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# RESPONSE OF *PEPEROMIA OBTUSIFOLIA* (L.) A. DIETR CV. VARIEGATA PLANT TO SOME FERTILIZATION TREATMENTS

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**ABSTRACT:** An experiment was established under plastic house at the nursery of Hort. Res. Inst., ARC, Giza, Egypt during 2012 and 2013 seasons to find out the effect of foliar spraying with active dry yeast solution at 0, 1, 3 and 5 g/l, soil drenching with NPK mixture (2:2:1) at 2 g/pot and the interaction between each level of yeast and that of NPK mixture on growth and chemical composition of 3-months-old transplants of *Peperomia obtusifolia* (L.) A. Diter. grown in 14-cm-diameter plastic pots filled with about 1 kg of an equal mixture of washed sand, clay and peatmoss (1:1:1, by volume.)

The obtained results indicated that various single and combined treatments improved all vegetative and root growth parameters with various significant differences compared to the control in both seasons. Active dry yeast alone at 3 g/l treatment gave better result than the other individual ones, whereas comparing between any level of dry yeast combined with NPK (2 g/pot) was more effective in improving vegetative and root growth of plants than all the individual treatments, the interaction between 3 g/l active dry yeast and 2 g/pot NPK recorded the best growth at all in both seasons. On the same line were those results of pigments content in the leaves reached maximum by 3 g/l dry yeast, but the opposite was right regarding the percentages of total soluble sugars, N, P and K content those reached the highest values by the level of 5 g/l dry yeast in most cases of both seasons. However, content of those constituents was doubled by connecting between active dry yeast at any level and NPK mixture 2 g/pot, with the prevalence of 3 g/l active dry yeast plus 2 g/pot NPK combination, that gave the highest content in the two seasons.

Hence, it can be recommended to fertilize *Peperomia obtusifolia* cv. Variegata plants cultivated in 14-cm-diameter plastic pots with active dry yeast at 3 g/l (as a foliar spray) plus NPK mixture (2:2:1) at 2 g/pot (as a soil drench), 5 times with one month interval to obtain the best vegetative growth and high pot plant quality.

**Key words:** Radiator plant, *Peperomia obtusifolia* (L.) A. Dietr, NPK mixture, active dry yeast, fertilization treatments.

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## INTRODUCTION

*Peperomia obtusifolia* (L.) A. Diter., Radiatar plant (Fam. Piperaceae) is a popular ornamental foliage plant native to tropical America and southern Florida. It may be grown in pots, pans or hanging baskets for its attractive foliage (cv. Veriegata has variegated leaves make it more attractive). It is grow either in the ground as a low creeping groundcover or climbing on another plant (Bailey, 1976). Peperomia plants are compact, small succulent and herbaceous. Both stems and leaves are thick and fleshy with a smooth waxy surface. They tolerate low light density well and are easy to grow, which make them excellent house pot-plants (Huxley *et al*., 1992).

Fertilization is still one of the most important methods essential for improving growth and quality of various plant species, especially pot-ones, which usually grow inside a limited space not exceed 3/4 of pot size and under go bad aeration plus the low illumination which may reduce or slow photosynthesis process in the leaves and consequently depress the food formation. So, fertilization under these stresses is obligatory. This was emphasized by El-Sayed *et al*. (2007) whom demonstrated that nitrobien biofertilizer at 5 g/pot greatly improved vegetative and root growth of *Peperomia obtusifolia* cv. Veriegata plant and the leaf content of pigments, total carbohydrates, N, P and K. On *Spathiphyllum wallisii*, El-Sayed *et al*. (2010) reported that a combination of NPK mixture at 2 g/pot + 4 g active dry yeast caused a marked increment in plant height, No. leaves/plant, leaf area, root length, No. roots/plant and fresh and dry weights of leaves and roots, besides the leaf content of chlorophyll a, b, carotenoids and reduced sugars. Likewise, Samet *et al*. (2012) revealed that 250 µM of yeast extract improved growth of *Atropa belladonna* and increased root content of scopolamine and hyoscyamine by 1.9 and 1.6 fold compared to control.

Like observations were also declared by Ali (2001) on *Calendula officinalis*, Ahmed (2002) on *Lucaena leucocephala*, Desouky (2004) on *Strelitzia reginae*, Abdel-Wahed *et al*. (2006) on *Euonymus japonicus*, Abdel-Wahed (2007) on *Brassaia arboricola* and Abdel-Fattah *et al*. (2009) who found that foliar spray with active dry yeast at 8 g/l improved growth and chemical composition of *Brassaia actinophylla* plant. However, this work was set out in order to investigate the response of Peperomia plant to foliar spray with active dry yeast, alone or combined with NPK fertilizer.

# MATERIALS AND METHODS

A pot experiment was undertaken under plastic house at the nursery of Hort. Res. Inst., ARC, Giza, Egypt through the two successive seasons of 2012 and 2013 to determine the most effective fertilization treatment reliable for good growth and high quality of Peperomia foliage-pot-plant.

Therefore, homogenous 3-months-old transplants of *Peperomia obtusifolia* (L.) A. Diter. (10-12 cm long, carry about 4-5 leaves) were planted on April, 1st for each season in 14-cm-diameter plastic pots (one transplant/pot) filled with about 1 kg of washed sand + clay + peatmoss mixture at equal parts by volume (1:1:1, v/v/v), the physical and chemical analysis of the sand and clay used in the two seasons are shown in Table (1), while those of the used peat are illustrated in Table (2).

**Table 1. Some physical and chemical properties of the used sand and clay in both seasons.**

| Soil type | Particle size distribution (%) | | | | S.P. | E.C. (dS/m) | pH | Cations (meq/l) | | | | Anions (meq/l) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coarse sand | Fine sand | Silt | Clay | | | | $Ca^{++}$ | $Mg^{++}$ | $Na^{+}$ | $K^{+}$ | $HCO_3^{-}$ | $Cl^{-}$ | $SO_4^{--}$ |
| **Sand** | 18.72 | 71.28 | 4.76 | 5.34 | 21.83 | 1.58 | 8.20 | 2.65 | 2.48 | 21.87 | 0.78 | 3.85 | 13.00 | 10.93 |
| **Clay** | 7.46 | 16.75 | 34.53 | 40.89 | 41.67 | 2.18 | 8.33 | 16.93 | 9.33 | 20.44 | 0.37 | 3.82 | 1.46 | 41.79 |

**Table 2. Some physical and chemical properties of the used peatmoss in both seasons.**

| | | | | | |
|---|---|---|---|---|---|
| **Organic matter** | 90-95 % | **Water relation capacity** | 60-75 % | **K** | 1.77% |
| **Ash** | 5-10 % | **Salinity** | 0.3 g/l | **Fe** | 421 ppm |
| **Density (vol. dry)** | 80-90 mg/l | **N** | 1.09% | **Mn** | 72 ppm |
| **pH value** | 3.4 | **P** | 0.23% | **Zn** | 41 ppm |

The transplants were properly reared till May, 1st, as they were received the following treatments:

1- No. fertilization, referred to as control.
2- Chemical fertilization, with NPK mixture (2:2:1) at 2 g/pot, added as a soil drench, 5 times with one month interval. Ammonium sulphate (20.5% N), Ca-superphosphate (15.5% $P_2O_5$) and K-sulphate (48.5% $K_2O$) fertilizers were used to obtain the required ratio.
3- Biofertilization with an aqueous solution of active dry yeast at the rates of 1, 3 and 5 g/l fortified with 30 g sucrose/l were applied as a foliar spray, 5 times with one month interval till the solution was run-off. The chemical composition of the active dry yeast used in both seasons is averaged in Table (3).
4- Each level of yeast was combined with NPK mixture (2 g/pot to form 3 combinations as follows:
   a- Active dry yeast at 1 g/l + 2 g NPK mixture/pot.
   b- Active dry yeast at 3 g/l + 2 g NPK mixture/pot.
   c- Active dry yeast at 5 g/l + 2 g NPK mixture/pot.

The layout of the experiment in the two seasons was a complete randomized design replicated thrice, as each replicate contained 5 plants (Mead *et al*., 1993). The regular agricultural practices recommended for this plantation were done whenever needed. The temperatures, relative humidity and light intensity inside the plastic house during the course of this study between: 25-39 °C, 45-82% and 500-600 lux, respectively.

At the end of each seasons (on October, 1st) the following data were recorded: plant length (cm), stem diameter (cm), number of leaves/plant (cm) as well as vegetative and root growth fresh and dry weights (g). In fresh leaf samples taken from the middle parts of the plants, photosynthetic pigments (chlorophyll a, b and carotenoids, mg/g f.w.) were measured according to the method of Saric *et al*. (1967), while in dry leaf ones, content of total soluble sugars (Dubois *et al*., 1956), nitrogen (Pregl, 1945), phosphorus (Cottenie *et al*., 1982) and potassium (Jackson, 1973) were evaluated as percentages.

Data were then tabulated and statistically analyzed according to program SAS Institute Program (1994), using Duncan's Multiple Range Test (Duncan, 1955), to compare among means of various treatments.

**Table 3. Chemical composition of the active dry yeast used in the two seasons.**

| | | | |
|---|---|---|---|
| **Proteins** | 47.00% | **Niacin** | 300-500 µg/g |
| **Carbohydrates** | 33.00% | **Pyrodoxin** | 28.0 µg/g |
| **Minerals** | 8.00% | **Pantathenate** | 70.0 µg/g |
| **Nucleic acids** | 8.00% | **Biotin** | 1.3 µg/g |
| **Lipids** | 4.00% | **Cholin** | 4000 µg/g |
| **Thiamine** | 60.100 µg/g | **Folic acid** | 5.13 µg/g |
| **Riboflavin** | 33-50 µg/g | **Vitamin B12** | 0.001 µg/g |
| **Approximate composition of minerals (mg/g):** | | | |
| **Na** | 0.12 | **Cu** | 8.00 |
| **Ca** | 0.75 | **Se** | 0.10 |
| **Fe** | 0.02 | **Mn** | 0.02 |
| **Mg** | 1.65 | **Cr** | 2.20 |
| **K** | 21.00 | **Ni** | 3.00 |
| **P** | 13.50 | **Va** | 0.04 |
| **S** | 3.90 | **Mo** | 0.40 |
| **Zn** | 0.17 | **Sn** | 3.00 |
| **Si** | 0.03 | **Li** | 0.17 |

# RESULTS AND DISCUSSION

**Effect of fertilization treatments on:**

**1- Vegetative and root growth traits:**

As shown in Tables (4 and 5), it is clear that means of all vegetative and root growth parameters were obviously increased in response to the different fertilization treatments employed in this study with various significant levels when compared to control means in both seasons. Among the individual treatments, active dry yeast at 3 g/l was the best and followed by the same biofertilizer at higher concentration (5 g/l). this may be attributed to the role of yeast in providing the plants with proteins, amino acids, minerals, ash, glycogen, fats, cellulose and vit. B (Table, 3). Moreover, yeast extract not only increases auxins and cytokinins, but also decreases abscisic acid (Abou El-Yazied and Mahdy, 2012). In this regard, Abdo *et al*. (2012) proved that application of yeast extract under stress of pollution with cadmium minimized the harmful effect of such heavy metal on ABA concentration and on Cd accumulation in leaves of soybean plants. Besides, Nassar *et al*. (2011) ascribed increasing stem diameter of *Phaseolus vulgaris* plants by 50, 100 or 150 ml active yeast extract/l mainly to increase in thickness of epidermis, cortex, phloem tissue, xylem tissue and parenchymatous area of the pith more than those of the control. Such treatment also increased thickness of both midvein and lamina of leaflet blades, which was accompanied with increments in thickness of palisade and spongy tissues.

An extra improvement in vegetative and root growth of fertilized plants was noticed when combining between any level of active dry yeast and NPK mixture at 2 g/pot, especially the combining between 3 g/l active dry yeast + 2 g/pot NPK that gave the tallest plants, thickest stems, highest No. leaves/plant, biggest leaf area and heaviest fresh and dry weights of vegetative and root growth at all in the two seasons. This may be due to lumping the beneficial effects of both yeast and NPK mixture in providing the plants with their requirements excessively. These results are in accordance with those detected by El-Sayed *et al*. (2007) on *Peperomia obtusifolia* cv. Variegata, Ali (2001) on *Calendula officinalis*, Desouki (2004) on *Strelitzia reginae*, Abdel-Wahed *et al*. (2006) on *Euonymus japonicus*, Abdel-Fattah *et al*. (2009) on *Brassaia actinophylla* and Samet *et al*. (2012) on *Atropa belladonna*.

**2- Chemical composition:**

A similar response to that of vegetative and root growth parameters was also occurred as well in respect of chlorophyll a, b and carotenoids content (mg/g f.w.), as the means of these pigments (Table, 6) were significantly increased in response to the different sole treatments in most cases of both seasons with the superiority of active dry yeast at 3 g/l treatment that recorded the utmost high content at all. The opposite was the right concerning the percentages of total soluble sugars, N, P and K (Table, 7), which reached the maximum values by foliar application of active dry yeast at 5 g/l relative to the other separate treatments with few exceptions in both seasons. This may be due to the role of active dry yeast in providing the plants with minerals, amino acids, carbohydrates, protein, fat, ash glycogen and other bioactive constituents, as shown before in Table (3). In this regard, Abou El-Yazied and Mahdy (2012) mentioned that foliar spraying with yeast extract at 5 ml/l increased photosynthetic pigments, N, P, K, B, total sugars, total free amino acids and crude protein content in the leaves of *Vicia faba* plants. Likewise, Abdo *et al*. (2012) postulated that yeast extract at 60 ml/l improved the contents of photosynthetic pigments, total sugars, IAA and $GA_3$ in the leaves cadmium-polluted soybean plants.

On the other hand combining between drenching the soil mixture with 2 g/pot of NPK and spraying the foliage with active yeast (at any level) induced more increment in the content of all the abovenamed constituents, but the excellence was also resulted from

**Table 4. Effect of fertilization treatments on vegetative growth of *Peperomia obtusifolia* (L.) A. Dietr cv. Veriegata plant during 2012 and 2013 seasons.**

| Treatments | Plant length (cm) | | Stem diameter (cm) | | No. leaves/plant | | Leaf area ($cm^2$) | |
|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| **Control** | 19.73e | 18.25d | 0.43c | 0.39c | 7.72d | 7.02e | 20.12d | 25.34d |
| **NPK at 2 g/pot (A)** | 23.98de | 23.00cd | 0.48c | 0.42c | 9.76cd | 9.21de | 21.73cd | 26.22cd |
| **Yeast at 1 g/pot (B)** | 22.52e | 22.13d | 0.45c | 0.41c | 8.23d | 8.00e | 20.54cd | 26.00cd |
| **Yeast at 3 g/pot (C)** | 31.89c | 29.24b | 0.61b | 0.55b | 12.21b | 11.99cd | 23.71bc | 27.97bc |
| **Yeast at 5 g/pot (D)** | 24.72d | 25.31c | 0.55b | 0.49bc | 10.56c | 11.00d | 22.00c | 26.99c |
| **A + B** | 27.83cd | 29.99b | 0.62b | 0.57b | 11.38bc | 12.76c | 24.10b | 28.31bc |
| **A + C** | 40.99a | 35.76a | 0.90a | 0.81a | 15.20a | 19.23a | 28.33a | 31.72a |
| **A + D** | 36.28b | 30.31b | 0.82ab | 0.76ab | 13.82ab | 15.87b | 25.60ab | 29.03b |

**- Means within a column having the same letters are not significantly different according to Duncan's Multiple Range Test (DMRT) at 5% level.**

**Table 5. Effect of fertilization treatments on vegetative growth and roots fresh and dry weights of *Peperomia obtusifolia* (L.) A. Dietr cv. Veriegata plant during 2012 and 2013 seasons.**

| Treatments | Fresh weight (g) | | | | Fresh weight (g) | | | |
|---|---|---|---|---|---|---|---|---|
| | Vegetative growth | | Roots | | Vegetative growth | | Roots | |
| | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| **Control** | 18.95d | 20.00d | 5.99e | 5.96e | 3.29e | 3.00e | 2.00d | 1.87c |
| **NPK at 2 g/pot (A)** | 20.22cd | 21.99c | 7.96de | 6.90de | 4.81d | 4.79d | 2.70bc | 2.00c |
| **Yeast at 1 g/pot (B)** | 19.98d | 20.87cd | 6.82e | 7.34d | 5.21cd | 5.09cd | 2.56c | 2.21bc |
| **Yeast at 3 g/pot (C)** | 21.34c | 23.21bc | 8.34d | 9.21c | 5.99c | 5.89c | 2.77bc | 2.95b |
| **Yeast at 5 g/pot (D)** | 24.96bc | 25.00b | 9.88cd | 9.99bc | 7.22bc | 6.80bc | 3.03b | 2.99b |
| **A + B** | 26.34b | 28.24ab | 11.22c | 10.98b | 7.98b | 7.10b | 3.42ab | 3.60ab |
| **A + C** | 30.21a | 31.05a | 15.42a | 12.96a | 9.26a | 9.03a | 3.99a | 3.87a |
| **A + D** | 27.99ab | 29.33ab | 13.21b | 11.28ab | 8.00b | 7.98ab | 3.52ab | 3.23ab |

**- Means within a column having the same letters are not significantly different according to Duncan's Multiple Range Test (DMRT) at 5% level.**

**Table 6. Effect of fertilization treatments on pigments content in the leaves of *Peperomia obtusifolia* (L.) A. Dietr cv. Veriegata plant during 2012 and 2013 seasons.**

| Treatments | Chlorophyll (a) (mg/100 g f.w.) | | Chlorophyll (b) (mg/100 g f.w.) | | Carotenoids (mg/100 g f.w.) | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| **Control** | 0.121d | 0.200d | 0.088d | 0.099c | 0.110d | 0.139c |
| **NPK at 2 g/pot (A)** | 0.150c | 0.226d | 0.121c | 0.113c | 0.172b | 0.158bc |
| **Yeast at 1 g/pot (B)** | 0.141c | 0.211d | 0.110cd | 0.102c | 0.152c | 0.163bc |
| **Yeast at 3 g/pot (C)** | 0.163c | 0.298bc | 0.130c | 0.126c | 0.181b | 0.171b |
| **Yeast at 5 g/pot (D)** | 0.159c | 0.240d | 0.122c | 0.122c | 0.162c | 0.169b |
| **A + B** | 0.169c | 0.251c | 0.187b | 0.196b | 0.171b | 0.176b |
| **A + C** | 0.321a | 0.385a | 0.210a | 0.248a | 0.240a | 0.251a |
| **A + D** | 0.270b | 0.316b | 0.193a | 0.230a | 0.221a | 0.217ab |

**- Means within a column having the same letters are not significantly different according to Duncan's Multiple Range Test (DMRT) at 5 % level.**

**Table 7. Effect of fertilization treatments on total soluble sugars, N, P and K content in the leaves of *Peperomia obtusifolia* (L.) A. Dietr cv. Veriegata plant during 2012 and 2013 seasons.**

| Treatments | Total soluble sugars | | N (%) | | P (%) | | K (%) | |
|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| **Control** | 10.73d | 12.71e | 1.07c | 1.20c | 0.10c | 0.14c | 0.99c | 1.06c |
| **NPK at 2 g/pot (A)** | 14.60ab | 15.43c | 1.28bc | 1.31bc | 0.21b | 0.23b | 1.18b | 1.26bc |
| **Yeast at 1 g/pot (B)** | 11.96cd | 13.24de | 1.10c | 1.26c | 0.13bc | 0.19bc | 1.13bc | 1.21bc |
| **Yeast at 3 g/pot (C)** | 12.17c | 14.50d | 1.16c | 1.30c | 0.16b | 0.23b | 1.20b | 1.30b |
| **Yeast at 5 g/pot (D)** | 13.73b | 16.22bc | 1.29bc | 1.39bc | 0.22b | 0.26b | 1.31ab | 1.40b |
| **A + B** | 14.00b | 16.58bc | 1.39b | 1.56b | 0.25ab | 0.34ab | 1.29b | 1.35b |
| **A + C** | 15.36a | 18.33a | 1.78a | 1.95a | 0.31a | 0.42a | 1.57a | 1.70a |
| **A + D** | 14.51ab | 17.10b | 1.56ab | 1.76ab | 0.27ab | 0.36ab | 1.40ab | 1.46ab |

**- Means within a column having the same letters are not significantly different according to Duncan's Multiple Range Test (DMRT) at 5% level.**

connecting between active dry yeast at 3 g/l and NPK mixture at 2 g/pot, as such combination registered the highest content over control and other treatments in the two seasons. This may be ascribed to the synergistic effect of both active yeast and NPK on supplying the plants luxuriously with several nutrients and vital components that accelerate biosynthesis rate and lead finally to accumulation of more constituents in plant tissues. Several reports are in line with the aforetasted results, such as those of Ahmed (2002) on *Lucaena leucocephala,* Abdel-Wahed (2007) on *Brassaia arboricola*, El-Sayed *et al*. (2010) on *Spathiphyllum wallisii* and Abdo *et al*. (2012) on soybean.

Accordingly, it is advised to fertilize *Peperomia obtusifolia* cv. Variegata plants cultivated in 14-cm-diameter plastic pots with active dry yeast at 3 g/l (as a foliar spray) plus NPK mixture (2:2:1) at 2 g/pot (as a soil drench, 5 times with one month interval to obtain the best growth and high quality.

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# استجابة نبات الببروميا (صنف فاريجاتا) لبعض معاملات التسميد

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أجريت التجربة بإحدى الصوبات البلاستيكية بمشتل معهد بحوث البساتين مركز البحوث الزراعية، الجيزة، مصر خلال موسمى ٢٠١٢، ٢٠١٣ لدراسة تأثير الرش الورقى بالمحلول المائى للخميرة الجافة النشطة بتركيزات: صفر، ١، ٣، ٥ جم/لتر، الإضافة الأرضية لمخلوط (٢ : ٢: ١) NPK بمعدل ٢ جم/أصيص وكذلك التفاعلات بين كل مستوى من مستويات الخميرة النشطة مع مخلوط الـ NPK بمعدل ٢ جم/أصيص على النمو والتركيب الكيميائي لشتلات عمر ثلاثة أشهر لنبات الببروميا (*Peperomia obtusifolia* (L.) A. Dietr cv. Variegata) المنزرعة بأصص بلاستيك قطرها ١٤ سم مملوءة بحوالي ١ كجم من مخلوط متساوي من الرمل المغسول، الطين والبيتموس (١:١:١، بالحجم).

أوضحت النتائج المتحصل عليها أن جميع المعاملات الفردية والمشتركة المطبقة بهذه الدراسة قد حسنت جميع قياسات النمو الخضري والجذرى بفروق معنوية متباينة عند مقارنتها بالكنترول فى كلا الموسمين. ولقد أعطت المعاملة الفردية للخميرة الجافة النشطة بتركيز ٣ جم/لتر نتائج أفضل من المعاملات الفردية الأخرى، بينما كان الجمع بين الرش بمحلول الخميرة الجافة (بأي مستوى) والتسميد بمخلوط NPK (بمعدل ٢ جم/أصيص) أكثر تأثيراً فى تحسين معدل النمو الخضري والجذري للنباتات من المعاملات الفردية، مع تفوق المعاملة المشتركة بين الخميرة النشطة (٣ جم/لتر) ومخلوط NPK (٢ جم/أصيص) والتي سجلت أفضل معدل للنمو على الإطلاق بكلا موسمي الدراسة. على نفس الاتجاه، كانت نتائج محتوى الصبغات فى الأوراق والتى بلغت أقصاها بالرش بمحلول الخميرة بمعدل ٣ جم/لتر، بينما كان العكس صحيحاً فيما يتعلق بالنسبة المئوية للسكريات الكلية الذائبة والنتروجين، الفوسفور، البوتاسيوم بالأوراق والتي بلغت أعلى القيم عند الرش بمحلول خميرة تركيزة ٥ جم/لتر. إلا أن محتوى هذه المكونات جميعاً قد تضاعف عند الجمع بين الرش بمحلول الخميرة النشطة والتسميد بمخلوط NPK، مع تفوق توليفة الرش بمحلول الخميرة النشطة بتركيز ٣ جم/لتر + مخلوط NPK بمعدل ٢ جم/أصيص والتي أعطت أعلى محتوى على الإطلاق بكلا الموسمين.

وعليه، يمكن التوصية بتسميد نباتات الببروميا (صنف فاريجاتا) المنزرعة فى أصص بلاستيك قطرها ١٤ سم ومملوءة بحوالى ١ كجم من مخلوط الرمل المغسول والطين والبيتموس (١:١:١ بالحجم) بمحلول الخميرة الجافة النشطة بمعدل ٣ جم/لتر (رشا على الأوراق) + مخلوط (٢: ٢: ١) NPK بمعدل ٢ جم/أصيص (تكبيشاً للتربة)، خمس مرات خلال موسم النمو وبفاصل شهر بين كل مرتين للحصول على أفضل نمو وأعلى جودة.