

Vieira, M.R.V., Diniz, N.B., Belfort, M.M., Moura, F.B., Simões, A.N., Silva, S.L.F. 2015. Effects of putrescine and spermine polyamines and boron on postharvest quality of potted plant gerberas cv. "Kosak" (*Gerbera jamesonii* Bolus). In: **Congresso Brasileiro de Processamento mínimo e Pós-colheita de frutas, flores e hortaliças**, 001. Anais... Aracaju-SE.

1 **Effects of putrescine and spermine polyamines and boron on**
2 **conservation of potted plant gerberas cv. "Kosak" (*Gerbera jamesonii***
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9 **ABSTRACT**

10 To investigation on the effect of putrescine (Put) and spermine (Spm) polyamines and
11 also boron on conservation of potted plant gerberas cv. "Kosak". The experimental
12 design was completely randomized with six treatments (control, 0,8 mL⁻¹ boron, 2mMol
13 L⁻¹ Put, 2mMol L⁻¹ Spm, 0,8 mL⁻¹ boron + 2mMol L⁻¹ Put and 0,8 mL⁻¹ boron + 2mMol
14 L⁻¹ Spm) and six replicates. The results indicated significant effect of Put, Spm and
15 boron on measured traits (p≤0.05). Mean comparison showed that 2mMol L⁻¹ Spm
16 caused the maximum conservation of potted plant gerberas cv. "Kosak".

17 **Keywords:** Floriculture; Postharvest; Ethylene; Bioregulators.

18 **Efeito das poliaminas putrescina e espermina e boro na conservação de**
19 **plantas envasadas de gérberas cv. "Kosak" (*Gerbera jamesonii* Bolus).**

20 **RESUMO**

21 Investigar o efeito das poliaminas putrescina (Put) e espermina (Spm) e também o boro
22 na conservação de plantas envasadas de gérberas cv. "Kosak". O delineamento
23 experimental foi inteiramente casualizado com seis tratamentos (controle, 0,8 mL⁻¹
24 boro, 2 mmol L⁻¹ Put, 2 mmol L⁻¹ Spm, 0,8 mL⁻¹ boro + 2 mmol L⁻¹ Put e 0,8 mL⁻¹ boro
25 + 2 mmol L⁻¹ Spm) e seis repetições. Os resultados indicaram efeito significativo de
26 Put, Spm e boro (p≤0,05). A comparação entre médias mostrou que o tratamento 2
27 mmol L⁻¹ Spm causou a máxima conservação de plantas envasadas de gérberas cv. "
28 Kosak".

29 **PALAVRAS-CHAVE:** Floricultura; Pós-colheita; Etileno; Biorregulador.

31 **INTRODUCTION**

32 The Gerbera (*Gerbera jamesonii* Bolus) is one of the most important flower crops
33 commercially grown and used both as cut flower and potted plant (Minerva and Kumar,

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34 2013). Gerbera life is reduced by ethylene and anti-ethylene compounds can be used to
35 control (Kalatejari et al., 2008; Elgimabi and Ahmed, 2009). There is evidence that
36 polyamine (PAs) and ethylene compete for the same precursor S-adenosylmethionine
37 (SAM) (Bouchereau et al., 1999; Pandey et al., 2000). PAs (Put, Spm and Spd) are
38 recognized as a new class of plant growth bioregulators (Dantuluri et al., 2008) and
39 influence many biochemical and physiological processes such as cell division and
40 senescence (Cohen, 1998). Changes in the levels of PAs and ethylene were observed
41 during senescence in plants like plum (De Dios et al., 2006) and *Hibiscus syriacus* (Seo
42 et al., 2007), and under high stress conditions, there is metabolic competition between
43 ethylene and PAs (Li et al., 2004). It has also been reported that boric acid has chemical
44 properties that inhibits the initial increase in ethylene production and can be a good
45 competitor with affordable price (Ahmadnia et al., 2013). The aim of this study was to
46 investigate the effect of putrescine (Put) and spermine (Spm) polyamines and also
47 boron on conservation of potted plant gerberas cv. "Kosak".

48

49 MATERIAL AND METHODS

50 The experiment was conducted in Department of Production Vegetable, Unidade
51 Acadêmica de Serra Talhada-UFRPE, Brazil. Treatments were composed of six
52 concentration: control, 0,8 boron mL⁻¹, 2mMol L⁻¹ Put, 2mMol L⁻¹ Spm, 0,8 boron mL⁻¹
53 + 2mMol L⁻¹ Put and 0,8 boron mL⁻¹ + 2mMol L⁻¹ Spm. Boron (Nutrioxi-boron), Put
54 (analytical standard-Fluka) and Spm (amorphous semi-solid, BioReagent) was applied
55 at the level of trade. Gerberas (ligules and leaves) cv. "Kosak" were sprayed once with
56 100 mL of each concentration for each treatment. In all the treatments 1 mL/100 L⁻¹ of a
57 non-ionic surfactant (Extravon®, Syngenta Agro S/A), to improve wetting and spray
58 distribution, was added. The apparatus used for application was low-pressure hand
59 sprayer. Postharvest quality of potted plant gerberas was calculated from the time
60 when about 50% of the flowers were wilted or senescent tissue (Larsen and Scholes,
61 1966). The experimental design was completely randomized and consisted six plants for
62 each treatment with six replicates. Analysis of variance was performed to detect
63 differences between treatment means, which were separated by Duncan test (p≤0.05)
64 using SAS software.

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66 **RESULTS AND DISCUSSION**

67 In the present experiment the PAs showed satisfactory results compared to the control,
68 especially plants that were subjected to treatment with Spm (Table 1, Figure 1, 2 and 3).
69 The results show values of 14.39 and 15.71 days to ligules and leaves respectively. In
70 the treatment with Put also showed good results, with values of 9.27 days for ligules and
71 10.43 for the leaves. These results are comparable with the data reported by Iman Talaat
72 et al. (2005) in retarded the senescence of leaf discs of two diverse species of roses
73 (*Rose damascena* and *Rose bourboniana*) whereas, PAs mainly Spm, synthesis
74 inhibitors such as difluoromethylarginine (DFMA) and methylglyoxal-
75 bisguanylhydrazone (MGBG) promoted senescence. Another probability is PAs inhibit
76 ethylene production ligule and leaves of gerberas by regulating the activity of 1-
77 aminocyclopropane-1-carboxylic acid (ACC) synthase and oxidase (Lee et al., 1997).
78 Moreover Mahgoub et al. (2011) provided further evidence PAs delayed senescence by
79 improving membrane stability.

80 In the study of boron mean comparisons showed that 0,8 mL⁻¹ boron was the most
81 effective treatment after treatment with 2mMol L⁻¹ Spm which had 9.84 for ligules and
82 10.61 days for leaves (Table 1, Figure 1 and 2). In studied 'Karl Rosenfield' cultivar,
83 Loyola-López. (2010) observed that the application of only water and preharvest
84 Borocal® was enough to significantly improve the duration of vase life. In this study
85 the results could be due to the prevention of ethylene synthesis, by reducing ethylene
86 production with decreasing the amount of ACC synthase, ACC oxidase activity and also
87 can be due to inhibition of ATP utilization that is used in respiration (Ahmadnia et al.,
88 2013). The combination of PAs and boron did not show satisfactory results on
89 conservation of potted plant gerberas cv. "Kosak".

90 **CONCLUSION**

91 In present study Spm increased conservation of potted plant gerberas cv. "Kosak".

92 **ACKNOWLEDGMENTS**

93 The authors acknowledge CNPQ and FACEPE for the financial support to this work.

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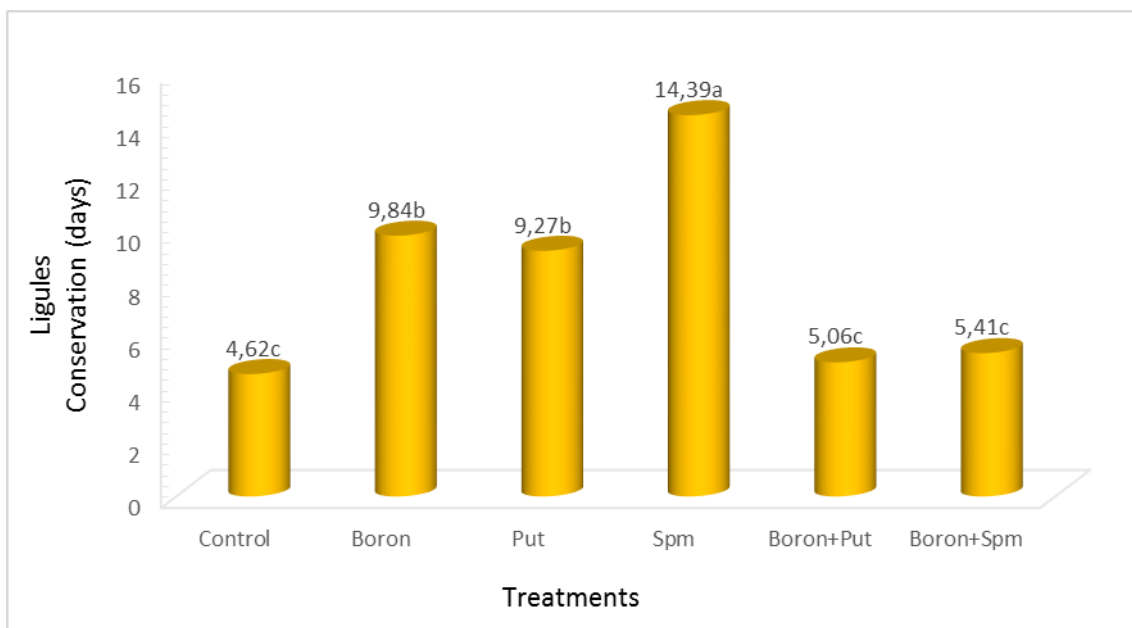
142 **Table 1.** Effect of putrescine (Put), spermine (Spm) and boron on conservation of
143 potted plant gerberas cv. “Kosak”.

Treatments	Conservation (days)	
	Ligules	Leaves
T1: control	4.62c	5.25c
T2: 0,8 mL ⁻¹ boron	9.84b	10.62b
T3: 2mMol L ⁻¹ Put	9.27b	10.43b
T4: 2mMol L ⁻¹ Spm	14.39a	15.71a
T5: 0,8 mL ⁻¹ boron + 2mMol L ⁻¹ Put	5.06c	6.04c
T6: 0,8 mL ⁻¹ boron + 2mMol L ⁻¹ Spm	5.40c	6.28c

144 *According to Duncan test, in each column, means with the same letters are not
145 significantly different.

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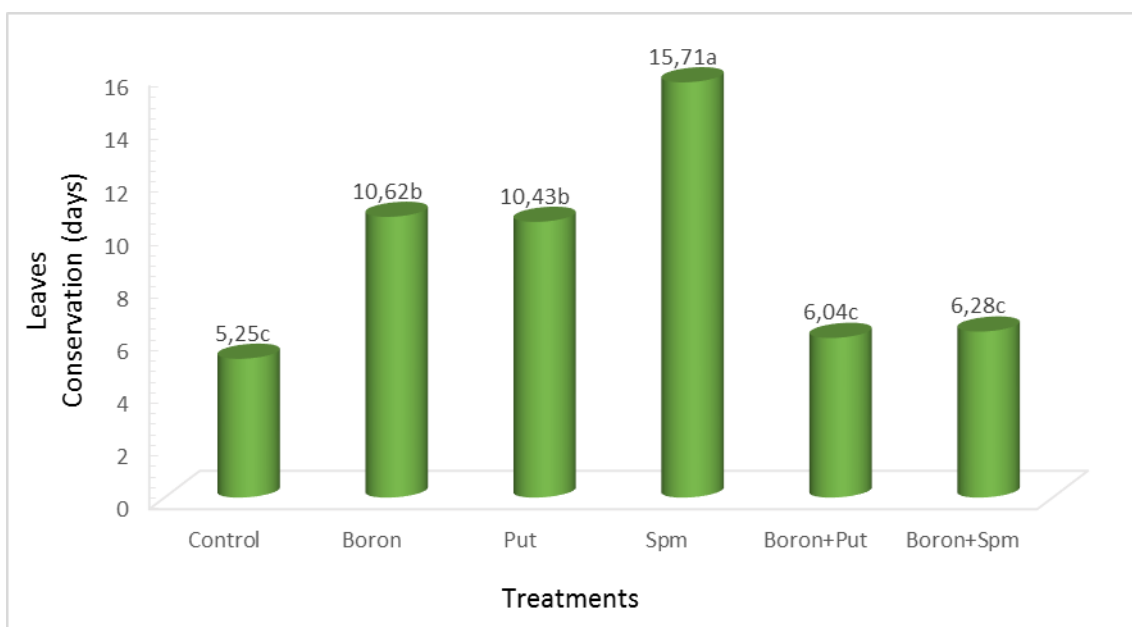
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147 **Figure 1:** Effect of putrescine (Put), spermine (Spm) and boron on conservation of
 148 potted plant gerberas (Ligules) cv. “Kosak”.

149 *According to Duncan test, in each column, means with the same letters are not significantly different.*

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 152
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155 **Figure 2:** Effect of putrescine (Put), spermine (Spm) and boron on conservation of
 156 potted plant gerberas (Leaves) cv. “Kosak”.

157 *According to Duncan test, in each column, means with the same letters are not significantly different.*

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177

180 **Figure 3:** Effect of spermine (Spm) on conservation of potted plant
181 gerberas cv. "Kosak".