

DIHAR

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LONG TERM POTATO STORAGE IN LADAKH CONDITIONS



Narender Singh
Dorjey Angchok
Hitesh Kumar
R B Srivastava

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Defence Institute of High Altitude Research (DIHAR)
Defence Research & Development Organisation (DRDO)
LEH (Ladakh)-194101 (J&K) India

Introduction

Introduction: In Ladakh potato crop is harvested in Sep-Oct and then the marketable surplus potatoes are stored inside the traditional cellar or buried underground in pits. But in this form of storage, after the month of April apparently due to physiological age of the potatoes and increase in temperature, the potatoes get sprouted and shrivel and become unfit for consumption. To solve this problem DIHAR developed a technology through which the harvested potatoes in Sept-Oct can be stored upto July-Aug with negligible weight loss, rottage and shriveling effect.

The technology of long term potato storage in Ladakh condition is summarized in the following steps:

Step 1: Details of specific underground storage structure:

Size: The structure comprises of underground rectangular box shape, having commercial internal size 7.2mtr length, 3.6mtr width and 2.7mtr height (2.1mtr upto ground level and 0.60mtr above ground level).

Capacity: The above size structure has the capacity to store approximately 17 MT of fresh potato tubers.

Orientation and walls: The orientation of the store is such that longitudinally it runs North to South. The structure should have upright stone masonry walls constructed with suitable ratio of cement and sand of 45cm width on about 60cm deep foundation wall.

Gate: One wooden gate of size 1.5mtr x 0.90mtr should be fitted on western corner of Northern side wall about 60cm above the surface of the store. The gate should be covered by double door. One door should be made of good quality smooth surface wooden planks openable towards inside and another door covered by 1mm x 1mm iron mesh openable towards outside.

Ventilators: There should be a provision of three ventilators of size 75cm x 45cm, one each in the center of southern, eastern and western walls above ground level having double windows (one fixed by 1mm x 1mm iron mesh and another made of openable glass).

Floor of the store: The floor of the store should be plane earth, over which there should be three raised cemented strip of size each 660 cm length,

60cm width and 30cm height at equal distance leaving about 30cm gap between the strips and from the side walls.

Roof: The roof should be constructed with wooden sticks. The wooden sticks should be placed side by side with out gap and resting on wooden poles of about 20cm diameter. The poles should be placed side by side having a gap of about 75cm. Over the wooden sticks a layer of dry grass (10 cm) is laid followed by a layer of wet mud (10 cm) and a layer of dry soil (10 cm.).

Stair: There should be a provision of cemented stair in front of the gate to go inside the store. To check the snow or melted water to go inside the store through the stairs, there should be a provision of a covering structure.

Inlet for fogging treatment: There should be a provision of 75cm long and 10cm diameter galvanized iron pipe (fixed at the center of northern side wall at ground level) to inject the CIPC fog inside the store. The pipe should have a suitable openable cap (fixed at the outside end) to retain the fog inside the store after fogging.



Injection of CIPC chemical



Fogging machine

STEP 2: Preparation of potatoes for storage

After proper harvesting, sorting and curing (hardening) follow the following steps

Packing: The potatoes should be filled up in leno bags with the capacity of about 50 kgs.

Stacking of the bags: The filled bags should systematically be stacked on the cemented strip in layers inside the underground store and arranged with sufficient space between the columns of bags to allow

circulation of CIPC fog, respiratory air and heat radiation. About 50 cm empty space is kept as a clearance between roof and the top of the stacked bags.



Step 3: CIPC treatment

To check the sprouting, tubers should be treated with CIPC chemical. Common name of CIPC is chlorpropham and chemical name Isopropyl 3-chlorocarbanilate. It is being marketed in India by United Phosphorus Ltd. Uniphos House, CD Marg, Khar (w), Mumbai 400052 in the name of "Oorja". It is classified as non-toxic to human beings and not classified as dangerous for operator or for transport. The fog of the chemical is applied with a fogging machine. LPG based handy fogging machine of above mentioned firm is found suitable to use in high altitude cold desert conditions of Ladakh. The CIPC chemical is injected as fog in the store through the fogging inlet pipe.

Quantity of CIPC for treatment: The fog of 1.5 litter CIPC chemical will be required for treatment of 17.2 tones potatoes. Note: The quantity of chemical may differ, based on temperature inside the store, kind of packing bags, leakage and type of surface of floor and walls of the store.

Time of treatment: Fogging of CIPC chemical at above rate should be done twice. First fogging treatment should be given in first fortnight of October and second in first fortnight of March. The optimum temperature of the store should be $10^{\circ}\text{C} \pm 2^{\circ}\text{C}$ at the time of fogging.



CIPC fogg testing

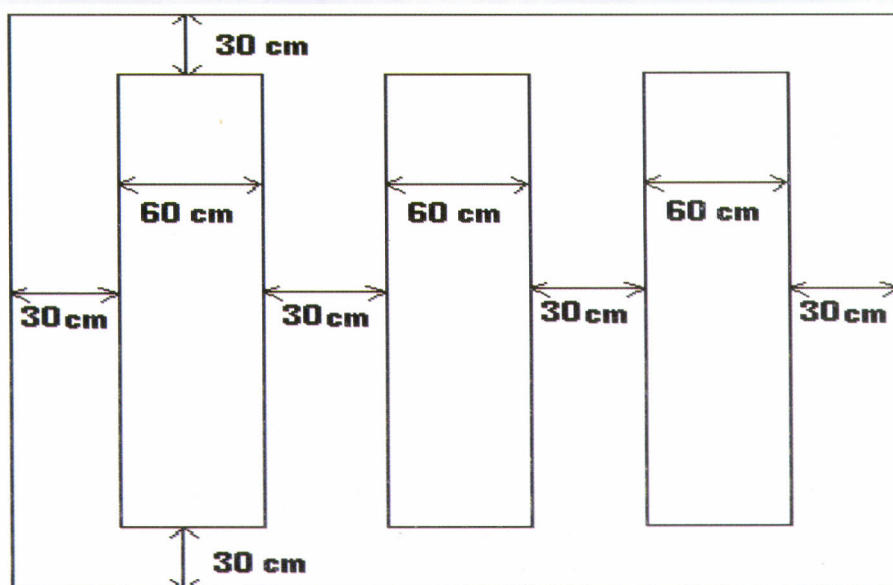
Post-fogging follow-ups:

During and after fogging, the store should remain airtight for 48-72 hours, for the fog vapors to settle down on the tubers.

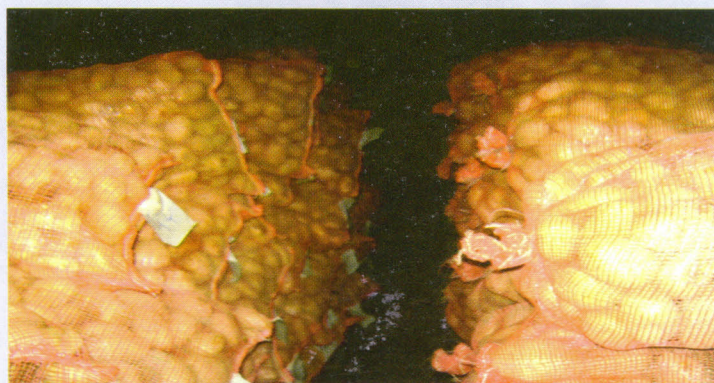
After 48-72 hours of fogging, the store should be open at mid day time to remove the excess carbondioxide from the store.

During the storage, at least weekly watching of temperature, humidity and condition of the tubers is required, so that adequate temperature (above sub-zero during winter months and near about 15°C during peak summer months) and humidity (about 80% or more) could be maintained by opening/closing of door/ventilators and watering in the basement channels of the store.

If there is sign of sprouting on the tubers, another treatment can be repeated in the month of May.



PLAN OF FLOOR



Stack of potatoes inside the store



Treatment result on potatoes

For Further Details Contact:
DIRECTOR
DEFENCE INSTITUTE OF HIGH ALTITUDE RESEARCH
C/O 56 APO
Telefax: 01982-252096