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## LIST OF ABBREVIATIONS

ABTS	2,2'-azinobis (3-ethylbenzothiazoline-6-sulfonic acid)
APX	ascorbate peroxidase
AOX	alternative oxidase
ASA	acetylsalicylic acid
AsA	ascorbic acid
bp	base pair
BSA	bovine serum albumin
°C	degrees Celsius
CAT	catalase
cDNA	complementary deoxyribonucleic acid
3Chl*	triplet sensitizer chlorophyll
Chl*	excited chlorophyll
Chl	chlorophyll
CI	chilling injury
Cu	copper
cv.	cultivar
DHA	dehydroascorbate
DHAR	dehydroascorbate reductase
DI	disease index
DNA	deoxyribonucleic acid
DPPH	1,1-diphenyl-2-picrylhydrazyl
DTNB	5, 5'-dithiobis (2-nitrobenzoic acid)
E	extinction coefficient
EC	enzyme commission
EDTA	ethylenediaminetetraacetic acid
EL	electrolyte leakage
ETC	electron transport chain
F	forward



## LIST OF ABBREVIATIONS (continued)

FAD	flavin adenine dinucleotide
Fe	iron
FRAP	ferric reducing antioxidant power
FW	fresh weight
GA	gallic acid
GPX	glutathione peroxidase
GR	glutathione reductase
GSH	glutathione (reduced form)
GSSG	glutathione disulfide (oxidized form)
GST	glutathione S-transferase
g	gram
H <sub>2</sub> O <sub>2</sub>	hydrogen peroxide
JA	jasmonic acid
kg	kilogram
L•	lipid radical
LOO•	lipid peroxide radical
LOX	lipoxygenase
M	molar concentration
MDA	malondialdehyde
MDHA	monodehydroascorbate
MDHAR	monodehydroascorbate reductase
MJ	methyl jasmonate
MeSA	methyl salicylate
Mn	manganese
mg	milligram
min	minute
ml	milliliter
mM	millimolar



## LIST OF ABBREVIATIONS (continued)

mm	millimeter
ms	millisecond
N	normal concentration
NADH	nicotinamide adenine dinucleotide
NAD(P)H	nicotinamide adenine dinucleotide phosphate
nm	nanometer
nmol	nanomole
No.	number
$^1\text{O}_2$	singlet oxygen
$\text{O}_2$	oxygen
$\text{O}_2^{\bullet-}$	superoxide radical
$\text{OH}^{\bullet}$	hydroxyl radical
PCD	programmed cell death
PCR	polymerase chain reaction
PGRs	plant growth regulators
PPO	polyphenol oxidase
POD	peroxidase
PUFA	polyunsaturated fatty acids
PVPP	polyvinyl polypyrrolidone
R	reward
RH	relative humidity
RNA	ribonucleic acid
ROS	reactive oxygen species
RT-PCR	reverse transcription-polymerase chain reaction
SA	salicylic acid
SOD	superoxide dismutase
TA	titratable acidity
TAC	total antioxidant capacity

## LIST OF ABBREVIATIONS (continued)

TBA	2-thiobarbituric acid
TCA	trichloroacetic acid
TPC	total phenolic compounds
TSS	total soluble solid
UV	ultraviolet
VIS	visible
$\mu\text{mol}$	micromole
$\mu\text{s}$	microsecond

## LIST OF SYMBOLS

$\alpha$	alpha
$\beta$	beta
$\gamma$	gamma
$\delta$	delta
©	copyright
®	registered
™	trade mark
%	percent

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## ข้อความแห่งการริเริ่ม

- 1) สภาพการเก็บรักษาที่อุณหภูมิต่ำ 5 °ซ สามารถยืดอายุการเก็บรักษาผลมะม่วงได้ แต่ยังไม่สามารถนำไปใช้ในการขนส่งเชิงการค้าได้ เนื่องจากก่อให้เกิดความเสียหายจากอาการสะท้านหนาวสูง มีการนำกรดซาลิซิลิกและเมทิลจัสโมเนตมาใช้ในการใช้ควบคุมอาการสะท้านหนาวในผลไม้บางชนิด แต่ยังมีความเข้าใจน้อยมากถึงผลของกรดซาลิซิลิกและเมทิลจัสโมเนตต่ออาการสะท้านหนาวในผลมะม่วงพันธุ์ไทย โดยเฉพาะพันธุ์น้ำดอกไม้เบอร์ 4 ซึ่งได้รับความนิยมในตลาดต่างประเทศ วิทยานิพนธ์นี้นำเสนอวิธีการป้องกันหรือลดอาการสะท้านหนาว และรักษาคุณภาพหลังการเก็บเกี่ยวของผลมะม่วงพันธุ์น้ำดอกไม้เบอร์ 4 ระหว่างเก็บรักษาที่อุณหภูมิต่ำ 5 °ซ เป็นเวลา 42 วัน โดยกรดซาลิซิลิกและเมทิลจัสโมเนต วิธีการนี้สามารถนำไปประยุกต์ใช้ในการเพิ่มความทนทานต่ออาการสะท้านหนาวและรักษาคุณภาพของผลมะม่วงน้ำดอกไม้เบอร์ 4 ระหว่างการเก็บรักษาที่อุณหภูมิ 5 °ซ เพื่อการขยายตลาดการส่งออกมะม่วงไปยังยุโรปและอเมริกา ซึ่งต้องใช้เวลาในการขนส่งภายใต้สภาพอุณหภูมิต่ำ
- 2) วิทยานิพนธ์นี้เสนอกลไกในการลดอาการสะท้านหนาวของผลมะม่วงน้ำดอกไม้เบอร์ 4 ระหว่างเก็บรักษาที่อุณหภูมิต่ำ 5 °ซ โดยการใช้กรดซาลิซิลิกและเมทิลจัสโมเนต ซึ่งกลไกเหล่านี้เกี่ยวข้องกับการเพิ่มขึ้นของระบบต้านอนุมูลอิสระที่ทำหน้าที่ปกป้องเซลล์จากความเสียหายออกซิเดชันโดยการเพิ่มประสิทธิภาพการกำจัดอนุมูลอิสระ ซึ่งมีผลทำให้สามารถลดการเกิดอาการสะท้านหนาวได้ในที่สุด

## STATEMENT OF ORIGINALITY

- 1) Low temperature storage at 5 °C can extend the storage life of mango fruit but it is not suitable for commercial transportation because it causes chilling injury (CI) damage. Salicylic acid (SA) and methyl jasmonate (MJ) treatments have been recommended for CI control in some fruits. However, there is little understanding on the effects of SA and MJ to CI response of cultivated Thai mangoes especially Nam Dok Mai No. 4 which is one of the most popular cultivar in the international markets. This thesis presents the method for protecting or reducing CI and maintaining postharvest quality of mango fruit cv. Nam Dok Mai No. 4 during low temperature storage at 5 °C for 42 days by SA and MJ. SA and MJ treatments can be applied in the improvement of CI tolerance and maintain the quality of Nam Dok Mai No.4 mango fruits during storage at 5 °C in order to expand markets to Europe and America where a longer time of transport under low temperature is required.
- 2) This thesis presents the mechanisms for reducing CI in mango fruits cv. Nam Dok Mai No. 4 during low temperature storage at 5 °C by SA and MJ treatments. These mechanisms are associated with increased activity of the antioxidant defense system that protects their cells from oxidative damage by scavenging reactive oxygen species (ROS) resulting in the reduction of CI.