Effects of Some Preservative Solutions on Vase Life in *Gerbera jamesonii*

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Abstract

Gerbera (*Gerbera jamesonii* H. Bolus ex. Hooker) is an important ornamental flower in global flower market. Consumers are attracted by its bright colour and beautiful shape; but as with other cut flowers, quality loss after harvest is a major concern. Moreover, in certain cultivars, its vase life is dramatically shortened by a stem bending problem. 'Navy', an attractive new variety, caused customer complaints resulting from its short vase life, as a result of a high incidence of stem bending.

In this thesis, 2 – 6% sucrose was shown to be an effective preservative for preventing 'Navy' from stem bending. Furthermore, deeper research showed sucrose improved stem rigidity and did so by improving lignification of sclerenchyma fibres in the phloem caps and interfascicular region.

Once stem bending has been prevented by sucrose, it is also possible to delay underlying flower senescence. Certain antibacterial materials were tested and a preservative solution containing 4% sucrose and colloidal silver (3 or 5 ppm) was shown to be the best. This may be mainly due to effective control of bacteria and resulting reduction in water stress; but also it may delay flower senescence by inhibiting ethylene action (although most gerbera varieties that have been tested are ethylene insensitive). Just sucrose and colloidal silver is sufficient to keep 'Navy' flowers alive for three or four weeks; which should be enough for consumer demand.

There is quite limited knowledge on the mechanism of gerbera flower senescence. The sequence of 'Navy' senescence was shown to involve first a change in head angle which always occurred on day 11 after harvest. Water uptake mostly started to be affected from day 13 to 15. Most of the senescence-associated colour changes, including the values of 'L', 'a', 'b', began to change during day 15 to 20. Flower weight generally did not change too much, and accompanying with water uptake reduced (apart from the first experiment). Therefore, the results suggest visible initiation of 'Navy' senescence might start

at around 11 – 13 days after harvest, so investigations into underlying genetic regulation would need to start before this time.

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Abbreviations

8-HQC：	8-hydroxyquinoline citrate
8-HQS:	8-hydroxyquinoline sulfate
ABA:	abscisic acid
ACC:	1-aminocyclopropane-1-carboxylic acid
ACO:	ACC oxidase
ACS:	ACC synthase
$AgNO_3$:	silver nitrate
AOA:	amino-oxyacetic acid
AOPP:	α-aminooxi-β-phenylpropionic acid
AP:	apoptotic-like mechanism
AU:	autophagous-like mechanism
BA:	benzyl adenine
$CaCl_2$:	calcium chloride
CHS:	chalcone synthase
CMS:	cytoplasmic male sterility
DFR:	dihydroflavonol-4-reductase
Dfs:	disc florets
ER:	endoplasmic reticulum
GA:	gibberellic acids
GDP:	geranyl diphosphate
JA:	jasmonic acid
MAP:	modified atmosphere packaging
MAPK:	MAP kinase
MTs:	cortical microtubules
PAL:	phenylalanine ammonia-lyase
PAs:	polyamines
PGRs:	plant growth regulators

PCD:	programmed cell death
PE:	polyethylene
PP:	polypropylene
PVC:	polyvinylchloride
Rf:	ray floret
ROS:	reactive oxygen species
UV:	ultraviolet
SA:	salicylic acid
SAGs:	senescence associated genes
SAM:	S-adenosyl methionine
SI:	self-incompatibility
TFs:	signal transduction and transcription factor