PESQUISA AGROPECUÁRIA GAÚCHA

doi: https://doi.org/10.36812/pag.202127190-98

ORIGINAL ARTICLE

Bagging of bunches and protected production in 'Niagara Rosada' vineyard

Inês Thomaz Guérios[1], Francine Lorena Cuquel[2], Luiz Antonio Biasi[3]*

Abstract - Vineyards of 'Niagara Rosada' have shown great productive potential. However, the grape production has been affected by factors related to climate adversities. Thus, this study aimed to evaluate the effect of plastic cover and bagging of bunches of 'Niagara Rosada', in Almirante Tamandaré, PR, Brazil. Plastic cover used was of polyethylene with 250 µm of thickness and bagging of the bunches with white non-woven fabric bags. The treatments were: without plastic cover over the vineyard and without bagging of bunches (control); with plastic cover over the vineyard and without bagging of bunches; with plastic cover over the vineyard and with bagging of bunches; and without plastic cover over the vineyard and with bagging of bunches. To determine the quality of the grapes, we evaluated weight of the bunches and berry, width and length of the bunch, number of berries per bunch, total soluble solids (SS), titratable acidity (TA), pH, and SS/TA ratio. In both crop seasons, treatments with the protected plants or bunches were superior in all evaluated traits. The plastic cover and bagging of bunches delayed maturation and improved the physical and chemical characteristics of bunches and berries of 'Niagara Rosada'.

Keywords: *Vitis labrusca*. Viticulture. Plastic cover. Postharvest.

Ensacamento dos cachos e cultivo protegido em vinhedo de 'Niagara Rosada'

Resumo - Os vinhedos de 'Niagara Rosada' têm mostrado grande potencial produtivo. No entanto, a produção da uva tem sido afetada por fatores relacionados a adversidades climáticas. Assim, este trabalho teve como objetivo avaliar o efeito da cobertura plástica e do ensacamento dos cachos de 'Niagara Rosada' em Almirante Tamandaré, PR, Brasil. A cobertura plástica utilizada foi de polietileno com espessura de 250 µm e o ensacamento dos cachos com tecido não texturizado (TNT) de cor branca. Os tratamentos foram: sem cobertura plástica do vinhedo e sem ensacamento dos cachos (Testemunha), com cobertura plástica do vinhedo e sem ensacamento dos cachos, com cobertura plástica do vinhedo e com ensacamento dos cachos e sem cobertura plástica do vinhedo e com ensacamento dos cachos. Para determinação da qualidade das uvas, avaliou-se massa dos cachos e bagas, largura e comprimento do cacho, número de bagas por cacho, teor de sólidos solúveis (SS), acidez titulável (AT), pH e relação SS/AT. Em ambas as safras, os tratamentos com proteção das plantas ou cachos apresentaram superioridade em todas as características avaliadas. A cobertura plástica e o ensacamento dos cachos atrasaram a maturação e melhoraram as características físicas e químicas dos cachos e bagas da uva 'Niagara Rosada'.

Palavras-chave: *Vitis labrusca.* Viticultura. Cobertura plástica. Pós-colheita.

[1] Programa de Pós-Graduação em Agronomia – Produção Vegetal. Universidade Federal do Paraná.
[2] Departamento de Fitotecnia e Fitossanidade, Setor de Ciências Agrárias, Universidade Federal do Paraná.
[3] Departamento de Fitotecnia e Fitossanidade, Setor de Ciências Agrárias, Universidade Federal do Paraná. E-mail: biasi@ufpr.br. *autor para correspondência

ISSN: 0104-907. ISSN ONLINE: 2595-7686.
Recebido em 18 mar 2021. Aceito em 23 abr 2021.

Introduction

Table grape bunches must be attractive, have a pleasant taste, present resistance to shipping and handling, and have good postharvest conservation (AQUINO *et al.*, 2010) to meet consumer demands. However, these features are difficult to be achieved due to the often-harsh weather conditions during maturation. Besides fruit quality, the productivity of the grapevine can also be affected by climate and incidence of pests and diseases (CHAVARRIA *et al.*, 2010; ALMANÇA *et al*., 2017).

The protected cultivation of grapevines is effective in minimizing the effects of climatic adversities. Waterproof plastic cover is a physical barrier that protects vines from rain and promotes changes in the microclimate, eco-physiological responses and occurrence of diseases (CHAVARRIA; SANTOS, 2009; COMIRAN *et al*., 2012; SANTOS; CHAVARRIA, 2012). These aspects favor productivity and minimizes the problems in the maturation of the grapes (CHAVARRIA *et al*., 2007).

Studies conducted in order to verify the influence of the use of plastic cover in vineyards demonstrated its positive effects (LULU; PEDRO JUNIOR, 2006; MOTA *et al.*, 2008; CHAVARRIA *et al*., 2009b; CONCEIÇÃO; MARIN, 2009). They can alter plant phenology (COMIRAN *et al.*, 2012); increase productivity; and stabilize production throughout the cycles, regardless of weather conditions (CHAVARRIA *et al*., 2009a; PEDRO JUNIOR *et al*., 2019), because with the plastic cover over the vineyard, the external effects of climate are reduced (ROBERTO; COLOMBO; ASSIS, 2011). Additionally, it was found that the plastic covers caused a prolongation in the ripening of 'Moscato Giallo' grapes, causing a delay in the harvest date (CHAVARRIA *et al.*, 2011).

The plastic cover of the vineyards also has the advantage of favoring the control of fungal diseases (CHAVARRIA; SANTOS, 2009). It has been reported that it provides a lower incidence of mildew, anthracnose (DETONI; CLEMENTE; FORNARI, 2007), rust, bacterial canker (BATISTA et al., 2015) and rotting in grapes (LULU; PEDRO JUNIOR, 2006). Chavarria *et al.* (2007) did not find incidences of mildew and rotting in 'Moscato Giallo' grape bunches grown under the protection of the plastic cover. It is possible to reduce the number of applications and the fungicide cost for disease control using plastic overhead cover (ALMANÇA *et al*., 2017).

Another method of protection of bunches against the action of insects, birds and diseases is the bagging of fruits. For the protection of fruits are used different types of materials such as brown paper bags, wax paper, parchment paper, newspapers, perforated micro-plastic and non-woven fabric (BIASI *et al*., 2007; PEREIRA *et al.*, 2009; TEIXEIRA *et al*., 2011). However, the agronomic performance under plastic cover is dependent on the cultivation method used (NOVELLO; PALMA, 2008).

In the Metropolitan Region of Curitiba, 'Niagara Rosada' grape is usually cultivated in the open field without plastic cover and without bagging. These technologies are not adopted due to the cost and because they are not widespread among fruit growers. As a result, the supply of grapes may decrease due to the limitations of climatic conditions favorable to the occurrence of diseases. The goal of this study was to

ISSN: 0104-907. ISSN ONLINE: 2595-7686.
Recebido em 18 mar 2021. Aceito em 23 abr 2021.

evaluate the effect of plastic cover and bagging of bunches of 'Niagara Rosada' in a vineyard located in Almirante Tamandaré, Paraná State (PR).

Material and Methods

The experiment was conducted in a six years old commercial vineyard of 'Niagara Rosada' on 'Solferino' rootstock, with trellis Pergola system spaced 1.8 m between plants within the row and 2.5 m between rows, located in Almirante Tamandaré, PR, Brazil (25° 19' 747 "S, and 49° 22' 787" W; 1032 meters of altitude). This region is characterized by Cfb climate, according to the Köppen Climate Classification System. Data regarding average monthly temperature, rainfall and solar radiation were recorded at the nearest Meteorological Station of Pinhais, PR, at the SIMEPAR Technological Institute (Table 1).

Table 1. Average temperature (°C), precipitation (mm), and solar radiation (W m^{-2}) during the 'Niagara Rosada' cycles in 2010/2011 and 2011/2012. Data from the SIMEPAR, Meteorological Station of Pinhais, PR, Brazil.

Characteristics	Cycle	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Average temperature (°C)	2010/2011	14.3	16.9	16.7	19.3	20.4	22.9	22.4
	2011/2012	14.1	14.3	16.8	17.1	19.1	19.5	21.4
Precipitation (mm)	2010/2011	40.0	99.6	162.8	143.0	383.4	389.4	310.2
	2011/2012	232.2	49.8	166.6	100.4	207.4	125.0	186.0
Solar radiation (W m^{-2})	2010/2011	305.3	306.4	326.4	385.7	327.4	260.8	337.4
	2011/2012	332.1	343.2	416.0	386.4	386.4	410.0	398.3

The Vineyard was covered with polyethylene (raffia tarpaulin transparent) with thickness of 250 µm. Covering was made with 3.0 m of width plastic over the rows of vines. Bagging was performed with non-woven fabric of white color, size of 23 x 20 cm, at the beginning of the change color of fruit.

The treatments were: 1) control – without plastic cover over the vineyard and without bagging of bunches; 2) without plastic cover over the vineyard and with bagging of bunches; 3) with plastic cover of polyethylene over the vineyard and without bagging of bunches; 4) with plastic cover over the vineyard and with bagging of bunches. Phytosanitary treatments and other cultural practices as pruning, fertilizing, and weed control obeyed the guidance of technicians from the EMATER, PR (Paraná Institute of Technical Assistance and Rural Extension).

The experimental design was completely randomized with six replicates and two bunches per plot. Harvest point was determined by the commercial harvest of the vineyard without covering, which occurred on February 16th, 2011 and 2012. Grapes were harvested in the early morning hours, packed in plastic boxes,

ISSN: 0104-907. ISSN ONLINE: 2595-7686.
Recebido em 18 mar 2021. Aceito em 23 abr 2021.

transported to laboratory and kept in a refrigerator with average temperature between 4 to 6 °C during the evaluation process. Two harvests were analyzed, from cycle 2010/2011 and 2011/2012.

The physical variables analyzed were weight, length, and width of bunches, weight of berries and rachis, and number of berries per bunch. For the chemical analysis we used the must of 20 berries from each plot and evaluated the content of soluble solids (SS) using a refractometer, pH and titratable acidity (TA) expressed as tartaric acid percentage.

Treatments and cycles were tested through two-way analysis of variance with mean of interactions separated by Scott Knott test ($p \leq 0.01$). Homogeneity of treatment variances was performed by Bartlett test ($p<0.05$). Data was analyzed by Assistat 7.6 beta statistical software.

Results and Discussion

In this work, it was evident the influence of protected cultivation in all variables analyzed, highlighting the treatment with covering and bagging (Tables 2 and 3). These results with the 'Niagara Rosada' are consistent with those results obtained by Detoni, Clemente and Fornari (2007) and Chavarria *et al*. (2011), with the plastic cover over the plants, and Pedro Júnior *et al.* (2007), with the individual protection of bunches.

For the weight of bunches and berries, number of berries per bunch, bunch length and width of bunches, the treatment of plastic cover and bagging of bunches provided the best results (Table 2). Control treatment, without any protection, showed lower results than the others in both harvests. Weight of bunches was 118% greater in the first crop and 70% greater in the second, with bagging and covering compared with the control. Pedro Junior *et al*. (2019) also observed greater weight of bunches and yield per vine in 'Syrah' grapevine with plastic cover. This increase in the mass of the bunches was due to the higher number of berries per bunches, which may be due to reduction of losses arising from the exposure of bunches to the climatic conditions and the most unfavorable conditions for the development of pathogens, especially the fungal diseases. The best microclimate conditions for fruiting under cover avoid problems with pollination and fructification by rainfall and wind, in the phenological sub-period that goes from flowering to the stage of the fruit set. The increase in the number of berries in bunches was also observed by Chavarria *et al*. (2009a) for the 'Moscato Giallo' grape under the plastic cover.

The superiority observed in length, width, and weight of the bunches in treatments with protection reflects the increased production. A fact also confirmed by Comiran *et al*. (2012) for the same cultivar in Bento Gonçalves, Rio Grande do Sul State (RS) and by Detoni, Clemente and Fornari (2007) for the 'Cabernet Sauvignon' grape in Toledo, PR, that used the plastic cover. The benefic effect of protection was observed by Pedro Júnior *et al.* (2007) for the 'Roman' grape in Jundiaí, São Paulo State (SP), that bagged the bunches.

ISSN: 0104-907. ISSN ONLINE: 2595-7686.
Recebido em 18 mar 2021. Aceito em 23 abr 2021.

The highest fruit set under plastic cover may be related to the decrease in negative environmental effects (CHAVARRIA *et al*., 2009b). The photosynthetic process benefits from the microclimate provided by coverage, with the reduction of solar radiation and wind, allowing lower evaporative demand and stimulating more stomatal opening. These factors positively influence the growth of the berries due to the greater amount of water, favoring the turgor pressure (responsible for cell growth) (OJEDA *et al*., 2004) and increase of yield.

Table 2. Weight of bunches and berries (g), length and width of bunches (cm), number of berries per bunch and weight of rachis (g) of 'Niagara Rosada' grapes, under the effect of bagging and plastic cover, in the cycles 2010/2011 and 2011/2012. Almirante Tamandaré, PR, Brazil.

Characteristics	Cycle	With cover and with bags	With cover and without bags	Without cover and with bags	Without cover and without bags	CV(%)
Weight of bunches	10/11	401.2 Aa	345.3 Ab	252.3 Bc	183.8 Ad	13.6
	11/12	292.7 Ba	258.7 Bb	269.1 Ac	171.9 Bd	
Weight of berries	10/11	384.2 Aa	332.6 Ab	242.0 Ac	174.6 Ad	13.5
	11/12	284.5 Ba	251.6 Ba	260.9 Aa	166.6 Ab	
Weight of rachis	10/11	17.0 Aa	12.7 Ab	10.4 Ab	9.2 Ab	32.2
	11/12	8.2 Ba	7.1 Bb	8.2 Ba	5.9 Bb	
Bunch length	10/11	16.8 Aa	15.7 Ab	14.7 Ab	13.2 Ac	7.3
	11/12	15.6 Ba	14.5 Bb	14.6 Bb	12.9 Bc	
Bunch width	10/11	12.1 Aa	11.3 Aa	9.8 Ab	8.9 Ac	7.8
	11/12	10.1 Ba	9.9 Ba	9.8 Ab	8.7 Bc	
Number of berries per bunch	10/11	83.3 Aa	68.8 Ab	55.1 Ac	40.7 Ad	13.3
	11/12	69.2 Aa	52.9 Bc	59.5 Ab	42.9 Ad	

Means followed by the same uppercase letters in columns and lowercase letters in lines are not different by the Scott-Knott test ($p \leq 0.01$).

Some differences between crops that may have been influenced by weather conditions were checked because the variations in rates, mainly precipitation and solar radiation (Table 1). Water availability is a determining factor of production and grape quality (OJEDA *et al*., 2004). Grapevines are very demanding for solar radiation, which is responsible for many physiological processes, such as differentiation of buds, coloring of berries and sugar accumulation (ROBERTO; COLOMBO; ASSIS, 2011). Despite, the plastic cover reduces 47.7% of light intensity, there is no damage to the photosynthetic capacity to the leaves of the 'Niagara Rosada' (DEUS *et al*., 2016).

ISSN: 0104-907. ISSN ONLINE: 2595-7686.
Recebido em 18 mar 2021. Aceito em 23 abr 2021.

Soluble solids content (SS) was lower in the treatment without cover and with bagging for both evaluated harvests, being obtained only 12.2 ºBrix. Higher values of SS were obtained with or without plastic cover and without bagging (Table 3). Vines under plastic cover showed higher SS content for 'Syrah' (PEDRO JUNIOR *et al.*, 2019), 'Merlot' and 'Cabernet Sauvignon' (VANDERLINDE *et al.*, 2016). The values of SS observed in the present work were lower than those observed in Bento Gonçalves, RS, for the same cultivar harvested on January 22nd. In this work it was possible to delay the harvest of grapes under plastic cover in 40 days, reaching 22 ºBrix (COMARIN *et al.*, 2012). The plastic cover also caused a prolongation of the ripening of the 'Moscato Giallo' grapes, causing a delay in the harvest date (CHAVARRIA *et al.*, 2011). However, in the present work, the harvest was performed for all treatments on the same date, following the harvest of the commercial vineyard.

Table 3. Content of soluble solids (SS) (°Brix), titratable acidity (TA) (% of tartaric acid), pH and SS/TA of 'Niagara Rosada' grape under the effect of bagging and plastic cover in the cycles 2010/2011 and 2011/2012. Almirante Tamandaré, PR, Brazil.

Characteristics	Cycle	With cover and with bags	With cover and without bags	Without cover and with bags	Without cover and without bags	CV(%)
Soluble solids	10/11	12.2 Ac	13.4 Aa	12.8 Ab	13.7 Aa	6.1
	11/12	12.2 Ac	14.2 Aa	13.1 Ab	14.5 Aa	
Titratable acidity	10/11	0.80 Aa	0.90 Ba	0.87 Ba	0.61 Bb	12.2
	11/12	0.70 Bb	1.10 Aa	1.00 Aa	0.80 Ab	
pH	10/11	3.5 Bb	3.5 Bb	3.5 Bb	3.6 Ba	1.1
	11/12	4.3 Aa	4.1 Ac	4.1 Ac	4.2 Ab	
SS/AT	10/11	15.4 Ab	14.8 Ab	14.9 Ab	22.7 Aa	11.6
	11/12	16.2 Aa	13.8 Ab	13.2 Ab	17.9 Ba	

Means followed by the same uppercase letters in columns and lowercase letters in lines are not different by the Scott-Knott test ($p \leq 0.01$).

Conflict of interests

The authors declare that the research was conducted in the absence of any potential conflicts of interest.

Ethical statements

The authors confirm that the ethical guidelines adopted by the journal were followed by this work, and all authors agree with the submission, content and transfer of the publication rights of the article to the journal.

ISSN: 0104-907. ISSN ONLINE: 2595-7686.
Recebido em 18 mar 2021. Aceito em 23 abr 2021.

They also declare that the work has not been previously published nor is it being considered for publication in another journal.

The authors assume full responsibility for the originality of the article, and may incur on them, any charges arising from claims, by third parties, in relation to the authorship of the article.

ORCID

Inês Thomaz Guérios https://orcid.org/0000-0003-2361-2854

Francine Lorena Cuquel https://orcid.org/0000-0002-3026-2058

Luiz Antonio Biasi https://orcid.org/0000-0002-3479-8925

References

ALMANÇA, M.A.K. *et al*. Diseases incidence and fungicide cost reduction with overhead covered grapes. **Revista Brasileira de Fruticultura**, v. 39, n. 4, e-020, 2017. https://doi.org/10.1590/0100-29452017020.

AQUINO, J.S. *et al*. Avaliação físico-química e sensorial de uvas 'Benitaka' comercializadas no Estado do Piauí - Brasil. **Nutrire**, v. 35, n. 3, p. 29-41, 2010.

BATISTA, D.C. *et al*. Dinâmica de inóculos e doenças em videira sob sistema convencional e protegido. **Revista Caatinga**, v. 28, n. 2, p. 256-262, 2015.

BIASI, L.A. *et al*. Qualidade de frutos de caqui 'Jiro' ensacados com diferentes embalagens. **Semina: Ciências Agrárias**, v. 28, n. 2, p. 213-218, 2007. https://doi.org/10.5433/1679-0359.2007v28n2p213.

CHAVARRIA, G. *et al*. Potencial produtivo de videiras cultivadas sob cobertura de plástico. **Pesquisa Agropecuária Brasileira**, v. 44, n. 2, p. 141-147, 2009a. https://doi.org/10.1590/S0100-204X2009000200005.

CHAVARRIA, G. *et al*. Microclima de vinhedos sob cultivo protegido. **Ciência Rural**, v. 39, n. 7, p. 2029-2034, 2009b. https://doi.org/10.1590/S0103-84782009005000147.

CHAVARRIA, G. *et al*. Cobertura plástica sobre vinhedo e suas influências nas características físico-químicas do mosto e do vinho. **Revista Brasileira de Fruticultura**, v. 33, n. 3, p. 809-815, 2011. https://doi.org/10.1590/S0100-29452011005000093.

CHAVARRIA, G.; SANTOS, H.P. Manejo de videiras sob cultivo protegido. **Ciência Rural**, v. 39, n. 6, p. 1917-1924, 2009. https://doi.org/10.1590/S0103-84782009005000104.

CHAVARRIA, G. *et al*. Incidência de doenças e necessidade de controle em cultivo protegido de videira. **Revista Brasileira de Fruticultura**, v. 29, n. 3, p. 477-482, 2007. https://doi.org/10.1590/S0100-29452007000300014.

CHAVARRIA, G. *et al*. Maturação de uvas Moscato Giallo sob cultivo protegido. **Revista Brasileira de Fruticultura**, v. 32, n. 1, p. 151-160, 2010. https://doi.org/10.1590/S0100-29452010005000014.

COMIRAN, F. *et al*. Microclima e produção de videiras 'Niágara Rosada' em cultivo orgânico sob cobertura plástica. **Revista Brasileira de Fruticultura**, v. 34, n. 1, p. 152-159, 2012. https://doi.org/10.1590/S0100-29452012000100021.

CONCEIÇÃO, M.A.F.; MARIN, F.R. Condições microclimáticas em um parreiral irrigado coberto com tela plástica. **Revista Brasileira de Fruticultura**, v. 31, n. 2, p. 423-431, 2009. https://doi.org/10.1590/S0100-29452009000200016.

DETONI, A.M.; CLEMENTE, E.; FORNARI, C. Produtividade e qualidade da uva 'Cabernet Sauvignon' produzida sob cobertura de plástico em cultivo orgânico. **Revista Brasileira de Fruticultura**, v. 29, n. 3, p. 530-534. 2007. https://doi.org/10.1590/S0100-29452007000300023.

DEUS, B.C.S. *et al.* Photosynthetic capacity of 'Niagara Rosada' grapes grown under transparent plastic covering. **Ciência Rural**, v. 46, n. 6, p. 950-956, 2016. https://doi.org/10.1590/0103-8478cr20150400.

LULU, J.; PEDRO JÚNIOR, M.J. Microclima de vinhedos cultivados sob cobertura plástica e a céu aberto. **Revista Brasileira de Agrometeorologia**, v. 14, n. 1, p. 106-115, 2006.

MOTA, C.S. *et al*. Comportamento vegetativo e produtivo de videiras 'Cabernet Sauvignon' cultivadas sob cobertura plástica. **Revista Brasileira de Fruticultura**, v. 30, n. 1, p. 148-153, 2008. https://doi.org/10.1590/S0100-29452008000100027.

ISSN: 0104-907. ISSN ONLINE: 2595-7686.
Recebido em 18 mar 2021. Aceito em 23 abr 2021.

NOVELLO, V.; PALMA, L. Growing grapes under cover. **Acta Horticulturae**, n. 785, p. 353-362, 2008.

OJEDA, H. *et al.* Determinación y control del estado hídrico de la vid: efectos morfológicos y fisiológicos de la restricción hídrica en vides. **Viticultura Enologia Profesional**, v. 90, p. 27-43, 2004.

PEDRO JÚNIOR, M.J. *et al*. Avaliações microclimáticas e das características de qualidade da uva de mesa 'Romana' com proteção individual dos cachos. **Bragantia**, v. 66, n. 1, p. 165-171, 2007. https://doi.org/10.1590/S0006-87052007000100020.

PEDRO JÚNIOR, M.J. *et al.* Microclima, produção e composição do mosto da 'Syrah' cultivada sob cobertura de plástico. **Revista de Ciências Agroveterinárias**, v. 18, n. 3, p. 374-379, 2019. https://doi.org/10.5965/223811711832019374.

PEREIRA, M.C.T. *et al*. Efeito do ensacamento na qualidade dos frutos e na incidência da broca-dos-frutos da atemoieira e da pinheira. **Bragantia**, v. 68, n. 2, p. 389-396, 2009. https://doi.org/10.1590/S0006-87052009000200013.

ROBERTO, S.R.; COLOMBO, L.A.; ASSIS, A.M. Revisão: cultivo protegido em viticultura. **Ciência e Técnica Vitivinícola**, v. 26, n. 1, p. 11-16, 2011.

SANTOS, H.P.; CHAVARRIA, G. Cultivo de videira em ambiente protegido. *In:* CHAVARRIA, G.; SANTOS, H.P. (Ed.) **Fruticultura em ambiente protegido**. Brasília: Embrapa, 2012. p. 221-278.

TEIXEIRA, R. *et al.* Efeito do ensacamento dos frutos no controle de pragas e doenças e na qualidade e maturação de maçãs 'Fuji Suprema'. **Bragantia**, v. 70, n. 3, p. 688-695, 2011. https://doi.org/10.1590/S0006-87052011000300027.

VANDERLINDE, G. *et al.* Composição química das uvas Cabernet Sauvignon e Merlot sob cobertura plástica em Santa Catarina. **Revista Brasileira de Viticultura e Enologia**, n. 8, p. 34-42, 2016.

ISSN: 0104-907. ISSN ONLINE: 2595-7686.
Recebido em 18 mar 2021. Aceito em 23 abr 2021.