APPLICATION OF THE CHECK-ALL-THAT-APPLY (CATA) METHOD IN BEEF PRODUCED IN THREE DIFFERENT GRAZING SYSTEMS

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I. INTRODUCTION

The intercropping of grasses with pigeon pea (*Cajanus cajan* cv. BRS Mandarin) is an alternative to mitigate greenhouse gas emissions (GHG), increase forage availability throughout the seasons, enhance protein intake, and improve animal productivity [1]. Intensified systems and nutritional strategies enhance production efficiency and may play a significant role in the sensory quality of beef, influencing aspects such as flavor, aroma and texture perception. This study aimed to evaluate, using the Check All That Apply (CATA) method, the descriptive attributes of beef produced in three pasture systems by consumers.

II. MATERIALS AND METHODS

Twenty-seven *Nellore* steers, with an initial weight of 221±7 kg and aged between 15-16 months, were distributed into three treatments with three spatial replicates: degraded pasture (*Urochloa spp.*), recovered pasture (*Urochloa spp.* fertilized with 200 kg of N/ha^{-1}), and consortium pasture with pigeon pea (*Cajanus cajan* cv. BRS Mandarin) and *Urochloa spp*., a system used for mitigating GHG. The animals remained in the field for two years, after which they were slaughtered in a commercial abattoir. Samples of the *Longissimus thoracis* muscle (between the 12^{th} and 13^{th} rib) from the left half carcass of each animal were collected after 24 hours of chilling. Steaks 2.5 cm thick were aged for seven days at 0 – 2 ºC, seasoned with 1 g of salt, and cooked to an internal temperature of 75 ºC in a combined oven at 180 ºC. Subsequently, the meat samples were cut into cubes, wrapped in aluminium foil, and cooked at 60 ºC until the time of the test. The sensory test was approved by the Ethics Committee for Research with Human Subjects, under protocol CAAE 61386622.0.0000.5380, and conducted at Multiuser Laboratory for Sensory Analysis of Foods – LAMASA (FZEA/USP - Pirassununga/SP, Brazil) with the participation of 119 consumers. The samples were evaluated by the following descriptive attributes: "flavor" (intense, mild, grilled, greasy, rancid, metallic, bitter, sweet, and liver); "aroma" (intense, mild, grilled, greasy, rancid, and bloody); and "texture" (tender, hard, fibrous, juicy, dry, and liver) using the Check-All-That-Apply (CATA) method [2]. Each panelist evaluated the samples coded with a random three-digit number, in a balanced order [3]. The data were analyzed by correspondence analysis, Cochran's Q test and analysis of the presence and absence of the attributes using XLSTAT software.

III. RESULTS AND DISCUSSION

Cochran's test showed significant p-values ($p<0.10$) for intense beef aroma (IBAR), mild beef aroma (MBAR), intense beef flavor (IBFL), mild beef flavor (MBFL), greasy aroma (GARO) and grilled aroma (GRAR). This means that there were significant differences among the studied treatments. Multiple pairwise comparisons using the Critical difference (Sheskin) procedure showed that recovered and consortium pasture differed for mild beef aroma and grilled aroma attributes. The plot in Figure 1 allows us to verify the quality of the analysis, which is good (100%, with 72.99% for F1 and 27.01% for F2). Acceptability is associated ($p<0.001$) with the intense beef flavor attribute when it is present in the presence/absence analysis.

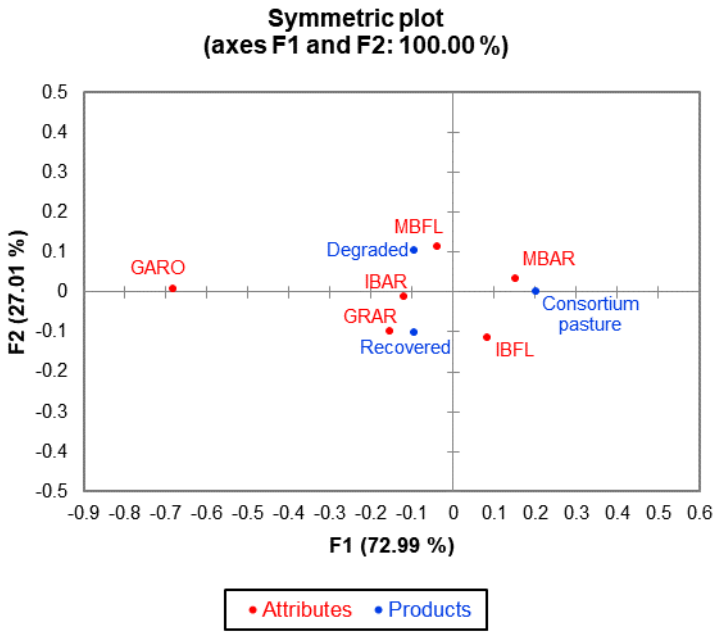

Figure 1. Descriptors of the sensory characteristics of beef produced in three pasture systems as determined by the CATA method. Attributes: GARO – Greasy aroma; GRAR – Grilled aroma; IBAR – Intense beef aroma; IBFL – Intense beef flavor; MBAR – mild beef aroma; MBFL – Mild beef flavor

IV. CONCLUSION

The studied pasture systems showed differences for intense beef aroma, mild beef aroma, intense beef flavor, mild beef flavor, greasy aroma and grilled aroma attributes. Intense flavor attribute affected acceptability of beef produced in the different systems. The consortium system of pigeon pea+*Urochloa spp*., in addition to being an efficient mitigation strategy for GHG emissions, produced meat with a milder beef aroma and less grilled aroma, in consumers' perception.

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