

## Control of sprouting and loss of weight in table potatoes during storage

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**Introduction :** The main object in the storage of any food product is to prolong its edible state for as much time as possible, and to minimise the losses due to dryage or decay that may occur during the period. In the case of perishables like potato, storage losses are bound to be heavy and may occur in various ways. If kept piled in sacks or other containers, the tubers tend to sprout early, with consequent shrinkage and loss in weight and quality. This will be more, if the tubers are harvested after full maturity and some quantity of soil adheres to the tubers, which will be the case when the soil was too wet during lifting. Freshly harvested potatoes, stored under such conditions, are likely to decay quickly.

The successful storage of potatoes depends on a number of factors among which may be mentioned temperature, humidity, aeration, exclusion of light, soundness of tubers stored, freedom from dirt and moisture and the size of the pile.

Studies by various authorities have proved that the germination of potatoes can be arrested when stored at a temperature of 40°F. But, it is not possible for a grower or a dealer to instal the costly equipments to produce the above thermal conditions. Again, while maintaining the above temperature, a humidity of 85 to 90% is recommended, which is also difficult to control. This type of air-conditioning is very costly to instal.

For purposes of aeration, the store should be generously provided with facilities for ventilation. There must be a rapid and even distribution of air circulating in the storage room. The potatoes, to get the full benefit of aeration, have to be kept in open crates or shallow trays which should be stacked in tiers. This again, is a costly affair.

The quality of the potato is very quickly injured by light. Table potatoes should not be exposed to light any more than is absolutely necessary after harvest. It has been found that an exposure of two or three days to strong light (not sunlight), considerably affects the eating quality, and a long exposure to even a very weak light is also harmful. The storage room should, therefore, be kept as dark as possible.

The soundness of tubers stored is another important factor. Material infected with disease or mechanically injured during harvest, such as bruised and cut tubers, will have to be rejected from the ware, since these decay rapidly and offer easy points of infection for a number of storage decay organisms.

Losses during storage, normally, amount to nearly 20%, even in countries with a cool climate. In the case of warm countries like India, it is very much more. Hence measures to prolong the dormancy of the stored tubers by fairly inexpensive means are very important.

Kidd (1), concluded that concentration of 20% carbon-dioxide in storage atmosphere inhibited sprouting. Huelin (2), recorded that the presence of 0.1% of ethylene in the storage room was effective, and that retarding effects on sprouting were also exhibited by geraniol, citral, ethyl alcohol and acetaldehyde. Guthrie (3), successfully inhibited the sprouting of Irish Cobbler potatoes by storing them in a closed container, in the presence of a filter paper which had been impregnated with the methyl ester of alpha-naphthalene-acetic acid, or by keeping them in paper bags, the insides of which had been sprayed with an acetone solution of the ester. Denny (4), found that after five months of storage in wooden bins with the above ester, at 100 mgr. per kilogram, the uptake by the tubers was only about five mgr. per kilogram and that, of this, nearly four-fifths was in the peel. Working on the physiological effects of such a treatment, Shrivenberg and Veldstra (5), concluded that the ester produced no adverse effects on the colour, flavour or texture of the cooked tubers.

**Trials at the Agricultural Research Station, Nanjanad :**  
With the approval of the Director of Agriculture, Madras, a proprietary product "Barsprout", manufactured by the American Cyanamid Co., and containing as its active ingredient, the methyl ester of naphthalene-acetic acid, constituting 2.2% by weight in an inert vehicle amounting to 97.8%, was taken up for trials. The preparation claimed to inhibit sprouting of eating potatoes and also to retard sprouting and root formation on root crops like beets, carrots and turnips. The volatile chemical, it was stated, when distributed on the potatoes as they are put in storage, would vaporise into the eyes of the potatoes in sufficient strength to inhibit sprouting; that treated potatoes, put into normal storage in summer and fall, would be found still practically sproutless the following spring; that test lots, kept at 52°F for twelve months, had not sprouted; and finally, that extensive tests, conducted by the Boyce Thompson Institute for Plant Research, had shown that the active chemical in the product imparted no harmful effect to the treated tubers.

Carefully graded, uniform-sized tubers of the variety, Great Scot, directly after second-crop harvest, were used for the trials. The amount of tubers used per treatment was kept at five lb., replicated six times for the investigation as follows:

Treatment A:	Not treated (Control)			
Do.	B:	Treated with Barsprout at 1 gram per lb. of tubers.		
Do.	C:	do.	1.5	do.
Do.	D:	do.	2	do.

After a thorough mixing with the product, which was in the form of a fine powder, the materials of the different treatments were individually packed well in butter paper and kept away over wooden racks.

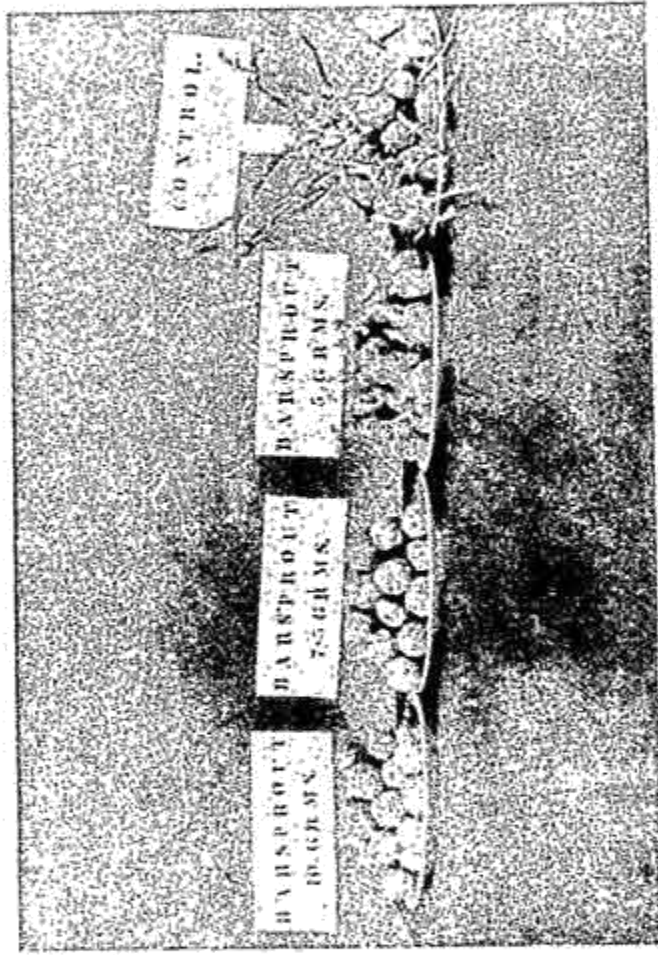
Exactly after a period of four months and a half, on 19-7-1951, one replicate was removed and opened for inspection. While the untreated control (A) had developed long sprouts, it was found that the treated lots were maintaining the dormant stage.

Again, after a total period of seven months and a half from the start, on 19-10-1951, the packets were opened and quantitative determinations of loss in weight and extent of sprouting made, as recorded below:

**TABLE.**  
Storage losses and sprouting.

Treatment	Weight of tuber				Percentage of loss in tuber weight	Average length of sprouts in cm.
	At the start on 5-3-1951		At close on 19-10-1951			
	lb.	oz.	lb.	oz.		
A: Control	5	0	1	7	71.25	36
B: treated at 1 grm. per lb.	5	0	3	3	36.25	6
C: treated at 1.5 grm. per lb.	5	0	3	5	33.75	5
D: treated at 2 grm. per lb.	5	0	3	13	23.75	3

**Conclusion:** From the above table, it is seen that while the percentage of loss in the untreated material due to dryage and shrinkage, consequent on loss of moisture by transpiration and sprouting, was as high as nearly three-fourths of the total weight of the material stored, it amounted to only about a third of the total initial weight of tubers in treatments using one gram and 1.5 grams of the product, and barely one-fourth in the treatment with two grams of the chemical. The use of the preparation had remarkably cut down storage losses. At the same time it was found that the extent of sprouting was also considerably less, the growth-length which averaged 36 cm. in the untreated material coming down to a



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mere three cm. in the treatment where the highest dose of product (two grams per lb.) was used. Since the ester, as per the authorities cited, is claimed to be harmless to the consumer by feeding trials, subject to the prescribed limits of concentration, the use of this and similar products may be deemed to be a safe and good practice, to keep off storage losses of potatoes.

**Summary:** Due to lack of proper storage facilities, there are always potato growers who are obliged to sell their crop as harvested, regardless of the price they get. Thus, they are at the mercy of the merchants who depress the price at the expense of, and loss to, the potato farmer. The article supplies information on the possibilities of the ryot being in a position to hold the crop for a rise in market prices by use of harmless chemicals, for keeping his stored ware in sound condition, in the absence of good storage or warehouse facilities.

## REFERENCES:

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