Effects of cold storage and shelf-life on sensory quality and consumer acceptance of ‘Abate Fetel’ pears

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ABSTRACT

Fruit products certified by quality labels should guarantee high levels of consumer acceptance, despite the unavoidable variability arising from growing conditions and postharvest responses. The quality of ‘Abate Fetel’ pear (Pyrus communis L.) fruit was studied, after short or long cold storage, by analysis of physicochemical, texture and flavour traits, to investigate factors affecting consumer acceptance. Fruit from three orchards differing in location and design, monitored during 10 d of ripening at 20 °C, softened progressively to reach and exceed firmness adequate for consumption. Change in colour, in particular hue angle, paralleled softening. Sensory traits were investigated by evaluating fruit of three different firmness levels within the range of acceptable eating quality. Firmness differences were clearly perceived both by expert judges and by consumers, but did not influence the degree of liking. ‘Abate Fetel’ pear can maintain acceptable eating quality at 20 °C for 4–8 d after 13 weeks storage at −1 °C, or 2–6 d after 23 weeks storage at −1 °C. Changing texture parameters were perceived at eating, without compromising overall quality. Production system affected intrinsic quality parameters such as total soluble solids concentration, but did not influence consumer acceptance. In consumer tests conducted after 13 weeks of cold storage, high scores were recorded, with a 86% acceptance frequency and more than 40% of scores reflecting “like very much” or “like extremely”. After 23 weeks of cold storage a decrease in degree of liking was observed. The overall value of ‘Abate Fetel IGP Emilia-Romagna’ quality label was confirmed by consumer evaluations. However, the decrease in consumer acceptance after 23 weeks of cold storage indicates that caution should be used in using long storage durations.

1. Introduction

Awareness of the important role of consumers in the food marketplace has increased in recent years (Asp, 1999). In particular, products that carry certified quality labels, have found their commercial appeal closely connected to the attributes “known origin” and “expected quality” (Stefani et al., 2006). To maintain reputation and meet consumer expectations, these products should provide consistent high organoleptic characteristics, in addition to intrinsic traits related to safety and nutritional values. The demand for high quality fruit, assured to provide healthful substances, high nutritional values and first-rate taste, highlights the importance of methodologies able to monitor quality along the postharvest chain from the field to the consumer.

The European pear (Pyrus communis L.) market is based on a limited number of well-known traditional cultivars. Italy has about 36% of the total European pear production, with ‘Abate Fetel’ the most important cultivar in terms of production and exported tonnage (EUROFEL, 2007). The success of ‘Abate Fetel’ can be attributed to the distinctive elongated shape, the strong recognition by consumers and the characteristic of maintaining excellent eating quality through long-term cold storage (Predieri and Gatti, 2008). These features are recognized not only in Italy, but also in other production countries such as Argentina (Garriz et al., 2005).

Quality measured at the timer of consumption allows for an overall assessment of cumulative effects on consumer acceptance. However, Shewfelt (1999) noted how in postharvest quality research, despite a clear lack of “external validity”, readily quantifiable attributes are generally preferred. Thus, instrumental methods are preferred to sensory evaluation, which is preferred over consumer testing. The present paper proposes a comprehensive product-oriented approach to pear fruit quality. A perishable product such as the pear, requires quality evaluation throughout the commercial distribution period and during shelf-life and ripening. ‘Abate Fetel’ fruit are commonly harvested in September, with peak commercial distribution in November–December and can be maintained in cold storage for three or more months.
Fruit products certified by quality labels should guarantee consistent quality levels, despite the unavoidable variability arising, even in a relatively small production area, from growing environment and production systems, which influence major pre-harvest factors (Sugar et al., 1998). Pre-harvest effects on intrinsic quality and sensory value of pear fruit have been described (Kappel and Neilsen, 1994; Garriz et al., 1997; Sugar et al., 1998; Hudina and Stampar, 2002; Policarpo et al., 2006). Previous studies on effects of production systems on ‘Abate Fetel’ eating quality have shown how appreciation of this pear can be affected by pre-harvest factors and how clearly low quality can be perceived and penalized by consumers (Predieri et al., 2005; Predieri and Gatti, 2008). To analyze quality levels and variability in Protected Geographical Indication (IGP) labelled pears, three commercial orchards were selected, all typical of the region of origin, but with different production systems. Quality change during postharvest was investigated through the combined use of physicochemical analyses to monitor intrinsic changes, assessment of texture and flavour traits determined by a trained panel, and estimation of consumer acceptance levels.

2. Materials and methods

2.1. Materials

Fruit were obtained from three orchards involved in commercial production of typical ‘Abate Fetel’ IGP pears (P. communis L.), located in the Po Valley, Ferrara, Emilia-Romagna, Italy. Each of the selected farms provided the most representative production system (Psys) of the area: Psys-A (‘La Palmetta’ farm, 7-year old orchard, 3000 trees/ha, rootstock quince ‘MC’); Psys-B (‘Castaldi’ farm, 9-year old orchard, 2000 trees/ha, rootstock quince ‘BA29’); Psys-C (‘Mazzoni’ farm, 7-year old orchard, 2800-trees/ha, rootstock quince ‘Sydo’). Fruit were harvested at commercial maturity from trees with a typical crop load, between 3 and 6 September 2007. Immediately after harvest, fruit with a minimum weight of 220 g were selected and firmness and total soluble solids (TSS) measured on 30 fruit per orchard (Table 1). Harvested fruit were stored at 0–1°C at 95% RH in a normal atmosphere for 13 or 23 weeks.

2.2. Physicochemical analyses

Fruit were removed from cold storage after 13 weeks (short storage) or after 23 weeks (long storage). Immediately after removal from cold storage, firmness, total soluble solids (TSS), and titratable acidity (TA) were determined on a sample of 12 fruit per production system. Measurements were repeated at 2 d intervals, for a 10 d period, on 12 fruit ripening at 20±2°C and 42% RH, simulating at-home ripening. Firmness was measured, after removing skin on two opposite sides of each fruit, with a penetrometer (Effegi, Alfonsine, Italy) fitted with a 7.9 mm probe. TSS and TA were determined on flesh juice extracted by an automatic juicer (CE18, Girmi, Italy). TSS was measured using a portable refractometer (Brixstix, Techniquip Corporation, Livermore, CA, USA). TA was measured with an automatic titrator (Titroline 96, Schott, Mainz, Germany) as determined by titrating 10 mL of flesh juice with 0.1 N NaOH to pH 8.1 endpoint (Elgar et al., 1997). Results are presented as mL malic acid L−1 juice.

Fruit skin colour was monitored during the 10 d ripening period on 12 fruit for each production system. Colour was determined with a colorimeter (Chroma Meter CR 400, Konica Minolta, Japan) calibrated with a white reference tile. The CIE L*a*b* colour space was used to record colour measurements with L* defining the lightness; h* (hue angle) calculated as h* = arctan (b*/a*), and C* (chromatic correction) calculated as C* = (a*2 + b*2)1/2 (McGuire, 1992).
2.3. Fruit sample preparation for panel and consumer tests

Fruit samples were prepared on the basis of firmness measurements with the aim of covering a 5 d period of optimal eating quality. Fruit having a firmness higher than 39.2 N (4 kg) were judged too hard to be eaten, as determined in previous studies on the same cultivar (Predieri et al., 2005) and confirmed by a preliminary acceptability test, thus not submitted to the Quantitative Descriptive Analysis (QDA). Panel tests were conducted only on fruit reaching a firmness below this threshold (edible-firm), then two more categories, determined by 2 and 4 d of additional ripening were defined (edible-medium, edible-soft). This method allowed us to provide sensory representative samples for each storage duration, while avoiding unripe or over-ripe fruit. After 13 weeks of cold storage, fruit with 0 or 2 d of shelf-life were found too unripe to be evaluated for eating quality. Edible fruit with firm, medium and soft texture were obtained after 4, 6, and 8 d of ripening, respectively. Fruit ripened for 10 d were judged over-ripe.

After 23 weeks of cold storage the same evaluation was performed. Fruit with 0 d of shelf-life were too unripe to be evaluated for eating quality. Edible fruit with firm, medium and soft texture were obtained after 2, 4, or 6 d of ripening at 20 °C, respectively. Fruit ripened for 8 or 10 d were judged over-ripe.

2.4. Panel test

Fruit ripened as described above were subjected to sensory evaluation by a panel of 12 trained assessors. A Quantitative Descriptive Analysis (QDA) was performed. Judges were presented with randomized three-digit coded samples (peeled pear slices) and were asked to evaluate juiciness, sweetness, acidity, pear aroma, astringency, graininess and firmness. Attributes were expressed on a nine-point hedonic scale (1 = dislike extremely; 2 = dislike strongly; 3 = dislike moderately; 4 = dislike slightly; 5 = neither like nor dislike; 6 = like slightly; 7 = like moderately; 8 = like very much; 9 = like extremely) (Lawless and Heymann, 1998). Consumers were asked to evaluate juiciness, sweetness, acidity, pear aroma, astringency, graininess and firmness. Judging of each sample was performed by a panel of 12 trained assessors. A Quantitative Descriptive Analysis (QDA) was performed. Judges were presented with randomized three-digit coded samples (peeled pear slices) and were asked to evaluate juiciness, sweetness, acidity, pear aroma, astringency, graininess and firmness. Attributes were expressed on a nine-point hedonic scale (1 = dislike extremely; 2 = dislike strongly; 3 = dislike moderately; 4 = dislike slightly; 5 = neither like nor dislike; 6 = like slightly; 7 = like moderately; 8 = like very much; 9 = like extremely) (Lawless and Heymann, 1998). Evaluations took place in individual sensory booths. Tests were replicated twice for each cold storage period. In each session each panelist evaluated fruit of three firmness levels for each production system. Within each session the design was balanced for order and carry-over effect.

2.5. Consumer test

Fruit for consumer tests were prepared as described for panel tests. Consumers were contacted in commercial galleries of a shopping centre in Bologna, Italy. Tests, conducted in November and early January, were performed on a group of 180 consumers each, half male and half female, ages 18–70. Peeled pear slices, placed in a previously coded labelled disposable plastic cups, were presented in a randomized block design to the consumer. To prevent browning, the slices were prepared immediately before being served. Consumer acceptance was measured as degree of liking. Consumers were asked to taste three coded samples of peeled pear slices (corresponding to firm, medium and soft texture, derived from fruit of the same Psys) and for each sample to indicate the degree of liking on a nine-point hedonic scale (1 = dislike extremely; 2 = dislike very much; 3: dislike moderately; 4: dislike slightly; 5 = neither like nor dislike; 6 = like slightly; 7 = like moderately; 8 = like very much; 9 = like extremely) (Lawless and Heymann, 1998). Consumers were then requested to describe sample ripeness as unripe, ripe, or over-ripe, on the basis of their consumption preferences.

2.6. Statistical analysis

Data were statistically analyzed with SAS system for Windows version 9.1 (SAS Institute, Cary, NC) and submitted to PROC GLM. Significant differences were determined according to LSD multiple range test.
test. Significant differences for data expressed as frequencies were submitted to PROC FREQ and determined according to $\chi^2$-square test.

### 3. Results

#### 3.1. Initial measurements

Fruit from the three orchards showed no differences in terms of firmness at harvest. The homogeneity of firmness among fruit from the different origins was consistent throughout cold storage. Fruit from Psys-A and Psys-C had TSS values of 16.2\% and 16.5\%, respectively at harvest. The highest TSS at harvest, 19.0\%, was recorded for Psys-B. These significant differences were confirmed by fruit coming out of cold storage after 13 and 23 weeks. Significant differences in TA among production systems were observed after short storage but were not found after long storage (Table 1).

#### 3.2. Fruit ripening during shelf-life

Fruit removed from cold storage after 13 weeks showed consistent softening after 10 d of ripening at 20°C. Average firmness decreased over 10 d from 49.2 N (5.0 kg) to 14.5 N (1.5 kg). No differences among production systems were observed (Table 2). When fruit were removed from cold storage after 23 weeks, average firmness was 42.4 N (4.4 kg), but after 10 d at 20°C firmness remained above 19.6 N (2 kg) (Table 2). In fruit removed from cold storage after 13 weeks some significant differences in TSS concentrations during ripening were observed, but not consistent trends. During shelf-life TA decreased in fruit from all three production system from day 0 to day 10. After 23 weeks, no significant variations in TSS and TA were observed during ripening (Table 2).

In a panel test conducted after 13 weeks cold storage, significant differences ($p < 0.01$) were recorded for fruit firmness and juiciness among samples from all three production systems, and influenced by shelf-life (Fig. 1a–c). In fruit derived from Psys-B, significant differences ($p < 0.05$) were recorded also in sweetness and aroma (Fig. 1b).

In a panel test conducted after 23 weeks cold storage, significant differences ($p < 0.01$) were recorded for fruit firmness for all three production systems (Fig. 1d–f). A significant difference ($p < 0.05$) in juiciness was recorded as an effect of shelf-life only for Psys-A.

#### 3.3. Panel test

Table 3 Mean values of colour components CIELAB Lightness (L), hue angle ($h^*$) and chroma (C*) for ‘Abate Fetel’ fruit derived from different production systems (Psys-A, Psys-B, Psys-C) as a function of cold storage period and of days of ripening at 20°C (shelf-life).

<table>
<thead>
<tr>
<th>Cold storage period</th>
<th>Shelf-life (days)</th>
<th>Psys-A</th>
<th>Psys-B</th>
<th>Psys-C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L, C* h*</td>
<td>L, C* h*</td>
<td>L, C* h*</td>
<td>L, C* h*</td>
</tr>
<tr>
<td>13 weeks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>75.7 b 50.0 b 106.9 a</td>
<td>74.8 c 47.8 d 107.3 a</td>
<td>72.8 b 47.9 b 110.4 a</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>75.9 b 49.9 b 105.5 a</td>
<td>74.4 c 47.3 d 104.7 b</td>
<td>73.8 b 48.3 b 108.1 b</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>74.8 b 50.0 b 103.3 a</td>
<td>77.8 ab 51.2 c 103.0 c</td>
<td>73.3 b 49.3 b 103.5 c</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>78.8 a 51.7 ab 98.7 b</td>
<td>77.4 ab 53.7 bc 99.3 d</td>
<td>78.2 a 55.1 a 98.7 d</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>77.4 ab 55.2 a 96.5 b</td>
<td>77.9 ab 55.2 ab 96.9 e</td>
<td>77.9 a 54.2 a 97.8 d</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>77.3 ab 56.0 a 94.9 e</td>
<td>81.2 a 57.2 a 95.7 e</td>
<td>77.8 a 54.2 a 95.7 e</td>
<td></td>
</tr>
</tbody>
</table>

| 23 weeks            |                  |        |        |        |
| 0                   | 743.4 s 47.9 b 103.4 a | 71.8 c 49.2 c 102.5 a | 74.2 n.s. 46.8 b 104.5 a |
| 2                   | 74.6 48.5 b 100.9 b | 72.6 c 50.1 c 96.1 b | 75.5 47.8 b 101.1 b |
| 4                   | 73.9 48.0 b 100.2 b | 77.1 b 51.8 c 96.4 b | 73.3 48.4 b 101.3 b |
| 6                   | 76.4 50.8 ab 96.2 bc | 77.9 ab 53.7 bc 97.9 b | 76.1 51.2 ab 98.6 c |
| 8                   | 75.3 53.4 ab 92.5 cd | 78.3 ab 55.3 ab 93.7 c | 75.8 53.4 ab 97.1 cd |
| 10                  | 76.2 55.3 a 91.2 d | 79.3 a 56.2 a 93.2 c | 77.1 54.2 a 94.1 d |

Means in the same column followed by different letters differ ($p < 0.05$) according to the least significant difference multiple range test.

### 3.4. Consumer test

‘Abate Fetel’ fruit stored for 13 weeks had high levels of acceptance: 86\% of consumer scores were >5 (neither like nor dislike), with about half of them being 8 or 9 (like very much or extremely)

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Table 4 Mean value of consumer degree of liking of ‘Abate Fetel’ fruit derived from different production systems (Psys-A, Psys-B, Psys-C) as a function of cold storage period and flesh firmness.

<table>
<thead>
<tr>
<th>Flesh firmness</th>
<th>Degree of liking (1–9)</th>
<th>Acceptance (% &gt;5)</th>
<th>Ripening evaluation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Psys-A</td>
<td>Psys-B</td>
<td>Psys-C</td>
</tr>
<tr>
<td>13 weeks Firm</td>
<td>7.14 a</td>
<td>7.17 a</td>
<td>7.14 a</td>
</tr>
<tr>
<td>Medium</td>
<td>7.08 a</td>
<td>6.91 a</td>
<td>7.27 a</td>
</tr>
<tr>
<td>Soft</td>
<td>7.18 a</td>
<td>7.30 a</td>
<td>7.05 a</td>
</tr>
<tr>
<td>23 weeks CS</td>
<td>Firm</td>
<td>6.70 a</td>
<td>6.95 a</td>
</tr>
<tr>
<td>Medium</td>
<td>6.88 a</td>
<td>6.47 a</td>
<td>6.33 a</td>
</tr>
<tr>
<td>Soft</td>
<td>7.02 a</td>
<td>6.32 a</td>
<td>6.35 a</td>
</tr>
<tr>
<td>13 weeks CS</td>
<td>Firm</td>
<td>7.13 a</td>
<td>7.13 a</td>
</tr>
<tr>
<td>Mean</td>
<td>6.87 b</td>
<td>6.58 b</td>
<td>6.27 b</td>
</tr>
</tbody>
</table>

Acceptance is calculated as percentage of scores over 5 (neither like nor dislike). Ripening evaluation (unripe, right, over-ripe) is based on individual consumption habits. Degree of liking means in the same column followed by different letters differ ($p < 0.05$) according to the least significant difference multiple range test. Acceptance and ripening differences are indicated as * ($p > 0.05$); ** ($p < 0.01$) or not significant (n.s.) according to $\chi^2$-square test.
The average score for samples from short storage was 7.1 (Table 4). When the consumer test was repeated after 23 weeks of cold storage, again high levels of acceptance for all production systems and shelf-lives were recorded: 75% of scores were >5, including about 30% of 8 and 9 (Table 4). However, the average degree of liking of 6.6 recorded after long storage was significantly lower than the previous, and a decrease in acceptance was observed. In tests after both short and long storage, consumer evaluation was not influenced by
Abnormal patterns of softening, called loss of ripening capacity, are determined by environmental and cultural factors including water, sunlight, nutrient availability, and crop load (Mattheis and Fellman, 1999). The highest TSS can be an effect of the lower tree density, providing a greater availability of resources and favouring tree production physiology (Faust, 1989). Relevant effects of planting density on fruit quality have been reported for pear (Policarpo et al., 2006).

The 10 d post-cold storage period at 20 °C was effective in inducing fruit ripening, with firmness decreasing from too hard to be edible, to an excessive softness, while providing several days of high eating quality. Fruit firmness was the parameter most indicative of the progress of ripening, confirming what has been observed on other European and 'Dick and Labavitch, 1989; De Belie et al., 2000; Murayama et al., 2002; and Asian (Wang et al., 2004; Gomez et al., 2005) pear cultivars. 'Abate Fetel' fruit removed from cold storage after 13 or 23 weeks showed a regular softening during shelf-life. Abnormal patterns of softening, called loss of ripening capacity, have been reported for pears due to prolonged storage, with fruit remaining firm and dry and unable to reach a buttery and juicy texture, satisfactory for consumption (Wang et al., 1985; Murayama et al., 2002). This was not observed in our study. However, some effects of storage on softening trends were detected. In fact, fruit removed after 23 weeks of cold storage, although softening during prolonged storage, remained firmer than those from short storage.

Elgar et al. (1997) did not find variation in TSS during ripening of 'Burre Bosc' and 'Doyenné du Comice' pears, while they observed a significant decrease in TA with storage and shelf-life. Our results did not show a clear trend for TSS and TA during ripening. Only slight random variations were observed in TSS, while a decrease in TA concentrations during ripening was observed only after short cold storage.

Background colour variation can be of help as a visual indication of ripening, and useful for assisting consumers in comparing fruit at different ripening stages. Elgar et al. (1997) reported a significant loss of green colour during ripening. Significant variations were observed also on 'Abate Fetel' fruit monitored in our study. As reported for 'Williams' pear fruit (Agar et al., 1999; Bower et al., 2003), the hue angle variation was the colour parameter exhibiting the most significant variations through the ripening process.

Pear flavour depends on a balance of sugars, acids, phenolics, and aromatic compounds (Bell et al., 1996), with a number of additional factors, primarily texture (Eccher Zerbini, 2002), influencing perception. Texture is a major quality characteristic determining consumer appreciation in fruit such as apples, with the two major determinants of texture being firmness and juiciness (Mehnagic et al., 2004). In the panel test conducted after 13 weeks cold storage, assessors clearly perceived differences in both firmness and juiciness paralleling shelf-life ripening. After 23 weeks only firmness showed a significant decrease with ripening, in fruit from all three production systems. After long storage, average perceived fruit firmness was judged 8% higher and average juiciness 5% lower, compared to the previous panel test. This result suggests some inhibitory effects of prolonged storage on fruit expression of the important sensory trait of juiciness.

None of the other sensory parameters showed significant changes with ripening during shelf-life, excluding fruit from Psys-B, where sweetness and aroma were found to increase in fruit from 13 weeks storage. This result may indicate a correlation between intrinsic properties determined by pre-harvest factors, since fruit from this production system differed from the others in having higher TSS concentration. 'Abate Fetel' aroma has been reported to have high correlation with degree of liking (Predieri et al., 2005). An average decrease in perceived aroma of about 9% was recorded in fruit tasted after long storage as compared to those evaluated after 13 weeks. Since volatile emission can be inhibited by storage conditions and duration (Rapparini and Predieri, 2003), these results suggest that postharvest management should be carefully planned so as to avoid any loss of fruit quality.

Sugar concentration is considered a key factor in commercial quality. In our study, despite a clear difference in TSS concentration among tested production systems, it did not affect consumer evaluation. This is in accord with a number of studies on fruit quality where TSS or TSS/TA have been investigated to analyze panel perception and explain consumer acceptability. Sweet/acid perception has been shown to be unreliable for predicting consumer judgement (Harker et al., 2002); in some studies sweetness perception appeared clouded by the influence of other parameters (Yuen et al., 1995). Also in studies conducted on fruit such as kiwifruit (Burdon et al., 2004) and peaches (Crisosto and Crisosto, 2005; Infante et al., 2008) the relationship between TSS concentration and consumer acceptance appears complex, with the TSS parameter alone generally not able to predict quality level. 'Abate Fetel' pears recorded considerably high scores for degree of liking after both cold storage durations. However, a decrease in consumer acceptance was recorded after prolonged storage. Physicochemical analyses indicated that after long storage fruit showed less ability to soften; sensory evaluation showed that the shorter storage fruits were juicer, sweeter and more aromatic. The quality loss during cold storage, although maintaining liking degree well over acceptance, should be taken in account when planning longer storage duration. However, since these data relate to hedonic judgements, a dissatisfaction of consumers for a product already present on the fresh product market for a long period cannot be excluded. Both aspects are important, since the concept of food quality implies the capacity of a product to meet consumer expectations and is defined as a consumer-based perceptual/evaluative construct (Cardello, 1995).

Shelf-life ripening produced clear differentiations in firmness of fruit samples. However, the great majority of the consumers, when asked to make a comparison of the pear just tasted with those resulting from the best in their personal experience, judged the offered samples to be “at a correct ripening stage”. These results show that for this cultivar, produced at high quality standards, the ripening during shelf-life is not the key point for acceptance, but represents “a fine tuning” for consumer individual preferences for eating satisfaction. This is of interest, since it is reported that consumers are much more sensitive to subtle differences in texture than flavour, and tend to use texture as the primary limiting factor for acceptability (Shewfelt, 1999). Our data indicate that, as related to ‘Abate Fetel’, the low consumer acceptance reported in previous studies (Predieri et al., 2005; Predieri and Gatti, 2008) should not be attributed to an incorrect shelf-life. High and low quality are created in the orchard and maintained by correct postharvest prac-
tices. Consumer appreciation is achieved when the basic quality requirements are fulfilled.

5. Conclusions

Quality and origin labels may augment commercial value of fruit products, but to be successful, they have an increased burden of fulfilling consumer expectations (Stefani et al., 2006). For products whose appeal depends on eating quality, such as ‘Abate Fetel’ pears, an extensive knowledge of factors affecting consumer acceptance is of major importance. A realistic approach to pear fruit quality would consider physicochemical parameters not as goals, but as tools for monitoring ripening and forecasting optimum eating quality. The ultimate plan is in fact to help in providing a consistently good quality supply to the consumers, thus protecting the standing of a given origin or marketing label. The major aims of the present study were to determine quality levels of ‘Abate Fetel’ fruit and to investigate how the unavoidable variability among fruit products sharing the same quality label, may affect product quality. ‘Abate Fetel’ pears were evaluated by consumers as high quality fruit after both short and long cold storage durations, but a decrease in consumer acceptance after the longer storage indicates that caution should be used in using longer storage durations.

Postharvest quality evaluation, pursued through a combined approach of sensory and consumer tests, represents a source of better understanding of final user behaviour and demand. The product-oriented methodology used in this research was suitable for providing data on the influence of production system and storage on ‘Abate Fetel’ pear fruit quality through postharvest life, until consumption.

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