Craft beer added with pink pepper: studying package, acceptance and purchase intention of the beverage

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ABSTRACT

Non-traditional ingredients are being introduced in craft beers, such as pink pepper. The objectives of this study were to propose an optimal packaging for an American Pale Ale craft beer added with pink pepper and to investigate the influence of this ingredient and of the packaging on sensory acceptance and purchase intention. Through the focus group and modified choice-based conjoint analysis (MCBCA), it was determined the optimal packaging should be labeled “brown with pink writing”, “bulged” format and illustration of “barley and hops”. Afterward, two acceptance and purchase intention sessions were performed. First, a blind test, it was verified that the samples (control, without pink pepper, and beer added with pink pepper) had good sensory scores. Color, gasification, aroma, flavor, and purchase intention did not differ between the samples. Foam, bitterness and overall impression had lower acceptance in the pink pepper beer. In the test in the presence of the optimal packaging, all attributes and purchase intention of the pink pepper beer were positively influenced by the packaging. We observed the role of the packaging on consumers’ behavior. Moreover, the addition of pink pepper is a sensory viable alternative for making a distinctive American Pale Ale craft beer. MCBCA = modified choice-based conjoint analysis.

Keywords: Beverages, Sensory Analysis, Modified Choice-Based Conjoint Analysis.
INTRODUCTION

Craft beer consumption in Brazil is expanding and with the changes that have been occurring lately in the behavior of beer consumers, the craft beers stand out, because they are considered of higher quality (Murray and O’Neill, 2012) and for having some differentiation from the more popular commercial beers, such as the addition of different ingredients, resulting in several types of beer, with different flavors and aromas (Kleban and Nickerson, 2012).

The pink pepper (*Schinus terebinthifolius* Raddi), native to Brazil, is a small fruit with a red or rosy color and a sweet flavor, which has a large use in popular medicine, as it presents antioxidant and antimicrobiological properties (Uliana et al., 2016; Dannenberg et al., 2017; Da Silva et al., 2017). Pink pepper has also been used to decorate, confer aroma and flavor to foods, both in the form of grain and essential oil (Souza, 2013). In Brazil, the State of Espírito Santo is the largest producer of pink pepper, whose production is mainly destined for export (Almeida and Leite, 2010).

The use of pink pepper in the production of beer represents an opportunity of innovation and it represents an alternative use of fruits with imperfections which would be discarded (Almeida and Leite, 2010).

The Brazilian craft beer market is still small, which makes it necessary to analyze how the consumers are influenced. A product has intrinsic properties, which are sensory characteristics such as appearance, flavor, texture and aroma (Asioli et al., 2017a) and the extrinsic properties such as nutritional information, brand, price, packaging and label information (Balcombe et al., 2016; Oliveira, Ares and Deliza, 2017; Ardeshiri and Rose, 2018; Aydin and Savas, 2018; Choi and Lee, 2019; Symmank, 2019). Both affect the purchase decision and acceptance of food products, therefore, it is necessary to measure and interpret the responses of the consumers on these characteristics (Asioli et al., 2017b; Toutounji et al., 2019).

AIM

Apply the techniques denominated focus group and modified choice-based conjoint analysis (MCBCA) to propose the optimal packaging for an American Pale Ale beer added with pink pepper produced by handicraft and investigate the influence of the addition of pink pepper and of the elaborated packaging on sensory acceptance and purchase intention of the consumers.
MATERIAL AND METHODS

This study was approved by the Research Ethics Committee of the Health Sciences Center (CCS) of the Federal University of Espírito Santo (UFES) -ES, Brazil, under number 1,121,640. The analyzes were carried out in the Laboratory of Sensory Analysis of the Department of Food Engineering of the Center of Agricultural Sciences and Engineering of UFES (CCAE-UFES).

The experiment was carried out by consumers, among residents of the city of Alegre, State of Espírito Santo, Brazil, employees and students of the CCAE-UFES.

Beer processing

The processing of the craft beers was carried out in batch (Brunelli et al., 2014). For the final production of 28 L of American Pale Ale beer, one half being the control formulation (without pink pepper) and the other half to the formulation with 0.1% pink pepper addition during production. Milled Pale Ale type malts (6.340kg) and Crystal 110® (0.260kg) were introduced into a flask, with 27L of mineral water (65 °C). For the mashing stage, the temperature of the mixture was controlled at 62 °C for 40 minutes and 72 °C for 20 minutes. After the saccharification, the temperature of the wort was raised to 78 °C.

The wort was filtered and the cake was washed with 21L of mineral water at 78 °C for extraction of the residual sugar. Then, the wort was divided into two lots, one for the control formulation and the other for the pink pepper formulation.

Both formulations were heated to boiling at atmospheric pressure for 60 minutes and added with hops. At the beginning of the boil, the first addition of 6g of Columbus® type hops was carried out in pellets to give bitterness to the beer; after 30 minutes of boiling, 7g of Cascade® type hops (for bitterness and aroma) were added and after 55 minutes, an additional 18g of Cascade® hops (for aroma) were added. In the case of the formulation with 0.1% pink pepper (concentration defined in preliminary tests), the addition of 13g of this macerated ingredient occurred after 30 minutes of boiling.

The worts were cooled to 20 °C, and the whirlpool was operated for 2 minutes to clarify the worts. Then, they were transferred to the fermenters and the density was corrected to 1.054 g.mL⁻¹ when necessary (BJCP, 2008). *Saccharomyces cerevisiae* (6 x 10⁹ UFC.g⁻¹ cells) of high fermentation was previously hydrated and 7.5g of yeast was inoculated into each formulation. The fermentation process started at a controlled temperature at 21 °C for seven days in incubator type B.O.D., LimaTec®. Then, the maturation stage was started, with temperature controlled at 3 °C for 10 days. Then, the priming stage was carried out, in which a solution of 0.5% (m.v⁻¹) inverted sugar was added.
Subsequently, the beers were bottled and closed with metal lids with a manual retractor, in amber bottles with the capacity of 600mL, previously washed and sanitized. The bottles were kept at room temperature (25 °C) for seven days for carbonation.

**Focus group**

Three roundtable focus group sessions were conducted, Lima Filho et al. (2015b; Della Lucia and Minim, 2018). Twenty people participated, the first and the second sessions composed of seven participants and the third session composed of six participants. All participants were beer appreciators and were recruited by invitation.

The sessions lasted an average of 90 minutes and were conducted by a moderator and two assistants. A script of questions about the participants’ behavior regarding the observation of beer labels was adopted. Six packs of craft beers were presented and participants were asked for their opinions and it was requested that they ordered the packages according to their preference.

The analysis of the results was performed after the reading of the notes and visualization of the videotapes. During the data analysis, the emphasis was on the frequency of certain responses and the occurrence of different and unique responses. As the study is qualitative, no statistical analysis was performed; excerpts from participants’ responses were transcribed.

**Modified choice-based conjoint analysis (MCBCA)**

MCBCA was carried out with the purpose of evaluating the effects of the factors and their levels on the choice of a craft beer packaging for the craft beer added with pink pepper. The steps of this analysis are described below, according to Della Lucia et al. (2011) and Lima Filho et al. (2015a).

The evaluation of the choice of craft beer packaging was carried out by 144 beer consumers. The determination of the factors and their levels for the assembly of the labels was obtained based on the results of the focus group sessions. The factors considered most relevant in the craft beer packaging, at two levels, were: label color (level 1: “yellow with brown writing” and level 2: “brown with pink writing”), label format (level 1: “bulged” and level 2: “rectangular”) and illustration of the label (level 1: “pink pepper” and level 2: “barley and hops”).

For the data collection, the complete profile was used (Green and Srinivasan, 1978) and the treatments arrangement used was the complete factorial (Carneiro et al., 2018). Therefore, eight treatments were obtained (Table 1).
Table 1. Treatments under study (packaging)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Color</th>
<th>Label format</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yellow with brown writing</td>
<td>Bulged</td>
<td>Pink pepper</td>
</tr>
<tr>
<td>2</td>
<td>Yellow with brown writing</td>
<td>Bulged</td>
<td>Barley and hops</td>
</tr>
<tr>
<td>3</td>
<td>Brown with pink writing</td>
<td>Bulged</td>
<td>Pink pepper</td>
</tr>
<tr>
<td>4</td>
<td>Brown with pink writing</td>
<td>Bulged</td>
<td>Barley and hops</td>
</tr>
<tr>
<td>5</td>
<td>Yellow with brown writing</td>
<td>Rectangular</td>
<td>Pink pepper</td>
</tr>
<tr>
<td>6</td>
<td>Yellow with brown writing</td>
<td>Rectangular</td>
<td>Barley and hops</td>
</tr>
<tr>
<td>7</td>
<td>Brown with pink writing</td>
<td>Rectangular</td>
<td>Pink pepper</td>
</tr>
<tr>
<td>8</td>
<td>Brown with pink writing</td>
<td>Rectangular</td>
<td>Barley and hops</td>
</tr>
</tbody>
</table>

The packaging labels were made by a specialized professional in accordance with Brazilian food labeling standards. The brand name used was fictitious. It is worth noticing that the labels differed only in relation to the factors under study. Two examples of labels used in packaging images and presented to consumers are shown in Figure 1.

Figure 1. Examples of labels made for the packages under study: (a) Treatment 4; (b) Treatment 5, as in Table 1.

Prior to the analysis, consumers were oriented about the test procedure and asked to behave as if they were buying craft beer.

The eight packaging images were simultaneously exposed to the consumers on a table and given the time of 2 minutes for analysis of the packages, and the participants were then asked to mark on the answer sheet the code of the packaging they would choose for purchase (Lima Filho et al., 2015a).

The order of the package images on the table followed the experimental design proposed by MacFie et al. (1989), in three replicates.

The analysis of MCBCA data was performed according to the methodology used by Della Lucia et al. (2011) and Lima Filho et al. (2015a). Of the eight packages presented, consumers should choose only one. Thus, when a treatment was chosen, the value 1 was
checked and the other treatments were assigned the value 0. For the data analysis, the levels of the factors were also encoded with 0 (level 1) or 1 (level 2).

The multinomial logit model, proposed by McFadden (1974), was adopted to estimate the probability of choice of treatments (Eq. (1)).

\[ P_j = \frac{e^{X_j\beta}}{\sum_{i=1}^8 e^{X_i\beta}} \]  

(1)

Where \( X \) is the matrix with the coded values of factor levels, \( j \) represents the treatment and \( \beta \) is the vector of parameters estimated by means of iterative numerical methods, in order to maximize the likelihood function (L) of the sample.

The effect of choosing a treatment at one level of a factor over another level of the same factor was calculated using Eq. (2) (Della Lucia et al., 2011).

\[ Hazard\ Ratio_n = \frac{P(\text{level 2})}{P(\text{level 1})} = e^{\beta_n(X_{\text{level 2}} - X_{\text{level 1}})} \]

(2)

Where \( n = 1, 2, 3 \) factors, \( X_{\text{level2}} = 1 \) and \( X_{\text{level1}} = 0 \) (according to the encoding levels of each factor).

**Sensory acceptance and purchase intention**

For the acceptance and purchase intention tests, 81 volunteers were recruited, randomly, based on their desire to participate in the study, regular beer consumers, over 18 years old (the minimum legal beer drinking age in Brazil). The participants performed two acceptance sessions, with a one-day interval (Della Lucia et al., 2013).

Session 1: a blind test was carried out with the objective of comparing the acceptance between the two American Pale Ale formulations (control, no added pink pepper, and formulation added with pink pepper). Consumers tasted the two samples, without obtaining any previous information about the product. Samples were coded with random three-digit numbers and presented in a monadic and random way for each consumer.

Session 2: an information test was carried out, in which the objective was to evaluate the influence of the craft beer packaging chosen through MCBCA on sensory acceptance of the consumers. Only the sample of beer with addition of pink pepper was evaluated, together with a prototype of the beer packaging. The participant was asked to judge the beverage, taking into account the fact that it came from that packaging (prototype).

In both sessions, the samples were served in acrylic glasses (capacity 50mL), at a temperature of 5 °C to 7 °C. It was used the 9-point hedonic scale, assigning scores that ranged from “I extremely disliked it “ (score 1) and “I extremely liked it” (score 9) for attributes.
color, foam, gasification, aroma, bitterness, taste and overall impression (Reis, & Minim, 2018). In addition to the acceptance, the judge also indicated his/her intention to purchase the product according to a 5-point scale that ranged from “I definitely would not buy” (score 1) and “I definitely would buy” (score 5) (Brewer, & McKeith, 1999).

To present the results, histograms of hedonic means of the attributes under study and purchase intention means were plotted for each sample and for each session.

For each attribute and for purchase intention, within session 1 analysis of variance was performed (ANOVA) ($\alpha=0.05$) for comparison between control formulation and the formulation with addition of pink pepper.

To evaluate the influence of the packaging on the acceptance of beer with addition of pink pepper, paired-comparison t tests were performed ($\alpha =0.05$) for each attribute on the sensory acceptance and purchase intention evaluation (Lange et al., 1999).

RESULTS

The sociodemographic profile of all consumers is shown in Figure 2.

Figure 2. Sociodemographic profile of the consumers who participated in the study: focus group sessions (n=20), MCBCA (n=144) and sensory acceptance/purchase intention (n=81).
Focus group

In focus group session 1, participants reported that the most observed factor was package design, followed by alcohol content, color of the label, ingredients, and source. Most participants were not consuming craft beers because of the difficulty of finding them on the market. One participant stated that he observed more the packaging of craft beers than of the industrial ones.

The label format was an aspect mentioned as important in session 1, however, it divided the opinion of the participants: “I like the bulged label for beers”; “I prefer square label for handicrafts.”

During session 2, the alcohol content, color, brand and font of the letter predominated as factors observed in beer packaging. Regarding the handicraft, in addition to alcohol content, the composition/ingredients and the design were quite cited.

One of the reasons cited for the non-consumption of handicrafts was the price: “If it were not so expensive, I would always buy it”. This fact can be justified by the income of the participants, since all were undergraduate students in session 2, which is assumed to have low income.

In session 3, factors such as alcohol content, brand and ingredients were the most cited by participants and, in the case of handicrafts, the list of ingredients was the aspect of greater impact during the observation of the packaging. In this session, the majority of the participants consume craft beers; however, this consumption is not frequent, due to the lack of availability and the high price on the local market.

In sessions 1 and 2, some participants stated that they observed the harmonization of beers with food. “I notice the combinations, I find it very interesting.”

Some participants in session 3 recommended that every beer label should specify since when the beer is produced. “I like it when it’s written the start date of beer production from the factory, since when it is produced.”

Information on ingredients, alcohol content and other characteristics of beer were cited as the most observed factors in craft beers at all sessions. It is interesting to note that a large part of the participants, in all sessions, stated that they care about the origin of the beer, appreciating the place of its production.

An important point is that in sessions 1 and 2, the color of the label was a prominent factor. “Yellow and red are colors that remind me of beer”; “I think dark colors look cooler for beer.”

The illustration was little cited during the sessions as a factor observed in beer packaging, however, when projecting the images of craft beers, the illustrations were always commented. “I like this figure”; “The design was disproportionate.”
The label format was mentioned during session 1 and also commented: “I like rectangular labels for craft beers”; “I think square label does not refer beer to me, I like the bulged ones.”

The participants ordered the projected packages as to the preference and the preferred of all the sessions, according to them, contained all the necessary information: “Full label, well harmonious”. They praised the brand name and the presence of the hashtag symbol, declaring it to be very modern. Few have criticized the lack of harmonization of beer with foods and consumption temperature. The less preferred packaging contained the label with erased colors, called little attention and lacked some information, as stated by the participants.

**Modified choice-based conjoint analysis**

The behavioral profile of participants is showed in Figure 3.

![Figure 3. Behavioral profile of participants of MCBCA (n=144).](image)

A model (likelihood function) was obtained for the group of consumers and the $\beta$ coefficients and the hazard ratio values are shown in Table 2.
Table 2. Summary of the estimation of the coefficients of the model by maximum likelihood and the hazard ratio values in MCBCA

<table>
<thead>
<tr>
<th>Factor</th>
<th>Coefficient estimation (β)</th>
<th>Hazard ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label color</td>
<td>0.13911*</td>
<td>1.149</td>
</tr>
<tr>
<td>Label format</td>
<td>-0.95551*</td>
<td>0.385</td>
</tr>
<tr>
<td>Label illustration</td>
<td>0.45199*</td>
<td>1.571</td>
</tr>
</tbody>
</table>

* significant by chi-square test (p ≤0.001); ns not significant by chi-square test (p > 0.001).

The hazard ratio for the factor color of the label means that the probability of choosing the packaging with the level “brown with pink writing” was 1.15 times greater than the probability of choosing a packaging with the level “yellow with brown writing”. It can be noticed that the value found was very close to 1, evidencing the low influence of the color factor, which was considered not significant (Table 2).

The probability of consumers choosing a package with the “bulged” level was 2.60 times greater than the probability that they would choose a package with the “rectangular” level.

The probability of choosing a package with the level “barley and hops” was 1.57 times greater than the probability of choosing a package with the level “pink pepper”.

The observed and estimated probabilities of choice for each treatment are presented in Table 3, which allows inferences about the quality of the adjusted model in MCBCA.

Table 3. Observed and estimated probabilities by MCBCA for the treatments on study

<table>
<thead>
<tr>
<th>Treatment*</th>
<th>Observed probability</th>
<th>Estimated probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.1319</td>
<td>0.1307</td>
</tr>
<tr>
<td>2</td>
<td>0.1944</td>
<td>0.2054</td>
</tr>
<tr>
<td>3</td>
<td>0.1597</td>
<td>0.1502</td>
</tr>
<tr>
<td>4</td>
<td>0.2361</td>
<td>0.2360</td>
</tr>
<tr>
<td>5</td>
<td>0.0347</td>
<td>0.0502</td>
</tr>
<tr>
<td>6</td>
<td>0.1042</td>
<td>0.0790</td>
</tr>
<tr>
<td>7</td>
<td>0.0625</td>
<td>0.0578</td>
</tr>
<tr>
<td>8</td>
<td>0.0764</td>
<td>0.0908</td>
</tr>
</tbody>
</table>

* As in Table 1.

It was possible to verify that treatment 4 (packaging containing the label with the following characteristics: label color “brown with pink writing”, “bulged” label format and illustration “barley and hops”) presented the highest estimated probability of choice (p = 0.2360), followed by treatment 2 (p = 0.2054). The estimated choice probabilities for these treatments were close and they differ only in relation to the levels of the color factor of the label, with treatment 2 having the level “yellow with brown writing” and treatment 4 having the level “brown with pink writing “.
Sensory acceptance and purchase intention

The beer labels characteristics most observed by the consumers are brand (77.8%), design (66.7%), information on ingredients (54.3%) and color and illustrations, both with 40.7%, according to data obtained by applying the questionnaire.

Craft beers are consumed by most of the participants (75.3%) and some of them justified the non-consumption due to the higher price and, mainly, due to the difficulty of finding it in the local market.

The majority of participants care about the ingredients used in craft beers (69.1%), take interest in differentiated ingredients (88.9%) and they like pink pepper (64.2%), occasionally consuming it (37.0%). However, 95.1% had not consumed beer with pink pepper prior to the present study and 97.5% would consume it in the future.

The hedonic means of the evaluated attributes and the purchase intention means of the formulations in session 1 are shown in Figure 4. For all attributes of the control formulation the means were between the “I moderately liked it” (score 7) and “I liked it very much” (score 8) categories.

Figure 4. Hedonic means of each attribute and purchase intention means in session 1 (blind test) for both beer formulations.

For the formulation with pink pepper, the means were between “I slightly liked it” (score 6) and “I like it very much” (score 8). Regarding the purchase intention, both formulations were between the categories “I maybe would buy / I maybe would not buy” (score 3) and “I probably would buy” (score 4).

In the blind test, there was no significant difference in color, gasification, aroma, taste and purchase intention (p>0.05) between the formulations (Figure 4). The foam and the
bitterness of the formulation with pink pepper obtained lower sensory acceptance than the foam and the bitterness of the control formulation (p ≤ 0.05), which may have resulted in the lower overall impression observed in the formulation with pink pepper in relation to the control beer (p≤0.05).

The hedonic means of the attributes evaluated and the purchase intention means of the formulation with pink pepper in sessions 1 and 2 are presented in Figure 5. For all attributes in both sessions, the hedonic means were between the categories “I slightly liked it” (score 6) and “I liked it very much” (score 8). Purchase intention in both sessions was between the categories “I maybe would buy/I maybe would not buy” (score 3) and “I definitely would buy” (score 5).

**Figure 5.** Hedonic means of each attribute and purchase intention means of beer added with pink pepper on sessions 1 (blind test) and 2 (test with packaging).

The paired-comparison t test identified significant differences (p≤0.05) (Figure 5) between the scores obtained for the acceptance of all attributes and purchase intention of the formulation with pink pepper when comparing session 1 (blind test) and session 2 (test with packaging).

**DISCUSSION**

The focus group sessions allowed the obtainment of various information about craft beers, such as the relation of consumers to the price of the beverages. Although the high price is one of the reasons for the non-consumption of handicrafts among undergraduate
students, Ascher (2012) and Brager and Greco (2011) stated that the “millennium generation” is interested in exploring new flavors of beer and willing to pay higher prices.

The design, one of the most cited factors in focus groups, is the product design, which refers to the shape of the packaging, and the graphic design, related to the packaging label. Sester et al. (2013) observed that young French consumers were more likely to reject a beer because of the taste than the bottle, which corroborates with what was observed in this study, in which the participants have the custom of observing the packaging design.

Regarding the packaging of beers, three factors stood out: color, illustration and format of the label. When projecting the images of craft beers, the illustrations were always criticized or praised. The color and the format of the labels divided the participants’ opinions, some preferred rectangular labels others enjoyed more the bulged ones. The color alone did not contribute to the packaging or not, but rather to the set, layout and arrangement of the information.

In the literature there were no studies that applied focus groups to study beer packaging, however, this technique was used to study alcoholic and non-alcoholic beverage packaging. Carneiro et al. (2010) verified that the most influential factors in the process of choosing and buying “cachaça” are the brand, the quality seals, awards received, place of production, aging time and the type of aging wood. Menezes et al. (2010) verified that the attributes most observed at the time of the purchase of wine are brand, origin and price.

From the results of the focus group, it was possible to notice that among the important factors in the decision process of buying craft beer, the illustration, color and format of the label stand out. Therefore, these characteristics were selected to be used in MCBCA.

The results of MCBCA show that the levels “bulged” and “barley and hops” are important so that the packaging of craft beer elaborated with pink pepper is more likely to be purchased by consumers. The label color did not influence on consumer choice, i.e., for them it is indifferent to choose a “yellow with brown writing” or a “brown with pink writing” packaging; however, both the probability of choice observed and estimated on treatment 4, which contains the level “brown with pink writing” were higher than those on treatment 2, with the level “yellow with brown writing”.

Therefore, the packaging of craft beer elaborated with pink pepper of greater influence on consumer choice and recommended as optimal for these consumers would be that corresponding to treatment 4 (Figure 1a), which contains the following features: color “brown with pink writing”, “bulged” format and illustration of “barley and hops”.

Lima Filho et al. (2015a) verified by MCBCA that the optimal packaging for irradiated strawberries would contain the information “food treated by ionisation process”, “to ensure freshness and quality for a longer time” and the radura symbol; Della Lucia et al. (2011)
found through MCBCA that the ideal packaging for strawberry light yogurt would have the information “0% sugar”, “0% fat” and “enriched with bioactive proteins”.

From the results obtained in MCBCA, the packaging of craft beer with pink pepper with the illustration of “barley and hops”, color “brown with pink writing” and “bulged” format was selected for the sensory acceptance/purchase intention session.

The results obtained in sensory acceptance/purchase intention tests demonstrate that the control formulation had good sensory acceptance and purchase intention, as well as beer with pink pepper, regardless of the condition of the session (Figure 4; Figure 5).

The difference in sensory acceptance of the bitterness attribute perceived by the evaluators (Figure 4) could be justified by the fact that alcohol content and the aftertaste of beers may affect the perception of bitterness (Hughes and Simpson, 1996; Schönberger, 2006).

Besides, to the same concentration of iso-α-acids (from hop compounds responsible for the bitterness of beers), the bitterness can be different for each beverage, depending on the concentration of the cis and trans isomers. These isomers contribute in distinct ways for the bitterness of the beer and their formation is dependent on the conditions of isomerization of the iso-α-acids during wort fermentation (Techakriengkrai et al., 2004).

Another fact which can justify the difference on sensory acceptance in relation to the bitterness may be the presence of some substance of pink pepper which changes its perception. However, other studies should be performed to elucidate this question.

The foam attribute presented greater acceptance in the control formulation than in the formulation with pink pepper (Figure 4). In the same way that occurred with the bitterness, possibly the pink pepper has any compound that could cause differences in the formation and stabilization of the foam and, consequently, differences between the sensory acceptance of control formulation and formulation with pink pepper. However, to clarify this fact, other studies are required.

As mentioned before, the differences on the sensory acceptance of bitterness and foam of the two formulations of craft beer may have resulted in the lower overall impression observed in the formulation with pink pepper in relation to the control beer.

Ribeiro (2015) studied the addition of essential oil of pink pepper in “Minas frescal” cheese and found that, for all attributes evaluated (appearance, taste, texture and overall impression), the hedonic means were greater than 7 (“I moderately liked it”), indicating that the product has obtained a good sensory acceptance.

By evaluating the addition of pink pepper to salmon and to chocolate, Bertoldi (2006) also found high acceptance. The hedonic means of salmon with pink pepper stood between the terms “I liked it very much” and “I extremely liked it” and of dark chocolate with pink pepper stood between “I moderately liked it” and “I liked it very much.”
It is noted that the beer with pink pepper had greater acceptance and purchase intention when the product packaging was presented to evaluators along with the beverage sample, compared with the results obtained in the blind test (Figure 5).

This result shows that the packaging influenced positively on acceptance and purchase intention of the beer elaborated with pink pepper, confirming its importance on consumer’s judgment. Some studies showed that the largest volume of information provided to the consumer regarding the product influences sensory evaluation; information related to the manufacture of the food (Caporale and Monteleone, 2004) and the origin of it (Caporale and Monteleone, 2001) tends to modify the behavior of the consumer at the moment of the choice and of the product consumption.

On the blind test, the formulation with pink pepper had already obtained a good acceptance, showing that the consumers have enjoyed the sensory characteristics of the beer, and with the presentation of the packaging, the acceptance has increased. It is possible to perceive that the packaging influences and has the ability to change the acceptance of some beers (Ribeiro et al., 2008; Chandon and Wansink, 2011; Della Lucia et al., 2013; Della Lucia et al., 2014).

In order to study the influence of the information about the type of craft beer on sensory acceptance, Carvalho (2015) conducted the evaluation of three types of beer in two sessions (blind test and test with type information). It was noted that the information on the type of craft beer for Pale Ale influenced positively the acceptance of the beverage and that the information about types Weissbier and Pilsner did not cause a significant influence on their acceptance. In General, all styles of beer had good acceptance by most evaluators on both sessions, standing between the hedonic terms “I slightly liked it” and “I liked it very much”.

In order to evaluate the influence of packaging on the acceptance of nine brands of commercial Brazilian beers of Pilsen type, Ribeiro et al. (2008) held three sessions of sensory acceptance: blind test, packaging test and test with information. It was verified that the familiarity with the beer brand allowed an influence on evaluations, at the time the product information was supplied during the sensory analysis. The best-known brands had a higher acceptance in the test with information, even though the same beer did not always have the highest hedonic mean in the blind test. Some brands negatively influenced the acceptance of the beverage, demonstrating a pejorative effect on the assessment of the consumer.

It is noted that the information contained in the packaging (beer type, ideal temperature of consumption, correct storage form, brand name, illustration, product description, alcohol content, liquid content, list of ingredients, origin, date of manufacture and expiry date) cause effect on the consumer acceptance, as in the case of the present study, in which the
acceptance of craft beer with pink pepper improved when the product packaging, developed and chosen by MCBCA, was presented to the evaluators.

**CONCLUSION**

In this work, the addition of pink pepper in an American Pale Ale craft beer provided good sensory acceptance and purchase intention of the beverage, and they were improved in the presence of a developed label for the beer package.

Focus group sessions made it possible to identify important information in the decision process of buying a craft beer and together with the modified choice-based conjoint analysis; it was possible to propose the optimal packaging for an American Pale Ale beer added with pink pepper. The label containing color brown with pink writing, bulged format and illustration of barley and hops has improved the sensory acceptance and purchase intention of the beverage.

The addition of pink pepper is a sensory viable alternative for making a distinctive American Pale Ale craft beer. Thus, together with the appropriate packaging, pink pepper is a spice with great potential for producing distinctive craft beers of the American Pale Ale type.

As this study is a pilot study since the acceptance and purchase intention tests were conducted in laboratory conditions, further studies in central locations, natural drinking environment or home-use-tests should be conducted to corroborate the findings of this work. Moreover, studies about physico-chemical and microbiological characteristics of the beer added with pink pepper and its stability during storage time must be conducted to complement this work.

**REFERENCES**


