

Economic viability of non-commercial and extensive rabbit breeding: A Slovenian case study

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SUMMARY

The aim of this study is to present the calculation of technological and economic viability in rabbit meat production. The input data and due results were based on a real case (farm) from Slovenia. The farm primarily produces rabbit meat for self-sufficient consumption, not for commercial purposes. The economic calculations were based on data collected from two production cycles, totalling 221 rabbits. Results show that production is economically justified when the selling price of rabbit meat amounts to at least 8 EUR/kg. Should the selling price of rabbit meat reach 9 EUR/kg, the financial result would increase for approximately 15 %. The analysis of economic viability in rabbit meat production confirms that such production is economically justified.

Key words: rabbit, breeding, meat, economic analysis

INTRODUCTION

The world production of rabbit meat is estimated at approximately 1 million tonnes, 54 % of which is produced in the EU. The biggest world's producers are China, Hungary, Italy, Spain and France – they contribute almost ¾ of the world production. In the last twenty years the world production has been increasing for 1.7 % each year, surpassing a bit more than 720 tonnes and reaching almost 1 million tonnes (Avitalia, 2018). Colin (1993) presents an overview of rabbit production in East European countries. In Bulgaria, rabbit production is traditional and self-consumption oriented. The production of rabbit meat is evaluated at 4100 tonnes/year. In Hungary, the significant production is only export-oriented, without any tradition of rabbit production and internal-market. Hungary is the second exporting country in the world, just after China (Colin, 1993). Accord-

ing to some new EU data, the EU27 accounts for 28 % of global production, with more than 340 million rabbits produced annually (FAOSTAT, 2012). Rabbits are the second-most farmed species in Europe, primarily in Italy, France and Spain. Little information is available on rabbit consumption in different countries. Yearly estimates range from 0.93 kg/person in France (ITAVI, 2014) and 1.35 kg/person in Spain (González-Redondo et al., 2012) during 2010, to as much as 4.4 kg/person in Italy (Unaitalia, 2010).

From the statements above, we can see that Slovenia neighbours the two most significant rabbit meat production countries, namely, Italy and Hungary. From this point of view, the import of rabbit meat is more important than self-sufficient production. According to its consumption capacity, Slovenia holds the 11th place with approximately 0.77 kg of rabbit meat consumed per inhabitant (Lebas

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and Colin, 1992). In the Educational Research Centre for Rabbit Production at Biotechnical Faculty in Ljubljana, the exclusively Slovenian selection of rabbits for meat production was developed, called SIKA, Slovenian female rabbit. Planinc et al. (2011) described the growth and mortality of suckling rabbits SIKA and stated that the breeding program for SIKA rabbit is not enough to increase the interest for rabbit meat production in Slovenia. Šajher (2014) has already analysed rabbit meat production from economic point of view on the case of non-commercial farm in Slovenia, including the development of technological-economic simulation. Rabbit breeding in Slovenia has decreased mainly due to the poor supply of medicines and feed additives that prevent high losses. According to this statements, the main type of rabbit breeding appears on family farms, namely non-commercial breeding.

The key point of this paper is to present the case study from Slovenia, a non-commercial farm for rabbit meat production. The paper includes the methodology section where authors described two types of most suitable rabbit species for meat production, and non-commercial breeding technology approach. Results and discussion sections contain the explanation of economic viability of production based on production costs calculation. Results can help the analysed farm (and others) to find out what to expect should they decide to place their product on the market.

METHODOLOGY

The analysed farm is located in the north-eastern part of Slovenia, near the City of Maribor. The herd consisted of seven does (females) with intensive reproduction features. The species included New Zealand Red Rabbit and Hycole Rabbit. Because of the resistance to rabbit diseases, we decided to use two crossbreed mares (bucks) for reproduction. The survey for this study was based on a sample of 221 rabbits from two production cycles.

1. New Zealand Red Rabbit

Perhaps surprisingly, New Zealand Red Rabbit is the second truly American breed of rabbits. Their genesis is tied in with Belgian Hares much more than with New Zealand breed of rabbits. As well as Californian and White New Zealand breed rabbit, the Red Rabbit is very suitable for meat production. The literature (Šajher, 2014) describes the New Zealand as a breed of rabbit, which despite its name, is of American origin. The breed originated in California, probably from rabbits imported from New Zealand.

New Zealand rabbits are available in five ARBA-recognized colours: white, red (Picture 1), black, blue, and broken (colour mingled with white). They average 10 to 12 lb (5 kg), with does being slightly larger than bucks. The New Zealand Rabbit is the most used rabbit breed in meat production. Due to its good meat production properties, we decided to include two New Zealand Red Rabbit does in researched reproduction process.



Figure 1: *New Zealand Red Rabbit (own source)*

2. Hycole

Hycole is a hybrid rabbit, mainly raised by one company located in the north of France. The company has a strong know-how and a powerful distribution network allowing it to be present on all markets around the world. The most powerful properties of Hycole include high average number of baby rabbits born alive, amounting to between 10.20 and 10.50, and a very good potential for growth. Rabbits achieve slaughtering weight (approx. 3 kg of live weight) at an age between 12-13 weeks (Hycole, 2018). According to statements on good reproduction above, we decided to include 5 Hycole does from the farm.



Figure 2: *Parental female Hycole (own source)*

3. Breeding technology approach

Our breeding approach was based on extensive reproduction cycles. This means that a reproduction cycle follows every 35 days after does give birth (3 days after the deposition of babies from mothers). The average number of rabbit babies born alive should be at least 6 per doe. If the average number is lower than 6, the doe is excluded from the reproduction process after 2 consecutive births. The expectation of a minimum number of born babies is important from the aspect of having a constant number of adult animals (60-80 rabbits) in the herd.

Feed rations for rabbits varied according to rabbit's body weight and fattening period. The first feed ration was calculated for the rabbit body weight of between 800 g to 1500 g, the second for between 1500 g and 2200 g and the last one for more than 2200 g. Feed rations consisted of hay, wheat, barley and rabbit feed briquettes, and were taken over from Šajher (2014).

The breeding course took place in rabbit cages. The size of cage was suitable for medium rabbit breeds, such as New Zealand Rabbit and Hycole, according to standards for fattening (Uradni list, 2018).

4. Economic analysis

The economic analysis was based on the economic-simulation approach for the calculation of economic viability, according to financial results and other economic parameters. We calculated the total income and total costs that represented the input data for the calculation of coefficient of economic and financial results. The calculation of total costs included the calculated price of own hay and costs for other purchased feed (wheat, barley and feed briquettes). In the structure of total costs, the cost of labour represented approx. 55 % of all costs. Costs regarding the investment in cages were taken into account as amortization costs for cages, calculated on 2 year basis with a level of amortization payment of 5 % per month, without need for taking a loan.

The total income was calculated as a sum product of output (quantity of meat rabbit) and potential price of rabbit meat (8-8.5 EUR/kg of rabbit meat

on the Slovenian market and 9 EUR/kg of rabbit meat on the Austrian market).

RESULTS AND DISCUSSION

The results and discussion section is structured in two sub-sections. The first section describes results of breeding (including the ratio between body weight and meat), while the second section describes obtained economic viability results.

1. Breeding results

The average weight of rabbit for slaughtering amounted to 2.93 kg. The average slaughter output amounted to 1.47 kg of meat (or approx. 50 %). The calculation of slaughter output shows that the best slaughter timing refers to the moment when rabbits achieve approximately 2.80 kg of body weight or after 3.5 months of fattening. Even though between 10 % and 15 % of rabbits could not reach the target slaughter body weight, they were also slaughtered. After 3.5 months of fattening, the conversion of feed consumption into increase of body weight and due ratio showed greater consumption instead of the desired effect, namely the increase of body weight. The highest conversion of feed was achieved in 35 days of fattening period, in which daily accretion achieved 47 g/day. The statements above can vary depending on the intensity of fattening period. In an intensive production, the target body weight for slaughter should be 2-2.8 kg reached in 80 days, while in extensive fattening process the body weight should be approximately 2.8 kg with the duration of fattening period of approximately 105 days.

2. Economic evaluation

The economic calculation was based on 221 slaughtered rabbits with an average weight of meat of 1.47 kg/rabbit. Table 1 presents different scenarios according to different selling price of meat (EUR/kg), with different economic results. Hypothetically, if the farm decides to begin commercial production, it can expect to achieve the economic parameters presented in Table 1.

Table 1: Economic simulation of rabbit meat production of case study farm

No. of scenario	Selling price per kg of rabbit meat	No. of slaughtered rabbits	Average quantity of meat per rabbit	Selling price per rabbit	Total income per herd	Total costs per herd	Coefficient of economics	Financial result
UNIT								
	EUR/kg	Number	kg	EUR	EUR	EUR	Number	EUR
EQUATIONS								
	<i>a</i>	<i>b</i>	<i>c</i>	$D=a*c$	$Tl=D*b$	<i>f</i>	$Ke=Tl/f$	$Fr=Tl-f$
1	8	221	1.47	11.76	2598.96	2542	1.02	56.96
2	8.5	221	1.47	12.49	2761.39	2542	1.09	219.4
3	9	221	1.47	13.23	2923.83	2542	1.15	381.83

Economic simulation results from Table 1 show that selling price per kilogram of rabbit meat is a very important factor. If the selling price increases from 8 to 8.5 EUR/kg, the financial results increase for EUR 162.44 and if the selling price per kilogram of rabbit meat reaches EUR 9, the financial results increase for EUR 324.87. All simulations were done on the quantity of 221 slaughtered rabbits with an average quantity of meat per rabbit of 1.47 kg. Costs regarding the investment in rabbit cages were EUR 765. According to the level payment amortization, the investment can be reimbursed in 21 months. In the structure of total costs, the investments represent 35.36 %, feed rations 22.68 % and manual labour 41.96 %.

The economic parameters show that even in the case of rabbit meat price of 8 EUR/kg, the production is economically justified (the K_e is higher than 1).

CONCLUSION

Based on the statements that Slovenia does not have a lot of intensive rabbit meat production farms and that it is a net import country when rabbit meat is concerned, the options for business ideas present themselves. According to his questionnaire survey, two findings are especially important: a) consumers are familiar with healthy properties of rabbit meat, and, b) consumers in Slovenia appreciate and trust the rabbit meat produced in Slovenia more.

The limitation of this survey and study refers to the veterinarian aspect and the option of artificial insemination, that were not included, as well as other potential costs of preventive veterinarian care.

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Ekonomska održivost nekomercijalnog i intenzivnog uzgoja kunića: Studija slučaja iz Slovenije

SAŽETAK

Cilj ovog rada je prikazati tehnološku i ekonomsku održivost proizvodnje mesa kunića. Ulazni podaci i dobiveni rezultati preuzeti su iz poslovanja odabrane farme u Sloveniji. Farma meso kunića prvenstveno proizvodi za vlastite potrebe, a ne u komercijalne svrhe. Izračuni ekonomskih pokazatelja temelje se na podacima prikupljenima tijekom dva proizvodna ciklusa, ukupno 221 kunić. Rezultati pokazuju da je proizvodnja ekonomski opravdana pri prodajnoj cijeni mesa kunića od najmanje 8 EUR/kg. Kada bi se postigla prodajna cijena mesa kunića od 9 EUR/kg, financijski bi rezultati bili uvećani za otprilike 15 %. Analiza ekonomske održivosti proizvodnje mesa kunića potvrđuje ekonomsku opravdanost njegove proizvodnje.

Ključne riječi: kunić, uzgoj, meso, ekonomska analiza

Wirtschaftliche Nachhaltigkeit einer nicht kommerziellen und intensiven Kaninchenzucht: Fallstudie aus Slowenien

ZUSAMMENFASSUNG

Ziel dieser Arbeit ist es, die technologische und wirtschaftliche Nachhaltigkeit der Herstellung von Kaninchenfleisch zu zeigen. Die Eingangsangaben und gewonnenen Ergebnisse wurden aus der geschäftlichen Tätigkeit einer auserwählten Farm aus Slowenien übernommen. Die Farm stellt Kaninchenfleisch in erster Linie für den Eigenbedarf und nicht zu kommerziellen Zwecken her. Die Berechnung der wirtschaftlichen Parameter beruht auf Angaben, die während zwei Herstellungszyklen gesammelt wurden, von insgesamt 221 Kaninchen. Die Ergebnisse zeigen eine wirtschaftliche Produktion bei einem Verkaufspreis für Kaninchenfleisch von mindestens 8 EUR/kg. Bei einem Verkaufspreis für Kaninchenfleisch von 9 EUR/kg, würden die finanziellen Ergebnisse um circa 15% ansteigen. Die Analyse der wirtschaftlichen Nachhaltigkeit der Herstellung von Kaninchenfleisch bestätigt die Wirtschaftlichkeit seiner Herstellung.

Schlüsselwörter: Kaninchen, Zucht, Fleisch, wirtschaftliche Analyse

La sostenibilidad económica de la cría intensiva no comercial de conejos: Estudio de caso de Slovenia

RESUMEN

El objetivo de este trabajo fue mostrar la sostenibilidad tecnológica y económica de la producción de carne de conejos. Los datos de entrada y los resultados fueron tomados de una granja elegida de Eslovenia. La granja produce la carne de conejos principalmente para sus propias necesidades y no con el fin comercial. El cálculo de indicadores económicos está basado en datos recogidos de dos ciclos de producción, con 221 conejos en total. Los resultados muestran que la producción tiene la justificación económica con el precio de venta de carne de conejos por lo menos 8 EUR/kg. Si se alcanzaría el precio de venta de carne de conejos de 9 EUR/kg, los resultados financieros aumentarían aproximadamente 15%. El análisis de sostenibilidad económica de la producción de carne de conejos confirma la justificación económica de su producción.

Palabras claves: conejo, cría, carne, análisis económica

Sostenibilità economica dell'allevamento non commerciale e intensivo del coniglio: caso di studio in Slovenia

RIASSUNTO

L'obiettivo di questo studio consiste nell'illustrare la sostenibilità tecnologica ed economica della produzione della carne di coniglio. I dati d'input e i risultati ottenuti sono stati attinti dall'attività di una certa fattoria operante in Slovenia. Questa fattoria produce carne di coniglio prevalentemente per uso proprio; non si tratta, dunque, di un allevamento commerciale. I calcoli degli indicatori economici si basano sui dati raccolti nel corso di due cicli di produzione, per un totale di 221 conigli. I risultati ottenuti ci dicono che tale produzione sarà giustificata dal punto di vista economico se il prezzo di vendita della carne del coniglio sarà pari ad almeno 8 EUR/kg. Se si riuscisse ad ottenere un prezzo di vendita pari a 9 EUR/kg, i risultati finanziari subirebbero un aumento di circa il 15%. L'analisi della sostenibilità economica della produzione della carne di coniglio conferma la giustificazione economica della sua produzione.

Parole chiave: coniglio, allevamento, carne, analisi economica