AGRO PRODUCTIVIDAD

Colegio de Postgraduados

Goat kid meat in the formulation of Vienna-type sausage

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Citation: Valadez-Pineda, A., López-Puga, J. C., Rico-Costilla, D. S., Luna-Maldonado, A. I., Hernández-Martínez, C. A., Flores-Girón, E., Rentería- Monterrubio, A. L., & Méndez Zamora, G., (2022). Carne de cabrito en la formulación de salchicha tipo Viena. *Agro Productividad*. https://doi.org/10.32854/agrop.v14i6.2244

Academic Editors: Jorge Cadena Iñiguez and Libia Iris Trejo Téllez

Received: March 23, 2022.
Accepted: June 15, 2022.
Published on-line: July 05, 2022.

Agro Productividad, 15(6). June. 2022. pp: 153-154.

ABSTRACT

Objective: To evaluate the substitution of pork meat with goat kid meat in the formulation of Vienna-type sausage.

Design/methodology/approach: A randomized complete block design was used with three treatments to substitute pork meat with goat kid meat: control sausage with 100% pork meat (SC1), sausage with 50% of pork meat and 50% of goat kid meat (SC2), and sausage with 100% of goat kid meat (SC3). The physicochemical variables (cooking loss (CL), pH, color, water holding capacity (WHC), proximate composition), textural profile and sensory characteristics were measurement to evaluate the treatments.

Results: The CL of sausages elaborated with goat kid mead did not have difference ($P>0.05$). The pH and WHC increased ($P<0.05$) for SC3, but their luminosity decreased ($P<0.05$) and the yellowness increased ($P<0.05$). Redness was similar ($P>0.05$) between sausages. The moisture, fat, protein, carbohydrate and ash contents improved ($P<0.05$) for SC2. Hardness, cohesiveness, chewiness, gumminess and resilience increased ($P<0.05$) for SC2 and SC3. The sensory evaluation showed that the three treatments were accepted by the consumers.

Limitations on study/implications: 100% of goat kid meat in the formulation did not improve the physicochemical variables due to increased CL, WHC, b*, carbohydrates and hardness, and decreased L*.

Findings/conclusions: The goat kid meat can be used at 50% for the formulation of Vienna-type sausages.

Keywords: composition, color, sensory, texture.

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INTRODUCTION

One of the main causes of meat deterioration is the oxidative process, which can happen during the conversion of muscle to meat, in meat processing or during storage (Cunha *et al.*, 2018). Likewise, meat products can have problems due to biochemical, sensorial and microbiological deterioration of the meat. Thus, the need to preserve foods could be through different methods such as freezing, refrigeration, dehydration and transformation of the meat into meat products (Teixeira *et al.*, 2020). Some examples of transformed meat products are chorizo, ham and sausage. In this sense, the Vienna-type sausage is a cured product prepared with lean meat and popular due to its color, flavor and taste (Wimontham and Rojanakorn, 2016).

Presently, methods are used not only to conserve the meat but also to satisfy the consumer in terms of health, flavor and texture, and even to reformulate transformed meat products with different additives or substituting the meat with another type of meat. In this sense, goat meat could be used to elaborate Vienna-type sausage in combination with pork meat. This is because goat meat has an average composition (g 100 g^{-1}) of 75.84 water, 20.60 protein, 2.31 lipids, 1.11 ash and 109.00 Kcal, and it stands out because it has double the amount of protein and a fourth less fat than beef and pork meat (USDA, 2021).

In recent studies different formulations of sausages with goat meat have been evaluated. For example, Frankfurt-type with different types of fat (Bratcher *et al.*, 2011), varied concentrations of pork fat (Leite *et al.*, 2015), goat meat and beef (Malekian *et al.*, 2016), sodium reduced (Da Silva-Araujo *et al.*, 2021), and other studies related with Vienna-type sausage (Vivar-Vera *et al.*, 2018; Diego-Zarate *et al.*, 2021; Sriwattana *et al.*, 2021). However, few studies have used goat kid meat in the elaboration of Vienna-type sausages, which could be an alternative for consumers due to the nutritional value of the meat of this species, which could improve the quality in a meat product.

In this study the substitution, partial or complete, of pork meat for goat meat in the formulation of Vienna-type sausages was evaluated through the physicochemical analysis (pH, cooking loss, color, water holding, and proximate composition), instrumental texture profile, and sensory acceptance.

MATERIALS AND METHODS

Experimental design

The experimental arrangement was based on a completely random block design, where pork meat was substituted in two levels by goat meat in the formulation of Vienna-type sausage. The treatments were defined as: control sausage 100% pork meat (SC1); sausage with 50% pork meat and 50% goat meat (SC2); and sausage with 100% goat meat (SC3). Each treatment was replicated twice with 1.3 kg each.

Elaboration process of the sausage and sampling

The process of elaboration and formulation of the sausage (Table 1) was carried out according to the method by Wimontham and Rojanakorn (2016). A total of 18 Eppendorf tubes of 50 mL per treatment (with replica; n=36 tubes) were used to pack the meat paste and evaluate the variables. From these tubes, seven were used for the physicochemical

Table 1. Formulation of the Vienna-type sausage to substitute pork meat.

Ingredients (%)	Treatments[1]		
	SC1	SC2	SC3
Pork meat	52.83	26.41	0.00
Goat meat	0.00	26.41	52.83
Pork back fat	19.44	19.44	19.44
Ice	20.93	20.93	20.93
NaCl	1.75	1.75	1.75
Sodium tripolyphosphate	0.10	0.10	0.10
Sodium ascorbate	0.07	0.07	0.07
Sausage condiment	0.50	0.50	0.50
Starch	4.39	4.39	4.39
$NaNO_2$	0.015	0.015	0.015
Total	100.00	100.00	100.00

[1] SC1: sausage control with 100% of pork meat; SC2: sausage with 50% of pork meat and 50% of goat meat; SC3: sausage with 100% of goat meat.

tests (cooking loss, pH, water holding and color), seven tubes for texture, and four tubes for sensory evaluation.

Cooking loss (CL), pH and water holding capacity (WHC)

The CL was determined with the weight of the meat paste packed before and after its cooking. The pH was measured with a potentiometer (HANNA; HI99163, Woonsoket, RI, USA) inserting the puncture electrode into the sample. The WHC was evaluated through the compression method (Méndez-Zamora *et al.*, 2015).

Color determination and proximate analysis

The color variables were measured with a colorimeter (SADT®, Chin Spec®, Color Difference Meter, Colorimeter-SC20, Beijing, China), and values were recorded of the color space CIE L*a*b*, luminosity (L*), red coordinates (a*), yellow coordinates (b*), chroma and hue angle. The total color change (TCC) and the coloring index (CI) were calculated with the equation by Ledesma *et al.* (2016) and Silva-Vazquez *et al.* (2018). In the proximate analysis (AOAC, 2016) the following were analyzed: moisture, proteins, fats, ash and carbohydrates (obtained from difference). The latter are estimated on dry basis.

Texture analysis and sensory evaluation

The instrumental texture profile analysis (TPA) was conducted according to the method established by Méndez-Zamora *et al.* (2015). The following variables were measured: hardness (N), adhesiveness (g s), elasticity (mm), cohesiveness (dimensionless), gumminess (g), chewiness (g mm) and resilience (dimensionless) in a texturometer (TA.XT. Plus, Stable Micro SystemsSerrey, England). The sausages were standardized at 2.4 cm diameter and 2.0 cm length. The trial was carried out at a preliminary speed of 2 mm s^{-1}, trial speed and post-trial speed of 5 mm s^{-1}, compressing 60% of the sample in two cycles with time between cycles of 0.5 s. The sensory evaluation was carried out through an acceptability trial by attributes (Meilgaard *et al.*, 2006). A total of 20 semi-trained consumers conducted the test when they received the sausage samples (three pieces of 0.3 cm thickness and 2.54 cm diameter) in plastic containers with a random three-digit number. Each consumer evaluated the redness, softness, juiciness, flavor and general acceptability, using a hedonistic scale of 5 points: 1=I dislike it very much, 2=I dislike it, 3=I neither like it nor dislike it, 4=I like it, 5=I like it very much. The test was done in a laboratory of sensory tests, in individual cabins with chair, sink, light and access to the sample.

Data analysis

The analysis of variables was conducted with Minitab® (2013), using the instruction of the general linear model to obtain the variance analysis and to evaluate H_0 (equality of treatments) of each variable. H_0 was rejected when $P<0.05$. For the case of physicochemical variables and texture, seven repetitions per replica per treatment were considered (n=14), and in the sensory analysis the evaluator was considered as a block. When H_0 was rejected, the means comparison of the treatments was carried out with Tukey's statistical test ($P<0.05$). The means comparison in carbohydrates was done with Fisher's LSD test ($P<0.05$). The data arrangement for the analysis was based on a completely random block design. In the sensory evaluation, Friedman's non-parametric test was used, considering the evaluator as block effect in the Minitab® (2013) procedures.

RESULTS AND DISCUSSION

Cooking loss, pH and water holding capacity

Cooking loss (CL) obtained in the Vienna-type sausages (SC) elaborated with goat kid meat did not present a significant difference ($P>0.05$) between treatments (Figure 1). SC3 presented a CL of 0.67%, followed by SC1 with 0.64% and SC2 with 0.53%. Opposite results were found in other studies; for example, in pork meat sausages a CL of 15.54% was found (Nuñez De González *et al.*, 2008), in Vienna-type pork sausages 2.35% (Wimontham and Rojanakorn, 2016); meanwhile, goat sausages subjected to freezing presented 9.78% of CL (Da Silva-Araujo *et al.*, 2021). The temperature, cooking time of the ingredients, and amount of fat in meat products affects the cooking loss (Choi *et al.*, 2010), which is why meat from a single species has better yield after cooking instead of combining meat from different species, although goat kid meat in the elaboration of sausage had a lower yield after cooking. The pH values obtained in the Vienna-type sausages experimented on with goat kid meat are showin in Figure 1. The pH values presented a significant difference ($P<0.05$) between treatments. SC3 obtained the highest pH with 6.14 and SC1 the lowest pH with 5.96.

Similar results from those of SC3 were found in the study by Leite *et al.* (2015), where goat sausages with 10% pork fat presented a pH of 6.10, while goat sausages with 30% pork fat had pH of 6.16. However, the results obtained by Wimontham and Rojanakorn (2016) in Vienna-type sausages made of pork meat were the opposite, the pH was 6.61. Lonergan

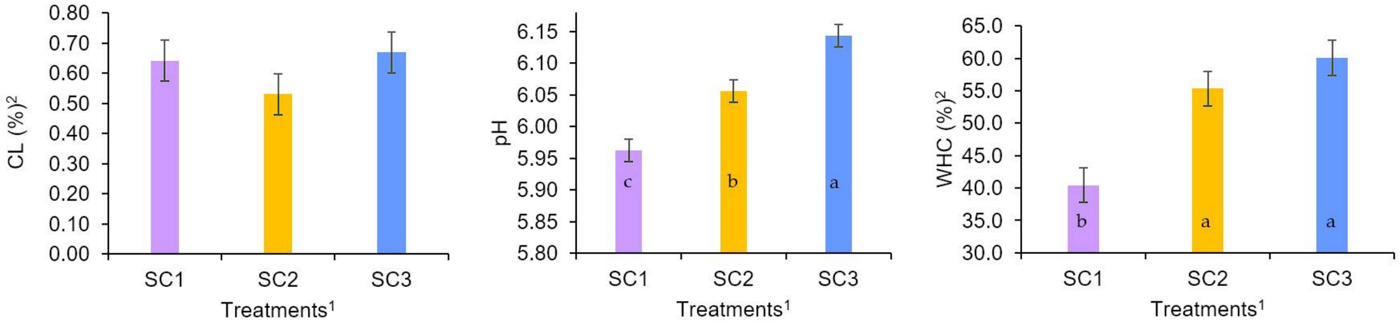

Figure 1. Cooking loss behavior (CL), pH and water holding capacity (WHC) of Vienna-type sausages elaborated with goat kid meat.
[1] SC1: control sausage 100% pork meat; SC2: sausage with 50 % pork meat and 50% goat meat; SC3: sausage with 100% goat meat.
a-c Means in bars with different letter are statistically different (Tukey, P<0.05).

et al. (2007) reported that the average pH of the pork meat canal is 5.71, while Teixeira *et al.* (2011) reported a pH of goat kid meat of 5.8-5.9. In this study, the pH increased when the pork meat was substituted by 50 and 100% with goat kid meat.

The WHC of the treatments presented a difference (P<0.05) between Vienna-type sausages elaborated with goat kid meat. SC3 obtained the highest WHC (60.11%) and SC1 the lowest WHC (40.44%) as shown in Figure 1. Similar results to SC3 were found in the study by Méndez-Zamora *et al.* (2015), where they studied Frankfurter sausages made of pork and bovine meat, while frozen goat meat sausages presented a WHC of 82% in another study (Da Silva-Araujo *et al.*, 2021).

Colorimetry

Figure 2 shows the results of luminisity (L*) obtained between sausages (CS) treated with goat kid meat, where a significant difference was found (P<0.05). SC1 obtained the highest L* (78.40) and SC3 the lowest L* (75.27). In previous studies lower values of L* were found than those obtained in pork meat Vienna-type sausages, of 70.72 (Wimontham and Rojanakorn, 2016); and L* was 63.63 in pork sausages (Nuñez De González *et al.*,

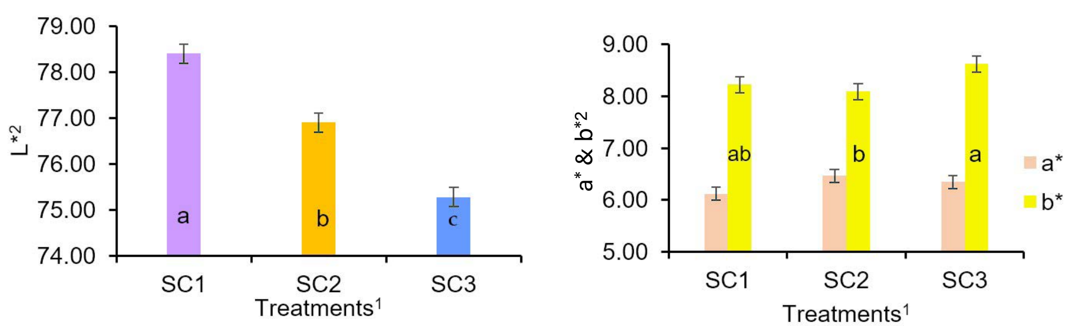

Figure 2. Luminosity, tendency to yellow and redness of Vienn-type sausages formulated with goat kid meat to substitute the pork meat.
[1] SC1: control sausage 100% pork meat; SC2: sausage with 50 % pork meat and 50% goat meat; SC3: sausage with 100% goat meat. [2] L*: luminosity; a*: red coordinates; b*: yellow coordinates.
a-c Means in bars with different letter differ statistically (Tukey, P<0.05).

2008). The value of L* decreases when goat kid meat is added to the treatments, and with lower content of pork fat in the sausages there is a lower value of L* (Kim *et al.*, 2011), because the meat, although lean, has a certain amount of fat, so as the goat kid meat is added the meat product becomes darker (lower L*).

The values with color tendency in a* (red coordinates) and b* (yellow coordinates) are shown in Figure 2. In b* a difference was found ($P<0.05$) between the Vienna-type sausages treated with goat kid meat to substitute the pork meat: b* increased in SC3 (8.62) and decreased in SC2 (8.09). On the other hand, no significant differences were found in a* ($P>0.05$), where SC2 obtained a value of 6.46, followed by SC3 with 6.35 and SC1 with 6.12. Opposite results were found in a* and b* from various studies in Vienna-type pork sausages (Wimontham and Rojanakorn, 2016) and pork sausages (Nuñez De González *et al.*, 2008). The oxidation of proteins and fat causes a deterioration in the color of meat products (Da Silva-Araujo *et al.*, 2021); in SC1 the lowest value of a* was found while in SC2 the lowest value of b*, both treatments had pork meat, which is why including goat kid meat in the formulation seems to decrease the oxidation of proteins and fat in cold meats.

The chroma, total color change (TCC) and coloration index (CI) presented a significant difference ($P<0.05$) between the different formulations (Table 2). These variables increased in Vienna-type sausages of SC3 and decreased in SC1. The hue value of sausages was not different ($P>0.05$). The study by Silva-Vazquez *et al.* (2018) obtained higher results. The values of coloration were affected when adding goat kid meat in the formulation. According to Álvarez *et al.* (2011), the ingredients and the added fat interfere in the change of coloration, which is why the coloration values increased when adding the goat kid meat.

Proximate analysis

In the proximate analysis, SC1 obtained the highest moisture and ash ($P<0.05$), while SC2 presented more fat and proteins ($P<0.05$), and SC3 higher content of carbohydrates ($P<0.05$; see Table 3).

Table 2. Results of coloration of the Vienna-type sausages with goat kid meat.

Treatment[1]	Color[2]			
	Chroma	Hue	ΔE	BI
SC1	10.29^b	53.17^a	17.78^c	16.53^b
SC2	10.40^b	51.29^a	19.26^b	16.99^b
SC3	10.76^a	53.42^a	20.80^a	18.06^a
SEM	0.10	0.95	0.20	0.12
P-value	0.004	0.233	0.000	0.000

[1] SC1: sausage control with 100% of pork meat; SC2: sausage with 50% of pork meat and 50% of goat meat; SC3: sausage with 100% of goat meat. SEM: standard error of the mean.
[2] Chroma: saturation index; Hue: Hue angle (tonality); ΔE: total color change, BI: browning index.
a-c Means in the same column with different letters are different ($P<0.05$).

Similar results in the moisture content were reported in frozen goat sausages with 100% NaCl (Da Silva-Araujo *et al.*, 2021) and in goat meat sausages with 10% of pork fat (Leite *et al.*, 2015). The moisture did not present difference between the sausages, although SC1 had a higher content, which is why it is deduced that pork meat has a higher water percentage (72.8-70.43%; Okrouhlá *et al.*, 2008) than goat meat (69.80-64.20%; Webb, 2014). The ash content increased ($P<0.05$) in SC1, since pork meat has more ash (1.13%) than goat meat (1.11%) (USDA, 2021). Diego-Zarate *et al.* (2021) found an increase in the ash when incorporating powdered dehydrated nopal, while the goat sausages with 30.00% pork fat presented similar values with 3.75% (Leite *et al.*, 2015), as well as in frozen goat sausages with 100% NaCl (Da Silva-Araujo *et al.*, 2021) with 3.97%.

The percentage of fats did not present difference ($P>0.05$) between treatments. Other studies presented results with more fat; for example, Malekian *et al.* (2016) in sausages elaborated with 100% goat meat obtained 15.47% of fat, while Leite *et al.* (2015) in goat sausages with 10% pork fat obtained 11.89% in fats. These contrasts show that when there is higher water content there is lower percentage of fat (Leite *et al.*, 2015), so it is deduced that SC2 presented higher percentage of fat because there was lower water content.

Similar results in protein were found by Diego-Zarate *et al.* (2021) in Vienna-type pork sausages and by Méndez-Zamora *et al.* (2015) in Frankfurter sausages. This similarity can be because the emulsions made with pork fat have higher protein and moisture percentage (Álvarez *et al.*, 2011); on the other hand, the protein content in goat kid meat is 20.60% while pork meat contains 10.28% (USDA, 2021), which is why this can indicate that the fat in pork meat, as well as the added fat and the addition of goat kid meat improved the protein content in SC2.

In Vienna-type pork sausages that Diego-Zarate *et al.* (2021) used as control, they obtained a similar percentage to those evaluated here, while Malekian *et al.* (2016) evaluated sausages with different combinations of goat and bovine meat, where it was shown that adding rice bran in the formulation increased the carbohydrate content. Starch is used as binding agent or extensor in low-fat meat products by emulsing them or restructuring them with added water (Totosaus, 2009), and as the percentage of starch

Table 3. Proximate analysis of Vienna-type sausages with goat kid meat.

Treatment[1]	Composition (%)[2]				
	Moisture	Ashes	Fat	Protein	Carbohydrates
SC1	65.88	3.24[a]	13.45	10.81	6.62[ab]
SC2	65.49	3.15[a]	13.81	10.97	6.57[b]
SC3	65.71	2.78[b]	13.21	10.96	7.33[a]
SEM	0.32	0.04	0.33	0.13	0.23
P-value	0.706	0.000	0.476	0.662	0.079

[1] SC1: sausage control with 100% of pork meat; SC2: sausage with 50% of pork meat and 50% of goat meat; SC3: sausage with 100% of goat meat. SEM: standard error of the mean.
a-b Means in the same column with different letters are different ($P<0.05$).
[2] Mean comparisons for carbohydrates was carried out with Fisher test, where a-b in the same column are different ($P<0.05$).

in this study's treatments (SC1, SC2 and SC3) was the same, and when comparing the results with Malekian *et al.* (2016).

Texture

The hardness and cohesiveness were different (P<0.05) between the sausages (Table 4), which were higher in SC3 and lower in SC1. The adhesiveness presented a trend (P=0.068; considering α=0.10), where SC1 and SC3 obtained high adhesiveness.

Similar elasticity results (0.81 mm) were reported in the study by Méndez-Zamora *et al.* (2015), while hardness (86 N), adhesiveness (−20.59 g s) and cohesiveness (0.23) were not within the range of the Vienna-type sausages with goat kid meat. The results obtained in this study with goat kid meat showed increments in hardness, since there is higher water holding and improved protein-water bonds.

The results found in adhesiveness and cohesiveness of the sausages formulated with goat kid meat to substitute the pork meat in Vienna-type sausages indicated that the adhesive and cohesive behavior of the sausages is similar to the control; that is, the restructuring of the sausages compared to the formulation of elastic gels in the products was not affected (Méndez-Zamora *et al.*, 2015). Similarly, in the study conducted by Da Silva-Araujo *et al.* (2021) there was no effect found in elasticity, although they did present slightly higher values (0.95-0.98 mm) than the Vienna-type sausages of this study. The adhesiveness results of the Vienna-type sausages were similar in adhesiveness and elasticity of Frankfurter sausages (Méndez-Zamora *et al.*, 2015).

The cohesiveness values in this study varied when substituting pork meat with goat kid meat, the same effect that Gadiyaram and Kannan (2004) found when elaborating sausages with bovine, porcine and caprine meat; these authors indicated that the type of meat affects the texture properties. On the other hand, Wimontham and Rojanakorn (2016) reported that cohesiveness, hardness and adhesiveness increased when reducing the content of sodium nitrate and including powdered gac aril (*Momordica cochinchinensis*) in Vienna-type sausages made from pork meat.

The gumminess, chewiness and resilience of sausages with goat kid meat to substitute the pork meat were different (P<0.05; Table 4). These variables were higher in SC3 and lower in SC1. The gumminess varied compared to that presented by Bratcher *et al.* (2011),

Table 4. Evaluation of the texture of Vienna-type sausages with goat kid meat.

Treatment[1]	Hardness (N)	Adhesiveness (g s)	Springiness (mm)	Cohesiveness	Gumminess (g)	Chewiness (g mm)	Resilience
SC1	46.17^{c}	−32.82^{a}	0.8124^{a}	0.3647^{c}	16.90^{c}	13.74^{c}	0.1557^{c}
SC2	68.27^{b}	−53.68^{a}	0.8142^{a}	0.4391^{b}	30.06^{b}	24.46^{b}	0.2186^{b}
SC3	92.59^{a}	−37.48^{a}	0.8275^{a}	0.5373^{a}	49.85^{a}	41.23^{a}	0.2857^{a}
SEM	1.49	6.48	0.0058	0.0094	1.18	0.96	0.0067
P-value	0.000	0.068	0.150	0.000	0.000	0.000	0.000

[1] SC1: sausage control with 100% of pork meat; SC2: sausage with 50% of pork meat and 50% of goat meat; SC3: sausage with 100% of goat meat. SEM: standard error of the mean.
a-c Means in the same column with different letters are different (P<0.05).

who evaluated the texture in Frankfurter sausages elaborated with goat meat and three different types of fat, where chewiness and resilience in this study were similar. Meanwhile, the gumminess of SC2 was similar to that of goat sausages evaluated by Gadiyaram and Kannan (2004).

Gumminess is related with hardness and cohesiveness, while chewiness with hardness, cohesiveness and elasticity (Gadiyaram and Kannan, 2004); therefore, as hardness, elasticity and cohesiveness increased when using goat kid meat, the gumminess and chewiness between treatments also increased. The fat in the sausages provokes an effect on the resilience (elastic recovery of samples to return to their original shape), and the higher the fat the lower the resilience (Andrès *et al.*, 2006). Then, the resilience increased when adding goat kid meat to the formulation; this characteristic of texture was lower in SC1 because the pork meat has more fat.

Differences in hardness, cohesiveness, gumminess and chewiness were found in the study by Diego-Zarate *et al.* (2021), but not in elasticity. These authors debated whether this is because of the ingredients and amount used in the formulation of these sausages. Then, it can be said that goat kid meat used to substitute pork meat in Vienna-type sausages affects their texture properties because the hardness, cohesiveness, gumminess, chewiness and resilience increased.

Sensory evaluation

The sensory evaluation of the attribute redness, odor and flavor of Vienna-type sausages formulated with goat kid meat to substitute pork meat did not show difference ($P>0.05$; Table 5). These attributes were valued as “I like it” (4.0), which indicates that the preference of these attributes did not influence when 100% of goat kid meat was used to substitute pork meat in the Vienna-type sausage formulation.

Similar results were obtained in the sensory analysis of sausages with goat meat evaluated by Paulos *et al.* (2015). Wimontham and Rojanakorn (2016) evaluated the acceptance in Vienna-type sausages with pork meat in which the content of $NaNO_2$ decreased and powdered gac aril was added; additionally, the odor is acceptable without decreasing $NaNO_2$, but the acceptability decreases if powdered gac aril is added in higher concentrations. The condiments have a great influence in the odor and flavor of meat

Table 5. Evaluation of the attributes of redness, odor and flavor of the Vienna-type sausages formulated to substitute pork meat with goat kid meat.

Treatment[1]	Pink color	Odor	Taste	Hardness	Juiciness	Overall acceptability
SC1	4.0	4.0	4.0	4.0	4.0	4.0
SC2	4.0	4.0	4.0	4.0	4.0	4.0
SC3	4.0	4.0	4.0	4.0	4.0	4.0
P-value	0.705	0.455	0.433	0.679	0.584	0.850

[1] SC1: sausage control with 100% of pork meat; SC2: sausage with 50% of pork meat and 50% of goat meat; SC3: sausage with 100% of goat meat.
P-values<0.05 are different (Friedman test).

products (Paulos *et al.*, 2015); in this case they were the same condiments and the same amount added in the treatments, which is why the addition of goat kid meat to substitute pork meat in Vienna-type sausages presented the same acceptability, since pork meat is commonly used in cold meats. When increasing the fat, the color intensity and brightness in sausages decreases, while when increasing the salt the color intensity and brightness increases (Ventanas *et al.*, 2010). Although goat kid meat contains less fat than pork meat, this did not affect the evaluation of redness.

The hardness, juiciness and global acceptability of the goat sausages did not present a difference (P>0.05) in these attributes with a degree of acceptance of 4.0 (I like it). This indicated that the attributes were acceptable using 100 (SC3) and 50 % (SC2) of goat kid meat to substitute pork meat in the formulation of Vienna-type sausages.

Paulos *et al.* (2015) obtained similar results in hardness, juiciness and global acceptability. Although pork meat was replaced with goat kid meat, the attributes were not affected. The addition of ingredients could decrease the hardness of the cold meats (Bratcher *et al.*, 2011), so the change of meat in the formulation did not interfere in the sensory evaluation of these attributes.

CONCLUSIONS

The cooking loss improved when 50% pork meat and goat kid meat (SC2) were combined. The water holding increased with 100% goat kid meat (SC3). SC1 (100% pork meat) presented higher luminosity. The color red increased when combining pork meat and goat kid meat in 50%. The yellowness and color change increased in SC3. SC2 presents higher fat and protein, although less carbohydrates. SC3 increased the texture parameters. The Vienna-type sausages of treatments SC2 and SC3 had sensory acceptance. The goat kid meat in 50% can be used in the elaboration of Vienna-type sausages.

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