

**EFFECT OF SOME NATURAL ESSENTIAL OILS AND
NANO-PARTICLE COMPOUNDS ON QUALITY AND
VASE LIFE OF CUT-FLOWERS OF GERBERA cv.
'ROSALIN' AND ROSE cv. 'BLACK MAGIC'**

By

NESREEN MOHAMED MOSTAFA DARWISH

B.Sc. Agric. Sc. (Ornamental Plants), Fac. Agric., Cairo Univ., 2005

M.Sc. Agric. Sc. (Ornamental, Medicinal and Aromatic Plants), Fac.
Agric., Ain Shams Univ., 2017

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ABSTRACT

Nesreen Mohamed Mostafa Darwish. Effect of Some Natural Essential Oils and Nano-Particle Compounds on Quality and Vase Life of Cut-Flowers of Gerbera cv. 'Rosalin' and Rose 'cv. Black Magic'. Unpublished PhD. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2022.

Gerbera (*Gerbera jamesonii*, Asteraceae), is an important commercial cut-flower crop. A prominent problem of gerbera cut flowers is short vase life mostly due to neck bending amongst other factors. Rose (*Rosa hybrid*, Rosaceae) is the queen/king of flowers, holding a great symbolic and cultural value. The aim of this study was to screen the effects of the essential oils of thyme, clove and caraway in addition to nano-silver particles on vase life and on some parameters of gerbera cv. 'Rosalin' and rose cv. 'Black magic' cut flowers. A factorial experiment was arranged in a completely randomized design with four flowers in each of four replications. Experiments were carried out in the laboratory of Ornamental plants, Horticulture Dept., with essential oils as a first factor in normal form (at 25 and 50 mg/l) and in nano-form (at 5 and 10 mg/l). Nano-silver was the second factor (at 5 mg/l) in addition to distilled water as control. The measured traits included: uptake of vase solution, vase life, neck bending of gerbera, flower fresh weight. Internally activity of enzymes; polyphenol oxidase (PPO), peroxidase (POD) and catalase (CAT) were estimated. Also, pigments of anthocyanin, carotenoids, total chlorophyll and also phenols index were assessed. Results of both gerbera and rose indicated that essential oils affected in a positive manner vase life, vase solution uptake and flower fresh weight. As for gerbera, reduced neck bending amongst other parameters clove oil in normal form at 25 mg/l was the most effective treatment. Similarly, a significant positive increase was observed on catalase, anthocyanin, carotenoids, total chlorophyll and phenols content. Whereas, nano essential oils had no effect on most of the parameters in gerbera. Nano-silver particles had no significant effect on most

of the parameters in both cut flowers investigated. Still, a significant effect on vase life and uptake of vase solution was detected in the case of gerbera and on vase life in addition to colour pigments (carotenoids, anthocyanin and total chlorophyll) of rose. Whereas, rose results indicated that thyme essential oil in normal form at 50 mg/l either with or without nano-silver. Similarly, a significant increase was observed on catalase, carotenoids, total chlorophyll, anthocyanin and phenols contents. Therefore, for the sake of extending vase life, more safely without the use of chemicals, the results propose the use of clove oil with gerbera cv. '*Gerbera jamesonii*' while thyme oil can be used in the case of rose cv. '*Rosa hybrida*'.

Keywords: Gerbera, *Gerbera jamesonii*, Rose, *Rosa hybrida*, Essential oils, Nano-silver, Vase life, Postharvest and Cut flowers.

LIST OF CONTENTS

	Page
LIST OF TABLES	IV
LIST OF FIGURES	VIII
LIST OF PLATES	XI
LIST OF ABBREVIATIONS	XII
INTRODUCTION	1
REVIEW OF LITERATURE	4
2.1. Gerbera and Factors Affecting Postharvest Life	4
2.1.1. Pre-harvest growing conditions	4
2.1.2. Harvesting phase and method	4
2.1.3. Postharvest handling situations	5
2.1.4. The malformation of neck bending phenomenon	7
2.1.5. Preservative chemicals used as final vase-solution treatments	9
2.1.5.1. Conventional chemical compounds	9
2.1.5.2. Eco-friendly chemical compounds	12
2.2. Rose and Factors Affecting Postharvest Life	17
2.2.1. Pre-harvest growing conditions	17
2.2.2. Harvesting phase and method	18
2.2.3. Postharvest handling situations	19
2.2.4. Preservative chemicals used as final vase-solution treatments	20
2.2.4.1. Conventional chemical compounds	20
2.2.4.2. Eco-friendly chemical compounds	23
MATERIAL AND METHODS	27
3.1. Experimental Site and Time Duration	27
3.2. Plant Material	27
3.3. Vase Preservative Solutions	29
3.3.1. Essential oils in normal form	29
3.3.2. Essential oils in nano form	29
3.3.3. Silver particles in nano form	31
3.4. Experimental Treatments	31

II

3.4.1. Essential oils in normal and nano forms	31
3.4.2. Silver particles in nano form treatments	32
3.5. Management of Experimental Flowers	32
3.6. Data Recorded	33
3.6.1. Vegetative and physiological parameters	33
3.6.1.1. Vase life	33
3.6.1.2. Uptake of vase solution	35
3.6.1.3. Flower fresh weight	35
3.6.1.4. Neck bending in gerbera	35
3.6.2. Chemical parameters	36
3.6.2.1. Determination of anti-oxidant enzymes' activities	36
3.6.2.2. Determination of chlorophyll and carotenoids contents	37
3.6.2.3. Determination of anthocyanin content	38
3.6.2.4. Determination of phenolic index (as a measure of phenols)	38
3.7. Chemicals and Reagents	38
3.8. Experimental Design and Statistical Analysis	39
RESULTS.	40
4.1. With Regard to Gerbera jamesonii cv. 'Rosalin' Cut-Flowers.	40
4.1.1. Effect of essential oils and nano-silver particles on morphological and physiological parameters.	40
4.1.1.1. Uptake of Vase solution	40
4.1.1.2. Flower fresh weight	44
4.1.1.3. Vase life	48
4.1.1.4. Neck bending	52
4.1.2. Effect of essential oils and nano-silver particles on chemical parameters	56
4.1.2.1. Activity of polyphenol oxidase enzyme	56
4.1.2.2. Activity of catalase enzyme	60
4.1.2.3. Activity of peroxidase enzyme	64
4.1.2.4. Total chlorophyll content	68
4.1.2.5. Carotenoids' pigments content	72
4.1.2.6. Anthocyanin pigment content	76

III

4.1.2.7. Phenolic index (as a measure of phenols)	80
4.2. With Regard to <i>Rosa hybrida</i> cv. 'Black magic' Cut-Flowers.	84
4.2.1. Effect of essential oils and nano-silver particles on morphological and physiological parameters.	84
4.2.1.1. Uptake of vase solution	84
4.2.1.2. Flower fresh weight	88
4.2.1.3. Vase life	92
4.2.2. Effect of essential oils and nano-silver particles on chemical parameters	96
4.2.2.1. Activity of polyphenol oxidase enzyme.	96
4.2.2.2. Activity of catalase enzyme	100
4.2.2.3. Activity of peroxidase enzyme	104
4.2.2.4. Total chlorophyll content	108
4.2.2.5. Carotenoids' pigments content	112
4.2.2.6. Anthocyanin pigment content	116
4.2.2.7. Phenolic index (as a measure of phenols)	120
DISCUSSION	124
5.1. Preface	124
5.2. General Discussion	125
5.3. Specific Discussion	130
5.3.1. Essential oils have antimicrobial features	130
5.3.2. Essential oils have antioxidant properties	132
5.3.3. Essential oils have growth regulatory effects	137
5.3.4. Nano-silver influences vase life of cut flowers	138
5.4. Suggestions For Future Research	141
SUMMARY AND CONCLUSIONS	142
6.1. Summary of Results	142
6.2. Conclusions	147
REFERENCES CITED	149
ARABIC SUMMARY	

LIST OF TABLES

Table No.		Page
1	Components of caraway, clove and thyme essential oils (El-Essawy <i>et al.</i> , 2019)	30
2	Effect of essential oils in normal and nano forms on uptake of vase solution (g/f) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	41
3	Effect of the interaction between essential oils and nano-silver on uptake of vase solution (g/f) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	43
4	Effect of essential oils in normal and nano forms on flower fresh weight in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	45
5	Effect of the interaction between essential oils and nano-silver on flower fresh weight (g/f) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	47
6	Effect of essential oils in normal and nano forms on activity of polyphenol oxidase enzyme (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	57
7	Effect of the interaction between essential oils and nano-silver on activity of polyphenol oxidase enzyme (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	59
8	Effect of essential oils in normal and nano forms on activity of catalase enzyme (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	61
9	Effect of the interaction between essential oils and nano-silver on activity of catalase enzyme (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	63

Table No.	Page
10 Effect of essential oils in normal and nano forms on activity of peroxidase enzyme (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	65
11 Effect of the interaction between essential oils and nano-silver on activity of peroxidase enzyme (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	67
12 Effect of essential oils in normal and nano forms on content of total chlorophyll (mg/g) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	69
13 Effect of the interaction between essential oils and nano-silver on content of total chlorophyll (mg/g) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	71
14 Effect of essential oils in normal and nano forms on content of carotenoids' pigments (mg/g) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	73
15 Effect of the interaction between essential oils and nano-silver on carotenoids' contents (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	75
16 Effect of essential oils in normal and nano forms on content of anthocyanin pigments (mg/g) in gerbera cut flowers cv. 'Rosalin' in two seasons 2020 and 2021.	77
17 Effect of the interaction between essential oils and nano-silver on anthocyanin contents (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	79
18 Effect of essential oils in normal and nano forms on phenolic index (ABS ₃₂₀ /g) as a measure of phenols in gerbera cut flowers cv. 'Rosalin' in two seasons 2020 and 2021.	81
19 Effect of the interaction between essential oils and nano-silver on phenolic index (ABS ₃₂₀ /g) as a measure of phenols in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	83

VI

Table No.		Page
20	Effect of essential oils in normal and nano forms on uptake of vase solution (g/f) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	85
21	Effect of the interaction between essential oils and nano-silver on uptake of vase solution (g/f) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	87
22	Effect of essential oils in normal and nano forms on flower fresh weight (g/f) in rose cut flowers cv. 'Black magic' in two seasons 2020 and 2021.	89
23	Effect of the interaction between essential oils and nano-silver on flower fresh weight (g/f) in rose cut flowers cv. 'Black magic' in two seasons 2020 and 2021.	91
24	Effect of essential oils in normal and nano forms on activity of polyphenol oxidase enzyme (IU/mgFw) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	97
25	Effect of the interaction between essential oils and nano-silver on activity of polyphenol oxidase enzyme (IU/mgFw) in rose cut flowers cv. 'Black magic' in two seasons 2020 and 2021.	99
26	Effect of essential oils in normal and nano forms on activity of catalase enzyme (IU/mgFw) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	101
27	Effect of the interaction between essential oils and nano-silver on activity of catalase enzyme (IU/mgFw) in rose cut flowers cv. 'Black magic' in two seasons 2020 and 2021.	103
28	Effect of essential oils in normal and nano forms on activity of peroxidase enzyme (IU/mgFw) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	105
29	Effect of the interaction between essential oils and nano-silver on activity of peroxidase enzyme (IU/mgFw) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	107

VII

Table No.		Page
30	Effect of essential oils in normal and nano forms on content of total chlorophyll (mg/g) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	109
31	Effect of the interaction between essential oils and nano-silver on content of total chlorophyll (mg/g) in rose cut flowers cv. 'Black magic' in two seasons 2020 and 2021.	111
32	Effect of essential oils in normal and nano forms on content of carotenoids pigments (mg/g) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	113
33	Effect of the interaction between essential oils and nano-silver on content of carotenoids pigments (mg/g) in rose cut flowers cv. 'Black magic' in two seasons 2020 and 2021.	115
34	Effect of essential oils in normal and nano forms on content of anthocyanin pigment (mg/g) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	117
35	Effect of the interaction between essential oils and nano-silver on content of anthocyanin pigment (mg/g) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	119
36	Effect of essential oils in normal and nano forms on phenolic index (ABS_{320}/g) as a measure of phenols in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	121
37	Effect of the interaction between essential oils and nano-silver on phenolic index (ABS_{320}/g) as a measure of phenols in rose cut flowers cv. 'Black magic' in two seasons 2020 and 2021.	123
38	Sum up of the main effects of essential oils and nano silver particles on cut-flowers of gerbera cv. 'Rosalin'	143
39	Sum up of the main effects of essential oils and nano silver particles on cut-flowers of rose cv. 'Black magic'	144
40	Sum up of the interaction effects between essential oils and nano silver particles on cut-flowers of gerbera cv. 'Rosalin'	145
41	Sum up of the interaction effects between essential oils and nano silver particles on cut-flowers of rose cv. 'Black magic'	146

VIII

LIST OF FIGURES

Fig. No.		Page
1	Effect of nano-silver application on uptake of vase solution (g/f) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	42
2	Effect of nano-silver application on flower fresh weight (g/f) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	46
3	Effect of essential oils in normal and nano forms on vase life (days) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	49
4	Effect of nano-silver application on vase life (days) in gerbera cut flowers cv. 'Rosalin' in two seasons 2020 and 2021.	50
5	Effect of the interaction between essential oils and nano-silver on vase life (days) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	51
6	Effect of essential oils in normal and nano forms on neck bending of cut-flowers in gerbera cv. 'Rosalin' in two seasons 2020 and 2021.	53
7	Effect of nano-silver application on neck bending of cut-flowers in gerbera cv. 'Rosalin' in two seasons 2020 and 2021.	54
8	Effect of the interaction between essential oils and nano-silver on neck bending of cut-flowers in gerbera cv. 'Rosalin' in two seasons 2020 and 2021.	55
9	Effect of nano-silver application on activity of polyphenol oxidase enzyme (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	58
10	Effect of nano-silver application on activity of catalase enzyme (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	62

IX

Fig. No.		Page
11	Effect of nano-silver application on activity of peroxidase enzyme (IU/mgFw) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	66
12	Effect of nano-silver application on content of total chlorophyll content (mg/g) in gerbera cut-flowers cv. 'Rosalin' in two seasons 2020 and 2021.	70
13	Effect of nano-silver application on content of carotenoids' pigments (mg/g) in gerbera cut flowers cv. 'Rosalin' in two seasons 2020 and 2021.	74
14	Effect of nano-silver application on anthocyanin content (mg/g) in gerbera cut flowers cv. 'Rosalin' in two seasons 2020 and 2021.	78
15	Effect of nano-silver application on phenolic index (ABS ₃₂₀ /g) as a measure of phenols in gerbera cut flowers cv. 'Rosalin' in two seasons 2020 and 2021.	82
16	Effect of nano-silver application on uptake of vase solution (g/f) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	86
17	Effect of nano-silver application on flower fresh weight (g/f) in rose cut flowers cv. 'Black magic' in two seasons 2020 and 2021.	90
18	Effect of essential oils in normal and nano forms on vase life (days) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	93
19	Effect of nano-silver application on vase life (days) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	94
20	Effect of the interaction between essential oils and nano-silver on vase life (days) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	95

Fig. No.		Page
21	Effect of nano-silver application on activity of polyphenol oxidase enzyme (IU/mgFw) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	98
22	Effect of nano-silver application on activity of catalase enzyme (IU/mgFw) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	102
23	Effect of nano-silver application on activity of peroxidase enzyme (IU/mgFw) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	106
24	Effect of nano-silver application on content of total chlorophyll (mg/g) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	110
25	Effect of nano-silver application on content of carotenoids' pigments (mg/g) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	114
26	Effect of nano-silver application on content of anthocyanin pigment (mg/g) in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	118
27	Effect of nano-silver application on phenolic index (ABS ₃₂₀ /g) as a measure of phenols in rose cut-flowers cv. 'Black magic' in two seasons 2020 and 2021.	122
28	Flow chart illustrating the mode of action strategies for essential oils used to extend vase life of cut-flowers	136
29	Flow chart illustrating the mode of action strategies of nano silver to prolong vase life of cut-flowers.	140

LIST OF PLATES

Plate No.	Page
1	Cut-flowers of <i>Gerbera jamesonii</i> cv. 'Rosalin' (to the left-hand side) and <i>Rosa hybrida</i> cv. 'Black magic' (to the right-hand side) at time of purchase from the commercial grower. 28
2	Glass bottles holding cut-flowers (Gerbera, left and roses, right). 32
3	End of vase life symptoms for gerbera: neck bending (A and B), petals curling (C), petals wilting (D) and petals abscission (F). 34
4	End of vase life symptoms for rose: unopened flower bud (A), petals wilting (B) and petals wilting with yellow leaves(C). 34
5	Measurement of flower angle (angle became bigger from left to right) in gerbera cv. 'Rosalin' cut flowers. 36
6	Vase life of gerbera cv. 'Rosalin' cut-flowers after 10 days from applying clove oil at 25 mg/l (left) compared to water control (right). 48
7	Neck bending phenomenon in gerbera cv. 'Rosalin' cut-flowers after 10 days from applying clove 25 at mg/l (left) compared to water control (right). 52
8	Vase life of rose cv. 'Black magic' cut-flowers after 10 days from applying thyme oil at 50 mg/l (left) compared to water control (right). 92

LIST OF ABBREVIATIONS

Abbreviation	: Respective meaning
Ag ⁺	: Silver ion
AgNO ₃	: Silver nitrate
ANTH	: Anthocyanin
CAR	: Carotenoids
CAT	: Catalase
CV	: Clove
cv.	: Cultivar
CW	: Caraway
e.g.	: For example
EC	: Electrical conductivity
EOs	: Essential oils
<i>et al</i>	: and others
FFW	: Flower fresh weight
h	: Hour
K	: Potassium
l	: Liter
LPS	: lipopolysaccharides
m mol/l	: Mill moles/liter
mg/g	: Milligram/gram
mg/l	: Milligram/liter
μl	: Milliliter
NB	: Neck bending
NRC	: National Research Centre
NS	: Nano Silver
pH	: Numeric scale used to specify the acidity
PHEN	: phenols
POD	: peroxidase
PPO	: polyphenol oxidase enzyme
ROS	: Reactive oxygen species
SOD	: superoxide dismutase
TCH	: Total chlorophyll
TH	: Thyme
UVS	: Uptake of vase solution
VL	: Vase life