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Influence of ventilation and humidity during storage on weight and quality changes of *Russet Burbank* potatoes[1]

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Summary

The data reported herein show that maintaining at least 95% relative humidity in the ventilating air caused significantly less weight loss than ventilating with air of 85% relative humidity. In addition, significantly less flattening, shrivelling, and sprouting were found in tubers ventilated with air of 95% relative humidity. There was no difference between the two air humidities in the amount of rot found.

Intermittent ventilation allowed significantly less weight loss than continuous ventilation. Also, intermittent ventilation caused significantly less flattening, less shrivelling, and less sprouting than continuous ventilation.

The processing data indicate that tubers ventilated with air of 95% or more relative humidity resulted in less peel loss, less trim loss, lower sugars content, and in general, produced higher-quality processed products than when the tubers had been ventilated with air of 85% relative humidity.

Introduction

Significant advances have been made in recent years with respect to the technological aspects of potato storage. As a result, quality change and weight loss during storage have been reduced. Fall crop potatoes can now be stored for 11 months or longer without serious quality deterioration and with much less weight loss than was formerly possible. Previous studies have revealed that certain relationships exist between the storage environment, storage management, length of the storage season, and level of weight and quality changes that occur during storage. However, certain environmental factors such as ventilation and humidity were not completely evaluated in terms of their effects on either weight loss or quality change. The data presented herein point out the interrelationships between the storage environment and weight and quality changes occurring to *Russet Burbank* potatoes throughout a 330-day storage period.

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Materials and methods

Russet Burbank potatoes grown at the University of Idaho, Aberdeen Branch Agricultural Experiment Station, were harvested, placed in storage research bins in the storage research building, and treated with a sprout inhibitor. Each of the bins held about 1800 kg (4000 pounds) of potatoes. The temperature, humidity and flow of air through each bin was controlled. The weight losses of the potatoes were obtained by weighing the bins periodically throughout the entire storage period. In each of two years, there were 14 pairs of bins and in the other two years, there were 16 pairs of bins.

To obtain the recovery rate and processing data, sample bins were removed from the storage at intervals, potatoes examined for defects, and then processed into various products. The specific gravity of each lot of potatoes was determined by the weights in air and water method. The raw product was analysed for sugar content. The quality of the finished product from each lot of potatoes was determined by standard procedures.

Two variations of ventilation management were used to control the temperature within the bins – intermittent and continuous. When ventilated intermittently, the tubers were supplied with air only as often and as long as was necessary to maintain a uniform temperature within the mass of potatoes, whereas with continuous ventilation, air was supplied 24 hours a day, throughout the storage season.

Two variations in the relative humidity of the air in the bins were used – 85% and 95%. The proper relative humidity was maintained by operation of louvres, refrigeration coils, and humidifiers.

Results

Potato weight loss

The weight that potato tubers lose during storage is influenced by a number of factors, such as amount of injury, presence of diseases, field frost and water rot. Also, the variety of potatoes grown, the cultural and climatic conditions under which they were grown can have some effect. However, for the purpose of this paper, only the effects of the relative humidity of the ventilating air and continuous versus intermittent ventilation are considered.

Ventilation. Ventilating the potato tubers intermittently at the rate of about 0.3 m^3 per minute per 1000 kg (0.5 ft ^{3}/min per 100 pounds) showed significantly less weight loss than when the air was provided continuously (Table 1). At the end of a 30-day period, the bins ventilated continuously showed 0.34% more weight loss than comparable bins receiving air of the same temperature and humidity intermittently. The bins under continuous ventilation continued to lose weight more rapidly than those receiving air intermittently, and at the end of the 330-day storage period had lost 1.42% more weight than had the latter.

Table 1. Influence of ventilation during storage on the periodic weight loss of *Russet Burbank* potatoes (4-year means).

Ventilation[1]	Days of storage[2]										
	30	60	90	120	150	180	210	240	270	300	330
Intermittent[3]	1.19	1.90	2.46	2.85	3.29	3.78	4.30	4.95	5.76	6.61	7.84
Continuous[4]	1.53	2.39	3.10	3.61	4.14	4.77	5.41	6.13	7.00	7.88	9.26
LSD 0.05	0.26	0.25	0.37	0.49	0.54	0.57	0.68	0.74	0.84	0.73	0.60
LSD 0.01	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	1.11

n.s. = Not significant – *Nicht signifikant – Non significatif*

[1] *Belüftung – Ventilation*
[2] *Lagerdauer in Tagen – Jours de stockage*
[3] *Unterbrochen – Intermittente*
[4] *Dauernd – Continue*

Tabelle 1. Einfluss der Belüftung während der Lagerung auf den periodischen Gewichtsverlust von Kartoffeln der Sorte *Russet Burbank* (Mittel von 4 Jahren).
Tableau 1. Influence de la ventilation pendant le stockage sur la diminution périodique de poids de pommes de terre *Russet Burbank* (moyenne de 4 années).

Relative humidity of the ventilating air. The four years of data reported herein show that when the relative humidity (r.h.) of the ventilating air was at least 95%, the weight losses were significantly less than with 85% r.h. (Table 2). After 30 days of storage, the weight loss from the tubers receiving air of 85% r.h. was 1.70% while the tubers receiving air of 95% r.h. or more had lost only 1.02%. After 60 days of storage, air of 85% r.h. had given 2.71% weight loss, and 95% r.h. only 1.57%. In each case these differences were highly significant.

Table 2. The influence of humidity during storage on the periodic weight loss of *Russet Burbank* potatoes (4-year means).

Relative humidity[1] (%)	Days of storage[2]										
	30	60	90	120	150	180	210	240	270	300	330
95	1.02	1.57	2.11	2.44	2.80	3.22	3.64	4.24	5.03	5.86	7.14
85	1.70	2.71	3.45	4.02	4.63	5.33	6.07	6.84	7.72	8.64	9.95
LSD 0.05	0.26	0.25	0.37	0.49	0.54	0.57	0.68	0.74	0.84	0.73	0.60
LSD 0.01	0.48	0.45	0.68	0.90	1.00	1.04	1.24	1.35	1.54	1.35	1.11

[1] *Relative Luftfeuchtigkeit – Humidité relative*
[2] *Lagerdauer in Tagen – Jours de stockage*
Tabelle 2. Einfluss der Luftfeuchtigkeit während der Lagerung auf den periodischen Gewichtsverlust von Kartoffeln der Sorte *Russet Burbank* (Mittel von 4 Jahren).
Tableau 2. Influence de l'humidité pendant la conservation sur la diminution périodique en poids de pommes de terre *Russet Burbank* (moyenne de 4 années).

The tubers ventilated with air of 85% r.h. continued to lose weight more rapidly throughout the entire storage period than did those that received air of 95% r.h. After 330-days of storage, weight loss with 85% r.h. was 9.95%, and with 95% r.h. only 7.14%. This is a highly significant difference.

The least weight loss during storage occurred when the tubers were ventilated intermittently with air of at least 95% r.h. (Table 3). After 30 days of storage, the bins receiving intermittent ventilation of 95% r.h. had lost 0.94% of their original weight, and the bins receiving continuous ventilation of 95% r.h. 1.10% – a non-significant difference. However, intermittent ventilation of 85% r.h. caused an average weight loss of 1.44%, and continuous ventilation of 85% r.h. 1.96%. These losses are significantly higher than those from the bins ventilated intermittently with air of at least 95% r.h.

After 90 days of storage, each treatment was significantly different from each other treatment. Intermittent ventilation with air of 95% r.h. had caused significantly less weight loss than any other treatment. In turn, continuous ventilation with air of 95% r.h. gave significantly less weight loss than did intermittent or continuous ventilation with air of 85% r.h.

The weight losses from the various treatments continued to diverge throughout storage, and after 330 days each treatment was still significantly different from each other treatment. Intermittent ventilation with 95% r.h. gave 6.38% weight loss, continuous ventilation with 95% r.h. 7.90%, intermittent ventilation with 85% r.h. 9.30%, and continuous ventilation with 85% r.h. 10.61%.

Table 3. The influence of ventilation and relative humidity (r.h.) during storage on the periodic weight loss of *Russet Burbank* potatoes (4-year means).

r.h. (%)	Ventilation management[1]*	Days of storage[2]										
		30	60	90	120	150	180	210	240	270	300	330
95	I	0.94	1.41	1.85	2.11	2.43	2.78	3.12	3.67	4.42	5.24	6.38
95	C	1.10	1.74	2.36	2.77	3.17	3.66	4.15	4.80	5.64	6.48	7.90
85	I	1.44	2.38	3.07	3.59	4.15	4.78	5.47	6.22	7.10	7.99	9.30
85	C	1.96	3.05	3.84	4.45	5.11	5.89	6.67	7.45	8.34	9.28	10.61
LSD	0.05	0.34	0.38	0.36	0.35	0.36	0.36	0.42	0.47	0.52	0.62	1.22
LSD	0.01	0.51	0.57	0.54	0.53	0.54	0.55	0.64	0.71	0.78	0.94	1.85

*I = Intermittent – *Unterbrochen – Intermittente*
C = Continuous – *Dauernd – Continue*

[1] *Belüftungsverfahren – Régime de ventilation*
[2] *Lagerdauer in Tagen – Jours de stockage*

Tabelle 3. Einfluss von Belüftung und relative Luftfeuchtigkeit (r.h.) während der Lagerung auf den periodischen Gewichtsverlust von Kartoffeln der Sorte *Russet Burbank* (Mittel von 4 Jahren).
Tableau 3. Influence de la ventilation et de l'humidité relative (r.h.) pendant la conservation sur la diminution périodique en poids de pommes de terre *Russet Burbank* (moyenne de 4 années).

Potato quality change

Potato quality in Idaho must be considered from the standpoint of both the fresh and processing markets. The fresh market is concerned with the external appearance as well as the internal or cooking quality of the tubers. The processing market is concerned with those tuber characteristics, whether external or internal, which influence the quality of the processed product. The maintenance of a high-quality raw product for both markets is affected by the storage management and the environmental factors to which the tubers are subjected during storage.

Ventilation. Because of the dual market which Idaho *Russet Burbank* potatoes serve, any defect which would detract from the appearance of the potatoes has to be considered as a quality defect for the fresh market shipper. Therefore, such changes as rotten, flattened, shrivelled, or sprouted tubers are considered as quality defects.

The data obtained during this study show that after 330 days of storage, there was no significant difference in the percentage of rotten tubers, regardless of the method of supplying air to the potatoes (Table 4). However, continuous ventilation resulted

Table 4. The influence of ventilation during storage on the quality changes of *Russet Burbank* potatoes after 330 days of storage (4-year means).

Ventilation management[1]	Rotted[2] (%)	Flattened[3] (%)	Shrivelled[4] (%)	Sprouted[5] (%)	Total* quality faults[6] (%)	Weight loss[7] (%)	Total loss[8] (%)
Intermittent[9]	1.77	4.67	2.15	2.30	10.88	7.84	18.72
Continuous[10]	1.96	6.86	2.72	3.09	14.67	9.26	23.93
LSD 0.05	n.s.	0.96	n.s.	n.s.	2.56	0.60	3.05
LSD 0.01	n.s.	1.76	n.s.	n.s.	n.s.	1.11	n.s.

n.s. = Not significant – *Nicht signifikant – Non significatif*

*Totals may differ from the sum of individual categories because of rounding off to the nearest 0.01 % in every case – *Die Gesamtsummen können infolge Auf- oder Abrundens auf das nächste 0,01 % in jedem Fall von den Summen der einzelnen Kategorien abweichen – Les totaux peuvent différer de la somme des parties parce que, dans chaque cas, on a arrondi les nombres au plus proche 0,01 %*

[1] *Belüftungsverfahren – Régime de ventilation*
[2] *Verfault – Pourriture*
[3] *Druckstellen – Aplatissement*
[4] *Geschrumpft – Ratatinement*
[5] *Ausgekeimt – Germination*
[6] *Total Qualitätsmängel – Pertes totales de qualité*
[7] *Gewichtsverlust – Pertes en poids*
[8] *Gesamtverlust – Pertes totales*
[9] *Unterbrochen – Intermittente*
[10] *Dauernd – Continue*

Tabelle 4. Einfluss der Belüftung während der Lagerung auf die Qualitätsveränderungen von Kartoffeln der Sorte *Russet Burbank* nach 330 Tagen Lagerung (Mittel von 4 Jahren).

Tableau 4. Influence de la ventilation pendant la conservation sur les modifications de qualité de pommes de terre *Russet Burbank* après 330 jours de stockage (moyenne de 4 années).

in significantly more flattened tubers than intermittent ventilation. Continuous ventilation of the bins resulted in 14.67% grade defects as compared to 10.88% grade defects in the bins ventilated intermittently.

Relative humidity of the ventilating air. Preliminary data indicated that the relative humidity of the ventilating air had considerable effect on various quality characteristics of both the raw product and processed product; therefore, quality was considered from the standpoint of fresh-market grade defects as well as quality of processed products.

There was no significant difference in rot between tubers ventilated with air of 95% r.h. and those ventilated with air of 85% r.h. (Table 5).

Tubers maintained at 7°C by using air of 95% r.h. or more had significantly fewer flattened, shrivelled, and sprouted tubers than those receiving air of 85% r.h. The 18.22% total grade defects found in tubers ventilated with air of 85% r.h. was significantly higher than the 7.33% defects found in tubers ventilated with air of 95% r.h.

The least quality change occurred when air of at least 95% r.h. was supplied intermittently (Table 6). The 6.30% quality change caused by this treatment was highly significantly less than that found in either of the treatments ventilated with air of 85% r.h.

Processed product quality

Through the excellent cooperation of many processing companies, additional data

Table 5. The influence of humidity during storage on the quality changes of *Russet Burbank* potatoes after 330 days of storage (4-year means).

Relative humidity[1] (%)	Rotted[2] (%)	Flattened[3] (%)	Shrivelled[4] (%)	Sprouted[5] (%)	Total* quality faults[6] (%)	Weight loss[7] (%)	Total loss[8] (%)
95	1.97	2.33	1.12	1.92	7.33	7.14	14.47
85	1.76	9.20	3.79	3.47	18.22	9.95	28.17
LSD 0.05	n.s.	0.96	1.25	0.94	2.56	0.60	3.05
LSD 0.01	n.s.	1.76	2.30	n.s.	4.72	1.11	5.59

*See Table 4 – *Siehe Tabelle 4 – Voir tableau 4*
n.s. = Not significant – *Nicht signifikant – Non significatif*

[1] *Relative Luftfeuchtigkeit – Humidité relative*
[2–8] *Siehe Tabelle 4 – Voir tableau 4*

Tabelle 5. Einfluss der Luftfeuchtigkeit während der Lagerung auf die Qualitätsveränderungen von Kartoffeln der Sorte *Russet Burbank* nach 330 Tagen Lagerung (Mittel von 4 Jahren).
Tableau 5. Influence de l'humidité pendant la conservation sur les modifications de qualité de pomme de terre *Russet Burbank* après 330 jours de stockage (moyennes de 4 années).

Table 6. The influence of ventilation and relative humidity (r.h.) during storage on the quality changes of *Russet Burbank* potatoes after 330 days of storage (4-year means).

r.h. (%)	Ventilation management[1]	Rotted[2] (%)	Flattened[3] (%)	Shrivelled[4] (%)	Sprouted[5] (%)	Total* quality faults[6] (%)	Weight loss[7] (%)	Total loss[8] (%)
95	intermittent[9]	1.99	1.82	0.84	1.66	6.30	6.38	12.68
95	continuous[10]	1.94	2.84	1.40	2.18	8.36	7.90	16.26
85	intermittent	1.54	7.52	3.47	2.94	15.46	9.30	24.76
85	continuous	1.98	10.88	4.11	4.00	20.97	10.61	31.58
LSD 0.05		n.s.	3.81	1.78	1.69	5.74	1.22	5.82
LSD 0.01		n.s.	5.76	2.69	n.s.	8.69	1.85	8.81

*See Table 4 – *Siehe Tabelle 4 – Voir tableau 4*
n.s. = Not significant – *Nicht signifikant – Non significatif*

[1–10] *Siehe Tabelle 4 – Voir tableau 4*

Tabelle 6. Einfluss von Belüftung und relative Luftfeuchtigkeit (r.h.) während der Lagerung auf die Qualitätsveränderungen von Kartoffeln der Sorte *Russet Burbank* nach 330 Tagen Lagerung (Mittel von 4 Jahren).
Tableau 6. Influence de la ventilation et de l'humidité relative (r.h.) pendant la conservation sur les modifications de qualité de pommes de terre *Russet Burbank* après 330 jours de stockage (moyennes de 4 années).

pertinent to processed product quality were obtained. These data relate to the production of frozen french fried potatoes, potato granules, potato flakes and dehydrated diced potatoes. Because it was not possible to furnish the various processing companies with samples large enough to get quality analyses periodically during the storage season, these data were obtained only from tubers which had been stored for at least 330 days.

The tubers were taken from the various storage environments and sent to several processing companies under lot number. After the companies had run the tubers through their pilot plants or quality testing laboratories, the results were returned to the University of Idaho, Aberdeen Branch Agricultural Experiment Station, decoded, and results interpreted.

Frozen french fries. The peel loss and the trim loss were lower from tubers ventilated with air of 95% r.h. than from tubers supplied with air of 85% r.h. (Table 7). The percentage of solids was lower, but the sugar content was lower, the colour of the fries was lighter, the flavour was better, the texture was mealier, the crispness better, there were fewer limp units, and the recovery rate was significantly higher with tubers ventilated with air of at least 95% r.h.

Table 7. Quality of frozen french fried potatoes as influenced by storage humidity, after 330 days of storage.

Quality characteristic[1]	Relative humidity[2]	
	85%	95%
Peel loss[3] (%)	11.1	9.5
Trim loss[4] (%)	11.6	9.5
Solids[5] (%)	22.8	22.1
Sugars[6] (%)	3.4	2.7
Colour (visual)[7]	good[13]	very good[14]
Colour (chart)[8]	2.0	1.5
Flavour[9]	good—	good
Texture[10]	good	good+
Crispness[11]	C	B
'Limp units'	9	6
Recovery[12]	24.5	31.0

[1] *Qualitätseigenschaften – Caractères de qualité*
[2] *Relative Luftfeuchtigkeit – Humidité relative*
[3] *Schälverlust – Perte à l'épluchage*
[4] *Nachputzverlust – Perte au parement*
[5] *Trockensubstanzgehalt – Matière sèche*
[6] *Zucker – Sucres*
[7] *Farbe (visuell) – Couleur (visuelle)*
[8] *Farbe (Farbkarte) – Couleur (carte de couleur)*
[9] *Geschmack – Goût*
[10] *Körnung – Texture*
[11] *Knusprigkeit – Etat croquant*
[12] *Ausbeute – Rendement*
[13] *Gut – Bon*
[14] *Sehr gut – Très bon*

Tabelle 7. Qualität von tiefgefrorenen Pommes frites, beeinflusst durch die Luftfeuchtigkeit während der Lagerung (Lagerdauer 330 Tage).
Tableau 7. Qualité des pommes frites en fonction de l'humidité pendant la conservation après 330 jours de stockage.

Table 8. Quality of potato granules as influenced by storage humidity (330 days of storage)

Quality characteristic[1]	Relative humidity[2]	
	85%	95%
Solids[3] (%)	23.4	22.9
Peel loss[4] (%)	10.6	8.7
Trim loss[5] (%)	9.0	7.6
Residue[6] (g)	8.1	7.4
'Seed cleaning'	50.2	48.0
+50 Mesh[7]	12.4	11.8
—50 Mesh	38.0	38.5

[1–5] *Siehe Tabelle 7 – Voir Tableau 7*
[6] *Rückstand – Résidu*
[7] *Maschen- mailles*

Tabelle 8. Qualität von Kartoffel-Granulaten, beeinflusst durch die Luftfeuchtigkeit während der Lagerung (Lagerdauer 330 Tage).
Tableau 8. Qualité des granules de pomme de terre en fonction de l'humidité pendant la conservation (330 jours de stockage).

Table 9. Quality of potato flakes as influenced by storage humidity (330 days of storage).

Quality characteristic[1]	Relative humidity[2]	
	85%	95%
Solids (2 stage)[3] (%)	23.4	22.2
Sugar[4] (%)	4.1	3.5
Colour[5]	69.0	68.0
Texture[6]	A	A
Flavour[7]	good[9]	good
4 h on 'steamtable'[8]	good	good

[1] *Qualitätseigenschaften – Caractères de qualité*
[2] *Relative Luftfeuchtigkeit – Humidité relative*
[3] *Trockensubstanzgehalt (2 Phasen) – Matière sèche (2 phases)*
[4] *Zucker – Sucre*
[5] *Farbe – Couleur*
[6] *Körnung – Texture*
[7] *Geschmack – Goût*
[8] *4 Std. 'steamtable' – 4 heures au conservateur à vapeur*
[9] *Gut – Bon*

Tabelle 9. Qualität von Kartoffelflocken, beeinflusst durch die Luftfeuchtigkeit während der Lagerung (Lagerdauer 330 Tage).
Tableau 9. Qualité des flocons de pomme de terre en fonction de l'humidité pendant la conservation (330 jours de stockage).

Potato granules. The peel loss and the trim loss were less when the tubers were processed into granules than when they were processed into frozen french fries: however, the tubers ventilated with air of at least 95% r.h. showed less peel loss and less trim loss than tubers ventilated with air of 85% r.h. (Table 8). The non-saleable fractions of the granule process – residue, seed cleaning and +50 mesh – were greater from tubers ventilated with air of 85% r.h. than from tubers ventilated with air of 95% r.h.

Potato flakes. The data received from the potato flake manufacturers indicate that the solids were higher and the colour slightly better in the tubers ventilated with air of 85% r.h., but that the sugar content, which is one of the most important quality characteristics, was lower in the tubers ventilated with air of 95% r.h. (Table 9). The other quality characteristics reported – texture, flavour, and after 4 hours on the steamtable – were equal and acceptable.

Dehydrated diced potatoes. The percentage of solids was higher in tubers ventilated with air of 85% r.h. than in those receiving air of 95% r.h. or more. (Table 10). The flavour and odour quality characteristics were equal and acceptable. The reconstitution ratio was slightly higher from the tubers ventilated with air of 85% r.h.; however the colour of the reconstituted product was better from tubers that had been ventilated with air of at least 95% r.h.

Table 10. Quality of potato dice as influenced by storage humidity (330 days of storage).

Quality characteristic[1]	Relative humidity[2]	
	85%	95%
Solids[3] (%)	22.3	21.5
Visual Colour[4]	slightly grey[8]	good[9]
Flavour[5]	very good[10]	very good
Odour[6]	very good	very good
Reconstitution ratio[7]	3.6 :1	3.5 :1

[1] *Qualitätseigenschaften – Caractères de qualité*
[2] *Relative Luftfeuchtigkeit – Humidité relative*
[3] *Trockensubstanzgehalt – Matière sèche*
[4] *Farbe (visuell) – Couleur visuelle*
[5] *Geschmack – Goût*
[6] *Geruch – Odeur*
[7] *Wiederherstellungsverhältnis – Taux de reconstitution*
[8] *Leicht grau – Légèrement gris*
[9] *Gut – Bon*
[10] *Sehr gut – Très bon*

Tabelle 10. Qualität von Kartoffelwürfeln, beeinflusst durch die Luftfeuchtigkeit während der Lagerung (Lagerdauer 330 Tage).
Tableau 10. Qualité de dés de pomme de terre en fonction de l'humidité pendant la conservation (330 jours de stockage).

Zusammenfassung

Einfluss der Belüftung und der Feuchtigkeit während der Lagerung auf Gewichts- und Qualitätsveränderungen von Kartoffeln der Sorte Russet Burbank.

Kartoffeln (Sorte *Russet Burbank*) wurden in Boxen zu zirka 1800 kg eingelagert und verschiedenen Belüftungsverfahren bei zwei Feuchtigkeitsgraden (85% und >95% relativer Luftfeuchtigkeit) unterworfen. Die Untersuchungen dauerten vier Lagerperioden. Gewichtsverluste wurden alle 30 Tage während einer Lagerzeit von 330 Tagen bestimmt (Tabellen 1, 2 und 3).

Bei Belüftung mit mindestens 95% konstanter relativer Luftfeuchtigkeit war der Gewichtsverlust signifikant geringer als bei Belüftung mit 85% relativer Luftfeuchtigkeit (Tabelle 2). Zudem wurden bei Belüftung mit 95% relativer Luftfeuchtigkeit signifikant weniger Druckstellen sowie geschrumpfte und ausgekeimte Knollen festgestellt (Tabelle 5). Die zwei Luftfeuchtigkeiten wirkten sich auf den Fäulnisbefall der Knollen nicht unterschiedlich aus (Tabelle 5).

Bei unterbrochener Belüftung ergab sich signifikant weniger Gewichtsverlust als bei dauernder Belüftung (Tabelle 1). Ebenso verursachte unterbrochene Belüftung weniger Druckstellen und weniger Schrumpfung und Auskeimung als dauernde Belüftung (Tabelle 4).

Die Verarbeitungsdaten zeigten, dass Knollen, die mit 95% oder mehr relativer Luftfeuchtigkeit belüftet wurden, weniger Schälverluste (Tabellen 7 und 8), weniger Nachputzverluste (Tabellen 7 und 8), weniger Zucker (Tabelle 9) aufwiesen und, im allgemeinen, verarbeitete Produkte von höherer Qualität ergaben (Tabellen 7, 8, 9 und 10) als bei Belüftung der Knollen mit 85% relativer Luftfeuchtigkeit.

Résumé

Influence de la ventilation et de l'humidité pendant la conservation sur les modifications du poids et de la qualité des pommes de terre Russet Burbank

Des pommes de terre de la variété *Russet Burbank* ont été stockées dans des cellules contenant 1800 kg environ et soumises à différents régimes de ventilation avec de l'air contenant 85 et >95% d'humidité relative. Les recherches ont porté sur quatre saisons. Les pertes de poids ont été déterminées à des intervalles de 30 jours répartis sur une période de stockage de 330 jours (tableaux 1, 2 et 3).

La ventilation avec de l'air à 95% minimum d'humidité relative (r.h.) a réduit d'une manière significative les pertes en poids par comparaison avec l'air à 85% de r.h. (tableau 2). Au surplus, l'aplatissement, la ratatinement et la germination ont été significativement moindres chez les tubercules ventilés avec de l'air à 95% r.h. (tableau 5). Aucune différence n'est apparue entre les deux taux d'humidité de l'air en ce qui concerne la pourriture (tableau 5).

La ventilation intermittente a permis de réduire d'une manière significative les pertes en poids par rapport à la ventilation continue (tableau 1). De même, la ventilation intermittente cause significativement moins d'aplatissement, de ratatinement et de germination que la ventilation continue (tableau 4).

Selon les données des diverses fabrications, la ventilation avec de l'air d'une teneur minimum de 95% de r.h. a donné une moindre perte à l'épluchage (tableaux 7 et 8) et au parement (tableaux 7 et 8), une plus basse teneur en sucres (tableau 9), et d'une manière générale, des produits de qualité supérieure (tableaux 7, 8, 9 et 10) que la ventilation avec de l'air contenant 85% de r.h.