



The economic and marketing analysis of the postharvest of a unique Hungarian product, the pear from Kunfehértó (2001-2002)

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ABSTRACT

We have viewed a business in the South Plain Region from an economic point of view. The main activity there is pear growing and storage. Four varieties of different time of ripening and storing are grown there. We have measured all the relevant activities, worked out local normatives and prepared a detailed technology. The economic evaluation was based on this data. Activities, like disinfection, pre-storage disinfection and selection, in-storing and out-storing, classification after storage, packaging, as well as loading trucks, were monitored by variety. Storage loss was determined and widely varied according to varieties, length of storage and time of out-storing. Different varieties resulted in different quality classes after storage. Price depended on the quality classes. Economic evaluation was carried out when all the relevant costs and revenues were known. Fixed and variable costs of storage were determined, break-even point was calculate and the market position of the product was evaluated.

(Keywords: pear-storage, economic evaluation, unique Hungarian product, postharvest)

ÖSSZEFOGLALÁS

A Kunfehértói körte - mint hungarikum - betárolásának ökonómiai és piaci elemzése (2001-2002)

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Vizsgálatainkban egy dél-alföldi vállalkozás adatait dolgoztuk fel, ahol nagy területen (50 ha) termesztett körtét tárolnak be. Négy körte fajta termesztésével foglalkoznak, melyek eltérő érési és tárolási idővel rendelkeznek. A tároláshoz kapcsolódó minden műveletet felvételeztük, kidolgoztuk a helyi normákat, részletes technológiát készítettünk. Az adatok az ökonómiai értékelések alapját képezték. Fajtánként megvizsgáltuk a fertőtlenítés, a tárolás előtti fertőtlenítés és válogatás, a betárolás, a kitérítés és a kitérítést követő osztályozás, csomagolás, kamionba rakás műveleteit. A tárolási veszteségek a fajták, a tárolás hossza, és a kitérítés időpontja szerint eltérően alakultak. A költségek és az árbevétel ismeretében elvégeztük az ökonómiai értékeléseket. Megállapítottuk a vállalkozás körtetárolásának állandó és változó költségeit, a tárolás fedezeti pontját és kiértékeljük a termék piaci helyzetét.

(Kulcsszavak: körtetárolás, ökonómiai értékelés, hungarikum)

INTRODUCTION

The vineyards and the orchards between the River Tisza and the river Danube abounded in different kinds of pears. The microclimate and the brown sandy soil assure good conditions for growing pears. The region of Kecskemét, Nagykőrös and Kunfehértó were traditionally considered to be famous fruit growing areas. As early as in the 19th century such special pears of good quality were grown in these areas that even the vice-bailiff of the county got them as a present (Totth *et al.*, 1998).

Nowadays the pear-growing centre of the Great Hungarian Plain is Kunfehértó. The pear from Kunfehértó is successful because the rainfall, the soil and the nutrients the pear needs are present in this area. Having chosen a good sort of pear, the local people started to grow pears successfully on the loose and sandy soil. The pears grown in the gynaecium of Kunfehértó were selected from one generation to the other.

The winter pears are the most delicate, the autumn ones are less delicate however the summer pears cannot be stored but they ripen early and they are tasty and full of flavour. The pear is harvested by hand which requires a great expertise (Hajduné *et al.*, 1999).

Storage is an important part of fruit growing. As far as pear fruit is concerned this question is even more important than certain varieties (especially those matured in autumn and winter) which can only be consumed and enjoyed after a cold storage (Sas, 1986). The further importance of storage is that the fruit can be kept on the market longer and the period of consumption can be prolonged. This matter is especially important when the buyer needs continuous shipment (Hajduné *et al.*, 2000). By storing fruit a higher profit can be realised. In some cases vast amounts of fruit, at the time of harvest, can be saved from selling it at a low price. A valuable, up-to-date construction is needed that preconceives necessary implementing resources.

In this recent article I wish to present the main management solutions and the profitability of growing in a case study.

MATERIALS AND METHODS

Conditions of the enterprise

In our study we processed the data of a small business in Bács-Kiskun County, where pears, grown on 50 hectares, are stored. The orchard is 14 years old. Four pear varieties are grown that differ in ripening and storing time. Data concerning storage of different varieties are shown in *Table 1*. The 1000 ton-capacity storage was built in 1994, its atmosphere is not controlled only the temperature and humidity is adjusted. The cooling medium used is ammonium. The storage consists of 6 rooms and a corridor. The area of one room is 116 m², the total net area is 696 m². In addition there is a 105 m² corridor and a 528 m² room for manipulation. The total net area is 1452 m² with the height of 5.3 m. The thickness of the wall is 0.5 m. 0°C and 92-94% relative humidity can be maintained during storage. The elements of the cooling system are shown in *Table 2*.

Methods of evaluation

All the relevant actions were considered and evaluated and the local normative and detailed technology was defined. These served as basics for the economic evaluation. The loss during storage was considered and varied between varieties and length of storage. Varieties sold resulted in different quality classes, different prices and varied according to selling season.

Table 1

The characteristics of differently stored pear varieties (2001-2002)

Variety (1)	Date of harvest (2)	Area (3) (hectare)	Yield (4) (ton)	End of storage (5)
William	3 August	10	133	2 November
Bosc Kobak	2 September	15	246	2 January
Packham's Triumph	3 November	15	333	3 March
Hardenpont	1 October	10	164	1 March

1. táblázat: Az egyes körtefajták tárolásának jellemzői

Fajta(1), Szedési idő(2), Terület(3), Hozam(4), Tárolási idő vége(5)

Table 2

Applied equipment in pear storage

Name (1)	Type(2)	Piece (3)	Nominal output (4)
Cooling compressor(5)	2V4/140-11	2	244 KW
Condensator (6)	AVAKO-200	2	279 KW
Air-cooling (7)	SM-125-16-8	30	19 KW
Ventillator (8)	AV-63-1440-12	30	9000 m ³ /h
Ammonia pump(9)	D 412 H	2	100 dm ³ /min

2. táblázat: A körte tárolásában alkalmazott géptípusok

Megnevezés(1), Típus(2), Mennyiség(3), Névleges teljesítmény(4), Hűtőkompresszor(5), Kondenzátor(6), Léghűtő(7), Ventilátor(8), Ammónia szivattyú(9)

By knowing costs and income profitability was calculated. These were counted per storing unit and stored quantity. Fix and variable costs of storage were defined, the return on storage, the level of cost and the profitability of storage.

Unique Hungarian product and market position of pears were considered too. We evaluated the strong points, the weak ones and the possibilities of the pear grown in the areas of Kunfehertó.

RESULTS AND DISCUSSION**Characteristics of pear storage***Synchronising harvest and storage*

Success of storage largely depends on the quality of harvested fruit. This is why picking workers are qualified and well paid. Pickers are supervised whether they pick damaged fruit. Those who do too much harm to the fruit are excluded. Transport is also gently done, roads are maintained before harvest, fork-lifts are only used at loading and unloading the fruit. In this given firm the front-yard of the storage is paved, transport is done by IFA trucks. Pears are picked into small containers that can be loaded with a

maximum of 280 kg fruit. Containers are unloaded by fork-lifts and transported to an FMC machine where the pears are disinfected.

Disinfecting

The FMC container's capacity is 2000 litre (STOP SCALD etoxyanin effective agent, 0.25% concentration). It is important to emphasise that after every 100 ton of pears new solution has to be mixed (18000 litre solution for the total 876 tons of fruit altogether). The variety William's yield was 133 tons of what was harvested in two days. For a daily 66.5 tons of fruit 238 crates are needed. The IFA truck can load 15 containers, so transport vehicles must return in 38 minutes. The duration of one container is 5 minutes. The transport of the disinfected containers and the loading is done by different fork-lifts. The normative of these lifts is 3.36 t/hour. The normative of the loading fork-lifts is 2.24 tons/hour. The yield of Bosc Kobak variety was harvested in four days. 220 containers are needed for the transport, the normative of one vehicle is 40 minutes. Packham's Triumph variety's 333-ton yield was harvested in five days, and for the continuous processing and disinfecting the IFA trucks had to return in 38 minutes. Hardenpont variety yielded 164 tons of fruit and it took the pickers 3 days to harvest and store. Daily storing amount was 55 tons which assumes a 46 minutes return of the vehicles.

Organising, preparing operations

It is necessary to check the storing rooms thoroughly, because proper technical conditions of storing must be ensured (isolation, spare parts etc.). Rooms must be disinfected, cleaned and ventilated. All these should be terminated before the first time of storing (3 August). Afterwards storing rooms are closed and ventilated thoroughly (Ferencz, 2000).

Storing order

The six rooms altogether make 3688.8 m² storing capacity. There are 99 pallets in one room with 6 storeys of pear on each pallet which is altogether 1680 kg pear (6×280 kg). An important issue is not to mix varieties. Another important matter is that no stored fruit should be manipulated until it is stored out, that is a newly loaded amount of pears should not neighbour an already stored one. William makes 79 pallets resulting in 80% utilisation of the place. In Hardenpont's case in the second room this index is 87.7%. Bosc Kobak makes 146 pallets altogether in two rooms (3rd and 4th) resulting in 100% and 47.5% respectively. Packhams fills the 5-6th rooms exactly. The average utilisation of room 6 is 87.7%.

Management of sorting

Sorting is done by an FMC type of machine. The average number of workers is 60. The capacity of the machine is 6.5 tons per hour and divides four quality categories. Its operating cost is 2950 Euro and the labour cost is 551 Euro. Workers put the sorted pear into cases and assure proper technical conditions. Woman workers put pears one by one into M30 cases. Containers contain 280 kg of pears and the machine processes 23.2 containers hourly, therefore 2 fork-lifts are necessary. For William 20.4 hours (2 days), for Bosc Kobak 37.8 hours (4 days), for Packham's Triumph and Hardenpont 51.2 hours (6 days) and 25.2 hours (3 days) respectively. Quality classes are shown in *Table 3*.

Table 3

Quality classes

Variety (1)	Storing loss (2)	Rate (6)	1 st class (3)	Rate	2 nd class (4)	Rate	3 rd class (5)	Rate
William	13.3 ton	10%	53.2 ton	40%	39.9 ton	30%	26.6 ton	20%
Bosc Kobak	22.14ton	9%	105.8 ton	43%	86.1 ton	35%	32 ton	13%
Packham's	26.64 ton	8%	153.2 ton	46%	120 ton	36%	33.3 ton	10%
Hardenpont	18.04 ton	11%	64 ton	39%	52.5 ton	32%	29.5 ton	18%

3. táblázat: Minőségi osztályok

Fajta(1), Tárolási veszteség(2), Első osztály(3), Másod osztály(4), Harmad osztály(5), Arány(6)

Evaluation of pear storing profitability

The main storing costs are summarised in Table 4. These calculations are not variety specific.

As it can be seen depreciation means the highest cost. It can be said that storage is very costly to firms. The profitability indexes are summarised in Table 5. The break-even point is at 264 kg/m². This firm stores 187.3 tons of pears on the average 1 m². It can be pointed out that the firm produces profit due to storage.

Table 4

Costs and cost factors of pear storage (2001-2002)

Cost factor (1)	Cost per 1 m ² (2) (1000 Euro)	Storing cost per 1 ton of pear (3) (1000 Euro)
Material cost (4)	1.4	1.1
Labour cost (5)	120.0	6.3
Social insurance+tax (6)	3.3	96.9
Depreciation (7)	744.1	59.1
Cost of machinery (8)	5087.7	3471.9
Other (FMC) cost (9)	7.3	7.3
Direct cost (10)	1155.9	1155.9
General cost (11)	16.4	1984.5
Total cost (12)	132.3	132.3

4. táblázat: Körtetárolás költsége és a költségnemek alakulása (2001-2002)

Költségnem(1), 1 m² költsége(2), Egy tonna körtére jutó tárolási költség(3), Anyag költség(4), Munkabér(5), Társadalombiztosítási járulék(6), Értécsökkenés(7), Traktorüzemi költség(8), Egyéb költség(9), Közvetlen költség(10), Általános költség(11), Teljes költség(12)

Table 5

Profitability indexes of pear growing (2001-2002)

Main natural specific costs (1)	
Total cost per 1 m ² area (growing+storing) (2)	5911.5 Euro
Total cost per 1 ton of pear fruit (growing+storing) (3)	623.9 Euro
Income per 1 m ² storing are (4)	713.9 Euro
Income per 1 ton of stored fruit (5)	753.1 Euro
Profit per 1 m ² storing are (6)	122.4 Euro
Profit per ton of stored fruit (7)	129.2 Euro
Main profitability indexes (8)	
Profitability % (9)	21%
Level of cost (10)	83%

5. táblázat: A körtetermesztés eredményességi mutatói (2001-2002)

Főbb természetes fajlagos költségek(1), 1 m² tárolt felületre jutó teljes költség (termesztés+tárolás)(2), Egy tonna tárolt gyümölcsre jutó teljes költség (termesztés+tárolás)(3), 1 m² tárolt felületre jutó árbevétel(4), 1 tonna tárolt gyümölcs árbevétele(5), 1 m² tárolt gyümölcsre jutó eredmény(6), 1 tonna tárolt gyümölcsre jutó eredmény(7), Főbb jövedelmezőségi mutatók(8), jövedelmezőségi %(9), Költségszint(10)

The market position of the product

This unique Hungarian product has different characteristic features. The values of this product derive from the conditions of the cultivated area and the expertise of the local people. It has got a juicy pulp, a specific smell, taste and high delicious quality. Because of the climate conditions in the region of Kunfehértó the quality of the product is higher than the average quality of the other cultivated areas. As far as the market position is concerned there has been a great demand for this product for the last few years. Raw pears are sold from autumn to winter and can be bought in processed form throughout the year.

The *strong points* of the pears grown in the areas of Kunfehértó are that it can be easily transported, it is not easily damaged and can be stored and ripened for a long time. Its distillation is of excellent quality (William's pear). The food processing level of the product determines its high quality. The fresh pear, even after storing, can be used for making tinned fruit, fruit juice, distillation and dried fruit. Other than the pear other winter fruits (apples) can also be consumed. The *weaknesses* of the product are that the protection of its origin is unsolved; it is not marked on the product where it is from and why it is unique. The resistance of the products grown is different to diseases and pests. That is why pesticides of different quantities must be used. This will have an influence on how much juice the product contains.

The marketing resources to utilize the *possibilities* are the following: in case of winter pears the size, the shape and the stalk make it possible to have significant markings. Information labels indicating the origin can be stuck on the product or tied onto the stalk. Marking the geographic origin is good for conveying additional information as well (e.g. chemical-free, number of hours of sunshine ripening the fruit). It is suitable for making a product for enjoyment (candied). "Pálinka", a famous unique Hungarian brandy is made of it and this is suitable for marketing its "image".

CONCLUSIONS

- It would be ideal to store pears by size and colour. That would make storing more differentiated. Storing parameters could then be altered making a lower loss rate and a longer storing period possible. This extra managerial work and cost would definitely increase profit.
- In order to better utilise storing capacity and lower specific costs this firm should purchase pears. The 87.71% utilisation rate should definitely be increased.
- Cost per production could be lowered if storage is lessened out in "dead period".
- Generally it is practical to repeat the SWOT analysis every 2-3 years, or more frequently as needed, and to compare it to the previous examination results.
- To increase the popularity and the market revenues of this Hungaricum noted, and to simultaneously enhance the situation of the producers and the processors associated with the products.
- The processing of this product by preserving the Hungaricum nature to increase the added value that is recognised on the market.
- The application of well-selected marketing tools helps in the development of the regional and the national „image”. The Hungaricum products are not well marketable on their own, but together with the appropriate „historical and cultural background”. The consumer in this case does not purchase merely a product – products are available anywhere – but also flavours, aromas and traditions.

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