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Prediction of the conditions for the consumption of game by Polish consumers

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ABSTRACT

Due to the changing needs of consumers and the increased risk of diet-related diseases, today's consumers are forced to seek alternative types of meat. It should, on one hand be tasty, and on the other will improve the health of the consumer. Game is considered to be such a meat. Although Poland is one of the leading producers and exporters of game in Europe, the level of its consumption is very low at about 0.08 kg/person/year. Based on quantitative data from 1000 respondents a model predicting the consumption of wild game based on logistic regression has been prepared. It was demonstrated that consumers are likely to increase their consumption of game, provided that it will have a higher quality and greater commercial availability. A higher propensity to change eating habits in respect of game was displayed mainly by men, city dwellers and those who evaluated their own knowledge on nutritional and diet higher than others.

1. Introduction

In recent years, consumers in the food market, including the meat market, have been looking for new products and new flavours. Food production technologies are being adapted to the needs of consumers and increasingly take into account nutritional recommendations (Pantano & Di Pietro, 2012). Today's consumers are interested in food with high nutritional value (MacRae, O'Reilly, & Morgan, 2005). They are attracted to low fat and cholesterol content in their diet (Saadoun, Cabrera, & Castellucio, 2006). Food should be produced in accordance with the principles of environmental sustainability, in line with ecological aspects (Dransfield, 2003) and characterised by a high level of quality (Grunert, Bredahl, & Brunsø, 2004; Hutchison, Mulley, Wiklund, & Flesch, 2010) and health safety.

As is well known, with the development of civilisation the number of cases of cardiovascular and heart disease have dramatically increased in the world, including in Poland (Cross et al., 2010). The reduction in the incidence of these diseases may contribute to a change in the current dietary behaviour of consumers (Siegrist, 2008; Verbeke, 2006).

Game meat could address the needs of today's consumers. It is believed that in the coming years, it can become an alternative to meat sourced from domestic animals (Hoffman & Wiklund, 2006; Saadoun et al., 2006; Ziembińska & Krasowska, 2007). Game is characterised by its dietary flavour and very good chemical composition (Daszkiewicz, Janiszewski, & Wajda, 2007; Daszkiewicz, Kubiak, Winarski, & Kobalczyk, 2012; Hutchison et al., 2010). Low fat content, the optimal ratio of unsaturated fatty acids to saturated, a content of protein, iron, sodium, potassium, calcium, zinc and vitamins point to the great health value of game (Dzierżyńska-Cybulko & Fruziński, 1997; Hoffman, 2000; Wiklund, Hutchison, Flesch, Mulley, & Littlejohn, 2005; Hoffman & Wiklund, 2006; Ziembińska & Krasowska, 2007; Hoffman, Mostert, Kidd, & Laubscher, 2009; Strazdina, Jemeljanovs, Sterna, & Antone, 2010; Strazdina, Jemeljanovs, Sterna, & Vjazevuca, 2011). An additional advantage of game, which is attractive to many consumers, is its characteristic taste and aroma (Dzierżyńska-Cybulko & Fruziński, 1997; Górecka & Szmańko, 2010; Hutchison et al., 2010; Wiklund, Johansson, & Malmfors, 2003a; Wiklund, Manley, Littlejohn, & Stevenson-Barry, 2003b).

In Poland, game is not a popular type of meat. Its level of consumption is only 0.08 kg/capita/year (Reinken, 1998; Schulp, Thuiller, & Verburg, 2014; Simińska, Bernacka, & Sadowski, 2011) while the annual consumption of all meat is 75 kg/capita/year (Central Statistical Office data). For comparison, in countries with a high degree of economic development, the consumption of game meat per capita is 6 kg. Game meat consumption in the EU ranges between 0.08 kg/capita/year (Poland and Portugal) and 5.7 kg/capita/year in France (Reinken, 1998). Other estimates are consistent with this and report values of up to 3,3 kg/capita/year in Norway (Lillehaug et al., 2005) and 4 kg/capita/year for Italian hunter families and in Northern Italy (Ramanzin et al., 2010; Paulsen, Smulders, & Hilbert, 2012) or up to

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8.4 kg/capita/year for Andalusian hunters (Rovira et al., 2012).

To encourage Polish consumers to change their nutritional habits from eating large volumes of high-energy pork (36.5 kg/person/year in 2014) to game – a meat with higher health values, a better understanding of the needs of the modern consumer related to this kind of meat is needed. Therefore, the primary objective of the publication is to isolate the important factors determining the current level of consumption of game, as well as understanding the needs and expectations of consumers, whose satisfaction could contribute to an increase of the consumption of game in the future. The knowledge obtained about the modern game consumer will be used to develop a nationwide campaign, the primary objective of which will be the promotion of information on the nutritional values of game. Literature studies show that low consumption of wild game by Poles is due to the high price of this type of meat and lower-priced livestock, such as beef, pork and poultry (Kilar, Ruda, & Kilar, 2015). The price of a game consists of factors such as the price of raw materials, processing costs, margins, including a high retail margin resulting from the fact that game is considered exclusive (Grzesińska, Tomaszewska, Bilska, & Przybylski, 2014).

2. Methods

Data from a nationwide quantitative study carried out in 2015 was used to achieve the research objective. The survey was conducted for three months. Purposeful sampling was applied to data collection. A nationwide study was conducted to understand the behaviour of Polish consumers on the meat market, including pork, beef, poultry and game meat. A 2152 e-mails database was drawn from the research agency. These people were asked to take part in the study. Only 1003 respondents completed questionnaires. Three questionnaires filled in incorrectly. Finally, for further statistical analysis, responses from 1000 respondents were extracted. The survey was conducted using the free research web platform. The link directing to the online survey was given to the respondents by e-mail.

From this research sample, 494 of respondents were consumers who declared that they consume game. The remaining respondents were people who do not consume game. The detailed demographic profile of the study population is shown in Table 1.

The research tool used in the study was an original questionnaire with a high degree of standardisation. It consisted of 32 questions characterising the behaviour of consumers in respect of meat (pork, beef, poultry and game meat). The research tool was tested earlier in a pilot study conducted on 50 people. In the preparation of this article, five questions underwent a detailed statistical analysis, covering: declarations of consumers on the consumption or not of game, an assessment of the frequency of game consumption, current reasons for not consuming game, potential factors that could entice consumers not consuming game or consuming it at a low level to change their behaviour towards increasing consumption.

Table 1
Sample profile [%].

Specification	Total N = 1000	Respondents	
		Consuming game N = 494	Not consuming game N = 506
Sex			
Female	52.70	54.08	45.92
Male	47.30	44.19	55.81
Education			
Basic	5.00	58.00	42.00
Vocational	7.40	55.75	44.25
Middle	41.00	52.93	47.07
Higher	36.60	41.26	58.74
Age			
Up to 20	24.90	42.17	57.83
21–30	18.40	40.76	59.24
31–40	19.60	54.59	45.41
41–50	17.50	56.00	44.00
51–60	13.20	55.30	44.70
Over 61	6.40	56.25	43.75
Place of living			
Town/city	83.70	49.10	50.90
Village	16.30	50.92	49.08

3. Statistical analysis

The statistical package SAS 9.4 was used for statistical analysis. As part of the primary data analysis, a frequency analysis and contingency tables were used. After verification of the empirical material, a model to predict the consumption of game was created. The question on declarations of consumers about consuming or not consuming game was used as a dependent variable of the model. Due to the fact that dependent variable (regresant) is binary, meaning that it is derived from a dichotomous scale taking one of two values ("yes" or "no") to describe the prediction of the consumption of game, a logistic regression model (LOGISTIC procedure) was used.

Probability of true – consumption of game model of logistic regression:

$$P(Y = T) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \ldots \beta_k X_k)}}$$

$$P(Y = T) = \frac{1}{1 + e^{-z}}$$

$$z = \beta_0 + \beta_1 X_1 + \ldots \beta_k X_k$$

where:

$\beta_0 - \beta k$ – model parameters/estimates (Apostolidis & McLeay, 2016; Hosmer & Lemeshow, 2000).

As independent variables (regressors), 9 variables describing the present reasons for not consuming game and 10 variables for potential incentives to increase consumption of game were selected for the analysis (Table 2). Other selected regressors were: variable describing the frequency of its consumption, a variable describing the subjective assessment of the amount game consumed, a variable on declarations to increase consumption of game in the coming years and variables characterising the respondents, which included: sex, age, education, number of people in the household, number of children under 16 years of age, place of residence and subjective assessments of diet, health, nutrition knowledge and the financial situation of the family.

An assessment of the quality of the model's fit was carried out using a classic logistic regression model for tools.

The selection of regressors based on their importance in the model was performed using a step selection (stepwise). After 10 stages,

Table 2
Independent variables included in the statistical analysis.

Variables describing the present reasons for not consuming game	Variables/stimuli to eating game
(1) High price	(1) Lower price
(2) Inability to prepare tasty dishes	(2) Higher quality
(3) Lack of variety	(3) Greater variety
(4) Health concerns	(4) Putting a quality mark on packaging
(5) Poor availability	(5) Greater availability of game
(6) Fear of infection (e.g. Trichinosis)	(6) Ability to prepare tasty dishes
(7) No tradition of eating it in the family	(7) Information about positive health effects
(8) Unacceptable taste	(8) Encouragement to consume game from other people (e.g. sellers, friends, family)
(9) Belief that a good dish can only be eaten in a restaurant	(9) Having a higher level of income
	(10) Attractive advertising