विषय: Guidelines for Safe storage, Preservation and Maintenance of Pulses-reg.

महोदय/महोदया,

Please find enclosed herewith a copy of “Guidelines for Safe storage, Preservation and Maintenance of Pulses”. These instructions may be brought to the notice of all concerned officials/officers for strict compliance and also ensure that, pulses procured are strictly in conformity with the Uniform specifications laid down by the Government of India, communicated vide this office letter no. QC 2 (I)/KMS/Pulses & Oilseeds/2015-16 dated 20.11.2015 (Urad & Tur) & and further revised vide letter dated 04.12.2015 (Urad).

The receipt of this communication may please be acknowledged.

संलग्नक: उपरोक्त (04 पेज)

प्रतिलिपि:

1. कार्यकारी निदेशक (खरीद/बिला/सतर्कता/टूर्नामेंट/बिक्री) के निजी सचिव, भाषा.मिति., मुख्यालय, नई दिल्ली।
2. महामंडल (खरीद/बिला/सतर्कता/परिचालन/बिक्री)- भाषा.मिति., मुख्यालय, नई दिल्ली।
3. निदेशक, खाद्य सुरक्षा संस्थान, गुजराट, हैदराबाद।
4. संयुक्त आयुक्त (एस.ए.आर.), उद्योगक्षेत्र मामले, खाद्य एवं जन वितरण मंडल, खाद्य एवं जन वितरण विभाग, कृषि विभाग, नई दिल्ली- कुर्यापा सूचना।
5. सभी कर्मचारी/अधिकारी, गुण निवेशक विभाग, भाषा.मिति., मुख्यालय, नई दिल्ली।
6. माई फाइल।
7. इंटरनेट/ भाषा.मिति. वेबसाइट।
**Guidelines for Safe storage, Preservation and Maintenance of Pulses**

Pulses can be defined as foodgrain obtained from leguminous crops. Following are the names of pulses including its Botanical name which are usually offered for the storage in our warehouses.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>English Name</th>
<th>Hindi Name</th>
<th>Botanical Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red-gram</td>
<td>Tur, Arhar</td>
<td><em>Cajanus cajan</em> L.</td>
</tr>
<tr>
<td>2</td>
<td>Bengal-gram</td>
<td>Channa</td>
<td><em>Cicer arietinum</em> L.</td>
</tr>
<tr>
<td>3</td>
<td>Black-gram</td>
<td>Urad</td>
<td><em>Phaseolus mungo</em> L.</td>
</tr>
<tr>
<td>4</td>
<td>Green-gram</td>
<td>Moong</td>
<td><em>Phaseolus aureous</em> Roxb.</td>
</tr>
<tr>
<td>5</td>
<td>Lentil</td>
<td>Masur</td>
<td><em>Lens culinaris</em> Medio or <em>Ervum Lens</em> L.</td>
</tr>
</tbody>
</table>

Pulses are stored in bags of 50 Kg weight. Before putting the pulses for storage in the warehouses it is important to ensure that the pulses are clean, cool, dry and free from obnoxious smell. The storage structure should also be neat and clean.

General code of storage practices are same as in case of wheat and rice.

**Pre-Storage steps:**

Before pulses are received in the godown, the Depot-in-charge should attend to the following points:-

- Pulses should be stored in covered godowns only.
- Check the godown to ensure that there is no likelihood of leakage of rain water and that drainage is in perfect condition.
- Check the electrical installations, light points, roof structure, and ventilators in the godowns.
- Clean the godown and its environments/surroundings.
- Assess capacity.
- Give pre-storage insecticidal treatment.
- Draw the stack plan and stack lines be re-drawn, if tainted.
- Arrange for required dunnage and get cleaned and disinfested.
- Stack card to be kept ready.
- Ensure adequate security and fire-fighting arrangements.

**Dunnage:**

Dunnage should be arranged on the floor on which stack are to be built. The dunnage for stacking of bags should be wooden crates or poly pallets.

**Stack Plan:**

Same as in case of Rice and Wheat but Whole pulses can be stacked up to a maximum of 16 bags height.

**Precautions to be taken at the time of Receipt and during Storage:**

**Receipt of Commodity:**

On arrival of truck/lorry in depot, ensure accuracy of weighment through weighbridge besides physical counting. A tarpaulin sheet be spread near
vehicle to collect spillage during unloading. At the time of receipt in the godown, the grain bags shall be carefully inspected. If some bags are found slack, torn, wet, damp or containing heavily infested grain or deleterious matter, they shall be segregated for taking suitable action, immediately. Slack bags shall be filled to standard weight, torn bags stitched or replaced, and damp or wet bags opened out and the grain dried and ear-marked for early disposal. In no case any damp or wet grain shall be allowed to go into a stack. Infested grain shall be cleaned and fumigated. In case the grain is dried in the sun, it shall be allowed to cool down before it is re-bagged. If any deleterious matter is noticed in the grain, it shall immediately be reported to the General Manager (R) with samples. Bags be stored properly by building stacks in given space. Stack card be filled up and displayed. Palla bags be attached with the stacks to collect spillage.

Representative sample of not less than 500 grams shall be drawn from each wagon/lorry load at the time or receipt into the godown. It shall be examined for general condition of the stocks, infestation etc. Classified and categorized on the basis of existing instructions. These observations require to be recorded on the reverse of the stack card. In case live infestation is noticed the lot shall be fumigated immediately. As a routine measure grains on receipt shall be given prophylactic treatment on the same day or within 24 hours of receipt at the latest. Moisture content of the grain shall be determined and recorded.

**QC INSPECTIONS:** Fortnightly Inspection/ Monthly Inspection/Quarterly Inspection/CAP Inspection be done as per instructions in vogue.

**CATEGORIZATION:**

The pulses offered for storage shall be-

- Sound and in merchantable condition, well dried, free from musty odour, infestation, moulds and routine contamination.

At the time of receipt of the stock of pulses have to be categorized. Basis of categorization in the **whole pulses** is the presence of Damaged grains/Slightly damaged and weevilled grains determined by weight/count:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Category</th>
<th>TUR-Arhar (Whole)</th>
<th>URAD-Whole</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of Damaged grains/ Sl. Damaged grains</td>
<td>% of Weevilled pulses</td>
<td>% of Damaged grains/ Sl. Damaged grains</td>
</tr>
<tr>
<td>1</td>
<td>A</td>
<td>Up to 3 % by weight</td>
<td>Up to 3 % by count</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>Above 3.0 and Upto 4.0 by weight</td>
<td>Above 3.0 and Upto 4.0 by count</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>Above 4.0 and Upto 5.0 by weight</td>
<td>Above 4.0 and Upto 5.0 by count</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>Above 5.0 and Upto 6.0 by weight</td>
<td>Above 5.0 and Upto 6.0 by count</td>
</tr>
</tbody>
</table>

Remarks: FSSAI has specified limit for weevilled grains in Tur-Split, there is no limit mentioned for Tur-whole. The limit of Urad-whole is taken i.e. 6.0 %.
CLASSIFICATION:

Pulses in storage shall be classified as 'Clear', 'Few' and 'Heavy' based on the presence of insect population as indicated below:

a. **Clear** - Lot completely free from any living infestation.
b. **Few** - Lot having up to two living insects per 500 gms. of representative sample.
c. **Heavy** - Lot having more than two living insects per 500 gms. of representative sample.

PRESERVATION and CHEMICAL TREATMENT:

**Aeration**: Moisture content in excess of 12% in the grain will create conditions favourable for insect development and that below 10% will be discouraging to insect growth. Aeration should be planned, therefore, taking these effects into consideration. As far as possible it is advisable not to aerate the grain on humid and wet days. On the days store is to be aerated both doors and ventilators need to be kept open.

**Cleanliness**: From the point of the health of pulses in store, cleanliness in the store assumes importance, cleanliness comprises, sweeping the store to remove grain spillage and dust, removal of webbings and accumulated dust from various parts of the store and brushing of the grain bags. In these, sweeping will be regular feature whereas, removal of webbing and brushing periodic tasks. Accumulated dust on the grain bags and in the store will favour insect growth and will also harbor insects. Insect control treatments and aeration will be less effective when the store and grain bags are covered with dust and webbings. It is likely that chemical treatment may be completely ineffective, when grain bags are covered with dust and webbings spillages when not collected will shelter insects and favour rat attacks. Proper cleanliness, therefore, is a first essential step in the maintenance of the health of the grain in store.

**PROPHYLACTIC MEASURES**:

Various chemicals used for Prophylactic treatment are given under:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of Chemical</th>
<th>Dilution with water</th>
<th>Dosage</th>
<th>Mode of Applicati</th>
<th>Frequency</th>
<th>Area</th>
</tr>
</thead>
</table>
| 1.     | Malathion 50% EC (Premium Grade) | 1: 100 (one litre of emulsion with 100 litres of water) | 3 ltr/100 sq. meter (surface treatment) | spraying | - Once in 3 Weeks during November to February  
- Every fortnight during March to October  
- Every fortnight throughout the year | J&K, Punjab, Haryana, Delhi, Uttarakhund, Bihar, Jharkhand, Rajasthan, UP, MP, Chhattisgarh |
| 2.     | Deltamethrine 2.5 % WP | 40gm/litre | 3 ltr/100 sq. meter (surface treatment) | spraying | Once in 3 months | Rest of State/UTs |
| 3.     | DDVP 76% EC | 1:150 | 3 ltr/100 sq. meter (Empty space; only 20 % floor area to be treated) | spraying | Fortnightly |
CURATIVE MEASURES:

Aluminium phosphide is used for the both stack and air-tight shed fumigation. For stack fumigation, the dosage is 3 tablets (9.0gms) per tone of the foodgrain with an exposure period of 7 days. Application of tablets is same as in case of Wheat/Rice.

Pre monsoon Fumigation

One round of pre monsoon fumigation of all stocks in the covered stores be ensured for better maintenance of the stock in insects free condition.

Pulses are relatively more susceptible to deterioration in storage and therefore need greater attention. A close watch on the conditions of stock shall be maintained and technical measures such as spraying and fumigation carried out promptly.

Insect-Pests of Pulses:

The most common insect pests of stored pulses are:

- Bruchid beetles (*Callosobruchus chinensis*, *Callosobruchus maculatus* etc.)
- Moths