Original Research Article

EFFECT OF POSTHARVEST DISINFECTION TREATMENTON PHYSICOCHEMICAL PROPERTIES OF CARROTS IN THE ASANTE MAMPONG MUNICIPAL

Comment [u1]: If Replaced with handling

Abstract

The aim of this study was to investigate the impact of postharvest handling practices particularly washing and scraping of carrots, on the physicochemical properties of the vegetable in the Asante Mampong Municipal area. The research was conducted within the catchment areas of three communities (namely Asaam, Kofiase, and Owuobonho) within the Mampong-Ashanti Municipality. The study encompassed three main phases of data collection: field survey, quantitative loss assessment, and interviews combined with laboratory studies.The physicochemical properties that were examined in the study were total soluble solids, moisture content, root firmness, and dry matter content. The dry matter content and the moisture content of the carrots were found to be significantly affected by the different handling practices, particularly washing and scraping as well as the communities from which they were sampled. However, the firmness of carrots as well as the total soluble solids was not observed to be significantly affected by different handling practices and communities. The study highlights the importance of proper postharvest handling practices in maintaining the quality and shelf-life of carrots. The results provide valuable insights for carrot farmers, traders, and consumers in the Asante Mampong Municipal area to adopt improved postharvest handling techniques, thereby reducing losses and enhancing the market value of their produce.

Keywords: Postharvest handling, physicochemical properties, carrots, Asante Mampong Municipality.

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1. INTRODUCTION

1.1 Background

Carrots (*Daucus carota L.*) are root vegetable that belongs to the "*Apiaceae*" family and is cultivated worldwide (Que et al., 2019). They are known for their crunchy texture, sweet flavor, and versatility in cooking. Carrots are typically orange in color, but cultivars exist in purple, black, red, white, and yellow (Massimo, 2013). They are also known for their high nutritional value and versatile culinary uses (Mann and Staba, 2002). In Ghana, carrots are an important crop, particularly in the Asante Mampong Municipal area, where favorable agroecological conditions support their cultivation (Osei-Bonsu et al., 2019). However, despite their economic significance, postharvest losses due to improper handling practices remain a significant challenge for farmers and stakeholders in the carrot production chain (Agyare et al., 2017).Postharvest handling is a critical stage of crop production that immediately follows harvest and includes activities such as threshing, drying, storage, and marketing (Khandai, 2018).The instant a crop is removed from the ground or separated from its parent plant, it begins to deteriorate. Post-harvest treatment largely determines the final quality of the crop, whether it is sold for fresh consumption or used as an ingredient in a processed food product (Khandai, 2018; Kaur et al., 2019).

The most important goals of post-harvest handling are to avoid moisture loss slow down undesirable chemical changes, and avoid physical damage such as bruising, to delay spoilage. In addition to moisture loss and physical damage, post-harvest handling can also affect the nutritional quality of crops. The nutritional quality of field and horticultural crops may be influenced by many factors such as inherent soil composition, climate, the crop and its cultivar, cultural and management practices, and postharvest handling and storage (Hornick, 2005). As such, improving post-harvest handling practices can significantly impact food security andeconomicdevelopment.

Comment [u3]: Within a paragraph don't mix drt topics

Key physicochemical properties of carrots, including total soluble solids, moisture content, dry matter content, color, texture, total soluble solids (TSS), and shelf-life, play an important role in determining the quality and marketability of carrots.The sweetness of carrots is related to their TSS content, which is a measure of the amounts of soluble sugars, organic acids, and other soluble compounds in the carrot (Seljasen et al., 2013). The TSS content of carrots can vary depending on factors such as cultivar, growing conditions, harvest time, and storage conditions. According to Rashidi et al. (2010), carrots have between 8.5 and 12.5% of soluble solids, and their water content and soluble solids typically have a significant impact on both the mechanical qualities and the overall quality traits of fresh fruits and vegetables. In a study that explored the nutritional value of carrots and determined attributes favored by consumers, TSS content was found to vary among different carrot varieties, ranging from 4.6 to 9.3 °Brix (Stefl, 2017).Moisture content is an important physicochemical property of carrots that affects their storage and shelf life. High moisture content can promote the growth of microorganisms and lead to spoilage, while low moisture content can cause the carrot to become dry and tough (Seljasen et al., 2013). According to Rashid et al. (2010), carrots contain 75 – 88% water content with the rest representing the dry matter content.

Dry matter content is the amount of material remaining in a carrot after the moisture has been removed that determines the nutrient content and overall quality of the carrot (Sharma et al., 2012). The dry matter of animals and plant materials would represent all its constituents except water (Fakir et al., 2012). Yusuf et al. (2021) reported the dry matter content of carrots to be between 10.9% to 16.4%. Weight loss is a physical property that can occur during postharvest handling practices such as transportation, storage, and processing, with a high weight loss resulting in decreased marketability due to the loss of product (Stefl, 2017). There is a direct relationship between water loss in horticultural produce and saleable weight and this also constitutes a direct loss in marketing as reported by Abubakar et al. (2020).To ensure high-quality and marketable carrots, it is important to consider these properties during pre- and postharvest handling practices and adopt sustainable practices that minimize physical damage and maintain optimal storage conditions.

After harvest, vegetables including carrots undergo a series of physiological changes such as respiration, transpiration, and ethylene production that can impact their quality, nutritional content, and storage potential (Kader, 2002). These changes contribute to the deterioration of carrot quality and can lead to undesirable postharvest disorders such as wilting, shriveling, softening, and browning (Palma et al., 2016). Understanding these changes is crucial for optimizing post-harvest handling and storage practices to maintain the freshness and nutritional value of carrots.

Postharvest handling techniques such as brushing, washing, and scraping, the application of edible coatings and films such as chitosan, and the use of packaging methods as well as the storage conditions can influence respiration, transpiration, and ethylene production in carrots and lead to changes in its physicochemical properties. Postharvest storage conditions significantly impact the quality attributes of carrots, including moisture content, dry matter content, total soluble solids (TSS) content, and root firmness (Kader, 2002; Nguyen et al., 2016; Mirani et al., 2022).

Storage temperature affects the moisture content of carrots. Mirani et al. (2022) found that the moisture content of carrots decreased with increasing days of storage. Rashidi et al. (2010) and Gupta et al. (2021) also ascertained that the total soluble solids level in carrots significantly increased with storage duration. Higher temperatures can lead to increased water loss and subsequently result in higher moisture content (Nguyen et al., 2016). Conversely, lower temperatures can minimize moisture loss and help maintain desired moisture levels (Kader, 2002). Lower temperatures can help maintain root firmness by slowing down tissue softening processes, while higher temperatures can accelerate softening and result in reduced root firmness (Nguyen et al., 2016). Derry *et al*. (2009) observed that during storage, optimum relative humidity is usually up to 98% to 100%, a state considered to effectively reduce post-harvest produce decay and moisture loss when carefully compared with storage at 90% to 95% relative humidly (RH) (Monaghan, 2006). High humidity can result in moisture absorption and subsequently decrease the dry matter content (Kader, 2002). Insufficient humidity can lead to increased tissue desiccation and softening, resulting in reduced root firmness whilst adequate humidity levels help maintain root turgidity and firmness (Nguyen et al., 2016).The use of various packaging methods as a postharvest management practice for carrots can also influence the vegetable's physicochemical properties. Kumar and Singh (2018) studied the effect of packaging materials on the postharvest quality of carrots and concluded that packaging materials

Comment [u4]:

significantly affect the physicochemical properties and postharvest quality of carrots. Their study also found that polyethylene terephthalate (PET) packaging was the most effective in maintaining the quality of carrots during storage. Proper packaging materials and techniques can regulate moisture levels, preventing excessive moisture loss or uptake and maintaining the desired moisture content in carrots (Liu et al., 2019) whilst minimizing dry matter losses and preserving the desired dry matter content during storage (Ahmed et al., 2020). Zhang and Zhang (2019) examined the impact of Modified Atmospheric Packaging (MAP) on the physicochemical properties and quality of fresh-cut carrots and found that MAP with 5% O_2 and 5% CO_2 was the most effective in maintaining the quality of fresh-cut carrots during storage. Overall, the collective body of literature suggests that postharvest packaging methods significantly influence the quality of carrots (Ayhan et al., 2008; Zhang and Zhang, 2019; Liu et al., 2019). The moisture content of carrots is greatly affected by packaging methods, with high oxygen modified atmosphere packaging (MAP) resulting in lower moisture content compared to low oxygen MAP whilst dry matter content and total soluble solid content are also affected by packaging methods, with lower levels found in high oxygen MAP and higher levels in low oxygen MAP. Additionally, root firmness is positively correlated with the oxygen level in MAP, with low oxygen MAP resulting in firmer roots.The application of edible coatings and films to fruits and vegetables can reduce water loss and help maintain moisture content whilst improving their texture and firmness during storage (Lin and Zhao, 2007; Kocira et al., 2021). Valencia-Chamorro et al. (2012)investigated the effect of chitosan coatings on the quality and shelf life of fresh-cut carrots. They ascertained that chitosan coatings can reduce weight loss, maintain firmness, and delay the browning of cut carrots. Sablani et al. (2012) also found that edible coatings and films impact the TSS content of carrots as they help to maintain sugar levels by reducing moisture loss and creating a modified atmosphere, thus preserving the TSS content and enhancing the sweetness of carrots. Ghasemnezhad et al. (2018) also investigated the effect of chitosan-based edible coating enriched with ginger essential oil on the quality of fresh-cut carrots. The results showed that the coating significantly reduced moisture loss, maintained higher total soluble solid content, and improved the firmness of the carrot. The coating also inhibited microbial growth and extended the shelf life of the carrot. The majority of the research points to significant advantages for both producers and consumers when edible coatings and films are applied to carrots after harvest. Additional investigation is required to determine the effects of various coatings and films on various carrot kinds as well as to uncover any potential issues about the safety or environmental implications of these treatments.The effects of brushing, scraping, and washing on the physicochemical properties of carrots and their quality that have been studied and documented in literature have produced mixed results. Kader (2002) asserted that washing and scraping can reduce the moisture content of carrots, but the extent of the effect depends on the specific washing and scraping methods used. Kumar and Singh (2017) found that washing and scraping significantly reduced the dry matter content and root firmness of carrots.

However, they found that there was no significant effect of these practices on the moisture content and total soluble solid content of the carrots. Liu and Wang (2019) ascertained that postharvest washing and brushing can improve the quality of carrots by reducing the moisture content and total soluble solid content while increasing the dry matter content and root firmness. Zhang and Zhang (2018) concluded that washing and brushing treatments can significantly reduce microbial contamination and improve appearance, but can also lead to moisture loss and reduced firmness.The optimal treatment was found to be washing with 100mg/L chlorine dioxide solutionfollowedbybrushing.

The inconsistency in results regarding the effects of postharvest practices such as washing, scraping, and brushing on carrots can be attributed to several factors, including variations in methods, storage conditions, and cultivars used in the studies. These variations can lead to different outcomes and make it difficult to draw conclusive findings. Therefore, further studies are needed to address these inconsistencies and establish a more comprehensive understanding of the effects of these practices on the physicochemical properties of carrots. By conducting additional research, the existing knowledge can be consolidated, and the reported effects can be verified. This is essential to ensure the reliability and accuracy of the findings. Moreover, conducting further studies can help identify any discrepancies or gaps in the literature, allowing for a more refined and complete understanding of the impacts of postharvest practices on carrot quality. By gaining a better understanding of these effects, farmers and traders can make informed decisions regarding their handling practices and adopt strategies that minimize postharvest losses while maintaining product integrity.Furthermore, it is important to consider the specific cultivars, growing conditions, and postharvest environment of a particular region, such as Asante Mampong in this case as the effects of scraping and washing on carrot quality may vary depending on these factors. Previous studies have not examined the effects of scraping and washing on the specific type of cultivars in Asante Mampong or taken into account the specific growing conditions in the area. The effects of scraping and washing on carrot quality may vary depending on these factors. Conducting a study that considers the growing environment and cultivation practices in Asante Mampong will lead to a more comprehensive understanding of the effects of scraping and washing on the specific cultivar(s) grown in that region. This region-specific study will provide valuable insights into the impacts of postharvest practices on the physicochemical properties of carrots in Asante Mampong and contribute to the knowledge base for carrot growers, processors, and consumers in that area.

Additionally, the research will have practical implications for stakeholders involved in the carrot production chain, including farmers, transporters, storage facilities, and marketers, and can contribute to the development of guidelines, interventions, and best practices for handling produce to ensure its longevity and marketability. As such, the current study intends to evaluate the impacts of postharvest management practices of farmers in the Asante Mampong Municipality on the physicochemical properties of carrots.

Comment [u5]: Introduction is bulky and reviewed out of topic

2.METHODOLOGY:

2.1 Data collection:

The data collection process was conducted in three distinct parts. The first part involved a field survey where information was gathered through personal observations on farmers' farms and interviews with farmers and marketers. The second phase of data collection focused on assessing quantitative loss. This involved determining the extent of loss at different stages, including the farm gate after harvest and the market after transportation. Spoiled carrot roots were counted separately on the farmers' farms and at the market. These counts were then subtracted from the total number of roots harvested or purchased to determine the quantity of marketable produce. The loss assessment was conducted in various farming communities and major marketing centers within the municipality.The third phase of data collection involved interviews, personal observation, and laboratory studies. A well-structured questionnaire was designed specifically for selected carrot farmers, traders, and consumers to capture relevant data. The questionnaire covered a range of topics, including post-harvest handling practices, demographic characteristics of the respondents, on-farm cultural practices, transportation methods, aging, marketing, and post-harvest treatments.

Comment [u6]: why do you select the area??

2.2 Sample:

Random samples of fresh carrots of the Tokita variety were harvested from commercial farmers in three selected communities of Asante Mampong Municipality namely Asaam, Kofiase, and Owuobonho, packed in a sack and transported to the laboratory at the Department of Crop and Soil Science of Kwame Nkrumah University of Science and Technology, following the practices typically employed by the farmers.

2.3 Experimental Design and Treatment:

The experiment was set up in a 3×3 factorial Completely Randomized Design (CRD) with three treatments; comprising of a control treatment; washed treatment and scraped treatment; each with three replications. For the "control" treatment, carrot samples were collected in their natural state, with the soil still attached to the roots, and transported to the Crop and Soil Science Department of Kwame Nkrumah University of Science and Technology for further analysis, providing a baseline or reference point for comparison. By including this control treatment, any observed changes or effects in the other experimental treatments could be compared to the original condition of the carrots when they were collected from the field. A "scraped" treatment was used to investigate the effect of removing the outer epidermis on the physicochemical properties of the carrots, such as moisture content, dry matter content, or total soluble solid content. The samples of carrots were first of all washed to clear the soil samples on them using distilled water. With the use of a metal sponge (steel sponge) / knife, the outer epidermis of the carrot roots was scraped and re-washed. The water particles on the carrot roots were allowed to drain off and randomly placed in the replications.A “washed” treatment was also used to investigate the impact of the washing process on the physicochemical properties of the carrots, such as moisture content, dry matter content, or total soluble solid content. The sampled carrots were washed with distilled water using bare hands to remove dirt and other extraneous materials. The washed carrots were put aside and droplets of water were allowed to drain off before arranging them at random in the replications.

Comment [u7]: For how long you stored? Where did you store or immediately after harvesting?? Clarify it! Following your response there is drt question to be raised

2.4 Parameters Assessed

2.4.1 MoistureContent:

The moisture content of the sample was determined with the use of an electric oven (Wagtech) and an analytical Scale (AAA / 00LE). The weight of the Petri dish was taken after which a slice of the carrots was added to it and re-weighted. The samples were oven dried at a temperature of about 105^{o}C and weighed again after twenty-four hours (24hrs) Rashidi *et al*., 2010).The percentage of moisture content was calculated as

$$\text{Moisure content (\%)} = \frac{\text{initial weight} - \text{weight after drying}}{\text{initial weight}} \times 100$$

where the real fresh weight was the weight minus (-) the petri dish before the drying process and the weight after drying is the weight minus (-) petri dish after the drying process.

2.4.2DryMatter:

The percentage dry matter content of the carrot roots was computed for the period of storage by using the analytical scale module (AAA/OOKE). A total of two (2) grams of each of the two fresh carrots roots was placed in an electric oven and dried up to a temperature of 105^{o} or 24 hours (Asamoah, 2012).

The real dry matter content was computed as $= \frac{\text{Dryweight}}{\text{Freshweight}} \text{x } 100$

2.4.3 Total Soluble Solids

Determination of Total Soluble Solids (TSS) was carried out using a hand-held refractometer, MT- 032QA supplies, LLC. Samples were cut into slices and mashed with a mortar and pestle, after which the juice was squeezed. The squeezed juice was dropped onto a plate and the reading on the prism scale was noted. The prism surface was then manipulated to face a light source. The average of the readings of the total soluble solids (TSS) was calculated using a hand-held refractometer and represented as Brix.

2.4.4 Root Firmness:

The root firmness of two samples of carrot roots was determined using a hand-held penetrometer (FT 327). The pressure was applied steadily until the plunger penetrated the flesh of the root up to the depth mark. The average reading was calculated.

2.5 Statistical Analysis

The data collected both from the field survey and the laboratory studies were statistically analyzed using the statistical package for the social scientist (SPPSS) version 17 software. Data from the laboratory studies were subjected to analysis of variance using Statistic 9 statistical software and the highly significant difference (HSD) test was applied to differentiate between the means that were different, statistically at (P = 0.01) among treatments.

3. RESULTS AND DISCUSSION:

The study involved sampling produce from three communities (Asaam, Kofiase, and Owuobonho) and analyzing the carrots in a science laboratory. The data were analyzed using ANOVA, and the Turkey HSD method was used to separate the means at a 1% level of significance.

3.1 Dry Matter Content

The results in Table 1 show that there is a significant difference in the dry matter content of carrots based on different handling practices and communities since the "P-value" of 0.0004 is less than 0.01. The washed carrots had the highest dry matter content across all three communities, while the scraped carrots had the lowest dry matter content, with Owuobonho having the highest dry matter content in the scraped handling method. The dry matter content of carrots is an important quality parameter that affects the taste, texture, and nutritional value of the carrots.

The results of this study suggest that washing the carrots can help to maintain a higher dry matter content, which is desirable for better-quality carrots. This finding is consistent with other studies that have shown that post-harvest treatments can affect the quality of carrots (Seljasen et al., 2013; Mirani et al., 2022). Additionally, the results suggest that proper handling and storage of carrots are important to maintain their quality. Further research is needed to determine the specific factors that contribute to the differences in dry matter content between handling methods and communities.

Comment [u8]: Even though your future direction is good, why do you thing when you suggest your topic and objectives? Think over; washing, scraping and control with dry matter content

Table 1: Dry Matter Content of Carrots as Influenced by Different Communities and Handling Practices

	Handling Practices (%)			
Community	Control (%)	Washed (%)	Scraped (%)	Means
Asaam	19.80ab	21.06a	6.69c	15.85b
Kofiase	19.69ab	20.96a	6.61c	15.76b
Owuobonho	19.71ab	21.40a	14.67b	18.60a
Means	19.74a	21.14a	9.33b	

CV=9.13

HSD (0.01). Community=2.39, Handling practices =2.38, Community x Handling practices=3.36, *P* value= 0.0004

3.2 Root Firmness

Table 2 shows the firmness of carrots as influenced by different communities and handling practices. The results indicate that there was no significant difference in firmness between the control, washed, and scraped handling practices across all three communities since the "*P-value*" of 0.976 is greater than 0.01. The mean firmness values for all handling practices and communities were similar, with a mean value of 10.75. Firmness is an important quality parameter for carrots as it affects the texture and overall quality of the vegetable. The results of this study suggest that the different handling practices and communities did not significantly affect the firmness of the carrots. However, other studies have shown that post-harvest treatments and storage conditions can affect the firmness of carrots (Seljasen et al., 2013; Ahmed et al., 2018). For example, storage temperature and packaging can affect the firmness of carrots during storage (Asgar, 2020; Mirani et al., 2022).

Overall, the results of this study suggest that the different handling practices and communities did not significantly affect the firmness of the carrots. However, further research is needed to determine the specific factors that contribute to the firmness of carrots and how they can be maintained during post-harvest handling and storage.

Table 2: Firmness of Carrots as Influenced by Different Communities and Handling Practices

	Handling Practices (%)			
Community	Control (%)	Washed (%)	Scraped (%)	Means
Asaam	10.78a	9.78a	9.87a	10.15a
Kofiase	10.71a	10.78a	10.37a	10.62a
Owuobonho	10.77a	9.82a	9.88a	10.15a
Means	10.75a	10.13a	10.04a	

CV=14.82, HSD (0.01), Community=2.39, Handling practices=2.38, Community x Handling practices=3.36, *P* value= 0.976

3.3 Moisture Content:

Table 3 shows the moisture content of carrots as influenced by different communities and handling practices. The results indicate that there was a significant difference in moisture content between the different handling practices and communities since the "*P-value*" of 0.0089 is less than 0.01. The scraped handling practice had the highest moisture content, while the washed handling practice had the lowest moisture content. The mean moisture content values for the control, washed, and scraped handling practices were 82.74, 82.36, and 85.89, respectively. Moisture content is an important quality parameter for carrots as it affects the texture, taste, and overall quality of the vegetable. The results of this study suggest that the different handling practices and communities significantly affected the moisture content of the carrots which is in tandem with other studies that have shown that post-harvest treatments and processing methods can also affect the moisture content of carrots (Sharma et al., 2012;Mirani et al., 2022; Ciurzy´nska et al., 2022).

Table 3: Moisture Content of Carrots as Influenced by Different Communities and Handling Practices

	Handling Practices (%)			
Community	Control (%)	Washed (%)	Scraped (%)	Means

Asaam	82.53bc	80.25c	85.59ab	82.79b
Kofiase	83.05abc	84.59ab	85.69ab	84.44a
Owuobonho	82.63bc	82.25bc	86.39a	83.76ab
Means	82.74b	82.36b	85.89a	

CV=1.20, HSD (0.01), Community=1.54, Handling practices=1.56, Community x Handling practices=3.51, *P* value =0.0089

3.4 Total Soluble Solids:

As seen in Table 4, there were no significant differences between communities and handling practices both between communities and within communities, since the “P-value” of 0.924 is greater than 0.01. However, in all the communities, washed carrots looked superior in terms of soluble solids than the rest of the handling practices across all three communities with scraped carrots recording the lower values of soluble solids. The control treatment in Kofiase recorded better soluble solids (9.16) than Asaam (8.76) and Owuobonho (8.67) while Asaam had a better soluble solids value of 11.16 than Kofiase (10.16) and Owuobonho (11.06). The scraped carrots were not statistically ($p>0.01$) different except that scraped carrots from Asaam had soluble values (9.14) higher than Kofiase and Owuobonho who had 8.95 and 9.077 of soluble solids respectively.

Soluble solids are an important quality parameter for carrots as they affect the taste and nutritional value of the vegetable. The results of this study suggest that washing the carrots can help to maintain a higher soluble solids content, which is desirable for better quality carrots. However, the results also suggest that the different handling practices and communities did not significantly affect the soluble solids content of the carrots. Other studies have shown that pre- and post-harvest factors and processing methods can affect the quality of carrots, including their soluble solids content (Seljasen et al., 2013; Sra et al., 2014; IIic et al., 2017; Dharmarha et al., 2018; Mirani et al., 2022) For example, the time of harvest, post-harvest treatments, and storage conditions can affect the soluble solids content of carrots (Seljasen et al., 2013; IIic et al., 2017; Mirani et al., 2022).

Overall, the results of this study suggest that the different handling practices and communities did not significantly affect the soluble solids content of the carrots. However, further research is needed to determine the specific factors that contribute to the soluble solids content of carrots and how they can be maintained during post-harvest handling and storage.

Table 4: Total Soluble Solids of Carrots as Influenced by Different Communities and Handling Practices

	Handling Practices (%)			
Community	Control (%)	Washed (%)	Scraped (%)	Means

Asaam	8.76a	11.16a	7.50a	9.143a
Kofiase	9.16a	10.16a	7.51a	8.95a
Owuobonho	8.67a	11.06a	7.49a	9.077a
Means	8.87ab	10.80a	7.50b	

CV=16.87, HSD (0.01). Community=2.38 Handling practices=2.42 Community x Handling practices=3.51, *P* value = 0.9241.

Comment [u9]: If there is no drt storage time were not used, is there expected result analysisng compositional analysis except foreign material analysis for control and
Maybe outer part of carrot that was scraped can be vary compositionally

4. CONCLUSION

Based on the results presented in the study, the following conclusions can be drawn; The dry matter content of carrots is significantly affected by different handling practices and communities. Washing the carrots can help to maintain a higher dry matter content, which is desirable for better-quality carrots. The firmness of carrots is not significantly affected by different handling practices and communities. The recommendation is to prioritize washing as a postharvest handling practice to maintain higher dry matter content in carrots, while also ensuring the implementation of proper handling and storage practices to preserve the firmness of the carrots.

The moisture content of carrots is significantly affected by different handling practices and communities. The results suggest that the different handling practices and communities significantly affected the moisture content of the carrots. Implementing proper washing techniques that minimize excessive water uptake and employing effective drying methods are essential to maintain the optimal moisture content in carrots. This will help preserve the quality and shelf life of the carrots. The soluble solids content of carrots is not significantly affected by different handling practices and communities. However, washing the carrots can help to maintain a higher soluble solids content, which is desirable for better quality carrots.

Overall, the study highlights the importance of proper post-harvest handling and storage practices to maintain the quality of carrots. Further research is needed to determine the specific factors that contribute to the quality of carrots and how they can be maintained during post-harvest handling and storage.

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