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Impact of hedonic evaluation on consumers' preferences for beef attributes including its enrichment with n-3 and CLA fatty acids

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ABSTRACT

The impact of hedonic evaluation on consumers' preferences for beef attributes was evaluated (origin, animal diet, fat content, color, price) including its enrichment with omega-3 (n-3) and conjugated linoleic acid (CLA) fatty acids. One group of consumers (n = 325) received information about n-3 and CLA, while the other group (n = 322) received no information. Consumers conducted a Discrete Choice Experiment (DCE), using the recently developed Generalized Multinomial Logit model; followed by a blind hedonic evaluation of beef samples, which were identified after tasting, and finally repeated the DCE. Results showed that hedonic evaluation had a significant impact on consumers' preferences, which were similar after tasting for all consumers, with less emphasis on the fat content, color, and origin attributes and greater emphasis on animal diet. Preference for n-3 enriched beef increased, while preference for CLA enriched beef was still not significant after tasting. The information provided had a significant effect on consumers' beef preferences, but no significant impact on beef liking scores.

1. Introduction

When health claims are present on food packaging, purchase intentions are favorably influenced (Miklavec, Pravst, Grunert, Klopčič, & Pohar, 2015; Nayga, 2008; Viana, Dos Santos Silva, & Trindade, 2014; Wagner, Howland, & Mann, 2015) and consumer's risk perception of certain diseases decrease (Choi & Springston, 2014; Kozup, Creyer, & Burton, 2003; Santarelli, Pierre, & Corpet, 2008; Van Wezemael, Verbeke, De Barcellos, Scholderer, & Perez-Cueto, 2010). Consumers are becoming more aware of the effect of food on their health (Siró, Kápolna, Kápolna, & Lugasi, 2008) and thus, health concerns are becoming a relevant determinant factor in food consumption. Consumer demands for food and beverages have evolved towards a new range of products, often related to health promotion and disease prevention.

The use of healthier meat products as functional foods has been studied and several strategies to include healthy compounds in meat and meat products have been investigated (Jiménez-Colmenero, Carballo, & Cofrades, 2001; Olmedilla-Alonso, Jiménez-Colmenero, & Sánchez-Muniz, 2013). Numerous animal feeding trials have been carried out in an attempt to increase the omega-3 (n-3) and conjugated linoleic acid (CLA) content in beef (Albertí et al., 2013; Olmedilla-Alonso et al., 2013; Realini, Guàrdia, Díaz, García-Regueiro, & Arnau, 2015). In the United States, health claims influenced the food purchase decisions of 64% of consumers in 2013, up from 61% in 2012 (IFIC, 2013). Thus, naturally enriched n-3 chicken, turkey, beef, eggs, and cheese are already commercialized. In the European market, meat products enriched with n-3 are gaining market share. In Spain, pork enriched with n-3 is starting to be commercialized. However, in the beef sector, enriched meat is still a negligible percentage of the market.

Many studies have analyzed consumers' preferences, attitudes, and levels of acceptance towards beef (Carpenter, Cornforth, & Whittier, 2001; Font-i-Furnols & Guerrero, 2014; Li, Jensen, Clark, & Lambert, 2015; Resurreccion, 2004; Realini et al., 2009, 2013; Ridley, Shook, & Devadoss, 2015; Verbeke, Pérez-Cueto, Barcellos, Krystallis, & Grunert, 2010 among others). Focusing on functional meat products, Olmedilla-Alonso, Granado-Lorencio, Herrero-Barbudo, and Blanco-Navarro (2006) mentioned that the development of functional meat products has a potential market due to the healthful benefits. Kraus (2015) identified n-3 as one of the most used functional compounds in the market, and meat products as one of the most suitable base products for it. Recently, Grasso, Brunton, Lyng, Lalor, and Monahan (2014) analyzed EU regulations regarding health claims for meat products and considered that functional meat products represent a great opportunity for the meat industry. Van Wezemael, Caputo, Nayga, Chryssochoidis, and Verbeke (2014) showed that the marketing opportunities related to health claims for beef are promising, and beef industries were asked to take full advantage of these factors to differentiate beef products in the market. However, consumer perception and functional ingredient

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purchase behavior is not one-dimensional and the final decision of food choice results from a variety of factors such as sensory, socioeconomic, attitudinal, risk perception, cultural, and information issues among others (Hellyer, Fraser, & Haddock-Fraser, 2012; Siró et al., 2008; Urala & Lahteenmaki, 2004).

The decision to purchase a food product involves a mixture of intrinsic and extrinsic cues and does not depend only on physicochemical properties, but also on consumers' expectations and attitudes towards the product (Franchi, 2012). Besides health and well-being enhancement claims, sensory attributes are also decisive factors in the choice of food (Verbeke, 2005; Urala & Lahteenmaki, 2003, 2004). An acknowledgement of the relevance of the sensory experience in food choices is not new and hedonic experiences have a strong influence on product preference (Heid & Hamm, 2013). Consumers' experiences modify product quality perceptions and scoring behavior, and are also likely to affect repurchase decisions (Poole, Martínez-Carrasco, & Giménez, 2006). Gabrielyan, McCluskey, Marsh, and Ross (2014) mentioned that intrinsic cues such as taste are the primary basis for consumers' expectations of quality and decisions on whether to make repeat purchases of a product. Asioli et al. (2014) found that flavor and odor are the most important attributes in driving consumers' choices of organic food. Annett, Muralidharan, Boxall, Cash, and Wismer (2008) and Hobbs, Sanderson, and Haghiri (2006) verified that health and nutritional information together with sensory evaluation and eating experience, are relevant for a positive evaluation of specific functional food (organic bread/functional meat). Combris, Bazoche, Giraud-Héraud, and Issanchou (2009) noticed that personal experience, derived from blind tasting, was significantly more important than label information regarding the "appellation of origin" of wines. Therefore, experience plays a very important role in defining individuals' perceptions and willingness to pay (WTP). Lange, Martin, Chabanet, Combris, and Issanchou (2002) and Noussair, Robin, and Ruffieux (2004) compared hedonic ratings and experimental auctions to evaluate food preferences, stating that hedonic ratings provided similar aggregate results. Poole et al. (2006) employed an experimental auction to test fruit quality perceptions by evaluating consumers' WTP after three alternative sensory experiments (visual appearance, touching and peeling, and tasting). The authors concluded that "experience" modifies product quality perceptions and scoring behavior, and is also likely to affect repurchase decisions. Lange, Rousseau, and Issanchou (1998) compared consumers' behavior using two scenarios: packaging exposure alone, and packaging exposure plus tasting. The authors reported that tasting had an important effect on consumers' purchase decisions. Respondents do consider different food attributes after tasting than they do before tasting, with a corresponding modification of their purchase decisions.

In this context, literature that analyzes the impact of hedonic valuation on consumers' purchasing decisions towards newly-developed meat products is still scarce (Lange, Rousseau, & Issanchou, 1999; Siret & Issanchou, 2000),and this topic remains untouched for beef enriched with polyunsaturated fatty acids, particularly in Spain. Thus, in this study, we applied a methodological approach that attempts to mimic consumers' behavior towards a novel product (enriched beef with beneficial fatty acids) based on the Total Food Quality Model (TFQM) originally proposed by Grunert, Hartvig Larsen, Madsen, and Baadsgaard (1996). According to the TFQM, many characteristics of a food product cannot be discovered before purchase, and consumers will develop expectations about its quality in order to make a food choice (Brunsø, Ahle, & Grunert, 2002). Before experiencing a new product, consumers usually rely on its extrinsic attributes to deduce its quality (Meillon, Urbano, Guillot, & Schlich, 2010; Speed, 1998), leading to the formation of hedonic expectations that are essential for making a purchase (Brunsø et al., 2002). These expectations are based on the information available and/or on previous experience with the same or similar products. After the product is tasted, the experienced quality can be determined. Finally, expectations and experienced quality are integrated (Meillon et al., 2010) allowing an understanding of consumer satisfaction.

In this context, the Expectancy-Disconfirmation model (Oliver, 1980) can be applied to analyze the relative impact of hedonic evaluation on consumer preferences. This model involves a comparison between the cognitive state prior to an event and the subsequent cognitive state after the event is experienced. The model implies that consumers purchase a product with expectations about the anticipated experience. Once the product is consumed, these expectations may change. If the experience matches the expectation, confirmation of the original expectation occurs, which results in satisfaction. If there is a mismatch, disconfirmation may occur in which the experience improves expectations, leading to positive satisfaction. Disconfirmation may also occur in which the experience worsens expectations, leading to negative satisfaction or dissatisfaction.

The relative impact of hedonic evaluation on consumer choices, can be evaluated by a three-step methodology (Meillon et al., 2010):

a) In a food purchase situation, consumers cannot taste the product and can only use extrinsic cues to make a choice (Meillon et al., 2010). When consumers see a new product on store shelves, they generate expectations on the basis of the available information related to the characteristics of the product or to similar products, and on their past experiences (Deliza & MacFie, 1996; Grunert, 1997; Meillon et al., 2010; Speed, 1998).
b) Tasting the new product allows the construction of a current experience which is essential for deciding whether to repeat a purchase or not.
c) After tasting the new product, the quality experience may result in agreement or disagreement with what they expected. These changes play an important role in satisfaction or dissatisfaction regarding the new product (Font-i-Furnols & Guerrero, 2014).

The main objective of this paper was to analyze the impact of hedonic evaluation on consumers' preferences towards beef attributes (origin, animal diet, fat content, color, price) including its enrichment with n-3 and CLA fatty acids. The effect of provided information to consumers, about the role of n-3 and CLA fatty acids and their potential health benefits, on overall liking of beef was also evaluated. On one hand, this is the first paper to empirically analyze the impact of the sensory experience on purchasing intent towards beef meat enriched with polyunsaturated fatty acid. On the other hand, this paper contributes methodologically to the literature on Discrete Choice Modelling (DCM) using the recently developed Generalized Multinomial Logit (GMNL) model of Fiebig, Keane, Louviere, and Wasi (2010), allowing to account for both preference and scale heterogeneity.

2. Materials and methods

In accordance with the main objective, our methodological framework consisted of three key steps:

a) The first step focused on analyzing the consumers' expected preferences, using Discrete Choice Experiment (DCE) towards beef meat attributes and its enrichment with n-3 and CLA (expected preferences). In this initial step, consumers were divided into two groups. While the first group received information about the enrichment process and the health benefits of CLA and n-3 fatty acids, the second group did not receive any additional information.
b) The second part was based on a blind tasting of four types of beef samples (conventional, enriched with n-3, enriched with CLA and enriched with both n-3 and CLA) from animals fed one of four different diets (hedonic evaluation). In this second stage, consumers evaluated overall liking using a 9-point hedonic scale (1 = dislike extremely to 9 = like extremely). After tasting the samples, all consumers were told what type of beef they had tasted in order to associate their score with the different types of beef.