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Technical Expectations – Packing of Lipid-based nutrient supplement (LNS)

Background

Product description

- Name: LNS-LQ/RUSF, LNS-PBWG, LNS-MQ and LNS-SQ
- Texture: Paste or spread
- Taste and appearance: Light brown to orange, brown color, with typical flavor and odor of peanut, milk and soy.
- Preparation instruction: Ready for consumption
- Target use and population: As per relevant food specification
- Ration size: 1 sachet per day

Packaging

- Packaging size:
 - LNS-SQ: 567 or 602 (or as per contract) individual sachets with a net weight of 20g each.
 - LNS-MQ: 300 individual sachets with a net weight of 50g each.
 - RUSF: 150 individual sachets with a net weight of 100g each.
 - PBWG: 168 individual sachets with a net weight of 75g each.
- Packaging type: Sachets packed in corrugated box

Storage considerations

- Recommended storage conditions: Store under dry and hygienic conditions and away from direct sunlight
- Shelf life: 2 years (24 months)

Purpose

WFP technical requirements provide a technical guide to suppliers in terms of WFP's expectations for packaging of product in addition to WFP specification for LNS. Conditions of the document are used for the audit purposes and technical assessment. Not complying with these requirements may generate critical, major or minor observation and/or suspension of the supplier.

Requirements

1. Compliance with WFP Packaging Specifications and Contract Conditions

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

2. Packaging

- Packaging specification with demonstrated performance against WFP specification. Controls at reception shall be performed and food contact material certificate for primary packaging shall be made available.



Validation process of new packaging supplier or new packaging material

WFP must be informed of any major packaging changes (e.g. new packaging supplier, new material composition, new production process at a packaging supplier)

Primary packaging

The scope of the validation process for primary packaging include new primary packaging supplier and major modifications in the packaging material (e.g. new composition, new production process).

As a minimum, the food manufacturer must validate the following parameters:

- Physical visit at the primary packaging supplier to validate packaging quality controls
- Packaging testing by an external laboratory to validate :
 - technical parameters listed on the certificate of analysis: WVTR, OTR, bond strength, seal strength, optical density (non-exhaustive list)
 - technical parameters that can impact machineability on the packing line: coefficient of friction, hot tack
- Small scale machine trial (minimum equivalent to 30min a nominal speed): registration of the film, packaging integrity (vacuum leak test and dye penetrant test), visual validation (good registration, no wrinkles)

Quality controls:

a) Controls at reception

- o Check compliance against WFP specification of food grade certificate and certificate of analysis from packaging suppliers (including WVTR and OTR for laminate and ECT for cartons)
- o Measure thickness of the metallized flexible material and grammage of cartons
- o Visually inspect the design/markings (carton, metallized flexible material ...)
- o Reject primary packaging received with foreign object or torn/exposed condition

b) In-line controls

- o Weight of the box (filled) - every 2h
- o Check readability of online printing of dates and batch number on sachets and boxes - every 2h
- o Leak test on empty sachets (filled with air)
 - o Frequency: at the beginning of the production and at least once a shift
 - o Number of sachets per nozzle: 5
 - o Minimum pressure recommended: -25kPa
 - o Minimum holding time: 1min
 - o 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 issue is confirmed, production must be stopped and immediate corrective actions on the line must be taken until the leak test is passed. IAWG strongly recommends blocking the products until re-testing is performed.
- o Leak test¹ on finished product (filled sachet) - bubble emission test or vacuum decay test:
 - o Frequency: at least every 30min (depending on the speed of the line)
 - o Number of sachets per nozzle: 3

¹ Leak test using bubble emission test or vacuum decay test are highly recommended and must be favored against pressure test with weight as it allows an accurate detection of the location of the leak helping the supplier to take corrective actions immediately. The benefit for manufacturers is quick detection of the leak and exact location, reducing food loss because swift corrective actions can be taken and reducing downtime.



- o Minimum pressure recommended: -25kPa
- o Minimum holding time: 1min
- o 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 issue is confirmed, production must be stopped and immediate corrective actions on the line must be taken until the leak test is passed. IAWG strongly recommends blocking the products until re-testing is performed.
- o Less recommended²: pressure test applying weight on sachets:
 - o Frequency: at least every 30min (depending on the speed of the line)
 - o Number of sachets per nozzle: 3
 - o Minimum weight recommended: 40kg
 - o Minimum holding time: 1min
 - o 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 issue is confirmed, production must be stopped and immediate corrective actions on the line must be taken until the leak test is passed. IAWG strongly recommends blocking the products until re-testing is performed.
- o Sealing quality shall 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 200mm/min)
- o 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

- o A document with pictures of examples of “good” and “bad” sachets (sealing quality, alignment, ink-jet information...) must be displayed next to each packaging machine
- o Check readability of online printing of dates and batch number on sachets and boxes
- o 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.
- o Drop test on boxes (see annex)

Supplier shall track their performance on leaky sachets in final product following ISO2859 General Inspection Level II sampling plan and report actual AQL's observed.

Net weight of individual packages and cartons must be monitored through statistical process control and usage of CPK.

Shelf life of packaging material:

Every packaging item (flexible laminate, carton box, bottle, cap, bag....) must 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

² This test is beneficial if it's done in a climatic chamber where the sachets can be exposed to high temperature (e.g. 50 °C) to simulate warehouse's conditions.



storage conditions must be reflected in raw material packaging specifications available at food manufacturer premises

Traceability information printed on sachet:

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)

Inspection of primary packaging manufacturers:

Food manufacturer shall perform a technical visit to each primary packaging supplier to approve new suppliers and minimum every 2 years

Food manufacturer shall ask their primary packaging suppliers to perform a self-assessment against the guideline provided by WFP or other protocol if appropriate.

Shape of sachets:

WFP recommends the use of 4 sides sealed sachets.
Minimum seal width must be 5mm.

3. Batch definition + Coding/Labelling + Traceability

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 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 day of production and packing line

Annex – Drop test protocol:

Drop test shall be performed as per principles of ISO 2248/ASTM D5276 (or equivalent), with following sequence 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)

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 loos of content