

Research Article

A Study on Vase Life of Dry Bundle Flower in Lavender

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**Abstract**

This research was carried out during July-2016 and March-2017 with aim to determination of usability as dry bundle flower of 'Raya', 'Munstead', 'Silver', 'Vera', 'Sevtopolis' and 'Super Blue' lavanders belong to *Lavandula angustifolia* Mill. species and 'Giant Hidcote', 'Dutch', 'Super A', 'Grosso' and 'Abrial' lavandin belong to *Lavandula x intermedia* Emeric ex Lois. species for 4 years. Lavender cultivars, harvested at full flowering period in middle of July-2016, were storage 8 months at room temperature (24±2 °C). Measurements were done in the middle each month during eight months. The spike length 3.77-12.37 cm, the stem length with spike 16.8-41.7 cm, the cluster number per spike 4.5-11.0 number spike<sup>1</sup>, the dry weight rate 33.21-49.00 % and spill rate 0.72-2.96% between varied and generally spill rate was decreased from 1<sup>st</sup> month towards 8<sup>th</sup> month (varied between 0.02 and 0.60%). The highest L value showing the brightness of lavender flowers were determined in *L. angustifolia* var. Raya with 46.5 h<sup>0</sup>, +a value showing red color tone from *L. angustifolia* var. Super Blue with 3.26 h<sup>0</sup> and -b value showing blue color tone from *L. angustifolia* var. Silver cultivars with 7.10 h<sup>0</sup>. While L and -b value of lavender cultivars were increased from 1<sup>st</sup> month towards 8<sup>th</sup> month, + a value was increased. Raya, Super Blue, Giant Hidcote and Sevtopolis cultivars were determined as favorable dry bundle flower species with more brightly colored and non-spill flower/ bud.

**Key words:** Lavender, dry bud, flower, color.

**Lavantada Kuru Demet Çiçeğin Vazo Ömrü Üzerine Bir Çalışma**

**Özet**

Araştırma, *Lavandula angustifolia* Mill. türüne ait 4 yaşındaki 'Raya', 'Munstead', 'Silver', 'Vera', 'Sevtopolis' ve 'Super Blue' lavander çeşitleri ile *Lavandula x intermedia* Emeric ex Lois. türüne ait 'Giant Hidcote', 'Dutch', 'Super A', 'Grosso' ve 'Abrialis' lavandin çeşitlerinin kuru demet çiçek olarak kullanılabilirliğinin belirlenmesi amacıyla Temmuz 2016- Mart 2017 periyodunda yürütülmüştür. Tam çiçeklenme döneminde (Temmuz-2016) hasat edilen lavanta çeşitleri 8 ay oda sıcaklığında (24±2 °C) bekletilmiştir. Ölçümler 8 ay boyunca her ayın ortasında yapılmıştır. Lavander ve lavandin çeşitlerinin incelenen bitkisel ve kuru çiçek özellikleri arasındaki farklılıklar istatistiksel olarak önemli olmuştur. Başak boyu 3.77-12.37 cm, başaklı sap uzunluğu 16.8-41.7 cm, başakta küme sayısı 4.5-11.0 adet/başak, kuru ağırlık oranı %33.21-49.00 ve silkme oranı % 0.72-2.96 arasında değişmiştir. Silkme oranı genel olarak 1. aydan 8. aya doğru azalmıştır (%0.02-0.60). Lavanta çiçeklerinin parlaklığını gösteren L değeri en yüksek 46.5 h<sup>0</sup> ile *L. angustifolia* var. Raya çeşidinde, kırmızı renk tonunu gösteren +a değeri en yüksek 3.26 h<sup>0</sup> ile *L. angustifolia* var. Super Blue çeşidinde ve mavi renk tonunu gösteren - b değeri ise en yüksek 7.10 h<sup>0</sup> ile *L. angustifolia* var. Silver çeşidinde belirlenmiştir. Lavanta çeşitlerinin L ve -b değeri 1. aydan 8. aya doğru yükselme, +a değeri ise düşüş eğilimi göstermiştir. Kuru demet çiçekçiliğinde, Raya, Super Blue, Giant Hidcote ve Sevtopolis lavander çeşitlerinin renk ve sapa tutunma bakımından en uygun çeşitler olduğu tespit edilmiştir.

**Anahtar kelimeler:** Lavanta, kuru tomurcuk, çiçek, renk.

## Introduction

Lavender is a significant perfume, cosmetic and medicinal plant cultivated in world due to precious essential oil (Guenther, 1952). Lavender and lavandin species with high commercial value are *Lavandula angustifolia* Mill. = *L. officinalis* L. = *L. vera* DC and *Lavandula intermedia* Emeric ex Loisel. = *L. hybrida* L., Spike lavender (*Lavandula spica*=*L. latifolia* Medik.), respectively (Beetham and Entwistle, 1982). In Turkey, lavandin, *L. x intermedia* var. Super A, were commercially cultivated in only Isparta, while farming of lavender and lavandin were done in world such as France, Bulgarian, Spain, Italia, Greece, England, Russia, USA, Austria and North Africa countries. In Isparta, *Lavandula x intermedia* var. Super A cultivar is cultured in the field which is about 3000 da. While majority part of the lavender produced is distilled for essential oil, a part is used as dry bud by drying. Spike length, shine, number and color of the flower and bud varied according to species and cultivars. 65% is stem and 35% is flower of dried lavender plant (Kara and Baydar, 2011; Kara and Baydar, 2013).

In recent years, the use of aromatherapy, soap, detergents, cosmetics products as well as dry bundle flower of lavender has begun to come up (Lis-Balchin and Hart, 1999). Dry bundle flower has been used as ornamental in floriculture, offices, houses and insect repellent. Generally, lavender species are preferred in dry bud production due to darker blue and stronger grip to stem. Vase life of dry bunch flowers in lavender is important because of more brightness color and grip resistance to stem of buds for use as ornamental plant. In terms of vase life in the production of dry bundle flowers, the determination of varieties that the color viability of the flower buds and strong to stem will be useful in determining the varieties of the producer for the purpose of production. The study was conducted with the aim to determine of the favorable lavender or lavandin cultivar for use dry bunch flower.

## Materials and Methods

Samples belong 'Raya', 'Munstead', 'Silver', 'Vera', 'Sevtopolis' and 'Super Blue' lavanders belong to *Lavandula angustifolia* Mill. Species, and 'Giant Hidcote', 'Dutch', 'Super A', 'Grosso' and 'Abrial' lavandin belong to *Lavandula x intermedia* Emeric ex Loisel. were taken from lavender and lavandin plantation for 4 years founded in experiment field of Isparta University of Applied Science. All the necessary agricultural practices were applied identically to the all lavender and lavandin cultivars. 200 g fresh stem flower at the full blooming stage for dry bunch flower were manually harvested as three replications in middle of July

2016 year and were brought to the laboratory. Measurements in the laboratory were laid out in a randomized plots design with two factors and three replications. Plants characteristics such as spike length (cm), stem length with spike (cm) and cluster number per spike (number) were measured (Kara and Baydar, 2013). 200 g fresh stem flower bundles from each cultivar put inside to vases as three replications, and placed deep plastic containers for the accumulation of spilled flowers and buds. These bundles were waited from July-2016 to March-2017 in the room temperature (24±2 °C). Measurements were done in the middle (±1 day) each month during eight months. The first data were measured in 15 August 2016, and the last measurement was done data in 15 March 2017 because of the spilling process is minimal. Dry weight ratio (%), spill ratio (%) of bundles and L (brightness), +a (red) and -b (blue) values for color analysis were determined. Minolta CR-300 color apparatus were used for color analysis in lavender cultivars.

The data were analyzed using the SAS Statistical Package Program; significant differences between the means were separated using the DUNCAN test (Steel and Torrie, 1980).

## Results and Discussion

Differences among examined characteristics (spike length, stem length with spike, cluster number per spike, dry weigh rate, spill rate, L, +a and -b values) for dry bundle flower of lavender and lavandin cultivars for were found statistically significant at  $p \leq 0.01$  level of significance. The spike length, stem length with spike, cluster number per spike, dry weigh rate and spill rate varied between 3.77-12.37 cm, 16.8-41.7 cm, 4.5-11.0 cluster spike<sup>-1</sup>, 33.21-49.00% and 0.72-2.96%, respectively (Table 1). L, +a and -b values varied according to cultivars. The highest L (brightness) +a (red) and -b (blue) values were determined from *L. angustifolia* var. Raya (L:39.72 h<sup>0</sup>), *L. angustifolia* var. Super Blue (+a:3.26 h<sup>0</sup>) and *L. angustifolia* var. Silver (-b:7.10 h<sup>0</sup>) cultivars, and the lowest values of these traits *L. angustifolia* var. Vera (L:39.72 h<sup>0</sup> and +a:1.14 h<sup>0</sup>) and *L. angustifolia* var. Sevtopolis (-b:1.73 h<sup>0</sup>), respectively (Table 2).

In storage period, the highest spill rate was measured in August month with 0.6% (at the first month), and the lowest in March month with 0.02% (at 8<sup>th</sup> month). Flowers and buds of cultivars almost complete dried at last of the first month. Dried flowers completely spilled within one month. Spill amount of buds were highest at last of the first month, and were decreased in following months. L and -b values were increased from the first month to the eighth month, while +a value was decreased.

As the plant dries, while the parts of the corolla spills, most of calyx remains on spike in lavender flowers therefore it looks as if there are flower on spike. This feature of lavender creates an advantage compare with ornamental plants such as roses, carnation, chrysanthemum and orchid due to their high moisture content. Vase life of after harvest were 5 days in rose, 7 days in carnation, 14

days in chrysanthemum, 28 days in orchid (Altan et al., 1983). Although dried lavender is not an alternative to these plants, it can be said that lavender usable as dry bunch flower for a long time. Vase life of flowers after harvest varied depending species, storage conditions, growing condition of plant, agronomic practices and harvest time (Çelikkol, 2008).

**Table 1.** Some morphological features of lavender and lavandin cultivars, and changes in dry weight, spill rate, L, +a and –b values

Cultivars	Spike length (cm)	Stem length with spike (cm)	Cluster number per spike (number)	Dry weight rate (%)
<i>L. angustifolia</i> var. Sevtopolis	7.87 b**	30.3 cd**	4.5 c**	41.17 b**
" Raya	7.03 b	27.6 de	5.7 c	40.42bc
" Munstead	3.77 c	16.8 f	4.8 c	42.50 ab
" Vera	8.07 b	24.8 e	9.3 b	35.33 cd
" Silver	9.27 ab	38.1 ab	8.3 b	41.42 bc
" Super Blue	10.07ab	34.3 bc	11.0 a	33.21 d
<i>L. x intermedia</i> var. G. Hidcote	12.37 a	32.3 cd	8.4 b	41.58 bc
" Dutch	7.80 b	30.1 cd	9.5 ab	40.50 bc
" Grosso	7.80 b	30.6 cd	9.7 ab	49.00 a
" Abrial	9.40 ab	41.7 a	8.9 b	43.29 ab
" Super A	9.87 ab	34.6 bc	8.3 b	44.42 ab
CV (%)	16.77	8.08	7.96	6.63
Cultivars	Spill rate (%)	L value	+a value	-b value
<i>L. angustifolia</i> var. Sevtopolis	0.72 h**	44.36 cd**	2.81 b**	1.73 e**
" Raya	0.97 g	46.54 a	2.75 b	2.29 e
" Munstead	2.45 b	45.73bc	1.88 cd	5.80 bc
" Vera	2.22 bc	39.72 e	1.14 f	5.49 c
" Silver	2.96 a	44.51 cd	1.78 cd	7.10 a
" Super Blue	1.47 e	46.07 b	3.26 a	3.36 d
<i>L. x intermedia</i> var. G. Hidcote	1.73 d	43.16 d	2.22 c	5.27 c
" Dutch	2.67 ab	45.94 b	1.71 de	5.99 bc
" Grosso	1.36 f	40.91 e	1.91 cd	3.78 d
" Abrial	1.82 d	45.30bc	1.29 ef	6.79 b
" Super A	1.40 f	44.4 a	1.25 ef	5.32 c
CV (%)	11.87	6.05	10.21	5.15

\*\* : Significant at P<0.01 probability level.

Means in the same columns followed by the same letters are not significantly different as statistically.

**Table 2.** Change in spill rate, L, +a and –b values in storage period

Months	Months			
	Spill rate (%)	L value	+a value	-b value
August	0.6 a**	41.08 d**	3.88 a**	3.24 c**
September	0.4 b	41.08 c	2.84 b	4.69 b
October	0.07 c	41.40 d	2.26 bc	4.68 b
November	0.06 c	41.13 d	1.91 cd	4.40 b
December	0.05 c	47.60 ab	1.63 de	5.84 a
January	0.04 c	47.63 a	1.61 de	5.57 a
February	0.03 c	47.27 b	1.67 de	5.68 a
March	0.02 c	47.90 b	1.44 e	5.86 a
CV (%)	6.24	4.09	5.87	3.54

\*\* : Significant at P<0.01 probability level.

Means in the same columns followed by the same letters are not significantly different as statistically.

## Conclusions

Vase life, quality and allure of used plants in dry bunch floriculture effects to trade, marketable value and wide of use area. According to results of research, the longest spike height were measured in *L. x intermedia* var. G. Hidcote, the brightest and darkest flowers in *L. angustifolia* var. Raya and

Super Blue, and the lowest spill rate in *L. angustifolia* var. Raya and Sevtopolis cultivars. As a result, we could recommend Hidcote, Raya, Super Blue and Sevtopolis cultivars for dry bunch flower in lavender and lavandin species.

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