IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 13, Issue 12 Ser. I (December 2020), PP 31-35
www.iosrjournals.org

Effect of the Enzymatic Complex on the Quality of Arabic Coffee

Eliabner Adriano Matias[1], Kleso Silva Franco Junior[2], Giselle Prado Brigante[3]
[1](*Discente do curso de Agronomic Centro Superior de Ensino e Pesquisa de Machado / CESEP, Machado, MG, Brasil)*
[2,3](*Docente Dr. do curso de Agronomic Centro Superior de Ensino e Pesquisa de Machado / CESEP, Machado, MG, Brasil)*

Abstract: *The quality of the coffee, as well as the attributes present in the drink, make them differentiated coffees, the set of these characteristics being decisive factors in commercialization, adding greater value to the product. Faced with this scenario, producers and coffee growers, new methods and processing are necessary in order to enhance and or maintain the quality of this drink. The objective of this study is to evaluate the effect of the enzymatic complex LNF CNA + CNB, on the final quality of arabica coffee. The research was carried out at Fazenda Recanto, located in the municipality of Machado, South of Minas Gerais. After the harvest, the beans were mechanically peeled, the coffees with mucilage adhered to the fruits were divided into 5 treatments, being: T1 directly to the yard after peeling, T2 demucilated without adding enzyme and the other 3 treatments demucilated with addition of the complex enzymatic LNF CNA + LNF CNB, the dose of (0.33 ml CNA + 0.11 ml CNB); (0.66 ml CNA + 0.22 ml CNB) and (0.77 ml CNA + 0.33 ml CNB), T3; T4; T5, respectively. The experimental design was completely randomized, with 5 treatments and 4 repetitions per treatment. Totaling 20 experimental plots composed of 10 liters of coffee. The grains were dried on a concrete terrace until reaching a humidity of 11.5%, then they were processed and evaluated according to the BSCA methodology. Analyzing them, it was concluded that the use of the enzymatic complex LNF CNA + CNB in the demucilation process did not provide difference in the quality of arabica coffee.*
Materials and Methods: T1 directly to the yard after peeling, T2 demucilated without adding enzyme and the other 3 treatments demucilated with addition of the complex enzymatic LNF CNA + LNF CNB, the dose of (0.33 ml CNA + 0.11 ml CNB); (0.66 ml CNA + 0.22 ml CNB) and (0.77 ml CNA + 0.33 ml CNB), T3; T4; T5, respectively. The experimental design was completely randomized, with 5 treatments and 4 repetitions per treatment. Totaling 20 experimental plots composed of 10 liters of coffee.
Results: After processing the post-harvest coffees, they were evaluated for quality and the data are presented in Table 2- (Classification of coffees (according to BSCA methodology) submitted to different types of processes with and without the application of the enzyme complex.), that in relation to the quality assessment score, there was no statistical difference.
Conclusion:the enzyme complex LNF CNA + CNB (Aspergillus aculeatus and Aspergillus niger) did not provide a difference in the quality of Arabica coffee according to BSCA methodology.
Key Word: *coffee growing, fermentation, processing.*

Date of Submission: 28-11-2020 Date of Acceptance: 13-12-2020

I. Introduction

Brazil is the largest producer and exporter of Arabica coffee in the world, highlighting the state of Minas Gerais as the largest in volume and production. Being one of the most popular drinks in the world, coffee is considered the most economically important commodity after oil [1].

To seek new consumption niches, as an alternative to commodity coffee, and to value production, its different origins and producers that aim for quality, is to put Minas Gerais coffee in a prominent place in the world market, creating business opportunities and adding value [2].

Evidently, the coffee consumer market has been changing in recent years, as consumers are opting for differentiated and quality coffees, all through the demand for these coffees has increased, influencing the producers of this drink to produce better quality coffees, an Since its price is based on qualitative parameters that may vary depending on the quality presented, providing the producer with greater market value.

According to [3]. The term coffee quality can be defined as a set of physical, chemical, sensory and safety attributes that meet the tastes of different types of consumers. The best beans are called specials, and when comparing with commodity coffees, it has been growing at an accelerated pace. The current sales value for some differentiated coffees has a surcharge that varies between 30% and 40% more than conventionally grown coffee. In some cases, it may exceed a 100% barrier. To differentiate specialty coffees, physical and sensory attributes must be based, such as the quality of the drink, which must be higher than the standard[3]. Still

in this perspective, there are several factors that influence the final quality of the coffee: edaphoclimatic characteristics, cultivars, cultivation conduction and management, harvest, type of processing, drying and storage [4].

The processing of coffee becomes an important step within the post-harvest, the separation of green and immature fruits from cherries is essential to obtain a better quality drink and, for this, it is necessary to use the most different techniques of processing (wet and dry) [5]. Wet processing consists of removing the peel, pulp and / or mucilage from the ripe fruit, which are substrates conducive to the development of microorganisms that can cause the occurrence of fermentations harmful to the final quality of the product. The form of wet processing gives rise to pulped, pulped or demucilated coffees. To obtain the peeled cherry coffee, the fruits are mechanically peeled and part of the mucilage still adheres to the fruit parchment. In obtaining pulped coffee, after peeling, the part of the mucilage that was still attached to the fruits is removed in biological fermentation tanks [6.7].

he use of enzymes and yeasts during the demucilation of wet processed coffee has been increasingly studied, given that the action of enzymes on pectin accelerates the demucilation process, which may introduce nuances of aromas and flavors differentiated to coffee. In this perspective, the present research aimed to evaluate the effects of the enzymatic complex of microbiological origin in coffee beans submitted to fermentation to remove mucilage and its relationship on coffee quality and sensory attributes.

II. Material And Methods

The survey was conducted at Fazenda Recanto, located in the municipality of Machado, Minas Gerais, located at coordinates 21 ° 40 ’51’’S and 46 ° 02’39’ ’O, at an average altitude of 1,000 meters.

According to [8] the region's climate is classified as warm and temperate, where summer presents greater rainfall when compared to winter, with an average annual rainfall of 1434.5 mm.

The coffee used in the experiment came from stand CT2003, variety Catuaí Vermelho 144, and was planted in 2003. The crop has a spacing of 3.80 m between rows by 0.80 m between plants, 3290 plants / ha, managed according to good production practices.

The coffee beans were harvested mechanically in the cherry stage with 80% maturity. After harvesting, the grains were mechanically dehusked through the huller Paline Alves PA-DCC/ECOATIVO/[6], part of the coffees in this process were taken directly to the terreiro giving rise to the witness being T1. In obtaining pulped coffee, after peeling, coffees with mucilage adhered to the fruits were divided into 4 treatments, T2 without adding enzyme and the other 3 treatments with adding the enzyme complex LNF CNA + LNF CNB, the dose of (0,33 ml CNA + 0,11 ml CNB); (0,66 ml CNA + 0,22 ml CNB) and (0,77 ml CNA + 0,33 ml CNB), T3; T4; T5, respectively.

The treatments that were demucilated, were directed in a tank with water until covering the coffees during the period of 3 hours.

The processes used were distributed in a completely randomized design, totaling five treatments, with 4 replications. The plots consisted of 10 liters of coffee, totaling 40 liters of coffee in each treatment performed. Thus, the established treatments are shown in table 1:

Table N° 1: Distribution of treatments:

Treatments	Processing
T1	Peeled cherry coffee
T2	Demucilated without added enzyme
T3	Demucilated with enzyme (0,33 ml CNA + 0,11 ml CNB)
T4	Demucilated with enzyme (0,66 ml CNA + 0,22 ml CNB)
T5	Demucilated with enzyme (0,77 ml CNA + 0,33 ml CNB)

The treatments after processing were sent to drying via a concrete patio where the coffee was dried as follows: The coffees were obtained from drying until reaching about 11,5% humidity (bu). The grains were revolved equally, these revisions being carried out daily every 30 minutes until reaching the ideal drying point for the grains.

After drying, the coffee beans were processed and the quality of the coffee was evaluated by Q-graders, according to a sensory evaluation using the CoE (“Cup of Excellence”) methodology, in which each attribute (clean drink, sweetness, acidity, body, flavor), remaining flavor, balance or balance and general grade) receives a score from 0 to 8, according to the intensity, being therefore more objective than the conventional “cup tasting”. The sum of the notes corresponds to the final classification of the drink. Each sample receives a pre-

established score of 36 points, to which are added the scores of each attribute, being classified as special coffees those with a score higher than 80.

The data were subjected to analysis of variance using the SISVAR® statistical software [9.] the significant difference between treatments being determined by the F test, with the means compared by the Scott Knott test at the 5% probability level.

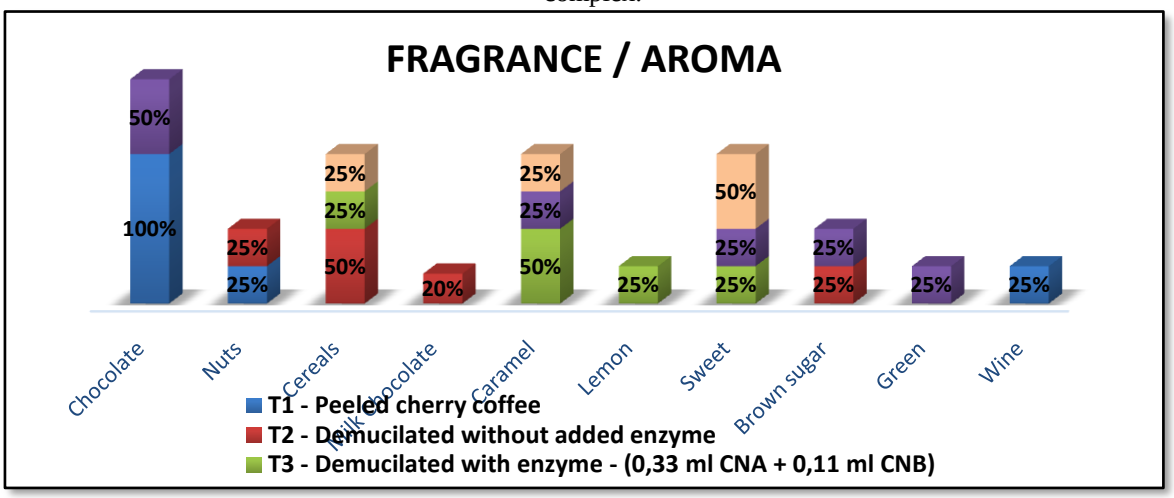
III. Result

After processing the post-harvest coffees, they were evaluated for quality and the data are presented in Table 2- (Classification of coffees (according to BSCA methodology) submitted to different types of processes with and without the application of the enzyme complex.), that in relation to the quality assessment score, there was no statistical difference.

Table N° 2: Classification of coffees (according to BSCA methodology) submitted to several types of processes with and without the application of the enzymatic complex.

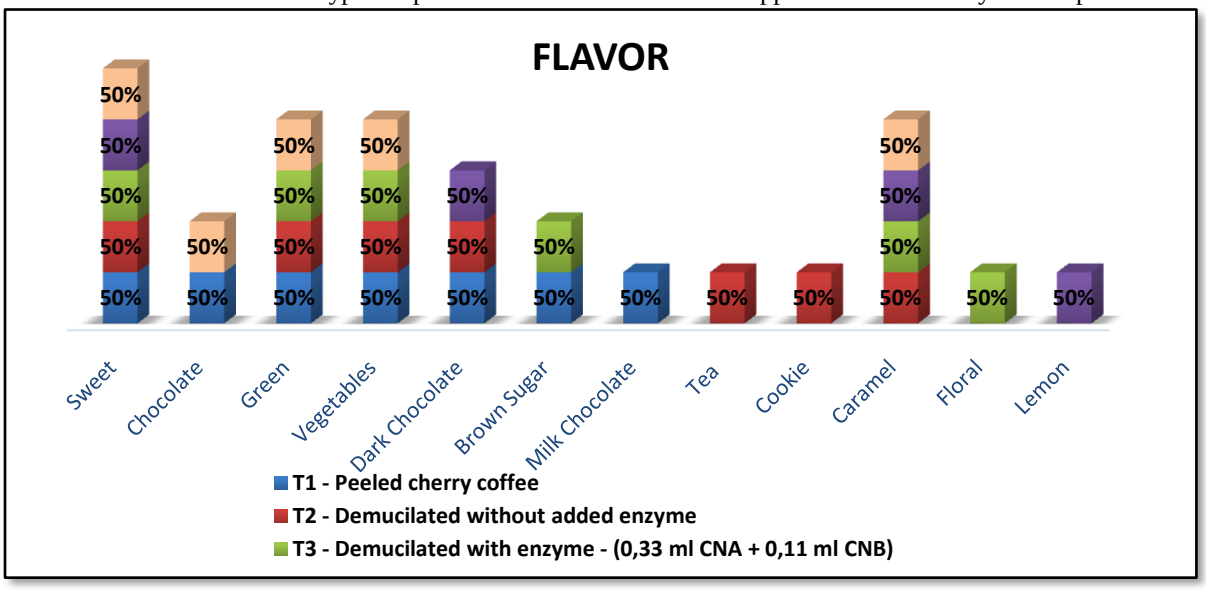
Treatment	Global Quality
T1 - (Teste)	82 A
T2	83,5 A
T3	82,75 A
T4	83,75 A
T5	82,45 A
Average	82,89
CV%	21,9

Graph n° 1: Sensory attributes of Fragrance and aroma in the classification of coffees (according to BSCA methodology) submitted to several types of processes with and without the application of the enzymatic complex.



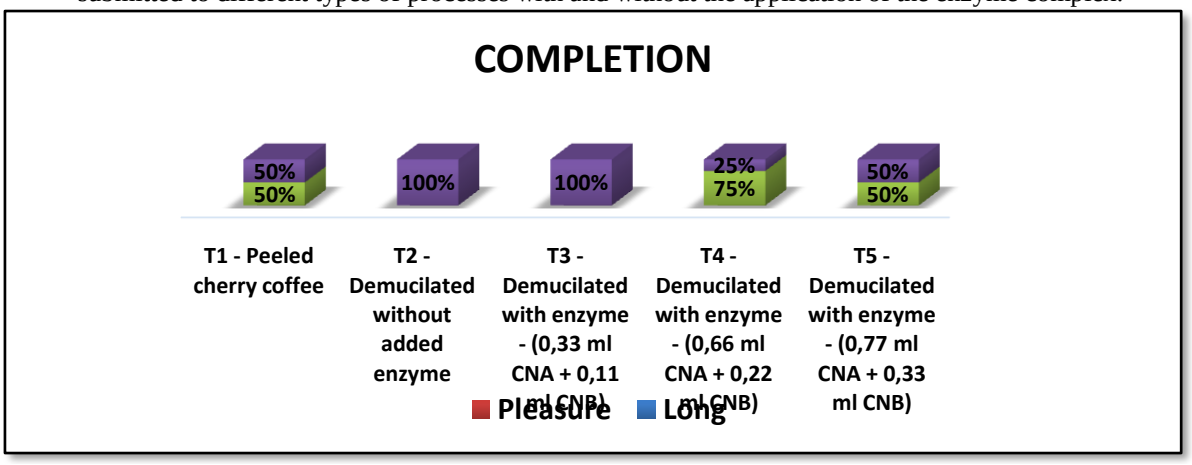
As for the sensory flavor attributes, we can evaluate in Graph 2- (Flavor sensory attributes in the classification of coffees (according to BSCA methodology) submitted to different types of processes with and without the application of the enzyme complex.), That T4 was the only one that it presented less characteristics than the other treatments, and also the only one that presented lemon flavor. In T3, it was the only one with a floral flavor. We can still observe that in the T2 treatment, specific flavors of tea and wafer were presented which he did not find in the other treatments. And in the control treatment we can see that they had exclusive flavors of milk chocolate. All treatments had the sweet taste in common.

Graph n°2: Flavor sensory attributes in the classification of coffees (according to BSCA methodology) submitted to different types of processes with and without the application of the enzyme complex.



In the finishing attributes, the treatment T2 and T3, were the only ones that presented homogenization in the finishing, giving 100% dryness in all repetitions, differently from the other treatments. In treatments T1 and T5, 50% sweet and 50% dry were equally distributed. Treatment T4, on the other hand, presented 75% sweet and 25% dry, this shows us that of the 4 repetitions within treatment 3 presented sweet finish.

Graph n° 3: Final sensory attributes in the classification of coffees (according to BSCA methodology) submitted to different types of processes with and without the application of the enzyme complex.



IV. Discussion

The results obtained in this study corroborate the study by [10]. who used the same enzyme complex in conilon coffee, however the authors did not identify the influence of the application on the final grade of coffees.

Although the final grades do not show statistical differences between treatments, it is noted that flavor was the attribute that showed the greatest variance of expression between treatments, very promising characteristics that according to [11]. In the fermentation process allows the producer to controlling your product by standardizing your coffees and trying to improve quality year after year, there are major changes in the market, coffee lovers are preferring different drinks with varied flavors. It is of great importance that coffee is produced with quality so that there is good commercial value.

In the work carried out by [12]. In which the same enzyme complex was used, however with different methodology, they identified that the enzymatic application can contribute to the drink quality of dry coffee beans in concrete and earth terraces, where in both terreiros the enzymatic application contributed to a better score of the drink according to SCAA methodology, thus being an option for the producer to raise the quality of

the drink. According to a study by 13. Which also used the same enzyme complex concluded that the use of LNF (CNA - CNB) enzyme complex in relation to the coffee drying process did not influence the final drying time results, nor did it influence the aroma attributes of the beverage.

In this perspective, the use of the enzyme complex still lacks the continuity of research, with the objective of identifying which dosages and processes may contribute to enhance the quality of the coffees.

V. Conclusion

It is concluded that the enzyme complex LNF CNA + CNB (Aspergillus aculeatus and Aspergillus niger) did not provide a difference in the quality of Arabica coffee according to BSCA methodology.

References

[1]. SUNARHARUM, W. B.; WILLIAMS, David J.; SMYTH, H. E. Complexity of coffee flavor: A compositional and sensory perspective. Food Research International, v. 62, p. 315-325, 2014.

[2]. ALVES, H.M.R.; VOLPATO, M.M.L.; VIEIRA, T.G.C.; BORÉM, F.M.; BARBOSA. J.N. Características ambientais e qualidade da bebida dos cafés do estado de Minas Gerais. Inf. Agropecu. Belo Horizonte, v. 32, p. 2-12, 2011.

[3]. SIMÕES, R.O.; FARONI, L.R.A.; QUEIROZ, D.M. Qualidade dos grãos de café (Coffea arabica L.) em coco processados por via seca. Revista Caatinga, v. 21, n. 2, p. 139-146, 2008.

[4]. BRAZIL SPECIALTY COFFEE ASSOCIATION - BSCA. O que são cafés especiais. Disponível em: < http://siteantigo.bsca.com.br/cafes-especiais.php> Acesso em: 02 Dezembro 2020.

[5]. BORÉM, F.M.; CORADI, P.C.; SAATH, R.; OLIVEIRA, J.A. Qualidade do café natural e despolpado após secagem em terreiro e com altas temperaturas. Ciência e Agrotecnologia, v.32, p.1609 1615, 2008.

[6]. MALTA, M.R.; CHAGAS, S.J.R.; CHALFOUN, S.M. Colheita e pós-colheita do café: Recomendações e coeficientes técnicos. Informe Agropecuário, v.29, n.247, p.83-94, 2008.

[7]. MALTA, M.R. Critérios utilizados na avaliação da qualidade do café. Informe Agropecuário, v.32, n.261, p.114-126, 2011.

[8]. CLIMATE DATA - Historical average temperature. Disponível em: < http://climate-data.org/. >Acesso em: 02 Dezembro 2020.

[9]. FERREIRA, DF Sisvar: um guia dos seus procedimentos de comparações múltiplas Bootstrap. Ciência e Agrotecnologia, v.38, p.109-112, 2014.

[10]. ALIXANDRE, F.T.; DIAS, R. S.; KROHLING, C. A.; SOUSA, D. G.; FORNAZIER, M.J.; TEÓFILO, P. P. Influência da forma de processamento na qualidade final do café conilon. Consórcio Brasileiro de Pesquisa e Desenvolvimento do Café – CBP&D/Café, 2019.

[11]. MOINHOS, R. Fermentação de café. Fonte: Boena vista café. Disponível em: <https://buenavistacafe.com.br/blog/2019/06/08/fermentacao-de-cafe/> Acesso em: 02 dezembro 2020.

[12]. BLAL, G.L.N.; FRANCO, K.S.; BARBOSA, C.K.R.; BRIGANTE, G.P. Avanços Científicos e Tecnológicos nas Ciências Agrárias: EFEITO DA APLICAÇÃO DO COMPLEXO ENZIMÁTICO NA QUALIDADE DO CAFÉ ARÁBICA SECOS EM DIFERENTES TERREIROS. Atena Editora, p.118-126, 2020.

[13]. SANTOS, D.F.; FRANCO, K.S.; SILVA, C.H.; SILVA, J.F.; PAIVA, L.C.; BRIGANTE, G.P. Efeito do complexo enzimático lnf (cna - cnb) na secagem processo e a qualidade do café. Editora UFLA, Coffee Science, 15:e151670, 2020

Eliabner Adriano Matias, et. al. "Effect of the Enzymatic Complex on the Quality of Arabic Coffee." *IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)*, 13(12), 2020, pp. 31-35.