pm 1\%$ of that which would be achieved by a free fall
- There should be no rupture of cartons (dent cartons are acceptable), no rupture of tape and no loss of content

Use of new primary or secondary packaging materials:

- WFP shall be informed
- Validation trial shall be performed on the line and quality parameters assessed and validated

Shelf life of packaging material:

Every packaging item (laminate, carton) should have a shelf life that is recommended by the packaging supplier. Similarly, clear definition of storage conditions to preserve packaging integrity and properties before productions should be provided by packaging supplier and applied by food manufacturer in its premises. Shelf life of packaging and storage conditions should be reflected in raw material packaging specifications available at food manufacturer premises.

Inspection of primary packaging manufacturers:

[Food manufacturer shall perform a technical visit to each primary packaging supplier to approve new suppliers and revisit at least once every 2 years.](#)

[Food manufacturer shall ask their primary packaging suppliers to perform a self-assessment against the guideline provided by WFP.](#)

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9. Traceability

- Traceability information shall be printed on the individual sachets (food grade ink required) and carton boxes (secondary packaging). WFP recommends the use of laser coding on sachets to print production date/best before end/lot number because it is more durable than other printing technologies (e.g. ink-jet)
- Marking of the product (primary and secondary packaging) shall facilitate tracing at least up to date of production and preferably more (e.g. time, packing machine)
- Each lot should be completely traceable to each raw material and primary packaging material used
- Each lot should be released only after clearance by the internal laboratory and quality assurance practices.
- The Packing List prepared for WFP, as well as stuffing of containers/loading trucks must facilitate traceability up to the day of production and packing line

10. Shelf-Life and Storage

Fat oxidation, fortification, water activity and mold growth are limiting factors impacting Fortified Date Bar shelf-life.

Lipid oxidation is considered one of the main causes of the deterioration of food products with a high fat content such as Fortified Date Bars. Lipid oxidation is associated with the formation of off-odor and off-flavor that compromise the acceptability of the products, as well as impact the nutritional quality of the foods.



In particular, the fatty acid content is relevant to maintain. For shelf-life testing to continue improving Fortified Date Bars stability, samples shall be stored at accelerated conditions of 45°C with 75% RH for 6-8 months. Test samples shall be pulled from storage monthly and tested as follows: 1) Leak test; 2) Water Activity; 3) Texture; 4) Peroxide value; 5) Moisture content; 6) Vitamin A and 6) Sensory for taste, odor, color, and appearance 7) Mold growth. The manufacture can do routine shelf-life study by storing final product at 30°C with 65% RH and compare with product stored at real storage condition at the warehouse.

Annexes

Fortified Biscuits and Fortified Date Bars packaging defects (guidance ~~and inspection form~~)

<https://docs.wfp.org/api/documents/WFP-0000150009/download/>

Fortified Biscuits and Fortified Date Bars visual inspection of the seal form

<https://docs.wfp.org/api/documents/WFP-0000156826/download/>



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