



## REVIEW ARTICLE

## EFFECT OF DEHAULMING METHODS AND TIMING ON YIELD AND STORABILITY OF POTATO IN KATHMANDU, NEPAL

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## ARTICLE DETAILS

## Article History:

Received 19 March 2025  
Revised 27 March 2025  
Accepted 15 April 2025  
Available online 07 May 2025

## ABSTRACT

An experiment was conducted at a farmer's field in Sankharapur, Kathmandu, Nepal, from March to June 2024 to demonstrate the Effect Of Dehaulinging Methods And Timing On Yield And Storability Of Potato. The experiment was laid out in a randomized complete block design (RCBD) with five treatments and four replications. The various treatments used in the experiment were T1: No Dehauling (Farmer's Practice). T2: Hand Cutting + 1 week before harvest T3: Chemical Dehauling + 1 week before harvest T4: Hand Cutting + 2 weeks before harvest T5: Chemical Dehauling + 2 weeks before harvest. The data were analyzed with R-Studio software at a 5% level of significance. Dehaulinging methods and timing did not significantly affect tuber yield or dry matter content. Dehaulinging 1 week before harvest consistently produced the best results (0.66476) across all storage parameters. Dehaulinging 2 weeks before harvesting significantly reduces yield (2194.94 kg/ha) and storage quality. Again, the dehaulinging method, whether done by hand or by chemical means, did not significantly influence the outcomes. Farmers may, therefore, choose methods of dehaulinging that suit their preferences, financial status, or environmental consciousness.

## KEYWORDS

Dehauling, Storability, Yield

## 1. INTRODUCTION

## 1.1 Background

Potato (*Solanum tuberosum* L.) is one of the most significant food crops growing around the world. It is listed position number four, succeeding maize, wheat, and rice concerning its total production (FAOSTAT, 2021). The potatoes have increased necessary to ensure that there will be food production and economic sustainability, especially in developing countries, where it constitutes a staple food crop (Devaux et al., 2014). If the yellowing of aerial parts has occurred, dehaulinging can be done because the yellowing of the vine means maturity of potato (Lutaladio and Ortiz, 2009). The timings of dehaulinging vary according to varieties, with the general norm that the non-disease-resistant varieties are dehaulinged earlier than the disease-resistant varieties (Virtanen et al., 2013). Generally, two methods of dehaulinging are: Mechanical methods: Haulm cutting: In this method, aerial parts are cut with sharp objects. Manual cutting takes around 40 man-hours per hectare, and hence advanced haulm cutters have been developed to increase field efficiency and cutting efficiency (Titiwa et al., 2019). Chemical method: Chemically by spraying various chemicals in foliage so as to cause plant death. It is much slower than the other methods ("Seed Potato Dehaulinging Methods", 2019). Paraquat as chemical agent has been studied widely as an effective chemical dehaulinging agent in the potato production. Chemical haulm destruction is a common practice in the potato cultivation to facilitate the harvest, control tuber size, and manage cropping.

## 1.2 Statement of Problem

In Sankhu, potato producers typically harvest potatoes according to their immediate requirements, digging them up when potato prices rise high in

the market instead of the set dehaulinging procedure. Many storage-related issues faced by potato growers in Nepal, which can have a big influence on their livelihood and revenue. A few of the main issues are as follows:

## 1.2.1 Insufficient Storage Facilities

- Conventional storage techniques: Farmers frequently use crude techniques, such as pits, sacks, or barns, which are not ideal for long-term storage.
- Inadequate capacity: Farmers are frequently forced to sell some of their produce right away after harvest since existing storage facilities are frequently unable to hold the full crop.

## 1.2.2 Losses Following Harvest

- Spoilage and rotting: Poor storage conditions can cause sprouting, rotting, and other types of spoiling, which can cost a lot of money.
- Insect infestations: Infestations by pests such as potato tuber moths can harm and lower the quality of potatoes that are kept in storage.
- Regional limitations: Lack of infrastructure and transport options in rural locations.

## 1.3 Justification

Potatoes are a staple food crop worldwide and optimizing potato yields is crucial for food security and economic sustainability. Dehaulinging, the process of removing the aboveground plant parts (haulms) before harvesting, is a common practice in potato cultivation. It is believed to influence the tuber bulking process, maturity, and yield. However, the

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DOI:  
10.26480/aedc.02.2025.101.108

effect of different dehauling methods and timings on potato yield is not well understood, leading to potential yield losses or inefficient use of resources.

The rationale for conducting this research is multifaceted:

**Yield optimization:** By understanding the effects of dehauling methods and timings on potato yield, growers can make informed decisions to maximize their potato production. This knowledge can help increase yields, leading to greater food availability and improved economic returns for farmers.

**Resource efficiency:** Different dehauling methods (mechanical, chemical, or a combination) have varying costs, labor requirements, and environmental impacts. Determining the most effective and efficient method can help farmers optimize resource utilization, reduce unnecessary expenses, and minimize environmental footprints.

**Crop management strategies:** The timing of dehauling is crucial as it can affect tuber maturity, skin set, and storability. Understanding the optimal timing can guide farmers in developing better crop management strategies, ensuring high-quality yields and prolonged storage life.

**Addressing knowledge gaps:** Despite the widespread practice of dehauling, there is limited scientific research exploring the combined effects of different methods and timings on potato yield in this area. This study aims to fill this knowledge gap, contributing to the advancement of potato production practices.

## 2. LITERATURE REVIEW

### 2.1 Botany

It belongs to the family Solanaceae, genus Solanum, and species Tuberosum. It is an herbaceous annual plant with underground tubers, which are the edible portion of the plant (Gautam et al., 2009).

### 2.2 Growth Habit and Morphology

The potato plant in Nepal shows a variety of growth habits, ranging from erect through semi-erect to sprawling types according to the variety and culture conditions. The leaves of the plant are compound and characterized by leaflets arranged in an alternate pattern along the stem. The flowers are predominantly self-pollinating, and berries containing many tiny seeds are produced (Shrestha et al., 2015).

### 2.3 Tuber Formation

Daylength, temperature, and genetic factors regarding the cultivar affect tuber formation in potato plants. In Nepal, tuber initiation generally occurs in the summer months when daylengths are short (Bhattarai et al., 2017).

### 2.4 Genetic Diversity

The genetic diversity of potato varieties in Nepal encompasses improved varieties and locally adapted landraces. Such genetic diversity is given by the agro-ecologically diverse conditions of the country, traditional farming practices, and exchange of germplasm between the regions (Shrestha et al., 2015; Gautam et al., 2009).

### 2.5 Dehauling

Dehauling—the deliberate killing or desiccation of the potato plant stems and foliage before harvesting—is a very important agricultural practice in potato cultivation. Such operations are considered to ensure proper yield; the timings and modes of dehauling can affect the complete yield of the potato, which is a very important area of study in regions like Sankhu of Kathmandu, where potato production plays an important role in the local economy and food security.

### 2.6 Effects of Dehauling Methods

Various dehauling methods have been little researched and studied in different potato-growing regions. Chemical desiccation entails herbicide application, either by spraying herbicides or desiccants such as diquat or paraquat, which is in widespread use (Halderson et al., 1988). Mechanical methods of defoliating plants—have been undertaken, involving the manual stripping of foliage or the use of machines, especially in regions where chemical options are unavailable (Pavlista, 2004).

### 2.7 Impact of Dehauling Timing

The timing of dehauling is related to the potato crop's physiological maturity and the desired use for the tubers. Usually, dehauling is done when the crop has maximized its yield potential but is yet to begin any sign of natural senescence (Van Evert et al., 2012).

#### 2.7.1 Physiological maturity

Ideally, dehauling should occur when the crop has reached physiological maturity. This is typically when the lower leaves start to yellow and senesce naturally. A group of researchers found that dehauling at this stage maximizes both yield and dry matter content of tubers (Struik et al., 2005).

#### 2.7.2 Skin set

Dehauling 10–14 days before harvest allows sufficient time for proper skin set, which is crucial for reducing skinning during harvest and improving storage quality. A group of researchers reported that a minimum of 10 days between vine killing and harvest was necessary for adequate skin set in most potato varieties (Halderson et al., 1988).

#### 2.7.3 Tuber size

The timing of dehauling can be used to control tuber size. Earlier dehauling can limit tuber size, which may be desirable for seed potato production or specific market requirements. A study noted that dehauling 2-3 weeks before the crop would naturally senesce can effectively control tuber size (Kempenaar and Struik, 2007).

#### 2.7.4 Disease management

Different genera of different soil-borne, seed-borne pathogens and many bacteria and fungi like *Rhizoctonia solani* (black scurf), *Phytophthora infestans* (late blight), *Phoma foveata* (gangrene), and *Verticillium dahliae* (*Verticillium* wilt), as well as bacterial diseases, are controlled through the practice of haulm killing (Kempenaar and Struik 2007). Several studies have been conducted to maximize the benefits of haulm killing and minimize soil-transmitted and seed-borne disease in seed potato production (Virtanen et al., 2014).

## 3. MATERIALS AND METHODOLOGY

The details are as follows:

### 3.1 Site description

The experiment was conducted at Sankhu-7, Kathmandu district, Province 5.

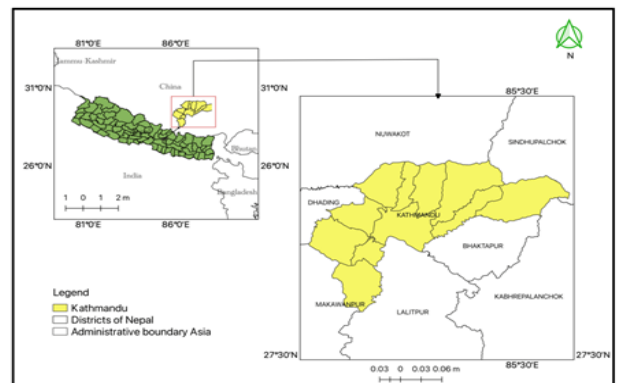


Figure 1: Map of Nepal showing Kathmandu district



Figure 2: Map of Shankharapur (Source: United States National Imagery and Mapping Agency data)

### 3.2 Experimental details

#### 3.2.1 Experimental materials

The experimental materials that are used for the investigation comprise various dehauling methods (hand and chemical method) and timing (2 weeks and 1 week before harvesting). The treatment consists of Janakdev varieties, and there are four replications to be done. Two methods of dehauling are used for commercial production in Kathmandu District.

#### 3.2.2 Date of sowing

**Date of Sowing:** 5th January 2024

#### 3.2.3 Spacing

**Plot description:** The research plot was designed on the standing potato plants cultivated by Farmer, with each treatment plot having five rows of bunds, in order to have the freedom of choosing five random sample plants on a random basis, leaving the plants on the border area.

#### 3.2.4 Design of the experiment

Design: RCBD (Randomized Complete Block Design)

No of Treatments: 5

No of Replication: 4

Single plot size: Farmers Parctice

Spacing between plots: Farmers Parctice

Spacing between replication: Farmers Parctice

Number of plants per plot: 20

Number of sample plants per plot: 5

#### Treatments application

T1: No Dehauling (*Farmer's Practice*)

T2: Hand Cutting + 1 week before harvest

T3: Chemical Dehauling + 1 week before harvest

T4: Hand Cutting +2 weeks before harvest

T5: Chemical Dehauling + 2 weeks before harvest

#### 3.2.5 Field Layout

Individual plots consist of 4 rows with the freedom of choosing 5 sample plant populations randomly. Spacing was for the freedom of practice.

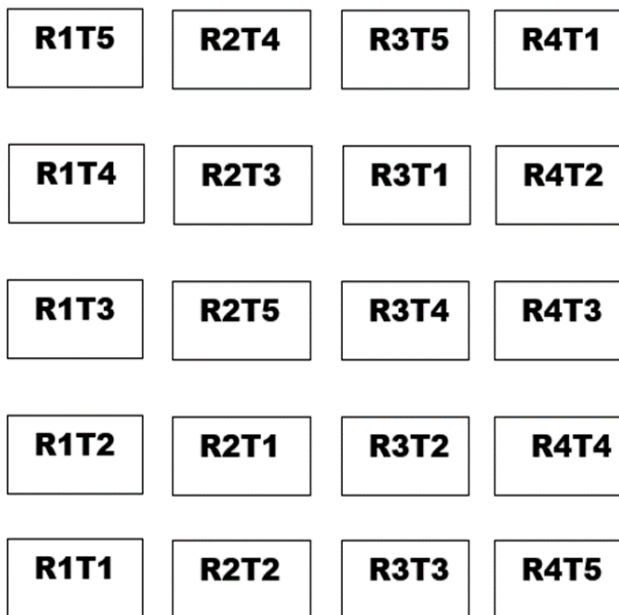


Figure 3: Layout of field

**First Dehauling:** 18th April, 2024

**Second Dehauling:** 25th April, 2024

**Harvesting Date:** 3rd May, 2024

#### 3.2.6 ANOVA TABLE

The ANOVA table for the RCBD with five treatments in four replications was as follows:

Table 4: Anova Table					
Source of Variation	Degrees of Freedom (df)	Sum of Squares (SS)	Mean Square (MS)	F-Value	p-value
Blocks	r-1 = 3	SSB	MSB = SSB/df	MSB/MSE	-
Methods	a-1 = 2	SSA	MSA = SSA/df	MSA/MSE	-
Timing	b-1 = 1	SSB	MSB = SSB/df	MSB/MSE	-
Methods x Timing	1	SSAB	MSAB = SSAB/df	MSAB/MSE	-
Error		SSE	MSE = SSE/df	-	-
Total	Total df - (Rep df + Practice df + Time df + Practice:Time df)	SST	-	-	-

#### 3.3 Detail of the operations

The field was prepared by deep plowing, followed by leveling one week before plantation. Weed trays were removed. The detailed layout was done prior to sowing. Total plots of 20 were prepared according to the experimental design.

##### 3.3.1 Manuring and fertilizer application

Recommended doses of fertilizer potatoes are: FYM: 30 tons/ha Urea: 140 kg/ha DAP: 220 kg/ha MOP: 100 kg/ha (NPDP, 2013/14) Well-decomposed FYM was thoroughly mixed during field preparation. The recommended dose of fertilizer, a half dose of urea, and a full dose of DAP and MOP were applied as basal doses.

##### 3.3.2 Irrigation

Potatoes were irrigated in the field, and watering through cans was also done if necessary. The field should not be flooded, and the water should not reach more than 2/3rd height of the ridges. 3-4 furrow irrigation was given at 60, 75, and 90 DAP.

##### 3.3.3 Earthing up

Earthing up was done at 60 DAP in the research plot.

##### 3.3.4 Haulm pulling

Haulm destruction before harvest was often applied to reduce damage at harvest. Before harvesting, haulms were removed 2 weeks and 1 week earlier by using sickle and chemical dessicants as mentioned above in treatment application. It was evident that good skin formation after haulm destruction was quicker in potatoes, which are close to maturity.

##### 3.3.5 Harvesting

Maturity indices of tubers can be identified by observing haulm that gets yellow with time and later death, the skin set of tuber, or tuber reaches desired size. It was harvested after 10-15 days of haulm pulling. Digging was done with the help of spades or khurpi in small fields.

#### 3.4 Data Collection

For the evaluation of the performance of different varieties, seed tuber yield and physical quality data were collected from the tagged plants at different times according to the requirement. Tuber weight was recorded using a digital weighing balance for accurate results. Five sample plants from each plot, excluding border plants, were selected. From which the following vegetative and yield parameters were studied:

##### 3.4.1 Meteorological data during crop season:

It was recorded during the cropping period from the nearest point of the agrometeorological data recorder. Data were obtained:

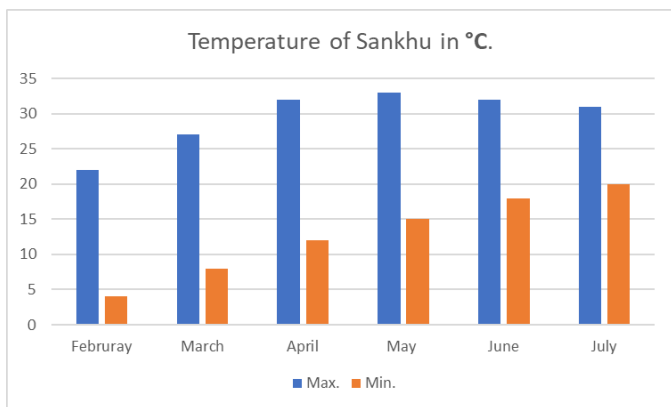


Figure 4: Maximum and minimum temperature during the experimental period

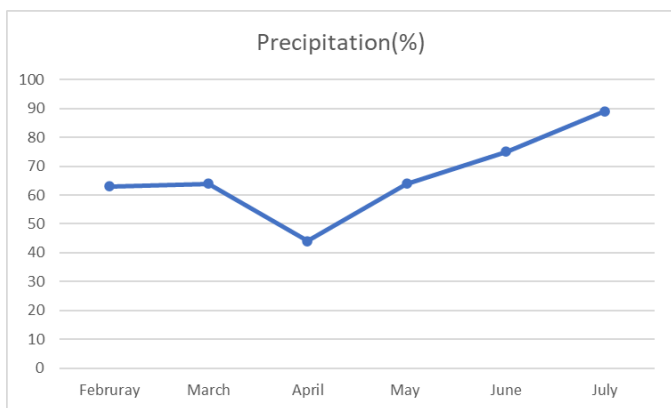


Figure 5: Precipitation during experimental period

### 3.4.2 Soil condition

Before sowing seed, soil samples were collected by using a W-shape pattern at a depth of 15-20 cm from 5 different spots on the research field. The sample that was taken from each location was combined to create a composite sample. Total nitrogen was determined by the Kjeldahl distillation method recommended by some researchers, available phosphorus by Olsen's bicarbonate method recommended and available potassium by the ammonium acetate extraction method using flame photometry (Bremner and Mulvaney, 1982; Olsen, 1954; Simard, 1993). Organic matter was determined by the Walkely and Black method and pH by the Beckman Glass Electrode pH meter (Walkely and Black, 1934; Cottenie et al., 1982). Condition of soil on trial field before conducting research is present in

SN	Parameters	Values
1	N%	0.22
2	P2O5(kg/ha)	72
3	K2O(Kg/ha)	286
4	OM(%)	4.4
5	PH	6.2

Lab details: Ministry of Agriculture and Livestock Development, Harihar Bhawan, Lalitpur

### 3.4.3 Parameters Observed

#### 3.4.3.1 Different yield parameters were

**Average tuber weight (g):** It was recorded as the ratio of the total weight of tubers per sample plant to the number of tubers per sample plant, which was expressed in grams at harvest.

**Marketable seed tuber yield (g):** At harvesting, the plants harvested from

the net area were taken from each plot for determining marketable seed tuber yield.

**Unmarketable tuber yield(g):** diseased, rotten, insect-attacked, deformed tuber were weighed and tabulated.

**Total tuber yield (g):** Total tuber yield was recorded as the sum of marketable seed tuber and unmarketable tuber yield.

### 3.4.4 Storability

After harvesting, diseased, deformed, pest-infested, and wounded potatoes were separated. Healthy and good potatoes from each treatment were combined, and a sample of 4 kg was separated. During the whole storage period, data was taken in the initial phase, midphase, and terminal phase of the storage period. Then, after each data take, the unhealthy tubers were removed.

#### 3.4.4.1 Healthy Weight Ratio at 50 Days

=> Healthy Weight Ratio = (Weight of healthy tubers at 50 days after harvest) / (Total weight of tubers at 50 days)

#### 3.4.4.2 Healthy Number Ratio at 50 Days

=> Healthy Number Ratio = (Number of healthy tubers at 50 days after harvest) / (Total number of tubers at 50 days)

#### 3.4.4.3 Storability Ratio by Weight

Storability Ratio by Weight = Healthy Weight at 50 Days / Initial Sample Weight

#### 3.4.4.3 Storability Ratio by Number

Storability Ratio by Number = (Number of healthy tubers at 50 days) / (Initial number of tubers)

### 3.4.5 Dry matter calculation

From each treatment plot, potato samples were separated. Dry matter was then taken in three phases: initial, mid, and final of the storage period.

Dry Matter (%) = (Dry Weight / Wet Weight) \* 100

## 4. RESULTS AND DISCUSSION

### 4.1 Effects of dehauling methods and timing on Tuber yield per plant and productivity

#### 4.1.1 Average Tuber yield per plant (gm)

While there were numerical differences in yield between treatments, these differences were not statistically significant. This parameter was not related to haulm cutting because tuber formation in potatoes was almost completed within 50 days. Harvesting Day had the highest yield (41.27 gm), followed by 1 week before harvesting (39.78 gm), and 2 weeks before harvesting (36.02 gm).

FACTORS	TREATMENTS	Average Yield(gm)
METHODS	Hand Cutting	35.64
	Chemical Used	40.15
	LSD (0.05)	22.24
	SEm (±)	1.27
	f-prob	ns
	CV, %	25.57
Harvesting Timing	Harvesting Day	41.26
	1 week before harvesting	39.77
	2 weeks before harvesting	36.01
	LSD (0.05)	22.24
	SEm (±)	1.55
	f-prob	ns
	CV, %	25.57
	<b>Grand Mean</b>	<b>38.57</b>

NOTE: CV: Coefficient of Variation; means with the same letters are non-significant at p = 0.05 by DMRT; SEm: Standard error of mean; '\*\*\*\*'

Significant at 1% level of significance; ns: non-significant

#### 4.1.2 Productivity

Only timing showed statistical significance ( $p = 0.02$ ). No significant interaction between practices and timing ( $p = 0.66$ ). Replication effects were non-significant ( $p = 0.91$ ). The choice of dehauling method (none, hand cutting, or chemical) didn't significantly affect productivity. Waterer compared chemical vs. mechanical vine killing in potatoes and found no significant differences between methods (Waterer, 2007). Timing was

crucial—harvesting 1 week before the usual harvest date appeared optimal. Harvesting 2 weeks early resulted in significantly reduced yields. The grand mean of 2463.94 kg/ha represents the overall productivity across all treatments. However, our results were in contrast with the research results according to who observed a significant effect of the dehauling treatments on tuber yield (Desmukh et al., 2024). This might occur due to missing the recommended dose of fertilisers applied during crop growth.

**Table 7: Productivity of potato affected by dehauling methods and timing at Sankhu, 2024**

FACTORS	TREATMENTS	PRODUCTIVITY(Kg/ha)
<b>METHODS</b>	Hand Cutting	2421.60
	Chemical Used	2506.60
	LSD (0.05)	620.86
	SEm ( $\pm$ )	52.02
	f-prob	ns
	CV, %	16.353
<b>Harvesting Timing</b>	Harvesting Day	2463.27 <sup>ab</sup>
	1 week before harvesting	2733.26 <sup>a</sup>
	2 weeks before harvesting	2194.94 <sup>b</sup>
	LSD (0.05)	620.86
	SEm ( $\pm$ )	63.71
	f-prob	*
	CV, %	16.35
	<b>Grand Mean</b>	2463.93

NOTE: CV: Coefficient of Variation; means with the same letters are non-significant at  $p = 0.05$  by DMRT; '\*\*\*\*' Significant at 1% level of significance; SEm: Standard error of mean; ns: non-significant; WT: weight.

#### 4.2 Effects of dehauling methods and timing on healthy tuber weight after 50 days of harvest

The timing of dehauling was the most crucial factor affecting healthy tuber weight after 50 days of harvest. Dehauling 1 week before harvesting appeared to be the optimal timing for maintaining healthy tuber weight during storage. The method of dehauling (hand cutting vs.

chemical) didn't seem to matter as much as the timing. According to a study, haulm killing would appear to be more effective, whatever the method used, if carried out once the foliage has already activated natural senescence (van Evert et al., 2012). A researcher reported that in order to promote uniform development of skin set and develop resistance to abrasion (excoriation), it has been recommended that potato plant vines be killed 7 to 21 days before harvest (Bohl, 2003). However, the length of time is dependent on the potato variety planted and the maturity of the plant when the vines were killed, and the environmental conditions after the treatment (Zotarelli et al., 2019).

**Table 8: Weight of healthy tubers after 50 days of harvest as affected by different dehauling methods and timing at Sankhu, 2024**

FACTORS	TREATMENTS	Healthy Tubers WT after 50 DAH
<b>METHODS</b>	Hand Cutting	0.62
	Chemical Used	0.57
	LSD (0.05)	0.26
	SEm ( $\pm$ )	0.01
	f-prob	Ns
	CV, %	20.03
<b>Harvesting Timing</b>	Harvesting Day	0.57 <sup>b</sup>
	1 week before harvesting	0.86 <sup>a</sup>
	2 weeks before harvesting	0.32 <sup>c</sup>
	LSD (0.05)	0.26
	SEm ( $\pm$ )	0.01
	f-prob	***
	CV, %	20.03
	<b>Grand Mean</b>	0.59

NOTE: CV: Coefficient of Variation; means with the same letters are non-significant at  $p = 0.05$  by DMRT; SEm: Standard error of mean; ns: non-significant; '\*\*\*\*' Significant at 1% level of significance; DAH: days after harvesting; WT: weight.

#### 4.3 Effects of dehauling methods and timing on healthy tuber number after 50 days of harvest

All methods had the same significance level (a), indicating they performed similarly. Dehauling 1 week before harvesting resulted in the highest healthy tuber number which was significantly better than the other

timings. The method of dehauling (hand cutting vs. chemical vs. no dehauling) didn't seem to matter as much as the timing. According to a study haulm killing would appear to be more effective, whatever the method used, if carried out once the foliage has already activated natural senescence (van Evert et al., 2012). A researcher reported that in order to promote uniform development of skin set and develop resistance to abrasion (excoriation), it has been recommended that potato plant vines be killed 7 to 21 days before harvest (Bohl, 2003). However, the length of time is dependent on the potato variety planted, the maturity of the plant when the vines were killed, and the environmental conditions after the

treatment (Zotarelli et al., 2019).

**Table 9:** Healthy tuber number after 50 days of harvest affected by different dehauling methods and timing at Sankhu, 2024

FACTORS	TREATMENTS	HEALTHY TUBER NUM AFTER 50 DAH
<b>METHODS</b>	Hand Cutting	0.63
	Chemical Used	0.65
	LSD (0.05)	0.26
	SEm ( $\pm$ )	0.01
	f-prob	ns
	CV, %	18.71
<b>Harvesting Timing</b>	Harvesting Day	0.58 <sup>b</sup>
	1 week before harvesting	0.93 <sup>a</sup>
	2 weeks before harvesting	0.35 <sup>c</sup>
	LSD (0.05)	0.26
	SEm ( $\pm$ )	0.01
	f-prob	***
	CV, %	18.71
	<b>Grand Mean</b>	0.63

NOTE: CV: Coefficient of Variation; means with the same letters are non-significant at  $p = 0.05$  by DMRT; SEm: Standard error of mean; \*\*\*\* Significant at 1% level of significance; ns: non-significant; DAH: Days after harvesting

#### 4.4 Effects of dehauling methods and timing on storage index of tuber based on weight.

The timing of dehauling has a highly significant effect on the storage index (indicated by \*\*\* in the ANOVA table, with a very low p-value of  $2.35E-08$ ). Dehauling 1 week before harvesting resulted in the highest storage index (0.66), which was significantly better than the other timings. There's no statistically significant difference between the three

dehauling methods (No Dehauling, Hand Cutting, and Chemical Used) on the storage index based on weight. The interaction between the dehauling method and timing (Pract: Time in the ANOVA table) was not significant (p-value 0.81). Focus on dehauling 1 week before harvesting, regardless of the method used, to maximize the storage quality of potatoes. An experiment conducted showed that the time between haulm destruction and harvest directly correlates with the amount of sclerotia on tubers, which can increase the tubers' susceptibility to damage and infection by rot-causing pathogens in storage (Dijst, 1988). According to a study, the time between haulm destruction and harvesting can be shorter when the haulm destruction is done in a more mature crop (Kempenaar and Struik, 2007).

**Table 10:** Storage index based on weight affected by different dehauling methods and timing at Sankhu, 2024

FACTORS	TREATMENTS	Storage Index Based on Weight
<b>METHODS</b>	Hand Cutting	0.48
	Chemical Used	0.43
	LSD (0.05)	0.14
	SEm ( $\pm$ )	0.008
	f-prob	ns
	CV, %	14.50
<b>Harvesting Timing</b>	Harvesting Day	0.40 <sup>b</sup>
	1 week before harvesting	0.66 <sup>a</sup>
	2 weeks before harvesting	0.24 <sup>c</sup>
	LSD (0.05)	0.14
	SEm ( $\pm$ )	0.01
	f-prob	***
	CV, %	14.50
	<b>Grand Mean</b>	0.44

NOTE: CV: Coefficient of Variation; means with the same letters are non-significant at  $p = 0.05$  by DMRT; SEm: Standard error of mean; \*\*\*\* Significant at 1% level of significance; ns: non-significant.

#### 4.5 Effects of dehauling methods and timing on storage index of tubers based on numbers

The findings for tuber weight, number, and storage index based on weight were very similar to the results for storage index based on number. Once more, the most important factor influencing the storage index based on number was the timing of dehauling. Whether it was based on weight or

number, dehauling one week prior to harvesting seemed to be the best time to maintain the highest storage index. The storage index based on number appears to be largely unaffected by the dehauling technique. An experiment conducted showed that the time between haulm destruction and harvest directly correlates with the amount of sclerotia on tubers, which can increase the tubers' susceptibility to damage and infection by rot-causing pathogens in storage (Dijst, 1988). According to a study, the time between haulm destruction and harvesting can be shorter when the haulm destruction is done in a more mature crop (Kempenaar and Struik, 2007).

**Table 11:** Storage index based on number affected based on different dehauling methods and timing at Sankhu, 2024

FACTORS	TREATMENTS	Storage Index Based on Number
<b>METHODS</b>	Hand Cutting	0.49
	Chemical Used	0.49

**Table 11 (cont):** Storage index based on number affected based on different dehauling methods and timing at Sankhu, 2024

	LSD (0.05)	0.22
	SEm ( $\pm$ )	0.01
	f-prob	ns
	CV, %	20.57
<b>Harvesting Timing</b>	Harvesting Day	0.42 <sup>b</sup>
	1 week before harvesting	0.71 <sup>a</sup>
	2 weeks before harvesting	0.27 <sup>c</sup>
	LSD (0.05)	0.22
	SEm ( $\pm$ )	0.01
	f-prob	***
	CV, %	20.57
	<b>Grand Mean</b>	0.48

NOTE: CV: Coefficient of Variation; means with the same letters are non-significant at  $p = 0.05$  by DMRT; SEm: Standard error of mean; '\*\*\*' Significant at 1% level of significance; ns: non-significant

#### 4.6 Effects of dehauling methods and timing on dry matter content (%) of tubers

Neither the dehauling method nor timing significantly affected dry matter content at 30 or 50 days after harvest. Dry matter content generally increased between 30 and 50 days after harvest, which was a normal occurrence during potato storage. It was supported by the findings of (Souza Krupek, 2018). Dry matter content increased over storage time for

all treatments (30 days: 18.32%, 50 days: 20.59% on average). At 30 days post-harvest, dry matter content ranged from 18.08% to 18.63% across dehauling methods. At 50 days post-harvest, dry matter content ranged from 20.30% to 20.88% across dehauling methods. Differences in dry matter content were not statistically significant for either methods or timing at both 30 and 50 days post-harvest. However, our results were in **contrast with** the research results according to who observed a significant effect of dehauling on the dry matter content of tubers (Desmukh et al., 2024). This might occur due to missing the recommended dose of fertilisers applied during crop growth.

**Table 12:** Dry matter content after 30 days and 50 days of harvest affected by different dehauling methods and timing at Sankhu, 2024

FACTORS	TREATMENTS	30 DAH dry matter content (%)	50 DAH dry matter content (%)
<b>METHODS</b>	Hand Cutting	18.07	20.87
	Chemical Used	18.40	20.29
	LSD (0.05)	4.9	7.55
	SEm ( $\pm$ )	0.28	0.43
	f-prob	ns	ns
	CV, %	11.94	16.26
<b>Harvesting Timing</b>	Harvesting Day	18.63	20.59
	1 week before harvesting	18.84	19.98
	2 weeks before harvesting	17.63	21.18
	LSD (0.05)	4.9	7.55
	SEm ( $\pm$ )	0.34	0.52
	f-prob	ns	ns
	CV, %	11.94	16.26
	<b>Grand Mean</b>	18.31	20.58

NOTE: CV: Coefficient of Variation; means with the same letters are non-significant at  $p = 0.05$  by DMRT; SEm: Standard error of mean; ns: non-significant; '\*\*\*' Significant at 1% level of significance; DAH= days after harvesting; ns = non-significant.

## 5. SUMMARY

My research work was on Effect Of Dehauling Methods And Timing On Yield And Storability Of Potato, Kathmandu, And Treatment applications were T1: No Dehauling (Farmer's Practice). T2: Hand Cutting + 1 week before harvest T3: Chemical Dehauling + 1 week before harvest T4: Hand Cutting +2 weeks before harvest T5: Chemical Dehauling + 2 weeks before harvest. Each treatment had 4 replicas. **Parameters Measured:** Yeild,Productivity, Healthy tuber weight after 50 days of harvest, Healthy tuber number after 50 days of harvest, Storage index based on weight, Storage index based on number, Dry matter content. Key Findings for Tuber Yield (gm) ranged from 35.64 to 41.27 grams across treatments, with the highest yield for No Dehauling (41.27 g) and the lowest yield for Hand Cutting (35.64 g). Earlier dehauling showed a trend of slightly lower yields.

No statistically significant differences between treatments. While caluculating the parameter for only timing showed statistical significance

( $p = 0.02034$ ). No significant interaction between practices and timing ( $p = 0.66$ ). And for Dry matter, Content increased over storage time (30 days: 18.32%, 50 days: 20.59% on average). Range at 30 days from 18.08% to 18.63% Range from 50 days: 20.30% to 20.88%. No statistically significant differences between treatments. Key findings for healthy tuber weight after 50 days of harvest, healthy tuber number after 50 days of harvest, storage index based on weight, and storage index based on number were observed.

No statistically significant differences were observed between dehauling methods for any parameter. Hand cutting showed slightly higher values for most parameters, but differences were not significant. CV% ranged from 14.5% to 20.6% across parameters, indicating acceptable experimental variation. But in the case of the effect of timing, highly significant effects (\*\*\*) were observed for all parameters. A consistent trend across all parameters was seen. 1 week before harvest showed performance. Harvesting day showed intermediate performance. 2 weeks before harvest showed the poorest performance. In case of treatment and timing interaction. There were no significant interactions between the dehauling method and timing. Timing effects were consistent across all dehauling methods

## 6. CONCLUSION

There were no prominent differences in dry matter content (quality) and yield of tubers between the treatments. However, during the storage period, dehauling practices gave better results than farmer practices. Specifically, the timing of dehauling played the crucial role in the longer shelf life in the storage rather than dehauling methods. The research indicates that while dehauling practices in general improve potato storability compared to traditional farmer practices, the specific method of dehauling doesn't significantly impact yield or quality. This is good news for farmers, as it means they don't need to invest in new equipment or drastically change their current practices. The most important finding for farmers is that proper timing of dehauling can significantly extend the shelf life of their potato harvest. This translates to reduced post-harvest losses due to spoilage, allowing farmers to sell more of their harvest, potentially negotiate better prices by selling later in the season when supply is lower, and have more potatoes available for their own consumption. The research findings can be shared with other farmers in Sankhu through workshops, demonstrations, or farmer-to-farmer networks. This peer-to-peer learning can be highly effective in promoting the adoption of improved practices.

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