EFFECTS OF MEDIA SOLUTIONS CONCENTRATION AND STORAGE TEMPERATURE ON VASE LIFE AND WILTING OF CUT CHRYSANTHEMUM FLOWER

Chrysanthemum indicum (L.)

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A DISERTATION SUBMITTED AS PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF BACHELOR IN PLANT TECHNOLOGY

PLANT TECHNOLOGY PROGRAMME
SCIENCE AND TECHNOLOGY SCHOOL
UNIVERSITI MALAYSIA SABAH

2007

BORANG PENGESAHAN STATUS TESIS@

JUDUL: EFFECT OF MEDIA CONCENTRATION AND STORAGE TEMPERATURE ON VASE LIFE AND WILTING OF CUT CHRYSANTHEMUM Chrysanthemum indicum (L)

Ijazah: Sarjana Muda sains (Teknologi Tumbuhan)

SESI PENGAJIAN: 2004 - 2007

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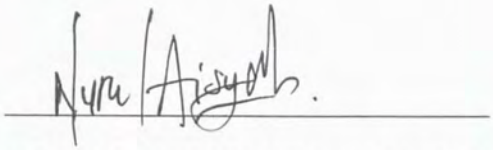

NURUL AISYAH BINTI HUSAIN

HS2004-2876

ACKNOWLEDGEMENT

I would to thanks all my family members, Abah, Ummi, Along, Angah, Achik, my little sister and also my special person whose has give me a lot of support especially financial support and also motivated to hearten me all this time. Not forgotten to my roommates, who also help me especially thanks for their consideration in order for me to do my experiment and completing it. To all my lovely friends and course mates, I also would like to thanks for their kindness and supportive attitudes to me all the times. Special thanks to my supervisor, Mr. James Jupikely Silip, who has given me a lot of learning experience and knowledge during my studies. Not forgotten to the laboratory assistant, Ms. Christina and Mr. Sanin, whose has preparing all the experiment materials and laboratory equipments to make sure that my experiment can be done smoothly without any delayed. Last but not least, once again I would like to give my special thank to all party either or nor participated direct or indirect in the process to completed this project. I am really appreciated for all the kindness and good deeds from all of you. I am hoping that my research can give a lot of benefit to everybody. Thank you.

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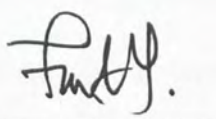

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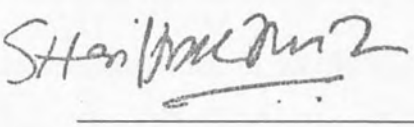

ABSTRACT

Study has been done to determine the effects of different sucrose concentration (2.0%, 3.0%, 4.0% and 5.0%) were compared to pipe water (control) and different storage temperature (20°C ± 1°C, 10°C ± 1°C and 25°C ± 5°C). I have examined whether the effects of different sucrose treatment and different storage temperature in extend the vase life and quality of cut flower, which may influence the percentages of water uptake, percentages of opening bud, flower wilting and vase life of cut chrysanthemum flowers. The results showed that the pipe water and 4.0% sucrose have high percentages on bud opening and lower percentages on flower wilting compared to 2.0%, 3.0% and 5.0% sucrose that has the lower percentages of opening bud and high on flower wilting. The experiment has shown that sucrose can have a wider effect on cut flower opening bud, water uptake and flower wilting than simply alleviating nutritional stress. In the storage temperature treatment, the cut flower showed lower percentages of opening bud and high percentages in flower wilting when conducted under high temperature (20°C ± 1°C and 25°C ± 5°C) because the higher the temperature, the shorter was the vase life of cut flowers. The cut flower put under lower temperature (10°C ± 1°C), showed the higher percentages of opening bud and the lower percentages of flower wilting. In conclusion, the lower the ambient temperature, the longer is the vase life of cut chrysanthemum flowers.

ABSTRAK

Kajian telah di lakukan untuk menentukan kesan kepekatan sukrosa yang berbeza, (2.0%, 3.0%, 4.0% and 5.0%), di bandingkan dengan air paip (kawalan) dan suhu penyimpanan yang berbeza (20°C ± 1°C, 10°C ± 1°C dan 25°C ± 5°C). Saya telah menyiasat samada perbezaan kepekatan sukrosa dan perbezaan suhu penyimpanan memberi kesan dalam meningkatkan tempoh hayat dan kualiti bunga keratan, yang mana mempengaruhi peratus pengambilan air, peratus pembukaan kudup, peratus kelayuan bunga dan jangka hayat bunga keratan. Keputusan menunjukkan air paip dan 4.0% sukrosa mempunyai peratus pembukaan kudup yang tinggi dan kelayuan bunga yang rendah berbanding 2.0%, 3.0% dan 5.0% kepekatan sukrosa yang mana mempunyai peratus pembukaan kudup yang rendah dan kelayuan bunga yang tinggi. Eksperimen yang di jalankan telah menunjukkan bahawa sukrosa boleh memberi kesan yang luas terhadap pembukaan kudup bunga keratan, pengambilan air dan kelayuan bunga daripada hanya kesan ringan oleh tekanan nutrisi. Dalam rawatan suhu penyimpanan, bunga keratan menunjukkan peratus pembukaan kudup yang rendah dan peratus kelayuan bunga yang tinggi apabila di jalankan di bawah suhu yang tinggi (20°C ± 1°C dan 25°C ± 5°C) kerana semakin tinggi suhu, semakin pendek tempoh hayat bunga. Bunga keratan yang di letakkan di bawah suhu rendah (10°C ± 1°C), menunjukkan peratus pembukaan kudup yang tinggi dan peratus kelayuan bunga yang rendah. Kesimpulannya, semakin rendah suhu persekitaran, semakin lama jangka hayat bunga keratan kekwa.

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CHAPTER 1

INTRODUCTION

1.1 Background

Flower is defined as the part of plant with either male or female or both reproductions structure. It is a group of reproductions organs of the flowering plants, which develops fruits and seeds and help in forming new offspring of the plants. From a morphological point of view flower is a highly condensed and modified shoots. Its function is reproductions. Fresh flower, otherwise known as cut flowers are cultivated in green house, shade house and outdoors. These products are arranged for displays in vases and used in bouquets, boutonnieres, wreath and others.

Major greenhouse-grown cut flowers species include rose (*Rosa x hybrida*), carnations (*Dianthus caryphyllus*), chrysanthemum, snapdragon (*Anthirrhimun majus*), freesia (*Freesia refracta*), and alstroemeria (*Alstroemeria spp.*) (Acquaah, 2002). Cut flowers are cultivated either on the grounds beds or on raised four meter wide bench.

The cut flower industry in Malaysia commonly in Sabah is a relatively develop compared to other agricultural activities. Starting as a hobby industry, the cut flowers industry in Malaysia has developed into a commercial enterprise and marked growth in the mid-eighties. The cut flower market consists of three important components which is temperate flower, orchids and other lowland flower. The area of cultivation of cut flower in Malaysia is determined by the climate and topography. Highlands such as the Kundasang, Sabah are the major growing areas of temperate flowers (Jong *et al.*, 2000).

Cut chrysanthemum flowers appear as various colors and shapes that can attract anyone who loves to see beautiful aspects of these flowers. Cut chrysanthemum is traded round the year in Malaysia and the bulk of these flowers are used in making garland, bracelets and others adornments. Flowers are also used as decorations in marriages and parties and for offering to God in temples and poojas. Because of their important uses in special ceremonies, the conditions of cut flowers and the quality are very important.

Post productions longevity is determined by conditions during a chain of periods beginning with early plant production and extending through late production, holding, shipping and retailing (Nelson, 2003). Fresh flower or cut flowers present a special problem itself. A cut flower is still a living entity even though it has been cut from the plants. Its maximum potential vase life, although acceptable in market place, is short. Cut flowers deteriorate for one or more reasons. Five common reasons for early senescence are inability of stems to absorb water because of blockage, excessive water loss from the

cut flower, a short supply of carbohydrates to support respiration, disease infections and negative effects of ethylene gas.

Basically, many factors that can improve crop quality before and post harvest usually can be used to improve vase life. Research has been conducted over the past 30 years to find a preservative solution that will protect against some of the causes of flower senescence and reductions of vase life. Floral preservatives perform the functions which include providing sugar (carbohydrates), supplying a bactericide to prevent microbial growth that causes blockage of water-conductive cells in the stem and acidify the solution. These floral preservatives are very effective in maintaining quality and extending longevity. Preservatives can double the vase life of cut flower compared to water. Other than floral preservative solution, the vase life of cut flower can also be extended using several harvested handling systems that has been used commercially such as refrigerated storage (0.5°C to 4°C), dry storage, and bud harvesting and ethylene control.

1.2 Objectives

The objective of the research is to evaluate the effects of media solutions concentration and different storage temperature on vase life and wilting of cut chrysanthemum flower. This research is important in order to improve the cut flowers production industry by maintaining and improving the quality of cut flowers.

CHAPTER 2

LITERATURE REVIEW

2.1 History of Chrysanthemum Flower

Chrysanthemum is a genus of about 30 species of perennial flowering plants in the family Asteraceae. This flower is a native to Asia and northeastern Europe. Commonly, this flower is referred to as "mums". Chrysanthemums are herbaceous perennial plants and growing to 50-150 cm tall, with deeply lobed leaves and large flower heads. In the wild species, chrysanthemum flower came with wide range of color such as white, yellow or pink, purple and form (shape) including standard and spray, or pompon (Figure 2.1).

Chrysanthemums were cultivated in China as a flowering herb as far back as the 15th century BC. An ancient Chinese city was named Chu-Hsien, meaning "chrysanthemum city". The flower was introduced into Japan in the 8th century CE and the Emperor adopted the flower as his official seal. There is a "Festival of Happiness" in Japan that celebrates the flower.

The flower was brought to the Western World in the 17th century. It was named by Carolus Linnaeus from the Greek prefix *chry*, which means golden (the color of original flower), and *anthemon*, meaning flower.

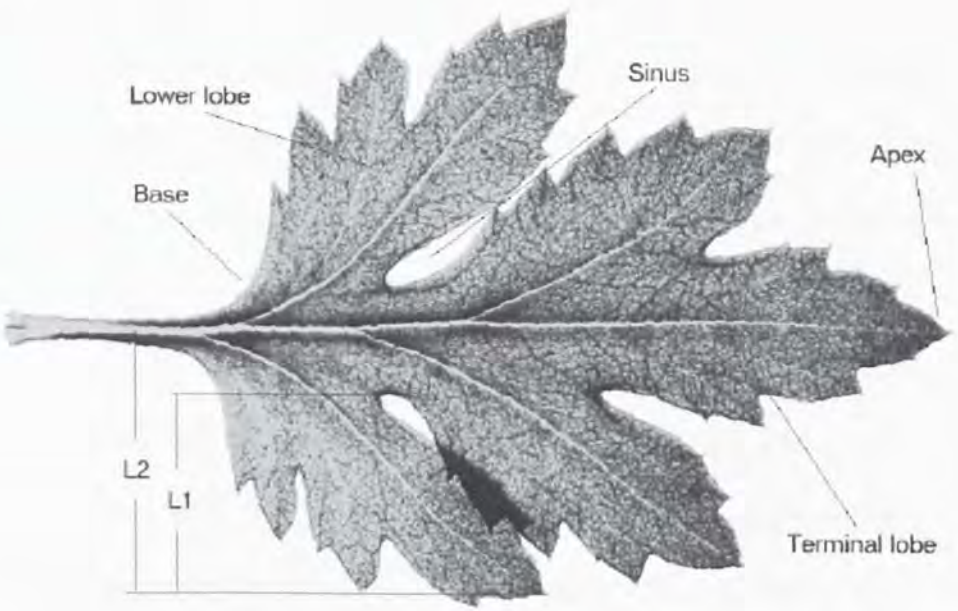
(Source: http://www.toursgallery.com)

Figure 2.1 Varieties color of Chrysanthemum flowers.

2.2 Botany of Chrysanthemum Flower

Chrysanthemums are described by a set of 64 characters that describe features ranging from plant height to bloom color. Fifteen of these characters are used to describe the size, shape and color of the leaves (Figure 2.2) (Warren, 1997).

Petals on chrysanthemum are actually florets (a small, usually part of a dense cluster, especially, one of the disk or ray flowers of a composite plant such as a daisy) since both sexual part (male/female) exist in one each. The chrysanthemum flower has two types of florets that would be called petals on a daisy and disk florets that are the center florets in a daisy type of bloom. Their blooms come in a huge variety of shapes and sizes. Some are spherical in shape and have incurved petals at the center. Some have tubular-shaped petals of unequal length with little hooks at the end. Spoon chrysanthemums have rather flat petals that are spoon-shaped at the end. Anemone chrysanthemums have fairy flat, thin petals with shorter tubular petals in the center (Warren, 1997).



(Source: Warren, 1997)

Figure 2.2 A typical chrysanthemum leaf showing the characters.

All classes of chrysanthemum have both types of florets, but in many of the classes, the disk florets are not apparent. There are so many varieties of chrysanthemum today that a system of classification is used to categorize and identify them. The classification is based on the type of florets and their growth pattern.

2.3 Cut Flower Production in Malaysia

The cut flower industry in Malaysia is relatively recent develop compared to other agricultural enterprises. The cut flower market consists of three important components which are temperate flowers, orchids and other lowland flowers. In general, the area of cultivation of cut flowers in Malaysia is determined by the climate and topography of the land. For instance, highland such as the Cameron Highlands are the major growing areas of temperate flowers. Other cut flowers adapt better to the hot humid conditions in the lowland with orchids constituting the major share of the production (Jong *et al.*, 2000).

The major production areas for temperate cut flowers are in Cameron Highland, Pahang State (638 ha), Gua Musang, Kelantan State (10.3 ha), and Ranau, Sabah (85.1 ha). The total area under cut flowers is estimated to be over 1,218 hectares, out of which 580 hectares are under orchids and 638 hectares are under temperate cut flowers. The most important temperate flower types are roses (33.48%), chrysanthemum (22.62%) and carnation (9.02%). These three flower types contributed 91.1% of total temperate cut flower production (Jong *et al.*, 2000).

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