شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

بعض الوثائق الاصلية تالفة

بالرسالة صفحات لم ترد بالاصل

POSTHARVEST STUDIES ON CARNATION FLOWERS (*Dianthus caryophyllus*)

BY

NERMEEN TAHA AHMED SHANAN
B.Sc., Agri. Cairo University (1998)

THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science

In

Ornamental Horticulture Department

FACULTY OF AGRICULTURE

CAIRO UNIVERSITY

Supervisors:-

Prof. Dr./ Hamdy Mohamed Aly El- Bagoury

Prof. Dr./ El- Saady Mohamed Badawy

Dr./ Mohamed Mousa Emarah

2003

POSTHARVEST STUDIES ON CUT CARNATION FLOWERS (*Dianthus caryophyllus*)

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Approved by:-

Prof. Dr./

Prof. Dr./

Prof. Dr./

Prof. Dr./

Committee in charge

Date:- / /

Deposited in the library

Date:- / /

Name of Candidate : Nermeen Taha Ahmed Shanan
Title of Thesis : Post harvest studies on cut carnation flowers (*Dianthus Caryophyllus*)
Supervisors : Prof. Dr. Hamdy Mohamed Aly El-Bagoury
: Prof. Dr. El Saady M. Badawy
: Dr. Mohoamed Mousa Emarah
Department : Ornamental Horticulture
Branch : Floriculture

ABSTRACT

Carnation flowers (*Dianthus Caryophyllus cv. America*) harvested at two different stage i.e. star or paint brush stage, sample of 1260 flowers was divided into three division, each division consists of 420 flowers as follows:- Dipping flower stems in 0,2,4 mM silver thiosulfate (STS) for 30 min, then subdivided into five groups (84 flowers), flower stems were hold under 5 different conditions: lab-conditions, 0°C/15 days, 0°C/30 days, 5°C/15 days and 5°C/30 days, 5 sub-groups were then divided into 7 groups of 12 flower each and treated as follows:

5% sucrose + 150 ppm 8-hydroxyquinoline with or without 200, 400 ppm citric acid, 5% suc with 200 or 400 ppm CA, 5% suc and distilled water. The results can be summarized as follows:-

Harvesting carnation flower at paint brush stage, treated with 2 or 4 mM STS as pulsing, lab-condition or 0°C/15 days and vase solution containing 5% suc + 150 ppm 8-HQ + 200 ppm CA gave:-

* The lowest change in flower weight during storage.
* The maximum value for flower diameter, vase life.
* The maximum rate of daily absorption for vase solution.
* The greatest value for fresh weight change during vase life.

Dipping flowers, harvested at paint brush stage, in 2 mM STS and placing them in a solution containing 5% sucrose + 150 ppm 8-HQ + 200 ppm CA gave the highest content of reducing sugars in petals and stems.

Dipping the flowers, harvested at star stage in 2 mM STS for 30 minutes and keeping them under lab-conditions gave the highest anthocyanin content

El-Saady Badawy

To My Parents

ACKNOWLEDGEMENT

First AND FORMOST I FEEL ALWAYS INDEBTED TO GOD

THE MOST BENFICENT AND MERCIFUL

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Content

INTRODUCTION

Carnation is a very ancient flower which was known for centuries before the Christian era. It is a native in the temperate regions of Europe and Asia and to a lesser extent North Africa. Botanically, all carnations are referred to as *Dianthus caryophyllus*, although caryophyllus is one of several hundred species of the genus Dianthus (Steven 1982).

Fresh cut flowers usage is an ancient custom dating back for thousands of years, dried bouquets of flowers have been found in caves and tombs in recent excavations. Nothing has changed, we still use flowers for adornment, decoration and to express our joys and sorrows.

We don't know when it was first discovered that placing a flower stem in water prolongs its life, but this discovery was a markable beginning for cut flowers post harvest prolonging freshness. Growers as well as consumers used floral preservatives to ensure their continued vigor throughout the year. The longevity of many cut flower species related to the stage of development at harvest. Vas life is usually shortened when flowers are harvested at relatively advanced stage of maturity, many flowers last longer when cut at very early developmental stages, and a large number of species including standard chrysanthemums, carnations and lilies do extremely well if harvested in the bud stage and opened in special opening solutions, (Sacalis, 1993).

Carnations are sensitive to ethylene at concentrations below 1 ppm, and affected flowers wilt rapidly. Treatment with silver thiosulfate inhibits the effects of ethylene, particularly if given directly following harvest, (Nowak and Rudnicki, 1990).

The storage of carnation makes it possible to adjust the supply to market demands. Moreover, storage makes it possible to accumulate large quantities of plant material for a single shipment. This simplifies the management process and reduces losses during handling. Long-term storage of carnation enables the grower to limit the area of flower production in the green house in winter and thus realize saving energy. The storage of carnation flower effectively extends the marketing period. It is also important for export since it facilitates long distance transportation by truck and by ship. In weighing storage alternatives the objective is always to ensure excellent quality of flowers after storage, without loss in viability or growth (Nowak and Rudnicki, 1990).

Numerous commercial preservatives are available to increase the longevity of cut carnation flowers. Most do an excellent job of extending vase life (Sacalis, 1993). Most floral preservatives contain carbohydrates, germicides, ethylene inhibitors, growth regulators and some mineral compounds (Nowak and Rudnicki, 1990).

The aim of the present study is to investigate the effect of harvesting stage temperature and period as well chemicals treatment on quality and longevity of carnation flowers (*Dianthus caryophyllus*) cv. America.

REVIEW OF LITERATURE

Effect of harvesting stage on the keeping quality of cut flowers:

Carro and Sumer (1979) reported that the optimum stage for harvesting cv. Mercedes rose blooms when the sepals moved a way from the bud and the tip of the petals separated the stems of flowers cut too early wilted and turned brown just below the bud.

Berkholst (1986) found that harvesting of Roses cv. Sonia flowers at different developmental stages at the immature stage had a final poor quality and smaller cell size than those cut at the mature stage. Intact flowers had the largest cell size.

Roaq and Ram (1986) reported that cutting the spikes of gladiolus at bud stage (1 day before the corolla of the lowest bud had emerged from the bracts) then they were pulse treated with water, 1 M sucrose, 10 – 5 MGA_3 or 1.0 M sucrose + 10 – 5 MGA_3, immediately before or after 24h dry storage at 20 + 2^0C (to induce water stress), or after 1 week of cold, dry storage at 4 + 0.5^0C. Spikes pulse treated with sucrose and sucrose + GA before storage gave bud opening percentage (>90%) similar to that transferred to water. Spikes puls treated after storage required GA_3 as well as sucrose for maximum percentage bud opening. This indicating that flower buds were sensitive to water stress which appeared to disrupt the endogenous GA supply system.

Han and Lee (1992) reported that harvesting of cut carnation cv. White sim flowers at stage 2 (petals 2.22, 18 cm long) showing colour and

opening (40-50% from vertical). This stage was the optimum stage of maturity for longest vase life and flower quality.

Sacalis and John (1993) refer that proper stage of development at harvest depend on variety and storage or shipping intention. Roses to be shipped long distances must be cut at a tighter stage, which may result in variations in performance as flowers. Roses cut at the right stage of development can have a vase life of 6 to 16 days.

Menguc *et al*. (1994) studied the effect of harvesting stage of cut flowers of carnation cv. Astor at 4 maturity stage (1) tight bud (2) cross (3) paint brush and (4) full open. Vase life decreased as harvest maturity advanced. Also the number of days to bud opening decreased.

Daj and Paul (1995) harvested *Protea nerifolia* cv. Pink wink floral stems at 5 developmental stages, they found that inflorescence diameter, fresh and dry weights increased from stage 1 (very tight bud) to stage 5 (bracts reflexed) and respiration rate was high in stage 1 and 3.

Song *et al*. (1996) reported that the best harvesting stage to cut *Lilium elegans* [L. *maculatum*] cv. Corderia and Avignon was recorded when the first flower was fully open.

Micheal and Linda (1999) reported that maturity at which carnation harvested depends on the proposed marketing procedure. Star stage buds (stage 1) are too immature for most purposes except long term storage. Buds with petals straight up (stage 2) will open quickly flower. For immediate use flowers are normally harvested between stage 3 and 4.

Eason *et al*. (2001) reported that flowering stems of *Sandersonia aurantiaca* can be harvested at a relatively immature stage (2-3 flowers