

PUNGENCY OF SELECTED ONION VARIETIES BEFORE AND AFTER STORAGE

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Introduction

The objective of this trial was to evaluate the pungency of 12 onion varieties commonly grown in the Treasure Valley.

Methods

Varieties for pungency analysis were selected based on information provided by the seed companies on their probability of being mild (Tables 1 and 2). 'Vaquero' was included as the industry standard variety of the Treasure Valley.

The onions were grown on a Owyhee silt loam previously planted to wheat. Onion seed was planted on March 19, 2004. The procedures for growing the onions can be found in the "2004 Onion Variety Trials" report by Shock et al. in this report. Onions in the early maturity trial were lifted on August 13, topped by hand and bagged on August 17, and graded on August 20. The onions in the full-season trial were lifted on September 8 to field cure. Onions in the full season trial were topped by hand and bagged on September 15. The bags were put in storage on September 22. The storage shed was managed to maintain an air temperature of approximately 34°F. Onions from the full season trial were graded out of storage in early January 2005.

On August 25, 10 bulbs from each of 5 plots of each of 3 varieties of the early maturing trial were sent to Vidalia Labs International (Collins, GA), by UPS ground, for pyruvate and sugars analysis. On October 5, 10 bulbs from each of 5 plots of each of 9 varieties of the full season trial were sent to Vidalia Labs International for pyruvate analysis. After storage, a second sample of 10 bulbs from each plot of the 9 full season varieties was sent to Vidalia Labs on January 14, 2005.

Bulb pyruvic acid content is related to onion pungency, with the units of measurement being micromoles pyruvic acid per gram of fresh weight ($\mu\text{moles/g FW}$). Onions with low pungency can taste sweet, because the sugar can be tasted. Onion bulbs having a pyruvate concentration of 5.5 or less are considered "sweet" according to Vidalia Labs sweet onion certification specifications. Sugars were analyzed by the Brix method.

Results

None of the early maturing varieties evaluated for pyruvate in 2004 had concentrations low enough to be considered sweet (Table 1). Of these, 'Renegade' was among the varieties with the lowest pyruvate concentration. 'Exacta' had the lowest sugar content. In 2003, variety Renegade, grown from transplants and harvested in July, had an average pyruvate concentration of 5.5 $\mu\text{moles/g FW}$ (Shock et al. 2004a).

On October 15, 2004 and January 24, 2005, none of the full season varieties had pyruvate concentrations low enough to be considered sweet (Table 2). There was no significant difference in either pyruvate concentration or sugar content between sampling dates. Varieties 'Harmony' and 'PX 5299' were among the varieties with the lowest pyruvate concentration. Varieties 'SVR 5819' and Vaquero were among the varieties with the highest sugar content. In 2003, the average pyruvate concentration of selected full season varieties was 5.3 $\mu\text{moles/g FW}$ in October and 7.9 $\mu\text{moles/g FW}$ in January, 2004 (Shock et al. 2004b).

References

Shock, C.C., E.B.G. Feibert, and L.D. Saunders. 2004a. Onion production from transplants in the Treasure Valley. Oregon State University Agricultural Experiment Station Special Report 1055:47-52.

Shock, C.C., E.B.G. Feibert, and L.D. Saunders. 2004b. Pungency of selected onion varieties before and after storage. Oregon State University Agricultural Experiment Station Special Report 1055:45-46.

Table 1. Pyruvate concentration and estimated sugar concentration of selected early maturing onion varieties on September 2, 2004, Malheur Experiment Station, Ontario, OR.

Seed company	Variety	Pyruvate concentration $\mu\text{moles/g FW}$	Sugars % Brix
Seminis	Exacta	6.36	8.88
	Golden Spike	6.84	9.92
Nunhems	Renegade	5.83	9.75
Average		6.34	9.52
LSD (0.05)		0.60	0.60

Table 2. Pyruvate concentration and estimated sugar concentration of selected full season onion varieties in 2003 and 2004, Malheur Experiment Station, Ontario, OR.

Date	Company	Variety	2003		2004	
			Pyruvate concentration μmoles/g FW	Sugars % Brix	Pyruvate concentration μmoles/g FW	Sugars % Brix
October	A. Takii	T-439	4.66	8.08	8.38	8.44
	Crookham	Harmony	6.08	8.88	7.24	8.80
	Seedworks	6011	4.90	9.04	8.04	8.64
	Seminis	Santa Fe	5.66	8.80	8.62	8.64
		PX 5299			6.63	8.25
		SVR 5819			9.88	9.48
	Nunhems	Ranchero	5.60	8.56	8.80	8.04
		Vaquero	5.62	9.00	9.10	9.00
		SX7002 ON	4.70	8.56	7.52	8.16
	Average		5.32	8.70	8.25	8.61
January	A. Takii	T-439	7.54	7.56	8.50	8.48
	Crookham	Harmony	6.40	8.72	6.60	8.56
	Seedworks	6011	8.12	8.56	8.02	8.64
	Seminis	Santa Fe	8.22	8.28	7.96	9.00
		PX 5299			8.33	8.40
		SVR 5819			8.84	9.04
	Nunhems	Ranchero	8.34	8.12	8.34	8.24
		Vaquero	8.90	8.64	8.92	8.80
		SX7002 ON	7.84	7.48	8.40	8.12
	Average		7.91	8.19	8.21	8.59
Average	A. Takii	T-439	6.10	7.82	8.44	8.46
	Crookham	Harmony	6.24	8.80	6.92	8.68
	Seedworks	6011	6.51	8.80	8.03	8.64
	Seminis	Santa Fe	6.94	8.54	8.29	8.82
		PX 5299			7.48	8.33
		SVR 5819			9.36	9.26
	Nunhems	Ranchero	6.97	8.34	8.57	8.14
		Vaquero	7.26	8.82	9.01	8.90
		SX7002 ON	6.27	8.02	7.96	8.14
	Average		6.61	8.45	8.23	8.60
LSD (0.05) Date			0.08	0.17	NS	NS
LSD (0.05) Variety			0.56	0.35	0.71	0.43
LSD (0.05) Date X variety			0.79	NS	1.00	NS