DEVELOPMENT OF LACTO-FERMENTED FUNGAL GROWTH INHIBITOR COATING TO EXTEND THE SHELF LIFE AND ENHANCE THE QUALITY OF MANGO (*Mangifera indica* L.)

By

FERNANDO HEWAGE RANJITH PIYASIRI

Thesis Submitted to School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

February 2022

FSTM 2022 15

COPYRIGHT

DEDICATION

This thesis is dedicated to

All I love

Specially,

To My mother, father, and beloved kids and wife

And

To all the teachers whoever taught me

Abstract of thesis presented to the Senate of Universiti Putra Malaysia, in fulfillment of the requirement for the degree of Doctor of Philosophy

DEVELOPMENT OF LACTO-FERMENTED FUNGAL GROWTH INHIBITOR COATING TO EXTEND THE SHELF LIFE AND ENHANCE THE QUALITY OF MANGO (*Mangifera indica* L.)

By

FERNANDO HEWAGE RANJITH PIYASIRI

February 2022

Chairman : Associate Professor Anis Shobirin Meor Hussin, PhD
Faculty : Food Science and Technology

Mango is a tropical dessert fruit that is consumed directly without further processing. Fungal diseases limit mangoes' postharvest life, which requires applying preservation techniques to reduce postharvest losses. Consumers have higher health risks from the chemicals used in postharvest preservation. The main objective of this research was to produce a natural antifungal coating formulation for controlling postharvest spoilage fungi in mango. The fungal growth inhibitors produced by five selected lactic acid bacteria (LAB) strains cultivated in agricultural by-products were screened against five spoilage fungi in mango. The Lacto-fermentation conditions, namely, substrate ratio (10-30%), fermentation time (42- 96 h), and temperature (31- 37ºC) of palm kernel cake (PKC) fermented with *Lactobacillus plantarum* ATCC8014 (PKCL1) and *Lactobacillus fermentum* ATCC9338 (PKCL2), were optimized to enhance the antifungal ability against *Colletotrichum gloeosporioides* DSM62136 and *Botryodiplodia theobromae* DSM62078 under response surface methodology (RSM) procedure. The antifungal compounds in PKCL1 and PKCL2 were identified using 1H-Nuclear magnetic resonance (NMR) spectroscopy-based metabolomics analysis. The antifungal action mechanisms were determined by inter cellular compounds' leakage, ergosterol synthesis, and fungal cell morphology. PKCL1 and PKCL2 were incorporated with polysaccharide-based polymers to develop the formulations of edible coatings with higher stability. Besides, the influence of coating formulations on mango fruit quality and postharvest life were evaluated. The LAB strains *L. plantarum* ATCC8014, and *L. fermentum* ATCC9338 were grown in PKC, and pineapple peel (PP) exhibited significantly strong *in vitro* antifungal activity against *C. gloeosporioides* DSM62136 and *B. theobromae* DSM62078. *In vivo* results showed that mango treated with PKCL1 and PKCL2 had the lowest disease incidence, disease severity, and total conidia concentration. The optimal fermentation conditions were; substrate ratio (24.75% and 30% (w/v)), fermentation time (96 h and 85.5 h) and temperature (37ºC) for PKCL1 and PKCL2 respectively. The higher lactic acid concentrations, moderate acetic acid concentrations, and bioactive peptides were obtained in PKCL1 and PKCL2. Significant differences were observed in

protein, DNA, and sugar concentrations in fungi cells when treated with PKCL1 or PKCL2. Furthermore, significant reductions of ergosterol and remarkable morphological changes were observed in treated fungi. Out of 10 polysaccharide-based polymers tested, chitosan (CH) was the best polymer to carry and sustainable release of antifungal compounds. CH coating containing PKCL1 and PKCL2 exhibited the prominent inhibition zones against *C. gloeosporioides* DSM62136 and *B. theobromae* DSM62078, and they controlled the growth of both fungi on mango. Both coating formulations did not negatively affect the mango quality. The quality and nutritional parameters were not significantly different among coating formulations and CH only coating but significantly different from the uncoated fruits. The results of all experiments showed that the antifungal compounds produced by Lacto-fermentation of PKC with *L. plantarum* ATCC8014 and *L. fermentum* ATCC9338 exhibit a great potential to control *C. gloeosporioides* DSM62136 and *B. theobromae* DSM62078. Moreover, these antifungal compounds can be employed as natural coatings incorporating CH polymer to prevent anthracnose and stem-end rot in mango, enhancing shelf life and quality.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PEMBANGUNAN LAPISAN PERENCAT PERTUMBUHAN KULAT SECARA PENAPAIAN LAKTO UNTUK MENINGKATKAN JANGKA HAYAT DAN KUALITI MANGGA (*Mangifera indica* L.)

Oleh

FERNANDO HEWAGE RANJITH PIYASIRI

Februari 2022

Pengerusi : Profesor Madya Anis Shobirin Binti Meor Hussin, PhD
Fakulti : Sains dan Teknologi Makanan

Mangga adalah pencuci mulut tropika yang dimakan secara langsung tanpa pemprosesan selanjutnya. Penyakit kulat mengehadkan jangka hayat mangga selepas penuaian dimana memerlukan pengunaan teknik pemeliharaan untuk mengurangkan kerugian selepas penuaian. Terdapat risiko yang lebih tinggi terhadap kesihatan pengguna oleh bahan kimia yang digunakan dalam pemeliharaan selepas penuaian. Objektif utama penyelidikan ini adalah untuk menghasilkan formulasi salutan antikulat semulajadi untuk mengawal kulat selepas mangga dituai. Sebatian antikulat yang dihasilkan oleh lima bakteria asid laktik (LAB) yang dikultur daripada sisa produk pertanian telah disaring terhadap lima kulat terhadap mangga. Syarat-syarat penapaian Lacto, iaitu nisbah substrat (10- 30%), masa penapaian (48- 96h), dan suhu (31- 37ºC) kek kernel sawit (PKC) ditapai dengan *Lactobacillus plantarum* ATCC8014 (PKCL1) dan *Lactobacillus fermentum* ATCC9338 (PKCL2) dioptimumkan untuk meningkatkan aktiviti antikulat terhadap *Colletotrichum gloeosporioides* DSM62136 dan *Botryodiplodia theobromae* DSM62078 menggunakan metodologi Kaedah Respon Permukaan (RSM). Kompoun antikulat PKCL1 dan PKCL2 telah dikenal pasti menggunakan analisis proteomik magnetik nuklear (NMR) yang berasaskan spektroskopi bagi menentukan mekanisma tindakan antikulat melalui kebocoran sebatian antara sel, sintesis ergosterol, dan morfologi sel kulat. PKCL1 dan PKCL2 digabungkan dengan polimer berasaskan polimer untuk membangunkan formulasi salutan boleh dimakan dengan kestabilan yang lebih tinggi. Selain itu, kesan rumusan salutan terhadap kualiti mangga dan jangka hayatnya telah dinilai. *L. plantarum* ATCC8014 dan *L. fermentum* ATCC9338 telah ditumbuh pada PKC dan kulit nanas (PP) menunjukkan aktiviti antikulat yang tinggi terhadap *C. gloeosporioides* DSM62136 dan *B. theobromae* DSM62078. Keputusan *in vivo* menunjukkan bahawa mangga yang dirawat dengan PKCL1 dan PKCL2 menunjukkan kadar terendah bagi penyakit, keterukan penyakit, dan kepekatan conidia. Syarat-syarat penapaian yang optimum adalah; nisbah substrat (24.75% dan 30% (w/v)), masa penapaian (96 h dan 85.5 h) dan suhu (37ºC) masing-masing untuk PKCL1 dan PKCL2. Kepekatan asid laktik yang lebih tinggi, kepekatan sederhana asid asetik, dan

peptida bioaktifdi perolehi di PKCL1 dan PKCL2. Perbedaan yang signifikan diperhatikan dalam protein, DNA, dan kepekatan gula dalam sel kulat apabila dirawat dengan PKCL1 atau PKCL2. Tambahan pula, pengurangan ketara ergosterol dan perubahan morfologi yang luar biasa diperhatikan dalam kulat yang dirawat. Daripada 10 polimer berasaskan polimer yang diuji, chitosan (CH) adalah polimer terbaik untuk membawa dan pelepasan berterusan sebatian antikulat. Lapisan CH yang mengandungi PKCL1 dan PKCL2 mempamerkan zon perencatan yang menonjol terhadap *C. gloeosporioides* DSM62136 dan *B. theobromae* DSM62078, dan mereka mengawal pertumbuhan kedua-dua kulat pada mangga. Kedua-dua formulasi salutan tidak memberi kesan negatif kepada kualiti mangga. Parameter kualiti dan pemakanan tidak jauh berbeza di kalangan formulasi salutan dan CH hanya salutan tetapi jauh berbeza daripada buah-buahan yang tidak dikenali. Hasil daripada semua eksperimen menunjukkan bahawa sebatian antikulat yang dihasilkan oleh Lacto-fermentation PKC dengan *L. plantarum* ATCC8014 dan *L. fermentum* ATCC9338 mempamerkan potensi yang lebih tinggi untuk dikawal *C. gloeosporioides* DSM62136 dan *B. theobromae* . DSM62078 Selain itu, sebatian antikulat ini boleh digunakan sebagai salutan antikulat semulajadi yang diperbadankan dengan polimer CH untuk mengawal antraknosa dan reput batang dalam mangga dengan meningkatkan hayat dan kualiti mangga.

ACKNOWLEDGEMENTS

I would like to express my profound and gratitude to my great supervisors, who provided expertise, suggestions, and guidance. I am particularly grateful to my primary supervisor, Associate Professor Dr. Anis Shobirin Meor Hussin, for her continuous, tireless support and approachable throughout my study. Her vast knowledge, constructive criticisms, and logical way of thinking greatly value my thesis. I am deeply thankful to my co-supervisors, Dr. Belal J. Muhialdin Mula Hasan, Dr. Noor Liyana Binti Yusof, Dr. Nameer Khairullah Mohammed, and Dr. Siti Hajar Binti Ariffin, for their understanding, being always ready to listen and discuss any aspects of my research as well as inspiring, encouraging and personal guidance that provides a sound basis for my thesis.

I would like to thank all the Department of Food Technology staff, Faculty of Food Science and Technology, especially all academic staff, science officers, laboratories staff, office staff, and technical staff for their valuable support. I am grateful to the Microscopy unit and NMR unit of the Institute of Bio Science staff, who provide technical assistance in the laboratories during analysis and help during this research. I also would like to acknowledge Dr. Sarina Lim for her statistical advice and guidance for my entire studies. I would also like to thank all the friends of the Biotechnology laboratory 1 and 2 and all of my Sri Lankan friends in UPM, who gave many kinds of valuable support and encouragement for my entire study period.

My special thanks go to my family, who always trust, encourage and inspire me to pursue my PhD study. Furthermore, the most heartfelt acknowledgment goes to my loving wife, son, daughter, and mother for their everlasting love, understanding, and sacrifices. Finally, I want to appreciate all my relatives and family members for their valuable support.

I would like to express my deep and gratitude to the Department of Agriculture, Sri Lanka, Sri Lanka Council of Agriculture Research Policy, and the Ministry of Agriculture, who granted me this unique opportunity to fulfil my study. Finally, my thanks go to all Sri Lankan citizens and those not mentioned here but have helped me complete this study.

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

Anis Shobirin binti Meor Hussin, PhD
Associate Professor
Faculty of Food Science and Technology
Universiti Putra Malaysia
(Chairman)

Noor Liyana binti Yusof, PhD
Senior Lecturer
Faculty of Food Science and Technology
Universiti Putra Malaysia
(Member)

Belal J. Muhialdin Mula Hasan, PhD
Senior Lecturer
Faculty of Food Science and Technology
Universiti Putra Malaysia
(Member)

Siti Hajar binti Ariffin, PhD
Senior Lecturer
Faculty of Engineering
Universiti Putra Malaysia
(Member)

Nameer Khairullah Mohammed, PhD
Senior Lecturer
Faculty of Agriculture
Tikrit University
Iraq
(Member)

_____
ZALILAH MOHD SHARIFF, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 19 May 2022

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AA	Ascorbic Acid
ANOVA	Analysis of Variance
ATCC	American Type Culture Collection
°C	Degree Celsius
CAT	Catalase
CEP	Cell- Envelop Proteinases
CFS	Cell Free Supernatant
CFU	Colony Forming Units
CH	Chitosan
CMC	Carboxymethyl cellulose
CN	Carrageenan
CO_2	Carbon Dioxide
DI	Disease Incidence
DNA	Deoxyribonucleic acid
D_2O	Deuterium Oxide
DPPH	1, 1-Diphenyl-2-picrylhydrazyl
DSI	Disease Severity Index
DSMZ	German Collection of Microorganisms and Cell Cultures
DSS	Sodium trimethylsilylpropanesulfonate
EDTA	Ethylenediaminetetraacetic acid
FCR	Folin-Ciocalteu Regent
FDA	Food and Drug Administration
FFS	Film Forming Solution

FW	Fresh Weight
g	Gram
GAE	Galic Acid Equivalent
GRAS	Generally Recognize As Safe
HPLC	High Performance Liquid Chromatography
Hz	Hertz
CIE	Commission International Elcairage
IN	Inulin
kDa	Kilo Daltons
Km	Menten Constant Value
KSP	Potassium persulphate
LAB	Lactic Acid Bacteria
LC	Liquid Chromatography
LDPE	Low-density Polyethylene
LSD	Least Significant Difference
M	Molar
Mb	Megabase
MCC	Microcrystalline Cellulose
MD	Maltodextrin
MEB	Malt Extract Broth
MFC	Minimal Fungicidal Concentration
MIC	Minimal Inhibition Concentration
mM	Millimolar
MRSB	De Man Rogosa and & Sharpe Broth

MS	Mass Spectroscopy
MT	Metric Tonnes
NBT	Nitro-blue tetrazolium
NMR	Nuclear Magnetic Resonance
O_2	Oxygen
OP	Orange Peel
OPA	O-phthalaldehyde
PB	Phosphate Buffer
PDA	Potato Dextrose Agar
PE	Pectin
PKC	Palm Kernel Cake
POD	Peroxidase
PP	Pineapple Peel
PVC	Polyvinyl Chloride
PVPP	Polyvinylpolypyrrolidone
RB	Rice Bran
RCBD	Randomize Complete Block Design
RH	Relative Humidity
RNA	Ribosenucleic Acid
ROS	Reactive Oxygen Species
RSM	Response Surface Methodology
SA	Sodium Alginate
SAS	Statistical Analysis System
SEM	Scanning Electron Microscope

SOD	Superoxidase Dismutase
SP	Starch Potato
SS	Starch Soluble
TA	Titratable Acidity
TE	Trolox Equivalent
TPC	Total Phenolic Content
TSS	Total Soluble Solids
UK	United Kingdom
US	United State
UV	Ultra Violet
Vm	Maximum Respiration Rate
WHO	World Health Organization
WI	Whiteness Index
WR	Watermelon Rind
WVP	Water Vapour Permeability
X_1	Independent Variables
Y_1	Dependant Responses
μg	Micro Gram
ΔE	Total Colour Difference
%	Percentage
µL	Microliter
µmoles	Micromoles

CHAPTER 1

INTRODUCTION

Mango (*Mangifera indica* L.) is prevalent due to its excellent taste and excellent nutrient profile, including vitamins, minerals, and phytochemicals. It is an important tropical fruit belonging to the family of Anacardiaceae. Mango has a significant commercial value in the global export market, in recent years, it has taken a high economic value with more than 1.69 billion US $ annual export value (Muhammad Siddiq, Jeffrey K. Brecht, 2017; G. Shu, Shi, Chen, Ji, & Meng, 2017). During the last decades, mango production and international trade have increased rapidly, though the postharvest losses are also grown in all steps of the mango supply chain (Singh, Singh, Sane, & Nath, 2013). Therefore, there is a requirement for systematic storage and apply postharvest preservation techniques to reduce these losses in the mango industry.

Fungal diseases are one of the major problems that involve elevated postharvest losses of mango. Fungal diseases make significant economic losses and possible health problems for consumers by producing secondary metabolites like mycotoxins. Major postharvest fungal diseases of mango have been reported as anthracnose (*Colletotrichum gloeosporioides*), stem end rot (*Botryodiplodia theobromae, Lasiodiplodia theobromae, Dothiorella dominicana, or Phomopsis mangifera*), and black mold disease (*Aspergillus sp.*). Several fungal infestations like *C. gloeosporioides* begin at the flowering stage and endophytically colonize and live with protection of epidermis tissues (de Oliveira Costa et al., 2010; Prusky, Alkan, Mengiste, & Fluhr, 2013). Consequently, quiescent infestations are challenging to identify and prevent at the first stages of mango development. Therefore, these postharvest diseases seriously affect the postharvest stage during mango ripening, reducing the postharvest life and limiting long-distance commercial transportation and export. For a long time, many technologies such as chemical, physical, and biological approaches have been practised to prevent the fungal diseases of mango. Many of these technologies support to extend the shelf life to approximately 2- 4 weeks. However, chemical applications have been popular during the past three decades because of simple practising ability, high effectiveness, and comparatively low cost (Mahajan, Caleb, Singh, Watkins, & Geyer, 2014). However, the social rejection and community protests have limited application chemicals, which prompted the exploration for alternative methods to prevent fungal diseases (Onaran & Yanar, 2016; Palou, 2018; Wisniewski, Droby, Norelli, Liu, & Schena, 2016).

Bio-preservation is an alternative technology for controlling the growth of harmful microorganisms and is safe for consumers and the environment (Lamont, Wilkins, Bywater-Ekegärd, & Smith, 2017; Muhialdin, Saari, & Hussin, 2020; Roselló et al., 2013). For a longer time, LAB was used as a bio preservative agent for the natural preservation of food. The use of the antagonism activity of LAB to control the spoilage fungi in fresh produce was becoming an exciting research field with the social demand for chemical-free foods (Jeddi et al., 2014; Li et al., 2015; Trias, Bañeras, Montesinos, & Badosa, 2008). The use of LAB and/or their metabolites as bio preservatives showed significant results against a broad range of fungi, which improve the postharvest life,

quality and sensory properties of different fruits (Barrios-Roblero et al., 2019; Anna Marín, Plotto, Atarés, & Chiralt, 2019). The antifungal activity of LABs has been well documented with the production of different antifungal metabolites such as organic acids, bioactive peptides, fatty acids, and hydrogen peroxide (Magnusson & Schnürer, 2001; Muhialdin, Hassan, Bakar, & Saari, 2016). As examples, many of the earlier studies revealed the antifungal capability of different LAB strains on various fresh produces (Marín et al., 2019; El-Mabroc et al., 2012; Barrios-Roblero et al., 2019; Trias, Bañeras, Badosa, & Montesinos, 2008; Sathe, Nawani, Dhakephalkar, & Kapadnis, 2007)

The production of antifungal compounds through the Lacto-fermentation depends on significant factors such as substrate, bacteria stains, temperature, pH, and fermentation time (Janakiram Naveena, Altaf, Bhadrayya, & Reddy, 2004; Sridevi, Padmaja, Sahitya, Vardhan, & Rao, 2015). The nutrition profile of substrates is highly affected by antifungal production (Ricci et al., 2019), and Pessione & Cirrincione (2016) reported that a higher amount of bio-active peptides are produced in protein-rich substrates. The vital issue of LAB fermentation is the higher substrate cost due to the high nutrition requirement of LAB (Wang, Yan, Wang, Zhang, & Qi, 2012). Agricultural by-products are sustainable solutions for the substrate cost of Lacto-fermentation because of the high potential to use as a substrate with large amounts of carbohydrates, proteins, minerals, vitamins, and higher moisture contained in them (Rodriguez Couto, 2008; Shalini & Gupta, 2010).

The use of Lacto-fermented antifungal compounds directly in food systems has been reported few barriers and limitations. Some of the critical characteristics of antifungal compounds like amphipathicity, polarity, hydrophobicity, aromatic residues, and position of charged enforce the hydrophobic nature, low stability, and higher binding ability with unstable molecules (Lee et al., 2014; Min & Krochta, 2005; Sagaram et al., 2011; Treviño-Garza et al., 2015). Antifungal compounds with edible coatings are promising technologies that improve both molecules' antifungal activity, stability, and other essential properties. Natural biopolymers such as proteins, polysaccharides, lipids, resins, and mixtures can produce active coatings. Such coatings can be combined with antifungal compounds (Karaca, Pérez-Gago, Taberner, & Palou, 2014; Tavassoli-Kafrani, Shekarchizadeh, & Masoudpour-Behabadi, 2016). Several previous studies reported that the use of different antifungal compounds incorporation with varying materials of coating; chitosan and plant gel aloe-vera (Palou, Ali, Fallik, & Romanazzi, 2016), pectin (Treviño-Garza et al., 2015), alginate (Narsaiah et al., 2014), sericin (Chimvaree et al., 2019), whey protein (Min & Krochta, 2005) and tapioca starch (Sanjurjo, Flores, Gerschenson, & Jagus, 2006).

To use agricultural by-products as substrates in LAB fermentation to produce natural fungal growth inhibitors, it should meet specific criteria including the higher capacity to produce antifungal compounds, consumer and environmentally friendly and low cost (Lamont et al., 2017; Shalini & Gupta, 2010; Wang et al., 2012). Besides, the Lacto-fermented fungal growth inhibitors should promise to incorporation with polysaccharide-based biopolymers to enhance the stability of antifungal compounds (Karaca et al., 2014; Palou et al., 2015; Tavassoli-Kafrani et al., 2016). Furthermore, literature shows only

minimal numbers of works about developing natural antifungal coating formulations for controlling the postharvest fungi in mango using Lacto-fermented agricultural by-products and their applications.

1.1 Problem Statements

To date, consumer demand is increasing for green-labeled (chemical-free) fruits and vegetables, including mango, due to higher health problems concomitant with chemicals (Prochloraz, Fludioxonil, Benomyl, and Topsin) used in the preservation (Onaran & Yanar, 2016). Some chemicals (Ex. Carbamate, organophosphates) have been prohibited worldwide including Malaysia, but still these chemicals use in the mango industry. Especially, mango is a dessert fruit that is consumed directly without further processing. There is a higher risk to expose the chemicals. Besides, the fungal diseases limit the mango's postharvest life, interrupting the mango export chain (Singh et al., 2013). Therefore, there is essential to develop a robust technology to reduce postharvest losses with minimum health hazards for consumers.

On the other hand, there were a higher number of studies for conducting the LAB and their antifungal compounds to preserve fruits. But, the higher production cost, low stability, and barriers for direct applications limit their practical uses (Sagaram et al., 2011; Treviño-Garza et al., 2015). Therefore, the production of natural fungal growth inhibitors and development of the edible coating formulations is recommended to overcome previously mentioned issues. Thus, improving antifungal activity and stability of natural coating formulations without negative impacts on the mango quality should be achieved in the application for the mangoes.

1.2 Hypothesis

Production of fungal growth inhibitors using Lacto-fermented agricultural by-products against postharvest spoilage fungi in mango will succeed as using a biopreservation agent. The response surface methodology will be enhanced the antifungal activity of fungal growth inhibitors via optimization of the fermentation conditions. The limitations for applying fungal growth inhibitors on mango will be reduced by encapsulation with polysaccharide biopolymers. Moreover, the encapsulated fungal growth inhibitors will be controlled the postharvest spoilage fungi in mango without negative impacts. The natural antifungal coating formulations will be successfully employed for the mango.

1.3 Objectives

1.3.1 General Objective

The general objective of this study was directed towards the development of fungal growth inhibitors, and formulation development of natural antifungal coating for control postharvest spoilage fungi in mango.

1.3.2 Specific Objectives

1. To screen the antifungal activity for Lacto-fermented fungal growth inhibitors produced by selected LAB strains cultured in agricultural by-products against postharvest spoilage fungi in mango.

2. To optimize the fermentation conditions to maximize the antifungal activity in fungal growth inhibitors.

3. To identify the antifungal compounds and determine the antifungal action mechanism.

4. To enhance stability and usability of fungal growth inhibitors with polysaccharide-based edible coatings.

5. To evaluate the effects of chitosan edible coatings combined with fungal growth inhibitors on mango quality and shelf life.

REFERENCES

Abbasi, K. S., Anjum, N., Sammi, S., Masud, T., & Ali, S. (2011). Effect of coatings and packaging material on the keeping quality of mangoes (*Mangifera indica* L.) stored at low temperature. *Pakistan Journal of Nutrition*, *10*(2), 129–138. https://doi.org/10.3923/pjn.2011.129.138

Abbasi, N. A., Iqbal, Z., Maqbool, M., & Hafiz, I. A. (2009). Postharvest quality of mango (*mangifera indica* L.) fruit as affected by chitosan coating. *Pakistan Journal of Botany*, *41*(1), 343–357.

Abril, M., Curry, K. J., Smith, B. J., & Wedge, D. E. (2008). Improved microassays used to test natural product-based and conventional fungicides on plant pathogenic fungi. *Plant Disease*, *92*(1), 106–112. https://doi.org/10.1094/PDIS-92-1-0106

Adeniran, H. A., Abiose, S. H., & Ogunsua, A. O. (2010). Production of fungal β-amylase and amyloglucosidase on some nigerian agricultural residues. *Food and Bioprocess Technology*, *3*(5), 693–698. https://doi.org/10.1007/s11947-008-0141-3

Adesokan, I. A., Odetoyinbo, B. B., & Okanlawon, B. M. (2009). Optimization of lactic acid production by lactic acid bacteria isolated from some traditional fermented food in Nigeria. *Pakistan Journal of Nutrition*, *8*(5), 611–615.

Ahmed, M. J., Singh, Z., & Khan, A. S. (2009). Postharvest Aloe vera gel-coating modulates fruit ripening and quality of "Arctic Snow" nectarine kept in ambient and cold storage. *International Journal of Food Science and Technology*, *44*(5), 1024–1033. https://doi.org/10.1111/j.1365-2621.2008.01873.x

Ahmed, R. A. N., & Mohammed, S. A.S. (2014). Isolation and classification of fungi associated with spoilage of post-harvest mango (*Mangifera indica* L.) in Saudi Arabia. *African Journal of Microbiology Research*, *8*(7), 685–688. https://doi.org/10.5897/ajmr12.1898

Akem, C. N. (2006). Mango anthracnose disease: Present status and future research priorities. *Plant Pathology Journal*, *5*(3), 266–273.

Akhtar, K. P., & Alam, S. S. (2002). Assessment keys for some important diseases of mango. *Pakistan Journal of Biological Science*, *5*(2), 246–250.

Akinmusire, O. O. (2011). Fungal species associated with the spoilage of some edible fruits in maiduguri Northern Eastern Nigeria. *Advances in Environmental Biology*, *5*(1), 157–161.

Alcantara, C., Christine, B.Revilla-Guarinos, A. Perez-Martınez, G., Monedero, V. and Zuniga, M. (2016). Peptide and amino acid metabolism is controlled by an OmpR-family response regulator in *Lactobacillus casei*. *Molecular Microbiology*, *100*(1), 25–41. https://doi.org/10.1111/mmi.13299

Aldred, N. M. and D., & Applied. (2007). Post-harvest control strategies: Minimizing micotoxins in the food chain. *International Journal of Food Microbiology*, *119*(1–2), 131–139.

Aleksanteri, P. (2011). Development of LC/MS techniques for plant and drug metabolism studies. *University of Oulu*, 27–36.

Alemu, K., Ayalew, A., & Woldetsadik, K. (2014). Effect of aqueous extracts of some medicinal plants in controlling anthracnose disease and improving postharvest quality of mango fruit. *Persian Gulf Crop Protection*, *3*(3), 331–339.

Alharaty, G., & Ramaswamy, H. S. (2020). The effect of sodium alginate-calcium chloride coating on the quality parameters and shelf life of strawberry cut fruits. *Journal of Composites Science*, *4*(3), 1–15. https://doi.org/10.3390/jcs4030123

Ali-Shtayeh, M. S., & Abu Ghdeib, S. I. (1999). Antifungal activity of plant extracts against dermatophytes. *Mycoses*, *42*(11–12), 665–672.

Alkan, N., & Kumar, P. (2018). Postharvest storage management of mango fruit. *Achieving Sustainable Cultivation of Mango; Galán Saúco, V., Lu, P., Eds*, 377–402.

Aloui, H., & Khwaldia, K. (2014). Alginate coatings containing grapefruit essential oil or grapefruit seed extract for grapes preservation. *International Journal of Food Science and Technology*, *49*, 952–959. https://doi.org/10.1111/ijfs.12387

Aloui, H., & Khwaldia, K. (2016). Natural antimicrobial edible coatings for microbial safety and food quality enhancement. *Comprehensive Reviews in Food Science and Food Safety*, *15*(6), 1080–1103. https://doi.org/10.1111/1541-4337.12226

Alshelmani, M. I., Loh, T. C., Foo, H. L., Sazili, A. Q., & Lau, W. H. (2016). Effect of feeding different levels of palm kernel cake fermented by *Paenibacillus polymyxa* ATCC 842 on nutrient digestibility , intestinal morphology , and gut microflora in broiler chickens. *Animal Feed Science and Technology*, *216*, 216–224. https://doi.org/10.1016/j.anifeedsci.2016.03.019

Altamirano-Fortoul, R., Moreno-Terrazas, R., Quezada-Gallo, A., & Rosell, C. M. (2012). Viability of some probiotic coatings in bread and its effect on the crust mechanical properties. *Food Hydrocolloids*, *29*(1), 166–174.

Aluko, R. E. (2012). *Functional Foods and Nutraceuticals*. Springer New York Dordrecht Heidelberg London Library. https://doi.org/10.1007/978-1-4614-3480-1

Amann, I. R., Ludwig, W., & Schleifer, K. (1995). The consular provinciae of 44 BCE and the collapse of the restored republic. *Microbiological Reviews*, *59*(1), 143–169.

Amenaghawon, N. A., Nwaru, K. I., Aisien, F. A., & Ogbeide, S. E. (2013). Application of Box-Behnken design for the optimization of citric acid production from corn starch using Aspergillus niger. *British Biotechnology Journal*, *3*(3), 236–245.

André, S., Washington, S. K., Darby, E., Vega, M. M., Filip, A. D., Ash, N. S., Muzikar, K. A., Piesse, C., Foulan, T., O'Leary, D. J., & Ladram, A. (2015). Structure-activity relationship-based optimization of small temporin-SHf Analogs with potent antibacterial activity. *ACS Chemical Biology*, *10*(10), 2257–2266. https://doi.org/10.1021/acschembio.5b00495

Anker, M., Stading, M., & Hermansson, A. (1999). Effects of pH and the gel state on the mechanical properties , moisture contents , and glass transition temperatures of whey protein films. *Journal of Agricultural and Food Chemistry*, (47), 1878–1886.

Annele Hatakka, Hammel, K. E. (2010). Fungal biodegradation of lignocelluloses. In *Industrial Applications*, *2*, 320–340.

Anthon, G. E., Sekine, Y., Watanabe, N., &, & Barrett, D. M. (2002). Thermal inactivation of pectin methylesterase , polygalacturonase , and peroxidase in tomato juice. *Journal of Agricultural and Food Chemistry*, *50*, 6153–6159.

Antosova, Z., Mackova, M., Kral, V., & Macek, T. (2009). Therapeutic application of peptides and proteins : parenteral forever ? *Trends in Biotechnology*, *27*(11), 628–635. https://doi.org/10.1016/j.tibtech.2009.07.009

Arauz, L. F. (2000). Mango anthracnose: Economic impact and current options for intergrated management. *Plant Disease*, *84*(6), 600–611.

Armstrong, J. W., & Mangan, R. L. (2007). Commercial quarantine heat treatments. *Heat Treatments for Postharvest Pest Control: Theory and Practice*, 311–340. https://doi.org/10.1079/9781845932527.0311

Artés, F., Gómez, P., Aguayo, E., Escalona, V., & Artés-Hernández, F. (2009). Sustainable sanitation techniques for keeping quality and safety of fresh-cut plant commodities. *Postharvest Biology and Technology*, *51*(3), 287–296. https://doi.org/10.1016/j.postharvbio.2008.10.003

Artiga-Artigas, M., Acevedo-Fani, A., & Martín-Belloso, O. (2017). Improving the shelf life of low-fat cut cheese using nanoemulsion-based edible coatings containing oregano essential oil and mandarin fiber. *Food control*, *76*, 1-12.

Arulrajah, B., Muhialdin, B. J., Zarei, M., Hasan, H., & Saari, N. (2020). Lacto-fermented kenaf (*Hibiscus cannabinus* L .) seed protein as a source of bioactive peptides and their applications as natural preservatives. *Food Control*, *110*, 106969. https://doi.org/10.1016/j.foodcont.2019.106969

Asagbra, A. E., Sanni, A. I., & Oyewole, O. B. (2005). Solid-state fermentation production of tetracycline by Streptomyces strains using some agricultural

wastes as substrate. *World Journal of Microbiology & Biotechnology*, *21*, 107–114. https://doi.org/10.1007/s11274-004-2778-z

Ashoush, I. S, & Gadallah, M. G. E. (2011). Utilization of mangopeels and seed kernels powders as sources of phytochemicals in biscuit. *World Journal of Dairy & Food Sciences*, *6*(1), 35–42.

Aunsbjerg, S. D., Honoré, A. H., Marcussen, J., Ebrahimi, P., Vogensen, F. K., Benfeldt, C., Skov, T., & Knøchel, S. (2015). Contribution of volatiles to the antifungal effect of *Lactobacillus paracasei* in defined medium and yogurt. *International Journal of Food Microbiology*, *194*, 46–53. https://doi.org/10.1016/j.ijfoodmicro.2014.11.007

Ayele, L., Tsadik, K. W., Abegaz, K., & Yetneberk, S. (2012). Postharvest ripening and shelf life of mango (*Mangifera indica* L.) fruit as influenced by 1-methylcyclopropene and polyethylene packaging. *Ethiopian Journal of Agricultural Science*, *22*, 26–44.

Azarakhsh, N., Osman, A., Ghazali, H. M., Tan, C. P., & Adzahan, N. M. (2014). Lemongrass essential oil incorporated into alginate-based edible coating for shelf-life extension and quality retention of fresh-cut pineapple. *Postharvest Biology and Technology*, *88*, 1–7. https://doi.org/10.1016/j.postharvbio.2013.09.004

Baird-Parker, A. C. (1980). Organic acids. *Microbial Ecology of Foods*, *1*, 126.

Bajpai, V. K., Sharma, A., & Baek, K. H. (2013). Antibacterial mode of action of *Cudrania tricuspidata* fruit essential oil, affecting membrane permeability and surface characteristics of food-borne pathogens. *Food Control*, *32*(2), 582–590. https://doi.org/10.1016/j.foodcont.2013.01.032

Balamurugan, S. (2014). In vitro antifungal activity of *Citrus aurantifolia* Linn plant extracts against phytopathogenic fungi *Macrophomina phaseolina*. *International Letters of Natural Sciences*, *8*(2).

Baldwin, E. A., Burns, J. K., Kazokas, W., Brecht, J. K., Hagenmaier, R. D., Bender, R. J., & Pesis, E. (1999). Effect of two edible coatings with different permeability characteristics on mango (*Mangifera indica* L.) ripening during storage. *Postharvest Biology and Technology*, *17*, 215–226.

Balouiri, M., Sadiki, M., & Ibnsouda, S. K. (2016). Methods for in vitro evaluating antimicrobial activity: A review. *Journal of Pharmaceutical Analysis*, *6*(2), 71–79. https://doi.org/10.1016/j.jpha.2015.11.005

Baltazari, A., Mtui, H., Chove, L., Msogoya, T., Kudra, A., Tryphone, G., Samwel, J., Paliyath, G., Sulliwan, A., Subramanian, J. & Mwatawala, M. (2020). Evaluation of post-harvest losses and shelf life of fresh mango (*Mangifera indica* L.) in eastern zone of Tanzania. *International Journal of Fruit Science*, *20*(4), 855-870.

Barman, K., Asrey, R., & Pal, R. K. (2011). Putrescine and carnauba wax pretreatments alleviate chilling injury, enhance shelf life and preserve pomegranate fruit quality during cold storage. *Scientia Horticulturae*, *130*(4), 795–800.

Barreteau, H., Mandoukou, L., Adt, I., Gaillard, I., Courtois, B., & Courtois, J. (2004). A rapid method for determining the antimicrobial activity of novel natural molecules. *Journal of Food Protection*, *67*(9), 1961–1964.

Barrios-Roblero, C., Rosas-Quijano, R., Salvador-Figueroa, M., Gálvez-López, D., & Vázquez-Ovando, A. (2019). Antifungal lactic acid bacteria isolated from fermented beverages with activity against *Colletotrichum gloeosporioides*. *Food Bioscience*, *29*, 47–54. https://doi.org/10.1016/j.fbio.2019.03.008

Barrios, S., Lema, P., & Lareo, C. (2014). Modeling respiration rate of strawberry (cv. San Andreas) for modified atmosphere packaging design. *International Journal of Food Properties*, *17*(9), 2039–2051. https://doi.org/10.1080/10942912.2013.784328

Batish, V. K., Grover, S., & Lal, R. (1989). Screening lactic starter cultures for antifungal activity. *Cultured Dairy Products Journal*, *24*, 21–25.

Batish, V. K., Roy, U., Lal, R., & Grover, S. (1997). Antifungal attributes of lactic Acid bacteria - A reviea. *Critical Reviews in Biotechnology*, *17*(3), 209–225. https://doi.org/10.3109/07388559709146614

Bautista, O. K., & Esguerra, E. B. (2007). Use of scanning and transmission electron microscopy to identify morphological and cellular damage on phytopathogenic fungi due to natural products application. In 2nd (Ed.), *Postharvest Technology for Southeast Asian perishable crops* (pp. 302–305). Makati, Metro Manila: Technology and Livelihood Research Center.

Bechinger, B., & Gorr, S. U. (2017). Antimicrobial peptides: Mechanisms of action and resistance. *Journal of Dental Research*, *96*(3), 254–260. https://doi.org/10.1177/0022034516679973

Bergsson, Arnfinnsson, Steingrimsson, T. (2001). In vitro killing of *Candida albicans* by fatty acids and monoglycerides. *Antimicrobial Agents and Chemotherapy*, *45*(11), 3209–3212. https://doi.org/10.1128/AAC.45.11.3209

Berlec, A., Tompa, G., Slapar, N., Fonović, U. P., Rogelj, I., &, & Štrukelj, B. (2008). Optimization of fermentation conditions for the expression of sweet-tasting protein brazzein in *Lactococcus lactis*. *Letters in Applied Microbiology*, *46*, 227–231. https://doi.org/10.1111/j.1472-765X.2007.02297.x

Beverly, R. B., Latimer, J. G., & Smittle, D. A. (1993). Preharvest physiological and cultural effects on postharvest quality. In *Postharvest Handling* (pp. 73–98). Elsevier.

Black, B. A., Zannini, E., Curtis, J. M., & Gänzle, M. G. (2013). Antifungal hydroxy fatty acids produced during sourdough fermentation : Microbial and enzymatic

pathways , and antifungal activity in bread. *Applied and Environmental Microbiology*, *79*(6), 1866–1873. https://doi.org/10.1128/AEM.03784-12

Boquet, R., Chirife, J., & Iglesiast, H. A. (1978). Equations for fitting water sorption isotherms of foods: II. Evaluation of various two-parameter models. *International Journal of Food Science and Technology*, *13*(4), 319–327.

Borrero, J., Kelly, E., O'Connor, P. M., Kelleher, P., Scully, C., Cotter, P. D., & van Sinderen, D. et al. (2018). Plantaricyclin A, a novel circular bacteriocin produced by *Lactobacillus plantarum* NI326: purification, characterization, and heterologous production. *Applied and Environmental Microbiology*, *84*(1), 1–10.

Bosque-Sendra, J. M., Pescarolo, S., Cuadros-Rodríguez, L., García-Campaña, A. M., &, & Almansa-López, E. M. (2001). Optimizing analytical methods using sequential response surface methodology. Application to the pararosaniline determination of formaldehyde. *Fresenius' Journal of Analytical Chemistry*, *369*(7), 715–718.

Bourbon, A. I., Pinheiro, A. C., Cerqueira, M. A., Rocha, C. M. R., Avides, M. C., Quintas, M. A. C., & Vicente, A. A. (2011). Physico-chemical characterization of chitosan-based edible films incorporating bioactive compounds of different molecular weight. *Journal of Food Engineering*, *106*(2), 111–118. https://doi.org/10.1016/j.jfoodeng.2011.03.024

Bourtoom, T. (2008). Edible films and coatings : characteristics and properties. *International Food Research Journal*, *15*(3), 237–248.

Braide, W., Kanu, I. A., Oranusi, U. S., & Adeleye, S. A. (2016). Production of bioethanol from agricultural waste. *Journal of Fundamental and Applied Sciences*, *8*(2), 372–386.

Brecht, J.K. (2020). *Mango postharvest best management practices mannual*. (2nd, Ed.). University of Florida: The National Mango Board (NMB), an instrumentality of the U.S. Department of Agriculture.

Broadbent, J. R., Cai, H., Larsen, R. L., Hughes, J. E., Welker, D. L., De Carvalho, V. G., Tompkins, T. A., Ardo, Y., Vogensen, F., De Lorentiis, A., Gatti, M., Neviani, E., & Steele, J. L. (2011). Genetic diversity in proteolytic enzymes and amino acid metabolism among *Lactobacillus helveticus* strains. *Journal of Dairy Science*, *94*(9), 4313–4328. https://doi.org/10.3168/jds.2010-4068

Broekaert, W. F., Terras, F. R. G., Cammue, B. P. A., & Vanderleyden, J. (1990). An automated quantitative assay for fungal growth inhibition. *FEMS Microbiology Letters*, *69*(1–2), 55–59. https://doi.org/10.1016/0378-1097(90)90412-J

Brosnan, B., Coffey, A., Arendt, E. K., & Furey, A. (2012). Rapid identification, by use of the LTQ Orbitrap hybrid FT mass spectrometer, of antifungal compounds produced by lactic acid bacteria. *Analytical and Bioanalytical Chemistry*, *403*(10), 2983–2995. https://doi.org/10.1007/s00216-012-5955-1

Buonocore, G. G., Del Nobile, M. A., Panizza, A., Corbo, M. R., & Nicolais, L. (2003). A general approach to describe the antimicrobial agent release from highly swellable films intended for food packaging applications. *Journal of Controlled Release*, *90*(1), 97–107. https://doi.org/10.1016/S0168-3659(03)00154-8

Campos, M. and Campos, R. (2017). Applications of quartering method in soils and foods. *International Journal of Engineering Research and Application ISSN*, *7*(1), 35–39. https://doi.org/10.9790/9622-0701023539

Cano, A., Fortunati, E., Cháfer, M., Kenny, J. M., Chiralt, A., & González-Martínez, C. (2015). Properties and ageing behaviour of pea starch films as affected by blend with poly(vinyl alcohol). *Food Hydrocolloids*, *48*, 84–93. https://doi.org/10.1016/j.foodhyd.2015.01.008

Cao, T. L., Yang, S. Y., & Song, K. Bin. (2018). Development of burdock root inulin/chitosan blend films containing oregano and thyme essential oils. *International Journal of Molecular Sciences*, *19*(1). https://doi.org/10.3390/ijms19010131

Carrillo-Muñoz, A. J., Quindós, G., Ruesga, M., Del Valle, O., Pemán, J., Cantón, E., Hernández-Molina, J. M., & Santos, P. (2006). In vitro antifungal susceptibility testing of filamentous fungi with Sensititre Yeast One™. *Mycoses*, *49*(4), 293–297. https://doi.org/10.1111/j.1439-0507.2006.01250.x

Casariego, A., B.W.S. Souza, M.A. Cerqueira, J.A. Teixeira, L. Cruz, R.Dı´az, A. A. V. (2009). Chitosan/ clay films' properties as affected by biopolymer and clay micro/ nanoparticles' concentrations. *Food Hydrocolloids*, *23*, 1895–1902. https://doi.org/10.1016/j.foodhyd.2009.02.007

Castrillo, M., Kruger, N. J., & Whatley, F. R. (1992). Sucrose metabolism in mango fruit during ripening. *Plant Science*, *84*(1), 45–51. https://doi.org/10.1016/0168-9452(92)90206-2

Cé, N., Noreña, C. P. Z., & Brandelli, A. (2012). Antimicrobial activity of chitosan films containing nisin , peptide P34 , and natamycin, *6337*, 20–26. https://doi.org/10.1080/19476337.2010.537371

Chabikwa, T. G., Barbier, F. F., Tanurdzic, M., & Beveridge, C. A. (2020). De novo transcriptome assembly and annotation for gene discovery in avocado, macadamia and mango. *Scientific Data*, *7*(1). https://doi.org/10.1038/s41597-019-0350-9

Chaichi, M., Hashemi, M., Badii, F., & Mohammadi, A. (2017). Preparation and characterization of a novel bionanocomposite edible film based on pectin and crystalline nanocellulose. *Carbohydrate Polymers*, *157*, 167–175. https://doi.org/10.1016/j.carbpol.2016.09.062

Chang-bravo, L., López-córdoba, A., & Martino, M. (2014). Biopolymeric matrices made of carrageenan and corn starch for the antioxidant extracts delivery of

Cuban red propolis and yerba mate. *Reactive and Functional Polymers*, *85*, 11–19. https://doi.org/10.1016/j.reactfunctpolym.2014.09.025

Charalampopoulos, D., Pandiella, S. S., & Webb, C. (2002). Growth studies of potentially probiotic lactic acid bacteria in cereal-based substrates. *Journal of AppliedMicrobiology*, *92*, 851–859.

Chawla, P., Bhandari, L., Sadh, P. K., & Kaushik, R. (2017). Impact of solid state fermentation (*Aspergillus oryzae*) on functional properties and mineral bioavailability of black eyed pea (*Vigna unguiculata*) seed flour. *Cereal Chemistry*, *94*(3), 437–442.

Chen, C., Shao, Y., Tao, Y., & Wen, H. (2015). Optimization of dynamic microwave-assisted extraction of *Armillaria polysaccharides* using RSM, and their biological activity. *LWT - Food Science and Technology*, *64*(2), 1263–1269. https://doi.org/10.1016/j.lwt.2015.07.009

Chen Li , Jiliu Pei, Shengyu Zhu, Yukang Song, Xiaohui Xiong, & F. X. (2020). Development of chitosan/peptide Films: physical, antibacterial and antioxidant properties. *Coatings*, *10*(1193), 1–16.

Chen, T., Lu, J., Kang, B., Lin, M., Ding, L., Zhang, L., Chen, G., Chen, S., & Lin, H. (2018). Antifungal activity and action mechanism of ginger oleoresin against pestalotiopsis microspora isolated from Chinese olive fruits. *Frontiers in Microbiology*, *9*, 1–9. https://doi.org/10.3389/fmicb.2018.02583

Chien, P. J., Sheu, F., & Yang, F. H. (2007). Effects of edible chitosan coating on quality and shelf life of sliced mango fruit. *Journal of Food Engineering*, *78*(1), 225–229. https://doi.org/10.1016/j.jfoodeng.2005.09.022

Chimvaree, C., Wongs-Aree, C., Supapvanich, S., Charoenrat, T., Tepsorn, R., & Boonyaritthongchai, P. (2019). Effect of sericin coating on reducing browning of fresh-cut mango cv. "Nam Dok Mai No. 4." *Agriculture and Natural Resources*, *53*(5), 521–526. https://doi.org/10.34044/j.anres.2019.53.5.11

Chiumarelli, M., Ferrari, C. C., Sarantópoulos, C. I. G. L., & Hubinger, M. D. (2011). Fresh cut Tommy Atkins mango pre-treated with citric acid and coated with cassava (*Manihot esculenta* Crantz) starch or sodium alginate. *Innovative Food Science and Emerging Technologies*, *12*(3), 381–387. https://doi.org/10.1016/j.ifset.2011.02.006

Chowdhury, M., & Rahim, M. (2009). Integrated crop management to control anthracnose (*Colletotrichum gloeosporioides*) of mango. *Journal of Agriculture & Rural Development*, *7*(1–2), 115–120. https://doi.org/10.3329/jard.v7i1.4430

Cilurzo, F., Cupone, I. E., Minghetti, P., Selmin, F., & Montanari, L. (2008). Fast dissolving films made of maltodextrins. *European Journal of Pharmaceutics and Biopharmaceutics*, *70*(3), 895–900. https://doi.org/10.1016/j.ejpb.2008.06.032

Cisneros- Zevallos & Krochta, J. M. (2003). Dependence of coating thickness on viscosity of coating solution applied to. *Journal of Food Science*, *68*(2), 503–510.

Cissé, M., Polidori, J., Montet, D., Loiseau, G., & Ducamp-Collin, M. N. (2015). Preservation of mango quality by using functional chitosan-lactoperoxidase systems coatings. *Postharvest Biology and Technology*, *101*, 10–14. https://doi.org/10.1016/j.postharvbio.2014.11.003

Coates, L. M., Johnson, G. I., & Dale, M. (1997). Postharvest pathology of fruit and vegetables. *Plant Pathogens and Plant Diseases. Rockvale Publications Editors, Armidale, Australia*, 533–547.

Coda, R., Cassone, A., Rizzello, C. G., Nionelli, L., Cardinali, G., & Gobbetti, M. (2011). Antifungal activity of *Wickerhamomyces anomalus* and *Lactobacillus plantarum* during sourdough fermentation: Identification of novel compounds and long-term effect during storage of wheat bread. *Applied and Environmental Microbiology*, *77*(10), 3484–3492. https://doi.org/10.1128/AEM.02669-10

Cooksey, K. (2005). Effectiveness of antimicrobial food packaging materials. *Food Additives and Contaminants*, *22*(10), 980–987. https://doi.org/10.1080/02652030500246164

Cordenunsi, B. R., & Lajolo, F. M. (1995). Starch breakdown during banana ripening : Sucrose synthase and sucrose phosphate synthase. *Journal of Agricultural and Food Chemistry*, *43*, 347–351. https://doi.org/10.1021/jf00050a016

Corsetti, A., Gobbetti, M., Rossi, J., & Damiani, P. (1998). Antimould activity of sourdough lactic acid bacteria: Identification of a mixture of organic acids produced by *Lactobacillus sanfrancisco* CB1. *Applied Microbiology and Biotechnology*, *50*(2), 253–256. https://doi.org/10.1007/s002530051285

Gounga, M. E., Xu, S. Y., & Wang, Z. (2007). Whey protein isolate-based edible films as affected by protein concentration, glycerol ratio and pullulan addition in film formation. *Journal of Food Engineering*, *83*(4), 521-530. https://doi.org/10.1016/j.jfoodeng.2007.04.008

Courtin, P., Monnet, V., & Rul, F. (2002). Cell-wall proteinase PrtS and PrtB have a different role in *Streptococcus thermophilus*/*Lactobacillus bulgaricus* mixed culture in milk. *Microbiology*, *148*, 3413–3421. https://doi.org/10.1099/00221287-148-11-3413

Cray, J. A., Bhaganna, P., Singhal, R. S., Patil, S. V, Saha, D., Chakraborty, R., Iwaguchi, S., Timson, D. J., & Hallsworth, J. E. (2014). Chaotropic and hydrophobic stress mechanisms of antifungal substances. In *Modern fungicides and antifungal compounds VII. Proceedings of the 17th International Reinhardsbrunn Symposium, April 21-25 2013, Friedrichroda, Germany* (pp. 73–80). Deutsche Phytomedizinische Gesellschaft eV Verlag.

Crowley, S., Jennifer, M. &, & Sinderen, D. Van. (2013). Current perspectives on antifungal lactic acid bacteria as natural. *Trends in Food Science and Technology*, *33*(2), 93–109. https://doi.org/10.1016/j.tifs.2013.07.004

Crowley, S., Mahony, J., & Van Sinderen, D. (2012). Comparative analysis of two antifungal *Lactobacillus plantarum* isolates and their application as bioprotectants in refrigerated foods. *Journal of Applied Microbiology*, *113*(6), 1417–1427. https://doi.org/10.1111/jam.12012

Da, X., Nishiyama, Y., Tie, D., Hein, K. Z., Yamamoto, O., & Morita, E. (2019). Antifungal activity and mechanism of action of Ou-gon (Scutellaria root extract) components against pathogenic fungi. *Scientific Reports*, *9*(1). https://doi.org/10.1038/s41598-019-38916-w

Dal Bello, F., Clarke, C. I., Ryan, L. A. M., Ulmer, H., Schober, T. J., & Stro, K. (2007). Improvement of the quality and shelf life of wheat bread by fermentation with the antifungal strain *Lactobacillus plantarum* FST 1.7. *Journal of Cereal Science*, *45*, 309–318. https://doi.org/10.1016/j.jcs.2006.09.004

Dalié, D. K. D., Deschamps, A. M., & Richard-Forget, F. (2010). Lactic acid bacteria - Potential for control of mold growth and mycotoxins: A review. *Food Control*, *21*(4), 370–380. https://doi.org/10.1016/j.foodcont.2009.07.011

Dang, K. T. H., Singh, Z., & Swinny, E. E. (2008). Edible coatings influence fruit ripening, quality, and aroma biosynthesis in mango fruit. *Journal of Agricultural and Food Chemistry*, *56*(4), 1361–1370. https://doi.org/10.1021/jf072208a

Dávila-Aviña, J., Gil Chavez, G. J., Olivas, G., Ayala-Zavala, J. F., M, R.-D., Pareek, S., & Ga, G.-A. (2017). Evaluation of edible coatings effect on anaerobic metabolism and volatile compounds production of fresh tomato (*Lycopersicon esculentum* Mill.) cv. "Grandella." *Research Journal of Chemical and Environmental Sciences*, *53*, 31-43.

Davis, C. R., Wibowo, D., Lee, T. H., & Fleet, G. H. (1986). Growth and metabolism of lactic acid bacteria during fermentation and conservation of some Australian wines. *Food Technology in Australia*, *38*(1), 35–40.

de Azevedo Neto, A. D., Prisco, J. T., Enéas-Filho, J., de Abreu, C. E. B., & Gomes-Filho, E. (2006). Effect of salt stress on antioxidative enzymes and lipid peroxidation in leaves and roots of salt-tolerant and salt-sensitive maize genotypes. *Environmental and Experimental Botany*, *56*, 87–94. https://doi.org/10.1016/j.envexpbot.2005.01.008

De Coninck, B., Cammue, B. P. A., & Thevissen, K. (2013). Modes of antifungal action and in planta functions of plant defensins and defensin-like peptides. *Fungal Biology Reviews*, *26*(4), 109–120.

de Oliveira Costa, V. S., Michereff, S. J., Martins, R. B., Gava, C. A. T., Mizubuti, E. S. G., & Câmara, M. P. S. (2010). Species of *Botryosphaeriaceae* associated on

mango in Brazil. *European Journal of Plant Pathology*, *127*(4), 509–519. https://doi.org/10.1007/s10658-010-9616-y

Debono, M., & Gordee, R. S. (1994). Antibiotics that inhibit fungal cell wall development. *Annual Review of Microbiology*, *48*, 471–497. https://doi.org/10.1146/annurev.mi.48.100194.002351

Deising, H. B., Reimann, S., & Pascholati, S. F. (2008). Mechanisms and significance of fungicide resistance. *Brazilian Journal of Microbiology*, *39*(2), 286–295.

Delgado, J., Peromingo, B., Núñez, F., & Asensio, M. A. (2016). Use of molds and their antifungal proteins for biocontrol of toxigenic molds on dry-ripened cheese and meats. *Current Opinion in Food Science*, *11*, 40–45. https://doi.org/10.1016/j.cofs.2016.09.003

Dev, S. R. S., Birla, S. L., Raghavan, G. S. V., & Subbiah, J. (2012). *Microbial decontamination of food by microwave (MW) and radio frequency (RF)*. *Microbial Decontamination in the Food Industry: Novel Methods and Applications*. Woodhead Publishing Limited. https://doi.org/10.1533/9780857095756.2.274

Devlieghere, F., Vermeulen, A., & Debevere, J. (2004). Chitosan : antimicrobial activity , interactions with food components and applicability as a coating on fruit and vegetables. *Food Microbiology*, *21*, 703–714. https://doi.org/10.1016/j.fm.2004.02.008

Dhall, R. K. (2013). Advances in edible coatings for fresh Fruits and vegetables: A review. *Critical Reviews in Food Science and Nutrition*, *53*(5), 435–450. https://doi.org/10.1080/10408398.2010.541568

Diedhiou, P. M., Mbaye, N., Dramé, A., & Samb, P. I. (2007). Alteration of post harvest diseases of mango *Mangifera indica* through production practices and climatic factors. *African Journal of Biotechnology*, *6*(9), 1087–1094. https://doi.org/10.4314/ajb.v6i9.57113

Dinh, T. T. T., Kim, D. H., Luong, H. X., Lee, B. J., & Kim, Y. W. (2015). Antimicrobial activity of doubly-stapled alanine/lysine-based peptides. *Bioorganic and Medicinal Chemistry Letters*, *25*(18), 4016–4019. https://doi.org/10.1016/j.bmcl.2015.06.053

Dinika, I., Kumar, D., Balia, R., Lara, G., & Patel, A. R. (2020). Potential of cheese whey bioactive proteins and peptides in the development of antimicrobial edible film composite : A review of recent trends. *Trends in Food Science & Technology*, *103*, 57–67. https://doi.org/10.1016/j.tifs.2020.06.017

Dombu, C. Y., & Betbeder, D. (2013). Airway delivery of peptides and proteins using nanoparticles. *Biomaterials*, *34*(2), 516–525. https://doi.org/10.1016/j.biomaterials.2012.08.070

Dong, A., Ho, V. T. T., Lo, R., Bansal, N., & Turner, M. S. (2016). A genetic diversity study of antifungal *Lactobacillus plantarum* isolates. *Food Control*, *72*, 83–89. https://doi.org/10.1016/j.foodcont.2016.07.026

Dukare, A. S., Paul, S., Nambi, V. E., Gupta, R. K., Singh, R., Sharma, K., & Vishwakarma, R. K. (2019). Exploitation of microbial antagonists for the control of postharvest diseases of fruits: a review. *Critical Reviews in Food Science and Nutrition*, *59*(9), 1498–1513. https://doi.org/10.1080/10408398.2017.1417235

Duran, M., Seckin, M., Demirel, N. N., Temizkan, R., Burak, M., & Caner, C. (2016). Potential of antimicrobial active packaging' containing natamycin, nisin, pomegranate and grape seed extract in chitosan coating' to extend shelf life of fresh strawberry. *Food and Bioproducts Processing*, *98*, 354–363. https://doi.org/10.1016/j.fbp.2016.01.007

Ediriweera, M. K., Tennekoon, K. H., & Samarakoon, S. R. (2017). A Review on ethnopharmacological applications, pharmacological activities, and bioactive compounds of *Mangifera indica* (mango). *Evidence-Based Complementary and Alternative Medicine*, *2017*. https://doi.org/10.1155/2017/6949835

El-Mabroc, A.S.W., Hassan, Z., Mokthar, A.M, Khaled, M.A., Kahr, F. K. S. A. (2012). Screening of lactic acid bacteria as biocontrol against (*Colletotrichum capsici*) on chilli Bangi. *Research Journal of Applied Science, 7*(9–12), 466–473.

El-Nezami, H., Polychronaki, N., Salminen, S., & Mykkänen, H. (2002). Binding rather than metabolism may explain the interaction of two food-grade *Lactobacillus* strains with zearalenone and its derivative ά-zearalenol. *Applied and Environmental Microbiology*, *68*(7), 3545–3549. https://doi.org/10.1128/AEM.68.7.3545-3549.2002

Embuscado, M. E., & Huber, K. C. (2009). *Edible films and coatings for food applications* (Vol. 9). New York, USA: Springer.

Erukainure, O. L., Oke, O. V., Daramola, A. O., Adenekan, S. O., & Umanhonlen, E. E. (2010). Improvement of the biochemical properties of watermelon rinds subjectted to *Saccharomyces cerevisae* solid media fermentation. *Pakistan Journal of Nutrition*, *9*(8), 806–809. https://doi.org/10.3923/pjn.2010.806.809

Esguerra, E. B., Rolle, R., & Rahman, M. A. (2018). Post-harvest management of mango for quality and safety assurance. *Guidance for Horticultural Supply Chain Stakeholders. Food and Agriculture Organization of the United Nations, Rome*.

Farkas, J., Ehlermann, D. A. E., & Mohácsi-Farkas, C. S. (2014). Food technologies: food irradiation. In *Encyclopedia of 867 Food Safety In: Vol 3* (pp. 178–186). Elsevier.

Faruck, M. O., Yusof, F., & Chowdhury, S. (2016). An overview of antifungal peptides derived from insect. *Peptides*, *80*(June), 80–88. https://doi.org/10.1016/j.peptides.2015.06.001

Fernández-Pan, I., Maté, J. I., Gardrat, C., & Coma, V. (2015). Effect of chitosan molecular weight on the antimicrobial activity and release rate of carvacrol-enriched films. *Food Hydrocolloids*, *51*, 60–68. https://doi.org/10.1016/j.foodhyd.2015.04.033

Ferraz, L. P., Cunha, T. da, da Silva, A. C., & Kupper, K. C. (2016). Biocontrol ability and putative mode of action of yeasts against *Geotrichum candidum* citri-aurantii in citrus fruit. *Microbiological Research*, *188–189*, 72–79. https://doi.org/10.1016/j.micres.2016.04.012

Flores, S., Conte, A., Campos, C., Gerschenson, L., & Del Nobile, M. (2007). Mass transport properties of tapioca-based active edible films. *Journal of Food Engineering*, *81*(3), 580–586. https://doi.org/10.1016/j.jfoodeng.2006.12.010

Fowomola, M. A. (2010). some nutrients and antinutrients contents of mango (*Magnifera indica*) seed. *African Journal of Food Science*, *4*(8), 472–476.

Franco-Lara, E., Link, H., & Weuster-Botz, D. (2006). Evaluation of artificial neural networks for modelling and optimization of medium composition with a genetic algorithm. *Process Biochemistry*, *41*(10), 2200–2206.

Freeman, R. (1987). *Handbook of nuclear magnetic resonance*. John Wiley and Sons, New York.

Galsurker, O., Diskin, S., Duanis-Assaf, D., Doron-Faigenboim, A., Maurer, D., Feygenberg, O., & Alkan, N. (2020). Harvesting mango fruit with a short stem-end altered endophytic microbiome and reduce stem-end rot. *Microorganisms*, *8*(4). https://doi.org/10.3390/microorganisms8040558

Gao, Y., Kan, C., Wan, C., Chen, C., Chen, M., & Chen, J. (2018). Quality and biochemical changes of navel orange fruits during storage as affected by cinnamaldehyde -chitosan coating. *Scientia Horticulturae*, *239*, 80–86. https://doi.org/10.1016/j.scienta.2018.05.012

Garcha, S., & Natt, N. K. (2012). In situ control of food spoilage fungus using *Lactobacillus acidophilus* NCDC 291. *Journal of Food Science and Technology*, *49*(5), 643–648. https://doi.org/10.1007/s13197-011-0482-1

Garcia, E., & Barrett, D. M. (2002). Preservative treatments for fresh-cut fruits and vegetables. *Fresh-Cut Fruits and Vegetables: Science, Technology, and Market*, 267–303. https://doi.org/10.1201/9781420031874.ch9

Garofalo, C., Zannini, E., Aquilanti, L., Silvestri, G., Fierro, O., Picariello, G., & Clementi, F. (2012). Selection of sourdough lactobacilli with antifungal activity for use as biopreservatives in bakery products. *Journal of Agricultural and Food Chemistry*, *60*, 7719–7728.

Geleijnse, J. M., & Engberink, M. F. (2010). Lactopeptides and human blood pressure. *Current Opinion in Lipidology*, *21*(1), 58–63.

Geneston-Asio, L., & Cuaresma, F. (2016). A review of postharvest treatments to maintain mango (*Mangifera iIndica* L.) quality. *Annals of Tropical Research*, *38*(1), 81–93. https://doi.org/10.32945/atr3817.2016

Gerez, C. L., Carbajo, M. S. &, & Roll, G. (2010). Inhibition of citrus fungal pathogens by using lactic acid bacteria. *Journal of Food Science R*, *75*(6), 354–359. https://doi.org/10.1111/j.1750-3841.2010.01671.x

Gerez, C. L., Torino, M. I., Rollán, G. &, & de Valdez, G. F. (2009). Prevention of bread mould spoilage by using lactic acid bacteria with antifungal properties. *Food Control*, *20*(2), 144–148. https://doi.org/10.1016/j.foodcont.2008.03.005

Gerez, C. L., Torres, M. J., Font de Valdez, G., & Rollán, G. (2013). Control of spoilage fungi by lactic acid bacteria. *Biological Control*, *64*(3), 231–237. https://doi.org/10.1016/j.biocontrol.2012.10.009

Ghanbari, M., Jami, M., Kneifel, W., & Domig, K. J. (2013). Antimicrobial activity and partial characterization of bacteriocins produced by lactobacilli isolated from Sturgeon fish. *Food Control*, *32*(2), 379–385. https://doi.org/10.1016/j.foodcont.2012.12.024

Ghazvini, R. D., Kouhsari, E., Zibafar, E., Hashemi, S. J., Amini, A. &, & Niknejad, F. (2016). Antifungal activity and aflatoxin degradation of *Bifidobacterium bifidum* and *lactobacillus fermentum* against toxigenic *Aspergillus parasiticus*. *The Open Microbiology Journal*, *10*, 197–201. https://doi.org/10.2174/1874285801610010197

Gheribi, R., Puchot, L., Verge, P., Jaoued-Grayaa, N., Mezni, M., Habibi, Y., & Khwaldia, K. (2018). Development of plasticized edible films from *Opuntia ficus-indica* mucilage: A comparative study of various polyol plasticizers. *Carbohydrate Polymers*, *190*, 204–211. https://doi.org/10.1016/j.carbpol.2018.02.085

Ghosh, R., Barman, S., Mukhopadhyay, A., & Mandal, N. C. (2015). Biological control of fruit-rot of jackfruit by rhizobacteria and food grade lactic acid bacteria. *Biological Control*, *83*, 29–36. https://doi.org/10.1016/j.biocontrol.2014.12.020

Gobbetti, M., De Angelis, M., Corsetti, A., & Di Cagno, R. (2005). Biochemistry and physiology of sourdough lactic acid bacteria. *Trends in Food Science and Technology*, *16*(1–3), 57–69. https://doi.org/10.1016/j.tifs.2004.02.013

Gomaa, E. Z. (2017). Silver nanoparticles as an antimicrobial agent: A case study on Staphylococcus aureus and escherichia coli as models for gram-positive and gram-negative bacteria. *Journal of General and Applied Microbiology*, *63*(1), 36–43. https://doi.org/10.2323/jgam.2016.07.004

Gomes, M. H., Beaudry, R. M., Almeida, D. P. F., & Malcata, F. X. (2010). Modelling respiration of packaged fresh-cut 'Rocha' pear as affected by oxygen

concentration and temperature. *Journal of Food Engineering*, *96*(1), 74–79. https://doi.org/10.1016/j.jfoodeng.2009.06.043

Gómez-Guillén, M., Me, L.-C., Lacey, A. L. De, Giménez, B., & Montero, P. (2010). Antioxidant and antimicrobial peptide fractions from squid and tuna skin gelatin. *Sea By-Products as Real Material*, *661*(2), 89–115. Retrieved from http://digital.csic.es/bitstream/10261/40679/1/CAPITULOS_DE_LIBROS302952[1].pdf

González-Aguilar, G. A., Buta, J. G., & Wang, C. Y. (2001). Methyl jasmonate reduces chilling injury symptoms and enhances colour development of "Kent" mangoes. *Journal of the Science of Food and Agriculture*, *81*(13), 1244–1249. https://doi.org/10.1002/jsfa.933

Gonzalez-Aguilar, G. A., Villa-Rodriguez, J. A., Ayala-Zavala, J. F., & Yahia, E. M. (2010). Improvement of the antioxidant status of tropical fruits as a secondary response to some postharvest treatments. *Trends in Food Science and Technology*, *21*(10), 475–482. https://doi.org/10.1016/j.tifs.2010.07.004

Goodno, C. C., Swaisgood, H. E., & Catignani, G. L. (1981). A fluorimetric assay for available lysine in proteins. *Analytical Biochemistry*, *115*(1), 203–211.

Gourama, H. (1997). Inhibition of Growth and Mycotoxin Production of *Penicillium* by *Lactobacillus* Species. *LWT-Food Science and Technology*, *30*(3), 279–283.

Griffiths, M. W., & Tellez, A. M. (2013). *Lactobacillus helveticus*: the proteolytic system. *Frontiers in Microbiology*, *4*, 1–9. https://doi.org/10.3389/fmicb.2013.00030

Gull, A., Lone, A. A., & Wani, N. U. I. (2019). Biotic and abiotic stresses in plants. *Abiotic and Biotic Stress in Plants*, 1–19.

Gupta, A., Mandal, D., Ahmadibeni, Y., Parang, K., & Bothun, G. (2011). Hydrophobicity drives the cellular uptake of short cationic peptide ligands. *European Biophysics Journal*, *40*(6), 727–736. https://doi.org/10.1007/s00249-011-0685-4

Gupta, S., Cox, S., & Abu-ghannam, N. (2010). Process optimization for the development of a functional beverage based on lactic acid fermentation of oats. *Biochemical Engineering Journal*, *52*(2–3), 199–204. https://doi.org/10.1016/j.bej.2010.08.008

Gupta, S., Jaiswal, A. K., & Abu-ghannam, N. (2013). Optimization of fermentation conditions for the utilization of brewing waste to develop a nutraceutical rich liquid product. *Industrial Crops & Products*, *44*, 272–282. https://doi.org/10.1016/j.indcrop.2012.11.015

Gupte, M., & Kulkarni, P. (2003). A study of antifungal antibiotic production by *Thermomonospora* sp MTCC 3340 using full. *Journal OfChemical Technology and Biotechnology*, *610*, 605–610. https://doi.org/10.1002/jctb.818

Gyawali, R., & Ibrahim, S. A. (2014). Natural products as antimicrobial agents. *Food Control*, *46*, 412–429. https://doi.org/10.1016/j.foodcont.2014.05.047

Hadfield, K. A., & Bennett, A. B. (1998). Polygalacturonases: Many genes in search of a function. *Plant Physiology*, *117*(2), 337–343. https://doi.org/10.1104/pp.117.2.337

Hagenmaier, R. D., & Shaw, P. E. (1990). Moisture permeability of edible films Made with fatty acid and (Hydroxy propyl) methylcellulose. *Journal of Agricultural and Food Chemistry*, *38*, 1799–1803.

Haggag, W. (2010). Mango diseases in Egypt. *Agriculture and Biology Journal of North America*, *1*(3), 285–289. https://doi.org/10.5251/abjna.2010.1.3.285.289

Hallman, G. J., Denlinger, D. L., & Mangan, R. L. (2020). Temperature treatments for quarantine security: New approaches for fresh commodities. In *Temperature sensitivity in insects and application in integrated pest management* (pp. 201–234). CRC Press. https://doi.org/10.1201/9780429308581-8

Harris, D. R., Seberry, J. A., Wills, R. B. H., & Spohr, L. J. (2000). Effect of fruit maturity on efficiency of 1-methylcyclopropene to delay the ripening of bananas. *Postharvest Biology and Technology*, *20*, 303–308.

Hayes, M., Stanton, C., Fitzgerald, G. F., & Ross, R. P. (2007). Putting microbes to work: Dairy fermentation, cell factories and bioactive peptides. Part II: bioactive peptide functions, *2*, 435–449. https://doi.org/10.1002/biot.200700045

He, L., Liu, Y., Mustapha, A., & Lin, M. (2011). Antifungal activity of zinc oxide nanoparticles against *Botrytis cinerea* and *Penicillium expansum*. *Microbiological Research*, *166*(3), 207–215. https://doi.org/10.1016/j.micres.2010.03.003

Hegedüs, N., & Marx, F. (2013). Antifungal proteins: More than antimicrobials? *Fungal Biology Reviews*, *26*(4), 132–145. https://doi.org/10.1016/j.fbr.2012.07.002

Hernández-Saldaña, O., De la Fuente-Salcido, N., Valencia-Posadas, M., & Barboza-Corona, J. (2016). Aislamiento Y caracterizacion de bacterias productoras de peptidos antimicrobianos obtenidas a partir de leche de cabra. *Investigación y Desarrollo En Ciencia y Tecnología de Alimentos*, *1*(1), 429–435.

Hernández, T., Estrella, I., Pérez-Gordo, M., Alegría, E. G., Tenorio, C., Ruiz-Larrrea, F., & Moreno-Arribas, M. V. (2007). Contribution of malolactic fermentation by *Oenococcus oeni* and *Lactobacillus plantarum* to the changes in the nonanthocyanin polyphenolic composition of red wine. *Journal of Agricultural and Food Chemistry*, *55*(13), 5260–5266.

Ho, V. T. T., Lo, R., Bansal, N., & Turner, M. S. (2018). Characterisation of *Lactococcus lactis* isolates from herbs, fruits and vegetables for use as biopreservatives against *Listeria monocytogenes* in cheese. *Food Control*, *85*, 472–483. https://doi.org/10.1016/j.foodcont.2017.09.036

Hoa, T.T., Ducamp, M., Lebrun, M. and Beldwin, E. A. (2002). Effect of different coating treatments on the quality of mango fruit. *Journal of Food Quality*, *25*, 471–486. https://doi.org/10.1049/me:20020402

Hoa, T. T., & Ducamp, M. N. (2008). Effects of different coatings on biochemical changes of "cat Hoa loc" mangoes in storage. *Postharvest Biology and Technology*, *48*(1), 150–152. https://doi.org/10.1016/j.postharvbio.2007.09.021

Hofman, P. J., Jobin-Decor, M., Meiburg, G. F., Macnish, A. J., & Joyce, D. de C. (2001). Ripening and quality responses of avocado, custard apple, mango and papaya fruit to 1-methylcyclopropene. *Australian Journal of Experimental Agriculture*, *41*(4), 567–572.

Hofvendahl, K., & Hahn-hligerdal, B. (1997). L-lactic acid production from whole wheat flour hydrolysate using strains of *Lactobacilli* and *Lactococci. Enzyme and Microbial Technology*, *20*(96), 301–307.

Hong, K., Xie, J., Zhang, L., Sun, D., & Gong, D. (2012). Effects of chitosan coating on postharvest life and quality of guava (*Psidium guajava* L.) fruit during cold storage. *Scientia Horticulturae*, *144*, 172–178.

Hong, K., Xu, H., Wang, J., Zhang, L., Hu, H., Jia, Z., Gu, H., He, Q., & Gong, D. (2013). Quality changes and internal browning developments of summer pineapple fruit during storage at different temperatures. *Scientia Horticulturae*, *151*, 68–74. https://doi.org/10.1016/j.scienta.2012.12.016

Hong, Y. S., Ahn, Y. T., Park, J. C., Lee, J. H., Lee, H., Huh, C. S., Kim, D. H., Ryu, D. H., & Hwang, G. S. (2010). 1H NMR-based metabonomic assessment of probiotic effects in a colitis mouse model. *Archives of Pharmacal Research*, *33*(7), 1091–1101. https://doi.org/10.1007/s12272-010-0716-1

Hopkins, E. J., Chang, C., Lam, R. S. H., & Nickerson, M. T. (2015). Effects of flaxseed oil concentration on the performance of a soy protein isolate-based emulsion-type film. *Food Research International*, *67*, 418–425. https://doi.org/10.1016/j.foodres.2014.11.040

Hou, J., Liu, F., Ren, D., Han, W., & Du, Y. (2015). Effect of culturing conditions on the expression of key enzymes in the proteolytic system of *Lactobacillus bulgaricus*, *Journal of Zhejiang University-SCIENCE B*, *16*(4), 317–326. https://doi.org/10.1631/jzus.B1400230

Hu, M., Zhao, H., Zhang, C., Yu, J., & Lu, Z. (2013). Purification and characterization of plantaricin 163, a novel bacteriocin produced by *Lactobacillus plantarum* 163 isolated from traditional Chinese fermented vegetables. *Journal of Agricultural and Food Chemistry*, *61*(47), 11676–11682. https://doi.org/10.1021/jf403370y

Huang, Y.-J., & Linda Chang, P.-F. (2016). Effect of nanoscale silicate platelets on azoxystrobin-resistant isolates of *Botrytis cinerea* from strawberry In vitro and

in vivo. *Journal of Plant Pathology & Microbiology*, *07*(04), 1–6. https://doi.org/10.4172/2157-7471.1000345

Humphries, R. M., Ambler, J., Mitchell, S. L., Castanheira, M., Dingle, T., Hindler, J. A., Koeth, L., & Sei, K. (2018). CLSI methods development and standardization working group best practices for evaluation of antimicrobial susceptibility Tests. *Journal of Clinical Microbiology*, *56*(4), 1–10.

Ifudu, N. D. (1986). Indigenous resources for antibiotic production. *Aug/Sept Edition. Expansion Today*, 27–32.

Jacobi, K. K., MacRae, E. A., & Hetherington, S. E. (2001). Postharvest heat disinfestation treatments of mango fruit. *Scientia Horticulturae*, *89*(3), 171–193. https://doi.org/10.1016/S0304-4238(00)00240-5

Janakiram Naveena, B., Altaf, M., Bhadrayya, K., & Reddy, G. (2004). Production of L(+) lactic acid by *Lactobacillus amylophilus* GV6 in semi-solid state fermentation using wheat bran. *Food Technol. Biotechnol*, *42*(3), 147–152.

Janes, K. A., Calvo, P., & Alonso, M. J. (2001). Polysaccharide colloidal particles as delivery systems for macromolecules. *Advanced Drug Delivery Reviews*, *47*(1), 83–97.

Jawad, A. H., Alkarkhi, A. F. M., & Norulaini, N. A. N. (2013). Production of the lactic acid from mango peel waste – Factorial experiment. *Journal of King Saud University - Science*, *25*(1), 39–45. https://doi.org/10.1016/j.jksus.2012.04.001

Jay, J. M., Loessner, M. J., & Golden, D. A. (2008). *Modern food microbiology* (7th ed.). Springer Science & Business Media.

Jeddi, M., Yunesian, M., Gorji, M., Noori, N., Pourmand, M., & Khanik, D. R. J. (2014). Microbial evaluation of fresh, minimally-processed vegetables and bagged sprouts from chain supermarkets. *Journal of Health Popul Nutropul Nutr*, *32*(3), 391–399.

Jiang, Q., Stamatova, I., Kari, K., & Meurman, J. H. (2014). Inhibitory activity in vitro of probiotic lactobacilli against oral Candida under different fermentation conditions, *Beneficial microbes*, *5*(3), 3920. https://doi.org/10.3920/BM2014.0054

Jiménez, A., Fabra, M. J., Talens, P., & Chiralt, A. (2013). Phase transitions in starch based films containing fatty acids. Effect on water sorption and mechanical behaviour. *Food Hydrocolloids*, *30*(1), 408–418.

Jitareerat, P., Paumchai, S., Kanlayanarat, S., & Sangchote, S. (2007). Effect of chitosan on ripening, enzymatic activity, and disease development in mango (*Mangifera indica*) fruit. *New Zealand Journal of Crop and Horticultural Science*, *35*(2), 211–218. https://doi.org/10.1080/01140670709510187

Johnson, G. I. (2008). Status of mango postharvest disease management R & D: Options and solutions for the Australian mango industry. *Hortic Aus Final Rep Proj MG08017, Hortic*, *4*.

Johnson, G. I., Mead, A. J., Cooke, A. W., & Dean, J. R. (1991). Mango stem end rot pathogens - Infection levels between flowering and harvest. *Annals of Applied Biology*, *119*(3), 465–473. https://doi.org/10.1111/j.1744-7348.1991.tb04886.x

Johnson, G. I., Mead, A. J., Cooke, A. W., & Dean, J. R. (1992). Mango stem end rot pathogens - Fruit infection by endophytic colonisation of the inflorescence and pedicel. *Annals of Applied Biology*, *120*(2), 225–234. https://doi.org/10.1111/j.1744-7348.1992.tb03420.x

Johnson, G. I., & Sangchote, S. (1994). Control of postharvest diseases of tropical fruits: challenges for the 21st century: A review. [Conference paper]. *ACIAR Proceedings-Australian Centre for International Agricultural Research (Australia)*..

Johnson, G. I., Sangchote, S., & Cooke, A. W. (1990). Control of stem end rot (*Dothiorella dominicana*) and other postharvest diseases of mangoes (cv. Kensington Pride) during short-and long-term storage. *Tropical Agriculture, Trinidad and Tobago*, *67*(2), 183–187.

Johnston, J. W., Gunaseelan, K., Pidakala, P., Wang, M., & Schaffer, R. J. (2009). Co-ordination of early and late ripening events in apples is regulated through differential sensitivities to ethylene. *Journal of Experimental Botany*, *60*(9), 2689–2699.

Jongsri, P., Rojsitthisak, P., Wangsomboondee, T., & Seraypheap, K. (2017). Influence of chitosan coating combined with spermidine on anthracnose disease and qualities of 'Nam Dok Mai' mango after harvest. *Scientia Horticulturae*, *224*, 180–187. https://doi.org/10.1016/j.scienta.2017.06.011

Jongsri, P., Wangsomboondee, T., Rojsitthisak, P., & Seraypheap, K. (2016). Effect of molecular weights of chitosan coating on postharvest quality and physicochemical characteristics of mango fruit. *LWT - Food Science and Technology*, *73*, 28–36. https://doi.org/10.1016/j.lwt.2016.05.038

Juge, N. (2006). Plant protein inhibitors of cell wall degrading enzymes. *Trends in Plant Science*, *11*(7), 359–367. https://doi.org/10.1016/j.tplants.2006.05.006

Jukonyte, R., Zadeike, D., Bartkiene, E., Lele, V., Cernauskas, D., Suproniene, S., & Juodeikiene, G. (2018). A potential of brown rice polish as a substrate for the lactic acid and bioactive compounds production by the lactic acid bacteria newly isolated from cereal-based fermented products. *LWT - Food Science and Technology*, *97*, 323–331. https://doi.org/10.1016/j.lwt.2018.07.012

Kader, A A. (1986). Biochemical and physiological basis for effects of controlled and modified atmospheres on fruits and vegetables. *Food Technology (USA)*, 99–104.

Kader, A A. (2008). Mangoes recommendations for maintaining postharvest quality. *Fruit Ripening and Ethylene Management*. Univ. Calif. *Postharvest Technology Research and Information Center*.

Kader, Adel A. (2002). *Postharvest technology of horticultural crops* (Vol. 3311). University of California Agriculture and Natural Resources.

Kadum, H. (2019). Metabolomic profiling elucidated by 1H- NMR and the correlation with antibacterial and antioxidant activity of (*Cyperus rotundus* L.) fermented by lactic acid bacteria. *Journal of Pure and Applied Microbiology*, *13*(3), 1475–1482. https://doi.org/10.22207/JPAM.13.3.18

Kapur, A., Hasković, A., Čopra-Janićijević, A., Klepo, L., Topčagić, A., Tahirović, I., & Sofić, E. (2012). Spectrophotometric analysis of total ascorbic acid contetnt in various fruits and vegetables. *Bulletin of the Chemists and Technologists of Bosnia and Herzegovina*, *38*, 239–242.

Karaca, H., Pérez-Gago, M. B., Taberner, V., & Palou, L. (2014). Evaluating food additives as antifungal agents against *Monilinia fructicola* in vitro and in hydroxypropyl methylcellulose-lipid composite edible coatings for plums. *International Journal of Food Microbiology*, *179*, 72–79. https://doi.org/10.1016/j.ijfoodmicro.2014.03.027

Katalinic, V., Sonja Smole Mozina, Danijela Skroza, Ivana Generalic, Helena Abramovic, Mladen Miloš, Ivica Ljubenkov, Saša Piskernik, Ivan Pezo, & Petra Terpinc, M. B. (2010). Polyphenolic profile , antioxidant properties and antimicrobial activity of grape skin extracts of 14 *Vitis vinifera* varieties grown in Dalmatia (Croatia). *Food Chemistry*, *119*, 715–723. https://doi.org/10.1016/j.foodchem.2009.07.019

Kays, S. J., & Paull, R. E. (2004). Movement and exchange of gases, solvents and solutes within harvested products and their exchange between the product and its external environment. *Postharvest biology. Exon Press, Athens, GA, 415-458.*.

Keogh, J. B., Woonton, B. W., Taylor, C. M., Janakievski, F., Desilva, K., & Clifton, P. M. (2010). Effect of glycomacropeptide fractions on cholecystokinin and food intake. *British Journal of Nutrition*, *104*(2), 286–290. https://doi.org/10.1017/S0007114510000280

Khaliq, G., Tengku, M., Mohamed, M., Ding, P., Ghazali, H. M., & Putra, U. (2017). Storage behaviour and quality responses of mango (*Mangifera indica* L.) fruit treated with chitosan and gum arabic coatings during cold storage conditions. *International Food Research Journal*, *23*(Suppl), 141–148.

Khandelwal, P., & Upendra, R. S. (2019). Nanotechnology and bacteriocins: perspectives and opportunities. In *Packaging, Processing, and Preservation* (p. 187). CRC Press.

Kharazian, Z. A., Salehi Jouzani, G., Aghdasi, M., Khorvash, M., Zamani, M., & Mohammadzadeh, H. (2017). Biocontrol potential of *Lactobacillus strains*

isolated from corn silages against some plant pathogenic fungi. *Biological Control*, *110*(April), 33–43. https://doi.org/10.1016/j.biocontrol.2017.04.004

Kharchoufi, S., Parafati, L., Licciardello, F., Muratore, G., Hamdi, M., Cirvilleri, G., & Restuccia, C. (2018). Edible coatings incorporating pomegranate peel extract and biocontrol yeast to reduce *Penicillium digitatum* postharvest decay of oranges. *Food Microbiology*, *74*, 107–112. https://doi.org/10.1016/j.fm.2018.03.011

Kim, D., Lim, W., Lee, M., & Kim, M. (2012). Effect of temperature on continuous fermentative lactic acid (LA) production and bacterial community, and development of LA-producing UASB reactor. *Bioresource Technology*, *119*, 355–361. https://doi.org/10.1016/j.biortech.2012.05.027

Kim, Y., Brecht, J. K., & Talcott, S. T. (2007). Antioxidant phytochemical and fruit quality changes in mango (*Mangifera indica* L.) following hot water immersion and controlled atmosphere storage. *Food Chemistry*, *105*, 1327–1334. https://doi.org/10.1016/j.foodchem.2007.03.050

Kim, Y. W., Jeong, Y. J., Kim, A. Y., Son, H. H., Lee, J. A., Jung, C. H., Kim, C. H., & Kim, J. (2014). *Lactobacillus brevis* strains from fermented Aloe vera survive gastroduodenal environment and suppress common food borne enteropathogens. *PLoS ONE*, *9*(3), 1–10. https://doi.org/10.1371/journal.pone.0090866

Kishimoto, N., Sugihara, S., Mochida K. and Fujita, K. (2005). In vitro antifungal and antiviral activities of ϒ -and $^{\delta}$ - Lactone analogs utilized as food flavoring. *Biocontrol Science*, *10*(1–2), 31–36.

Klitgaard, A., Nielsen, K. F., Andersen, M.R., & Frisvad, J. C. (2015). *Liquid chromatography mass spectrometry for analysis of microbial metabolites*. Lyngby: Department of Systems Biology, Technical University of Denmark. General. https://doi.org/10.2174/157341107779314235

König, G & Fröhlich, U. (2009). *Biology of Microorganisms on Grapes, in Must and in Wine* (pp. 3-30). Heidelberg: Springer.https://doi.org/10.1007/978-3-540-85463-0_4

Korhonen, H., & Pihlanto, A. (2006). Bioactive peptides: Production and functionality. *International Dairy Journal*, *16*(9), 945–960. https://doi.org/10.1016/j.idairyj.2005.10.012

Kova, K., Egli, T., & Du, C. (1998). Growth kinetics of suspended microbial cells : from single- substrate-controlled growth to mixed-substrate kinetics. *Microbiology and Molecular Biology Reviews*, *62*(3), 646–666.

Krishnapillai, N., & Wilson Wijeratnam, R. S. (2013). Aspergillus rot of ripe mangoes (*Mangifera indica* L.) var. Ambalavi, Willard and Karuthakolumban. *Journal of the National Science Foundation of Sri Lanka*, *41*(1), 69–70. https://doi.org/10.4038/jnsfsr.v41i1.5335

Kuhn, D. M., Balkis, M., Chandra, J., Mukherjee, P. K., & Ghannoum, M. A. (2003). Uses and limitations of the XTT assay in studies of *Candida* growth and metabolism. *Journal of Clinical Microbiology*, *41*(1), 506–508. https://doi.org/10.1128/JCM.41.1.506-508.2003

Kumar, P., Kizhakkedathu, J. N., & Straus, S. K. (2018). Antimicrobial peptides: Diversity, mechanism of action and strategies to improve the activity and biocompatibility in vivo. *Biomolecules*, *8*(4), 1–24. https://doi.org/10.3390/biom8010004

Kumar, S., Das, D. K., Mishra, M., Singh, A. K., & Prasad, U. S. (1994). Sucrose metabolism during maturation and ripening of mango cultivars. *Plant Physiology and Biochemistry*, *21*, 27–32.

Kundu, P., Adhikary, N. K., & Maji, S. (2020). A critical review on use of edible coating to enhance shelf life of mango. *Current Journal of Applied Science and Technology*, *39*(27), 116–128. https://doi.org/10.9734/cjast/2020/v39i2730926

Kuratsu, M., Hamano, Y., & Dairi, T. (2010). Analysis of the *Lactobacillus* metabolic pathway. *Applied and Environmental Microbiology*, *76*(21), 7299–7301. https://doi.org/10.1128/AEM.01514-10

Kwak, M., Liu, R., Kim, M., Moon, D., Kim, A. H., Song, S., & Kang, S. (2014). Cyclic dipeptides from lactic acid bacteria inhibit the proliferation. *Journal of Microbiology*, *52*(1), 64–70. https://doi.org/10.1007/s12275-014-3520-7

Lacey, A. M. L. De, & Montero, P. (2012). Functionality of *Lactobacillus acidophilus* and *Bifidobacterium bifidum* incorporated to edible coatings and films. *Innovative Food Science and Emerging Technologies*, *16*, 277–282. https://doi.org/10.1016/j.ifset.2012.07.001

Ström, K., Sjögren, J., Broberg, A., & Schnürer, J. (2002). *Lactobacillus plantarum* MiLAB 393 produces the antifungal cyclic dipeptides cyclo(L-Phe-L-Pro) and cyclo(L-Phe-trans-4-OH-L-Pro) and 3-phenyllactic acid. *Applied and environmental microbiology*, *68*(9), 4322-4327..

Laidlaw, W. G., Armstrong, J. W., Chan, H. T. J., Jang, E. B., Vijaysengaran, M. P. S., & Mohamed, M. S. (1996). The effect of temperature profile in heat-treated disinfestation on mortality of pests and on fruit quality. In *International Conference on Tropical Fruits* (pp. 342–353).

Laitila, A., Alakomi, H., Raaska, L., Mattila-Sandholm, T., & Haikara, A. (2002). Antifungal activities of two *Lactobacillus plantarum* strains against Fusarium moulds in vitro and in malting of barley. *Journal of Applied Microbiology*, *93*(4), 566–576.

Lamont, J. R., Wilkins, O., Bywater-Ekegärd, M., & Smith, D. L. (2017). From yogurt to yield: Potential applications of lactic acid bacteria in plant production. *Soil Biology and Biochemistry*. Elsevier Ltd. https://doi.org/10.1016/j.soilbio.2017.03.015

Lamsal, K., Kim, S. W., Jung, J. H., Kim, Y. S., Kim, K. S., & Lee, Y. S. (2011). Application of silver nanoparticles for the control of *Colletotrichum* species in vitro and pepper anthracnose disease in field. *Mycobiology*, *39*(3), 194–199. https://doi.org/10.5941/MYCO.2011.39.3.194

Lan, W. tse, Chen, Y. sheng, Wu, H. chung, & Yanagida, F. (2012). Bio-protective potential of lactic acid bacteria isolated from fermented wax gourd. *Folia Microbiologica*, *57*(2), 99–105. https://doi.org/10.1007/s12223-012-0101-1

Laref, N., Guessas, B., & Kihal, M. (2013). Antifungal compounds production in different temperatures, pH and on modified MRS agar by *Lactobacillus* strains. *Journal of Biological Sciences*, *13*(2), 94–99.

Lauricella, M., Emanuele, S., Calvaruso, G., Giuliano, M., & D'Anneo, A. (2017). Multifaceted health benefits of *Mangifera indica* L. (Mango): The inestimable value of orchards recently planted in sicilian rural areas. *Nutrients*, *9*(5). https://doi.org/10.3390/nu9050525

Lavermicocca, P., Valerio, F., & Visconti, A. (2003). Antifungal activity of phenyllactic acid against molds isolated from bakery products. *Applied and Environmental Microbiology*, *69*(1), 634–640. https://doi.org/10.1128/AEM.69.1.634-640.2003

Lay, L., Barbier, G., & Coton, E. (2016). In vitro and in situ screening of lactic acid bacteria and propionibacteria antifungal activities against bakery product spoilage molds r o, *60*, 247–255. https://doi.org/10.1016/j.foodcont.2015.07.034

Leang, Y. H., & Saw, H. Y. (2011). Proximate and functional properties of sugarcane bagasse. *Agro Food Industry Hitech*, *22*(2), 5–8.

Lebeda, A., Luhová, L., Sedlářová, M., & Jančová, D. (2001). The role of enzymes in plant-fungal pathogens interactions. *Journal of Plant Diseases and Protection*, 89–111.

Lee, K. H., Kim, G. W., & Rhee, K. H. (2010). Identification of *Streptomyces* sp. KH29, which produces an antibiotic substance processing an inhibitory activity against multidrug-resistant *Acinetobacter baumannii*. *Journal of Microbiology and Biotechnology*, *20*(12), 1672–1676. https://doi.org/10.4014/jmb.1007.07035

Lee, M. R., Raman, N., Gellman, S. H., Lynn, D. M., & Palecek, S. P. (2014). Hydrophobicity and helicity regulate the antifungal activity of 14-helical β-peptides. *ACS Chemical Biology*, *9*(7), 1613–1621. https://doi.org/10.1021/cb500203e

Lefeber, T., Janssens, M., Camu, N., & Vuyst, L. De. (2010). Kinetic analysis of strains of lactic acid bacteria and acetic acid bacteria in cocoa pulp simulation media toward development of a starter culture for cocoa bean fermentation. *Microbiology and Food Biotechnology (IMDO)*, *76*(23), 7708–7716. https://doi.org/10.1128/AEM.01206-10

Li, H., Liu, L., Zhang, S., Cui, W., & Lv, J. (2012). Identification of antifungal compounds produced by *Lactobacillus casei* AST18. *Current Microbiology*, *65*(2), 156–161. https://doi.org/10.1007/s00284-012-0135-2

Li, L., R., P., Shewry, & Ward, J. L. (2008). Phenolic acids in wheat varieties in the HEALTHGRAIN diversity screen. *Journal of Agricultural and Food Chemistry*, *56*, 9732–9739.

Li, Ni, K., Pang, H., Wang, Y., Cai, Y., & Jin, Q. (2015). Identification and antimicrobial activity detection of lactic acid bacteria isolated from corn stover silage. *Asian-Australasian Journal of Animal Sciences*, *28*(5), 620–631. https://doi.org/10.5713/ajas.14.0439

Liang, S., Gliniewicz, K., Gerritsen, A. T., & Mcdonald, A. G. (2016). Analysis of microbial community variation during the mixed culture fermentation of agricultural peel wastes to produce lactic acid. *Bioresource Technology*, *208*, 7–12. https://doi.org/10.1016/j.biortech.2016.02.054

Liang, S., Mcdonald, A. G., & Coats, E. R. (2014). Lactic acid production with undefined mixed culture fermentation of potato peel waste. *Waste Management*, *34*(11), 2022–2027.

Lima, N. B., Lima, W. G., Tovar-Pedraza, J. M., Michereff, S. J., & Câmara, M. P. S. (2015). Comparative epidemiology of *Colletotrichum* species from mango in northeastern Brazil. *European Journal of Plant Pathology*, *141*(4), 679–688. https://doi.org/10.1007/s10658-014-0570-y

Lin, D., & Zhao, Y. (2007). Innovations in the development and application of edible coatings for fresh and minimally processed fruits and vegetables. *Comprehensive Reviews in Food Science and Food Safety*, *6*(3), 60–75. https://doi.org/10.1111/j.1541-4337.2007.00018.x

Lind, H., Jonsson, H., & Schnürer, J. (2005). Antifungal effect of dairy propionibacteria-Contribution of organic acids. *International Journal of Food Microbiology*, *98*(2), 157–165. https://doi.org/10.1016/j.ijfoodmicro.2004.05.020

Lipińska, L., Klewicki, R., Klewicka, E., Kołodziejczyk, K., Sójka, M., & Nowak, A. (2016). Antifungal activity of *Lactobacillus* sp. Bacteria in the presence of xylitol and galactosyl-xylitol. *BioMed Research International*, *2016*. https://doi.org/10.1155/2016/5897486

Liu, Jia, Sui, Y., Wisniewski, M., Droby, S., & Liu, Y. (2013). Review: Utilization of antagonistic yeasts to manage postharvest fungal diseases of fruit. *International Journal of Food Microbiology*. Elsevier B.V. https://doi.org/10.1016/j.ijfoodmicro.2013.09.004

Liu, Jia, Tian, S., Meng, X., & Xu, Y. (2007). Effects of chitosan on control of postharvest diseases and physiological responses of tomato fruit. *Postharvest Biology and Technology*, *44*(3), 300–306. https://doi.org/10.1016/j.postharvbio.2006.12.019

Liu, Jialin, & Nes, W. D. (2009). Steroidal triterpenes: Design of substrate-based inhibitors of ergosterol and sitosterol synthesis. *Molecules*, *14*(11), 4690–4706. https://doi.org/10.3390/molecules14114690

Liu, S., Wang, W., Deng, L., Ming, J., Yao, S., & Zeng, K. (2019). Control of sour rot in citrus fruit by three insect antimicrobial peptides. *Postharvest Biology and Technology*, *149*, 200–208.

Liu, Shao Q. (2002). Malolactic fermentation in wine - Beyond deacidification. *Journal of Applied Microbiology*, *92*(4), 589–601. https://doi.org/10.1046/j.1365-2672.2002.01589.x

Liu, Shao Quan, & Pilone, G. J. (2000). An overview of formation and roles of acetaldehyde in winemaking with emphasis on microbiological implications. *International Journal of Food Science and Technology*, *35*(1), 49–61. https://doi.org/10.1046/j.1365-2621.2000.00341.x

Liu, Z., Zeng, M., Dong, S., Xu, J., Song, H., & Zhao, Y. (2007). Effect of an antifungal peptide from oyster enzymatic hydrolysates for control of gray mold (*Botrytis cinerea*) on harvested strawberries. *Postharvest Biology and Technology*, *46*, 95–98. https://doi.org/10.1016/j.postharvbio.2007.03.013

Lizada, C. (1993). Mango. In 'Biochemistry of fruit ripening'.(Eds GB Seymour, JE Taylor, GA Tucker) pp. 255–271. Chapman and Hall: London.

Lluís Palou , Asgar Ali , Elazar Fallik, G. R. (2016). GRAS, plant- and animal-derived compounds as alternatives to conventional fungicides for the control of postharvest diseases of fresh horticultural produce. *Postharvest Biology and Technology*, *122*, 41–52.

Lluís Palou, J. L. S. and S. D. (2008). Alternatives to conventional fungicides for the control of citrus postharvest green and blue moulds. *An International Journal for Reviews in Postharvest Biology and Technology*, *2*(2), 1–16. https://doi.org/10.2212/spr.2008.2.2

Lonsdale, J. H. (1993). Preliminary results on the mode infection of *Nattrassia mangifera* in Mango. *South African Mango Growers' Association Yearbook*, *13*, 97–99.

Lonvaud-Funel, A. (1999). Optimal portfolio choice under a liability constraint. *Antonie van Leeuwenhoek 76:*, *76*, 317–331. https://doi.org/10.1023/A

López-Gálvez, F., Allende, A., Selma, M. V., & Gil, M. I. (2009). Prevention of Escherichia coli cross-contamination by different commercial sanitizers during washing of fresh-cut lettuce. *International Journal of Food Microbiology*, *133*(1–2), 167–171. https://doi.org/10.1016/j.ijfoodmicro.2009.05.017

Lurie, S. (1998). Postharvest heat treatments of horticultural crops. *Hort. Rev*, *22*(91), 121.

Luz, C., Saladino, F., Luciano, F. B., Mañes, J., & Meca, G. (2017). In vitro antifungal activity of bioactive peptides produced by *Lactobacillus plantarum* against *Aspergillus parasiticus* and *Penicillium expansum*. *LWT - Food Science and Technology*, *81*, 128–135. https://doi.org/10.1016/j.lwt.2017.03.053

Lyu, Y., Yang, Y., Lyu, X., Dong, N., & Shan, A. (2016). Antimicrobial activity, improved cell selectivity and mode of action of short PMAP-36-derived peptides against bacteria and *Candida*. *Scientific Reports*, *6*(June), 1–12. https://doi.org/10.1038/srep27258

Magnusson, J., Ström, K., Roos, S., Sjögren, J. &, & Schnürer, J. (2003). Broad and complex antifungal activity among environmental isolates of lactic acid bacteria. *FEMS Microbiology Letters*, *219*(1), 129–135.

Magnusson, J, & Schnürer, J. (2001). *Lactobacillus coryniformis* subsp. coryniformis strain Si3 produces a broad-spectrum proteinaceous antifungal compound. *Applied and Environmental Microbiology*, *67*(1), 1–5. https://doi.org/10.1128/AEM.67.1.1-5.2001

Magnusson, Jesper, Ström, K., Roos, S., Sjögren, J., & Schnürer, J. (2003). Broad and complex antifungal activity among environmental isolates of lactic acid bacteria. *FEMS Microbiology Letters*, *219*(1), 129–135. https://doi.org/10.1016/S0378-1097(02)01207-7

Mahajan, P. V, Caleb, O. J., Singh, Z., Watkins, C. B., & Geyer, M. (2014). Postharvest treatments of fresh produce. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, *372*(2017). https://doi.org/10.1098/rsta.2013.0309

Mahmoud, N. S., Awad, S. H., Madani, R. M. A., Osman, F. A., Elmamoun, K., & Hassan, A. B. (2016). Effect of γ radiation processing on fungal growth and quality characteristcs of millet grains. *Food Science and Nutrition*, *4*(3), 342–347. https://doi.org/10.1002/fsn3.295

Maldonado-Celis, M. E., Yahia, E. M., Bedoya, R., Landázuri, P., Loango, N., Aguillón, J., Restrepo, B. & Guerrero Ospina, J. C. (2019). Chemical composition of mango (*Mangifera indica* L.) fruit: nutritional and phytochemical compounds. *Frontiers in Plant Science*, *10*, 1073. https://doi.org/10.3389/fpls.2019.01073

Malhotra, B., Keshwani, A., & Kharkwal, H. (2015). Antimicrobial food packaging: Potential and pitfalls. *Frontiers in Microbiology*, *6*(JUN), 1–9. https://doi.org/10.3389/fmicb.2015.00611

Malz, F., & Jancke, H. (2005). Validation of quantitative NMR. *Journal of Pharmaceutical and Biomedical Analysis*, *38*(5), 813–823.

Maqbool, M., Ali, A., Alderson, P. G., Zahid, N., & Siddiqui, Y. (2011). Effect of a novel edible composite coating based on gum arabic and chitosan on biochemical and physiological responses of banana fruits during cold storage. *Journal of*

Agricultural and Food Chemistry, *59*(10), 5474–5482. https://doi.org/10.1021/jf200623m

Maqsood, A., Rehman, A., Ahmad, I., Nafees, M., Ashraf, I., Qureshi, R., Hussain, T. (2014). Physiological attributes of fungi associated with stem end rot of mango (*Mangifera indica* L.) cultivars in postharvest fruit losses. *Pakistan Journal of Botany*, *46*(5), 1915–1920.

Mari, M., Di Francesco, A., & Bertolini, P. (2014). Control of fruit postharvest diseases: Old issues and innovative approaches. *Stewart Postharvest Review*, *10*(1). https://doi.org/10.2212/spr.2014.1.1

Marin-Rodriguez, M. C., Smith, D. L., Manning, K., Orchard, J., &, & Seymour, G. B. (2003). Pectate lyase gene expression and enzyme activity in ripening banana fruit. *Plant Molecular Biology 51:*, *51*, 851–857.

Marín, A., Atarés, L., Cháfer, M., &, & Chiralt, A. (2017). Properties of biopolymer dispersions and films used as carriers of the biocontrol agent Candida sake CPA-1. *LWT -Food Science and Technology*, *79*, 60–69. https://doi.org/10.1016/j.lwt.2017.01.024

Marín, Anna, Plotto, A., Atarés, L., & Chiralt, A. (2019). Lactic acid bacteria incorporated into edible coatings to control fungal growth and maintain postharvest quality of grapes. *HortScience*, *54*(2), 337–343. https://doi.org/10.21273/HORTSCI13661-18

Martau, A. G., Mihai, M. and, & Vodnar, D. C. (2019). The use of chitosan , alginate , and pectin in the biomedical and food sector-biocompatability, bioadhesiveness, and biodegradability. *Polymers*, *12*(1837), 1–28.

McGuire, R. G. (1991). Concomitant decay reductions when mangoes are treated with heat to control infestations of Caribbean fruit flies. *Plant Disease*, *75*(9), 946–949.

McGuire, R. G., & Dimitroglou, D. A. (1999). Evaluation of shellac and sucrose ester fruit coating formulations that support biological control of post-harvest grapefruit decay. *Biocontrol Science and Technology*, *9*(1), 53–65. https://doi.org/10.1080/09583159929901

Medina, C., Gutiérrez, T. J., Goyanes, S., Bernal, C., & Famá, L. (2016). Biodegradability and plasticizing effect of yerba mate extract on cassava starch edible films. *Carbohydrate Polymers*, *151*, 150–159. https://doi.org/10.1016/j.carbpol.2016.05.025

Meira, S. M. M., Zehetmeyer, G., Werner, J. O., & Brandelli, A. (2017). A novel active packaging material based on starch-halloysite nanocomposites incorporating antimicrobial peptides. *Food Hydrocolloids*, *63*, 561–570. https://doi.org/10.1016/j.foodhyd.2016.10.013

Meng, X., Li, D., Zhou, D., Wang, D., Liu, Q., & Fan, S. (2016). Chemical composition, antibacterial activity and related mechanism of the essential oil from the leaves of *Juniperus rigida* Sieb. et Zucc against *Klebsiella pneumoniae. Journal of Ethnopharmacology*, *194*, 698–705. https://doi.org/10.1016/j.jep.2016.10.050

Michelle, G., Silva, C., Batista, W., Medeiros, D. B., Rodrigues, A., Helena, M., … Polete, G. (2017). The chitosan affects severely the carbon metabolism in mango (*Mangifera indica* L . cv . Palmer) fruit during storage. *Food Chemistry*, *237*, 372–378.

Miguel, T. de Á., Bordini, J. G., Saito, G. H., Andrade, C. G. T. d. J., Ono, M. A., Hirooka, E. Y., Vizoni, E., & Ono, E. Y. S. (2015). Effect of fungicide on *Fusarium verticillioides* mycelial morphology and fumonisin B1 production. *Brazilian Journal of Microbiology*, *46*(1), 293–299. https://doi.org/10.1590/S1517-838246120120383

Mim, F. S., Galib, S. M., Hasan, M. F., &, & Jerin, S. A. (2018). Automatic detection of mango ripening stages– An application of information technology to botany. *Scientia Horticulturae*, *237*, 156–163. https://doi.org/10.1016/j.scienta.2018.03.057

Min, S., & Krochta, J. M. (2005). Inhibition of *Penicillium commune* by edible whey protein films incorporating lactoferrin, lactoferrin hydrolysate, and lactoperoxidase systems. *Journal of Food Science*, *70*(2). https://doi.org/10.1111/j.1365-2621.2005.tb07108.x

Mittler, R. (2002). Oxidative stress, antioxidants and stress tolerance. *Trends in Plant Science*, *7*(9), 405–410. https://doi.org/10.1016/S1360-1385(02)02312-9

Moalemiyan, M., Ramaswamy, H. S., & Maftoonazad, N. (2012). Pectin-based edible coating for shelf-life extension of Ataulfo mango. *Journal of Food Process Engineering*, *35*(4), 572–600. https://doi.org/10.1111/j.1745-4530.2010.00609.x

Mohtashamian, S., & Boddohi, S. (2016). Nanostructured polysaccharide-based carriers for antimicrobial peptide delivery. *Journal of Pharmaceutical Investigation*. https://doi.org/10.1007/s40005-016-0289-1

Moreno, M. A., Vallejo, A. M., Ballester, A. R., Zampini, C., Isla, M. I., López-Rubio, A., & Fabra, M. J. (2020). Antifungal edible coatings containing *Argentinian propolis* extract and their application in raspberries. *Food Hydrocolloids*, *107*. https://doi.org/10.1016/j.foodhyd.2020.105973

Morton, J. F. (1987). *Fruits of warm climates*. Julia F. Morton, Miami, FL.pp. 356–363.

Moshayedi, S., Shahraz, F., Schaffner, D. W., Khanlarkhani, A., Shojaee-Aliabadi, S., Shahnia, M., & Khaksar, R. (2013). *In vitro* control of enterococcus faecalis by zataria multilfolira boiss, origanum vulgare l and mentha pulegium essential oils. *Journal of Food Safety*, *33*(3), 327–332. https://doi.org/10.1111/jfs.12056

Muccilli, S., & Restuccia, C. (2015). Bioprotective role of yeasts. *Microorganisms*, *3*(4), 588–611. https://doi.org/10.3390/microorganisms3040588

Muhammad Siddiq, Jeffrey K. Brecht, J. S. S. (2017). *Handbook of mango fruit : Production, postharvest science, processing technology and nutrition*. (M. Siddiq, Ed.) (first edit). West Sussex, PO19 8SQ, UK: Wiley Blackwell. https://doi.org/10.1002/9781119014362

Muhialdin, B. J., Algboory, H. L., Kadum, H., Mohammed, N. K., Saari, N., Hassan, Z., & Meor Hussin, A. S. (2020). Antifungal activity determination for the peptides generated by *Lactobacillus plantarum* TE10 against *Aspergillus flavus* in maize seeds. *Food Control*, *109*, 106898. https://doi.org/10.1016/j.foodcont.2019.106898

Muhialdin, B. J., Algboory, H. L., Mohammed, N. K., Kadum, H., Hussin, A. S. M., Saari, N., & Hassan, Z. (2020). Discovery and development of novel anti-fungal peptides against foodspoiling fungi. *Current Drug Discovery Technologies*, *17*(4), 553–561.

Muhialdin, B. J., Hassan, Z., Abu Bakar, F., Algboory, H. L., & Saari, N. (2015). Novel antifungal peptides produced by leuconostoc mesenteroides DU15 effectively inhibit growth of *Aspergillus niger*. *Journal of Food Science*, *80*(5), M1026–M1030. https://doi.org/10.1111/1750-3841.12844

Muhialdin, B. J., Hassan, Z., Bakar, F. A., & Saari, N. (2016). Identification of antifungal peptides produced by *Lactobacillus plantarum* IS10 grown in the MRS broth. *Food Control*, *59*, 27–30. https://doi.org/10.1016/j.foodcont.2015.05.022

Muhialdin, B. J., Hassan, Z., & Saari, N. (2018). In vitro antifungal activity of lactic acid bacteria low molecular peptides against spoilage fungi of bakery products. *Annals of Microbiology*, *68*(9), 557–567. https://doi.org/10.1007/s13213-018-1363-x

Muhialdin, B. J., Hassan, Z., & Sadon, S. K. (2011). Antifungal activity of *Lactobacillus fermentum* Te007, *Pediococcus pentosaceus* Te010, *Lactobacillus pentosus* G004, and *L. paracasi* D5 on selected Foods. *Journal of Food Science*, *76*(7), 493–499. https://doi.org/10.1111/j.1750-3841.2011.02292.x

Muhialdin, B. J., Saari, N., & Hussin, A. S. M. (2020). Review on the biological detoxification of Mycotoxdns using lactic acid bacteria to enhance the sustainability of foods supply. *Molecules (Basel, Switzerland)*. NLM (Medline). https://doi.org/10.3390/molecules25112655

Mukhopadhyay, S., Ukuku, D. O., Juneja, V., & Fan, X. (2014). Effects of UV-C treatment on inactivation of *Salmonella enterica* and *Escherichia coli* O157: H7 on grape tomato surface and stem scars, microbial loads, and quality. *Food Control*, *44*(2014), 110–117. https://doi.org/10.1016/j.foodcont.2014.03.027

Mustaffa, B., Mizairi, S., & Hawari, H. (1991). Palm kernel cake in cattle feedlotting. *Asean Food*, *6*, 102–103.

Naczk, M., & Shahidi, F. (2006). Phenolics in cereals, fruits and vegetables: Occurrence, extraction and analysis. *Journal of Pharmaceutical and Biomedical Analysis*, *41*, 1523–1542. https://doi.org/10.1016/j.jpba.2006.04.002

Narsaiah, K., Wilson, R. A., Gokul, K., Mandge, H. M., Jha, S. N., Bhadwal, S., Anurag, R. K., Malik, R. K., & Vij, S. (2014). Effect of bacteriocin-incorporated alginate coating on shelf-life of minimally processed papaya (*Carica papaya* L.). *Postharvest Biology and Technology*, *100*, 212–218. https://doi.org/10.1016/j.postharvbio.2014.10.003

Nawab, A., Alam, F., & Hasnain, A. (2017). Mango kernel starch as a novel edible coating for enhancing shelf- life of tomato (*Solanum lycopersicum*) fruit. *International Journal of Biological Macromolecules*, *103*(May), 581–586. https://doi.org/10.1016/j.ijbiomac.2017.05.057

Nawrot, R., Barylski, J., Nowicki, G., Broniarczyk, J., Buchwald, W., & Goździcka-Józefiak, A. (2014). Plant antimicrobial peptides. *Folia Microbiologica*, *59*(3), 181–196. https://doi.org/10.1007/s12223-013-0280-4

Nelson, S. C. (2008). Mango anthracnose (*Colletotrichum*. *Plant Disease*, *PD-48*(Aug), 1–9.

Nemţanu, M. R., Braşoveanu, M., Karaca, G., & Erper, I. (2014). Inactivation effect of electron beam irradiation on fungal load of naturally contaminated maize seeds. *Journal of the Science of Food and Agriculture*, *94*(13), 2668–2673. https://doi.org/10.1002/jsfa.6607

Niku-Paavola, M. L., Laitila, A., Mattila-Sandholm, T., & Haikara, A. (1999). New types of antimicrobial compounds produced by *Lactobacillus plantarum*. *Journal of Applied Microbiology*, *86*(1), 29–35. https://doi.org/10.1046/j.1365-2672.1999.00632.x

No, H.K., Meyers, S.P., Prinyawiwatkul, W. and Xu, Z. (2007). Applications of chitosan for improvement of quality and shelf life of foods : A review. *Concise Reviews/Hypotheses in Food Science*, *72*(5), 87–100. https://doi.org/10.1111/j.1750-3841.2007.00383.x

Nouroozi, R. V., Noroozi, M. V., & Ahmadizadeh, M. (2015). Determination of protein concentration using bradford microplate protein quantification assay. *International Electronic Journal of Medicine*, *4*(1), 11–17.

Ntsoane, M. L., Zude-Sasse, M., Mahajan, P., & Sivakumar, D. (2019). Quality assesment and postharvest technology of mango: A review of its current status and future perspectives. *Scientia Horticulturae*. Elsevier B.V. https://doi.org/10.1016/j.scienta.2019.01.033

Ogbogu, Chibuzo Linda, Ojiagu, David-Kingsley and Anyamene, N. C. (2014). Isolation and characterization of microorganisms involved in the postharvest loss of *Carica papaya* (Papaya) and *Mangifera indica* (Mango) in Awka, Southeastern Nigeria. *International J Ournal of Agriculture and Biosciences*, *3*(5), 225–229.

Ogunbanwo, S. T., Adebayo, A. A., Ayodele, M. A., & Okanlawon, B. M. (2008). Effects of lactic acid bacteria and *Saccharomyces cerevisae* co-cultures used as starters on the nutritional contents and shelf life of. *Journal of Applied Biosciences*, *12*, 612–622.

Oikeh, Oriakhi, E. I., & Omoregie, K. (2013). Proximate Analysis and Phytochemical Screening of *Citrus sinensis* Fruit Wastes. *The Bioscientist*, *1*(2), 164–170. Retrieved from http://www.bioscientistjournal.com

Ojokoh, A. O., & Orekoya, E. S. (2016). Effect of fermentation on the proximate composition of the epicarp of watermelon (*Citrullus lanatus*). *International Journal of Swarm Intelligence and Evolutionary Computation*, *5*(3), 1–6. https://doi.org/10.4172/2090-4908.1000143

Olayinka, B. U., & Etejere, E. O. (2018). Proximate and chemical compositions of watermelon (*Citrullus lanatus* (Thunb.) Matsum and Nakai cv red and cucumber (*Cucumis sativus* L. cv Pipino). *International Food Research Journal*, *25*(3), 1060–1066.

Olivas, G. I. I., & Barbosa-Cánovas, G. (2009). Edible films and coatings for fruits and vegetables. *Edible Films and Coatings for Food Applications*. Springer New York. https://doi.org/10.1007/978-0-387-92824-1_7

Oliveira, R. A. De, Fontes, L., & Bernardi, N. S. (2018). Experimental design for optimization of D-lactic acid production using a UV-light selected strain, *5*(4), 270–277. https://doi.org/10.15406/jabb.2018.05.00148

Oliveira Filho, J. G. de, Rodrigues, J. M., Valadares, A. C. F., Almeida, A. B. de, Lima, T. M. de, Takeuchi, K. P., Alves, C. C. F., de Figueiredo Sousa, H. A., daSilva, E. R., Dyszy, F. H., & Egea, M. B. (2019). Active food packaging: Alginate films with cottonseed protein hydrolysates. *Food Hydrocolloids*. Elsevier B.V. https://doi.org/10.1016/j.foodhyd.2019.01.052

Oliveira, P. M., Brosnan, B., Furey, A., Coffey, A., Zannini, E., & Arendt, E. K. (2015). Lactic acid bacteria bioprotection applied to the malting process. Part I: Strain characterization and identification of antifungal compounds. *Food Control*, *51*, 433–443. https://doi.org/10.1016/j.foodcont.2014.07.004

Omer, M., Yusof, F., & Chowdhury, S. (2015). An overview of antifungal peptides derived from insect. *Peptides*, *80*, 80–88. https://doi.org/10.1016/j.peptides.2015.06.001

Oms-Oliu, G., Soliva-Fortuny, R., & Martín-Belloso, O. (2008). Edible coatings with antibrowning agents to maintain sensory quality and antioxidant properties of fresh-cut pears. *Postharvest Biology and Technology*, *50*(1), 87–94. https://doi.org/10.1016/j.postharvbio.2008.03.005

Onaran, A., & Yanar, Y. (2016). *In vivo* and *In vitro* antifungal activities of five Plant extracts against various plant pathogens. *Egyptian Journal of Biological Pest Control*, *26*(2), 405.

Ong, L. G. A., Abd-Aziz, S., Noraini, S., Karim, M. I. A., &, & Hassan, M. A. (2004). Enzyme poduction and profile by *Aspergillus niger* during solid substrate fermentation using palm kernel cake as substrate. *Applied Biochemistry and Biotechnology*, *118*, 73–79.

Orzua, M. C., Mussatto, S. I., Contreras-esquivel, J. C., Rodriguez, R., De, H., Teixeira, J. A., & Aguilar, C. N. (2009). Exploitation of agro industrial wastes as immobilization carrier for solid-state fermentation, *30*, 24–27. https://doi.org/10.1016/j.indcrop.2009.02.001

Ozdemir, M., & Floros, J. D. (2004). Active food packaging technologies. *Critical Reviews in Food Science and Nutrition*, *44*(3), 185–193. https://doi.org/10.1080/10408690490441578

Paepatung, N., Nopharatana, A., & Songkasiri, W. (2009). Bio-methane potential of biological solid materials and agricultural wastes. *Asian Journal on Energy and Environment*, *10*(01), 19–27.

Palou, L. (2018). Postharvest treatments with gras salts to control fresh fruit decay. *Horticulturae*. MDPI Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/horticulturae4040046

Palou, L., Ali, A., Fallik, E., & Romanazzi, G. (2016). GRAS, plant- and animal-derived compounds as alternatives to conventional fungicides for the control of postharvest diseases of fresh horticultural produce. *Postharvest Biology and Technology*, *122*(2015), 41–52. https://doi.org/10.1016/j.postharvbio.2016.04.017

Palou, L., Valencia-Chamorro, S. A., & Pérez-Gago, M. B. (2015). Antifungal edible coatings for fresh citrus fruit: A review. *Coatings*, *5*(4), 962–986. https://doi.org/10.3390/coatings5040962

Parafati, L., Vitale, A., Restuccia, C., & Cirvilleri, G. (2015). Biocontrol ability and action mechanism of food-isolated yeast strains against *Botrytis cinerea* causing post-harvest bunch rot of table grape. *Food Microbiology*, *47*, 85–92. https://doi.org/10.1016/j.fm.2014.11.013

Park, H. J. (1999). Development of advanced edible coatings for fruits. *Trends in Food Science and Technology*, *10*(8), 254–260. https://doi.org/10.1016/S0924-2244(00)00003-0

Parmenter, C., Soukoulis, C., Singh, P., Macnaughtan, W., Parmenter, C. D., & Fisk, I. D. (2016). Compositional and physiochemical factors governing the viability of *Lactobacillus rhamnosus* GG Embedded in starch protien based edible films. *Food Hydrocolloids*, *52*, 876–887.

Pasquali, R. C., Taurozzi, M. P., & Bregni, C. (2008). Some considerations about the hydrophilic – lipophilic balance system. *International Journal of Pharmaceutics*, *356*, 44–51. https://doi.org/10.1016/j.ijpharm.2007.12.034

Pasquariello, M. S., Di Patre, D., Mastrobuoni, F., Zampella, L., Scortichini, M., & Petriccione, M. (2015). Influence of postharvest chitosan treatment on enzymatic browning and antioxidant enzyme activity in sweet cherry fruit. *Postharvest Biology and Technology*, *109*, 45–56. https://doi.org/10.1016/j.postharvbio.2015.06.007

Patrzykat, A., & Douglas, S. (2005). Antimicrobial peptides: Cooperative approaches to protection. *Protein & Peptide Letters*, *12*(1), 19–25. https://doi.org/10.2174/0929866053406057

Paul Ross, R., Morgan, S., & Hill, C. (2002). Preservation and fermentation: Past, present and future. *International Journal of Food Microbiology*, *79*(1–2), 3–16. https://doi.org/10.1016/S0168-1605(02)00174-5

Perdones, Á., Vargas, M., Atarés, L., & Chiralt, A. (2014). Physical, antioxidant and antimicrobial properties of chitosan-cinnamon leaf oil films as affected by oleic acid. *Food Hydrocolloids*, *36*, 256–264.

Pessione, E., & Cirrincione, S. (2016). Bioactive molecules released in food by lactic acid bacteria: Encrypted peptides and biogenic amines. *Frontiers in Microbiology*. Frontiers Research Foundation. https://doi.org/10.3389/fmicb.2016.00876

Pham, T., Kaushik, R., Parshetti, G. K., Mahmood, R., & Balasubramanian, R. (2015). Food waste-to-energy conversion technologies : Current status and future directions. *Waste Management*, *38*, 399–408. https://doi.org/10.1016/j.wasman.2014.12.004

Piñeros-hernandez, D., Medina-jaramillo, C., López-córdoba, A., & Goyanes, S. (2016). Edible cassava starch films carrying rosemary antioxidant extract for potentialuse as active food packaging. *Food Hydrocolloids*. https://doi.org/10.1016/j.foodhyd.2016.09.034

Piñeros-Hernandez, D., Medina-Jaramillo, C., López-Córdoba, A., & Goyanes, S. (2017). Edible cassava starch films carrying rosemary antioxidant extracts for potential use as active food packaging. *Food Hydrocolloids*, *63*, 488–495. https://doi.org/10.1016/j.foodhyd.2016.09.034

Pinto Reis, C., Neufeld, R. J., Ribeiro, A. J., & Veiga, F. (2006). Nanoencapsulation I. methods for preparation of drug-loaded polymeric nanoparticles. *Nanomedicine: Nanotechnology, Biology, and Medicine*, *2*(1), 8–21. https://doi.org/10.1016/j.nano.2005.12.003

Pola, C. C., Medeiros, E. A. A., Pereira, O. L., Souza, V. G. L., Otoni, C. G., Camilloto, G. P., & Soares, N. F. F. (2016). Cellulose acetate active films incorporated with oregano (*Origanum vulgare*) essential oil and organophilic montmorillonite clay control the growth of phytopathogenic fungi. *Food Packaging and Shelf Life*, *9*, 69–78. https://doi.org/10.1016/j.fpsl.2016.07.001

Prakash, O., & Srivastava, K. C. (1987). Mango diseases and their management. *A World Review. Today and Tomorrow's Printers and Publishers, New Delhi, India*.

Praseptiangga, D., Fatmala, N., Manuhara, G. J., Utami, R., & Khasanah, L. U. (2016). Preparation and preliminary characterization of semi refined kappa carrageenan-based edible film incorporated with cinnamon essential oil. In *AIP Conference Proceedings* (Vol. 1746). American Institute of Physics Inc. https://doi.org/10.1063/1.4953961

Prusky, D., Alkan, N., Mengiste, T., & Fluhr, R. (2013). Quiescent and necrotrophic lifestyle choice during postharvest disease development. *Annual Review of Phytopathology*, *51*, 155–176. https://doi.org/10.1146/annurev-phyto-082712-102349

Prusky, D., Fuchs, Y., Kobiler, I., Roth, I., Weksler, A., Shalom, Y., … Artes, L. (1999). Effect of hot water brushing, prochloraz treatment and waxing on the incidence of black spot decay caused by *Alternaria alternata* in mango fruits. *Postharvest Biology and Technology*, *15*(2), 165–174. https://doi.org/10.1016/S0925-5214(98)00082-9

Prusky, D., & Lichter, A. (2007). Activation of quiescent infections by postharvest pathogens during transition from the biotrophic to the necrotrophic stage. *FEMS Microbiology Letters*, *268*(1), 1–8. https://doi.org/10.1111/j.1574-6968.2006.00603.x

Rahman, E. A. A., Talib, R. A., Aziz, M. G., & Yusof, Y. A. (2013). Modelling the effect of temperature on respiration rate of fresh cut papaya (*Carica papaya* L.) fruits. *Food Science and Biotechnology*, *22*(6), 1581–1588. https://doi.org/10.1007/s10068-013-0254-y

Rai, M., Pandit, R., Gaikwad, S., & Kövics, G. (2016). Antimicrobial peptides as natural bio-preservative to enhance the shelf-life of food. *Journal of food science and Technology*, *53*(9), 3381-3394. https://doi.org/10.1007/s13197-016-2318-5

Rajmane, S. D., & Korekar, S. L. (2016). Changes in vitamin C content of different varieties of mango and papaya fruit due to post harvest fungi (MS) India. *Int J Sci Res Publ*, *6*, 175–177.

Rao, D. R., & Reddy, J. C. (1984). Effects of lactic fermentation of milk on milk lipids. *Journal of Food Science*, *49*, 748–750.

Rathod, G. M. (2010). Survey of post-harvest fungal diseases of some fruits from Marathwada Regions of Maharashtra, India. *Journal of Ecobiotechnology*, *2*(6), 7–10.

Rathore, S., Salmerón, I., & Pandiella, S. S. (2012). Production of potentially probiotic beverages using single and mixed cereal substrates fermented with lactic acid bacteria cultures. *Food Microbiology*, *30*(1), 239–244. https://doi.org/10.1016/j.fm.2011.09.001

Raveschot, C., Cudennec, B., Coutte, F., Flahaut, C., Drider, D., & Dhulster, P. (2018). Production of bioactive peptides by *Lactoacillus* species: from gene to application. *Frontiers in Microbiology*, *9*, 2354. https://doi.org/10.3389/fmicb.2018.02354

Ravindra, M. R., & Goswami, T. K. (2008). Modelling the respiration rate of green mature mango under aerobic conditions. *Biosystems Engineering*, *99*(2), 239–248. https://doi.org/10.1016/j.biosystemseng.2007.10.005

Raviyan, P., Zhang, Z., & Feng, H. (2005). Ultrasonication for tomato pectinmethylesterase inactivation : effect of cavitation intensity and temperature on inactivation. *Journal of Food Engineering*, *70*, 189–196. https://doi.org/10.1016/j.jfoodeng.2004.09.028

Reguant, C., Bordons, A., Arola, L., & Rozes, N. (2000). Influence of phenolic compounds on the physiology of *Oenococcus oeni* from wine. *Journal of Applied Microbiology*, *88*(6), 1065–1071.

Reis, J. A., Paula, A. T., Casarotti, S. N., & Penna, A. L. B. (2012). Lactic acid bacteria antimicrobial compounds: characteristics and applications. *Food Engineering Reviews*, *4*(2), 124–140. https://doi.org/10.1007/s12393-012-9051-2

Ren, L., Yan, X., Zhou, J., Tong, J., & Su, X. (2017). Influence of chitosan concentration on mechanical and barrier properties of corn starch/chitosan films. *International Journal of Biological Macromolecules*, *105*, 1636–1643. https://doi.org/10.1016/j.ijbiomac.2017.02.008

Ren, Y., He, J., Liu, H., Liu, G., & Ren, X. (2017). Nitric oxide alleviates deterioration and preserves antioxidant properties in 'Tainong' mango fruit during ripening. *Horticulture Environment and Biotechnology*, *58*(1), 27–37. https://doi.org/10.1007/s13580-017-0001-z

Raveschot, C., Cudennec, B., Coutte, F., Flahaut, C., Fremont, M., Drider, D., & Dhulster, P. (2018). Production of bioactive peptides by *Lactobacillus* species: from gene to application. *Frontiers in Microbiology*, *9*, 2354.

Rhim, J. W., & Shellhammer, T. H. (2005). Lipid-based edible films and coatings. In *Innovations in food packaging* (pp. 362–383). Elsevier.

Ricci, A., Bernini, V., Maoloni, A., Cirlini, M., Galaverna, G., Neviani, E., & Lazzi, C. (2019). Vegetable by-product lacto-fermentation as a new source of antimicrobial compounds. *Microorganisms*, *7*(12). https://doi.org/10.3390/microorganisms7120607

Ricke, S. C. (2003). Perspectives on the use of organic acids and short chain fatty acids as antimicrobials. *Poultry Science*, *82*(4), 632–639. https://doi.org/10.1093/ps/82.4.632

Rizzello, C. G., Cassone, A., Coda, R., & Gobbetti, M. (2011). Antifungal activity of sourdough fermented wheat germ used as an ingredient for bread making. *Food Chemistry*, *127*(3), 952–959. https://doi.org/10.1016/j.foodchem.2011.01.063

Robles-Sánchez, R. M., Rojas-Graü, M. A., Odriozola-Serrano, I., González-Aguilar, G., & Martin-Belloso, O. (2013). Influence of alginate-based edible coating as carrier of antibrowning agents on bioactive compounds and antioxidant activity in fresh-cut Kent mangoes. *LWT - Food Science and Technology*, *50*(1), 240–246. https://doi.org/10.1016/j.lwt.2012.05.021

Rodrigues, L. B., Leite, H. F., Yoshida, M. I., Saliba, J. B., Cunha, A. S., & Faraco, A. A. G. (2009). In vitro release and characterization of chitosan films as dexamethasone carrier. *International Journal of Pharmaceutics*, *368*(1–2), 1–6. https://doi.org/10.1016/j.ijpharm.2008.09.047

Rodriguez Couto, S. (2008, July). Exploitation of biological wastes for the production of value-added products uncler solid-state fermentation conditions. *Biotechnology Journal*. https://doi.org/10.1002/biot.200800031

Romanazzi, G., Nigro, S., Ippolito, A., Di Veenere D. and Salerno, M. (2002). Effects of pre- and postharvest chitosan treatments to control storage grey mold of table grapes. *Journal of Food Science*, *67*(5), 1862–1867.

Roselló, G., Bonaterra, A., Francés, J., Montesinos, L., Badosa, E., & Montesinos, E. (2013). Biological control of fire blight of apple and pear with antagonistic *Lactobacillus plantarum*. *European Journal of Plant Pathology*, *137*(3), 621–633. https://doi.org/10.1007/s10658-013-0275-7

Rosniyana, A., Hashifah, M. A., & Norin, S. A. S. (2007). The physico-chemical properties and nutritional composition of rice bran produced at different milling degrees of rice. *J. Trop. Agric. and Fd. Sc*, *35*(1), 99–105. Retrieved from http://ejtafs.mardi.gov.my/jtafs/35-1/Rice bran.pdf

Rouse, S., Harnett, D., Vaughan, A., & Sinderen, D. Van. (2008). Lactic acid bacteria with potential to eliminate fungal spoilage in foods. *Journal of Applied Microbiology*, *104*(3), 915–923. https://doi.org/10.1111/j.1365-2672.2007.03619.x

Roy, U., Batish, V. K., Grover, S., & Neelakantan, S. (1996). Production of antifungal substance by *Lactococcus lactis* subsp. lactis CHD-28.3. *International Journal of Food Microbiology*, *32*(1–2), 27–34. https://doi.org/10.1016/0168-1605(96)01101-4

Rufián-Henares, J. A., & Morales, F. J. (2008). Microtiter plate-based assay for screening antimicrobial activity of melanoidins against *E. coli* and *S. aureus*. *Food Chemistry*, *111*(4), 1069–1074.

Ruggirello, M., Nucera, D., Cannoni, M., Peraino, A., Rosso, F., Fontana, M., Cocolin, L., & Dolci, P. (2019). Antifungal activity of yeasts and lactic acid bacteria

isolated from cocoa bean fermentations. *Food Research International*, *115*(September 2019), 519–525. https://doi.org/10.1016/j.foodres.2018.10.002

Ryan, L. A. M., Zannini, E., Dal Bello, F., Pawlowska, A., Koehler, P., & Arendt, E. K. (2011). *Lactobacillus amylovorus* DSM 19280 as a novel food-grade antifungal agent for bakery products. *International Journal of Food Microbiology*, *146*(3), 276–283. https://doi.org/10.1016/j.ijfoodmicro.2011.02.036

Sadat-mekmene, L., Genay, M., Atlan, D., Lortal, S., & Gagnaire, V. (2011). Original features of cell-envelope proteinases of *Lactobacillus helveticus* . A review. *International Journal of Food Microbiology*, *146*(1), 1–13. https://doi.org/10.1016/j.ijfoodmicro.2011.01.039

Sadeghi, A., Raeisi, M., Ebrahimi, M., & Sadeghi, B. (2016). Antifungal activity of *Pediococcus pentosaceus* isolated from whole barley sourdough. *Journal of Food Quality and Hazards Control*, *3*(1), 30–36.

Sadiq, F. A., Yan, B., Tian, F., Zhao, J., Zhang, H., & Chen, W. (2019). Lactic Acid Bacteria as Antifungal and Anti-Mycotoxigenic Agents: A comprehensive review. *Comprehensive Reviews in Food Science and Food Safety*, *18*(5), 1403–1436. https://doi.org/10.1111/1541-4337.12481

Saeedi, M., Shahidi, F., Mortazavi, S. A., Milani, E., & Tabatabaei Yazdi, F. (2015). Isolation and identification of lactic acid bacteria in winter salad (Local Pickle) during fermentation using 16S rRNA gene sequence analysis. *Journal of Food Safety*, *35*(3), 287–294. https://doi.org/10.1111/jfs.12128

Sagaram, U. S., Pandurangi, R., Kaur, J., Smith, T. J., & Shah, D. M. (2011). Structure-activity determinants in antifungal plant defensins msdef1 and mtdef4 with different modes of action against *Fusarium graminearum*. *PLoS ONE*, *6*(4). https://doi.org/10.1371/journal.pone.0018550

Salarbashi, D., Tajik, S., Shojaee-aliabadi, S., Ghasemlou, M., Moayyed, H., Khaksar, R., & Noghabi, M. S. (2013). Development of new active packaging film made from a soluble soybean polysaccharide incorporated *Zataria multiflora* Boiss and *Mentha pulegium* essential oils. *Food Chemistry*, *146*, 614–622. https://doi.org/10.1016/j.foodchem.2013.09.014

Salmerón, I., Thomas, K., & Pandiella, S. S. (2014). Effect of substrate composition and inoculum on the fermentation kinetics and fl avour compound pro fi les of potentially non-dairy probiotic formulations. *LWT- Food Science and Technology*, *55*(1), 240–247. https://doi.org/10.1016/j.lwt.2013.07.008

Salvador-Figueroa, M., Aragón-Gómez, W. I., Hernández-Ortiz, E., Vázquez-Ovando, J. A., & Adriano-Anaya, M. de L. (2011). Effect of chitosan coating on some characteristics of mango (*Mangifera indica* L.) "Ataulfo" subjected to hydrothermal process. *African Journal of Agricultural Research*, *6*(27), 5800–5807. https://doi.org/10.5897/AJAR10.784

Salvetti, E., Fondi, M., Fani, R., Torriani, S., & Felis, G. E. (2013). Evolution of lactic acid bacteria in the order lactobacillales as depicted by analysis of glycolysis and pentose phosphate pathways. *Systematic and Applied Microbiology*, *36*(5), 291–305. https://doi.org/10.1016/j.syapm.2013.03.009

Sánchez-González, L., Saavedra, J. I. Q., & Chiralt, A. (2014). Antilisterial and physical properties of biopolymer films containing lactic acid bacteria. *Food Control*, *35*(1), 200–206. https://doi.org/10.1016/j.foodcont.2013.07.001

Sánchez-gonzález, Pastor, C., Laura, M., & Alicia Chiralt, A. (2011). Quality and safety of table grapes coated with HPMC edible coatings containing propolis extract. *Postharvest Biology and Technology*, *60*(1), 57–63. https://doi.org/10.1016/j.postharvbio.2010.11.004.The

Sangsawad, P., Roytrakul, S., & Yongsawatdigul, J. (2017). Angiotensin converting enzyme (ACE) inhibitory peptides derived from the simulated *in vitro* gastrointestinal digestion of cooked chicken breast. *Journal of Functional Foods*, *29*, 77–83.

Sanjurjo, K., Flores, S., Gerschenson, L., & Jagus, R. (2006). Study of the performance of nisin supported in edible films. *Food Research International*, *39*(6), 749–754. https://doi.org/10.1016/j.foodres.2006.01.016

Santos, A. M. G., Lins, S. R. O., Da Silva, J. M., & De Oliveira, S. M. A. (2015). Low doses of gamma radiation in the management of postharvest *Lasiodiplodia theobromae* in mangos. *Brazilian Journal of Microbiology*, *46*(3), 841–847. https://doi.org/10.1590/S1517-838246320140363

Sathe, S. J., Nawani, N. N., Dhakephalkar, P. K., & Kapadnis, B. P. (2007). Antifungal lactic acid bacteria with potential to prolong shelf-life of fresh vegetables. *Journal of Applied Microbiology*, *103*(6), 2622–2628. https://doi.org/10.1111/j.1365-2672.2007.03525.x

Saúco, V. G. (2017). Trends in world mango production and marketing. In *Acta Horticulturae* (Vol. 1183, pp. 351–363). International Society for Horticultural Science. https://doi.org/10.17660/ActaHortic.2017.1183.51

Savijoki, M. K., Ingmer, H., & Varmanen, P. (2006). Proteolytic systems of lactic acid bacteria, 394–406. https://doi.org/10.1007/s00253-006-0427-1

Sayanjali, S., Ghanbarzadeh, B., & Ghiassifar, S. (2011). Evaluation of antimicrobial and physical properties of edible film based on carboxymethyl cellulose containing potassium sorbate on some mycotoxigenic *Aspergillus* species in fresh pistachios. *LWT - Food Science and Technology*, *44*(4), 1133–1138. https://doi.org/10.1016/j.lwt.2010.12.017

Schirra, M., D'Hallewin, G., Ben-Yehoshua, S., & Fallik, E. (2000). Host-pathogen interactions modulated by heat treatment. *Postharvest Biology and Technology*, *21*(1), 71–85. https://doi.org/10.1016/S0925-5214(00)00166-6

Schnürer, J., & Magnusson, J. (2005). Antifungal lactic acid bacteria as biopreservatives. *Trends in Food Science and Technology*, *16*(1–3), 70–78. https://doi.org/10.1016/j.tifs.2004.02.014

Sebti, I.; Martial-Gros, A; Carnet-Pantiez, A; Grelier, S. & Coma, V. (2005). Chitosan polymer as bioactive coating and film against *Aspergillus niger* contamination. *Journal of Food Science*, *70*(2), 100–104.

Sebti, I., Chollet, E., Degraeve, P., Noel, C., & Peyrol, E. (2007). Water sensitivity, antimicrobial, and physicochemical analyses of edible films based on HPMC and/or chitosan. *Journal of Agricultural and Food Chemistry*, *55*(3), 693–699.

Senthilkumar, M., Amaresan N., S. A. (2021). *Plant-Microbe Interactions:Laboratory techniques* (Springer P). Springer Science+Business Media, LLC, part of Springer Nature,New York Plaza, New York, NY 10004, U.S.A. https://doi.org/https://doi.org/10.1007/978-1-0716-1080-0

Settanni, L., & Corsetti, A. (2008). Application of bacteriocins in vegetable food biopreservation. *International Journal of Food Microbiology*, *121*(2), 123–138. https://doi.org/10.1016/j.ijfoodmicro.2007.09.001

Shai, Y. (1995). Molecular recognition between membrane-spanning polypeptides. *Trends in Biochemical Sciences*, *20*(11), 460–464. https://doi.org/10.1016/S0968-0004(00)89101-X

Shalini, R., & Gupta, D. K. (2010a). Utilization of pomace from apple processing industries: A review. *Journal of Food Science and Technology*. https://doi.org/10.1007/s13197-010-0061-x

Shalini, R., & Gupta, D. K. (2010b, August). Utilization of pomace from apple processing industries: A review. *Journal of Food Science and Technology*. https://doi.org/10.1007/s13197-010-0061-x

Shankar, S., & Rhim, J. W. (2016). Preparation of nanocellulose from micro-crystalline cellulose: The effect on the performance and properties of agar-based composite films. *Carbohydrate Polymers*, *135*, 18–26. https://doi.org/10.1016/j.carbpol.2015.08.082

Shapawi, Z. A., Hajar, S., & Shamsudin, R. (2021). Modeling respiration rate of fresh-cut sweet potato (Anggun) stored in different packaging films. *Food Packaging and Shelf Life*, *28*(March), 100657. https://doi.org/10.1016/j.fpsl.2021.100657

Sharma, R. R., Rakesh, V., Sanikommu, R., & Jhalegar, J. (2014). Pre-harvest fruit bagging: A useful approach for plant protection and improved post-harvest fruit quality - A review. *Journal of Horticultural Science & Biotechnology*, *89*(2), 101–113. https://doi.org/10.1080/14620316.2014.11513055

Sherman, A., Rubinstein, M., Eshed, R., Benita, M., Ish-Shalom, M., Sharabi-Schwager, M., Rozen, A., Saada, D., Cohen, Y., & Ophir, R. (2015). Mango (*Mangifera indica* L.) germplasm diversity based on single nucleotide polymorphisms

derived from the transcriptome. *BMC Plant Biology*, *15*(1). https://doi.org/10.1186/s12870-015-0663-6

Shi, S., Wang, W., Liu, L., Wu, S., Wei, Y., & Li, W. (2013). Effect of chitosan / nano-silica coating on the physicochemical characteristics of longan fruit under ambient temperature. *Journal of Food Engineering*, *118*(1), 125–131. https://doi.org/10.1016/j.jfoodeng.2013.03.029

Shi, X., Li, B., Qin, G., & Tian, S. (2012). Mechanism of antifungal action of borate against *Colletotrichum gloeosporioides* related to mitochondrial degradation in spores. *Postharvest Biology and Technology*, *67*, 138–143. https://doi.org/10.1016/j.postharvbio.2012.01.003

Shu, G., Shi, X., Chen, H., Ji, Z., & Meng, J. (2017). Optimization of goat milk with ACE inhibitory peptides fermented by *Lactobacillus bulgaricus* LB6 using response surface methodology. *Molecules*, *22*, 1–9. https://doi.org/10.3390/molecules22112001

Shu, X. Z., & Zhu, K. J. (2002). Controlled drug release properties of ionically cross-linked chitosan beads : the influence of anion structure. *International Journal of Pharmaceutics*, *233*(1–2), 217–225.

Shukla, R., Kumar, A., Singh, P., & Dubey, N. K. (2009). Efficacy of *Lippia alba* (Mill.) N.E. brown essential oil and its monoterpene aldehyde constituents against fungi isolated from some edible legume seeds and aflatoxin B1 production. *International Journal of Food Microbiology*, *135*(2), 165–170. https://doi.org/10.1016/j.ijfoodmicro.2009.08.002

Simple, K., & Tripti, B. (2014). Studies to enhance the shelf life of fruits using Aloe Vera based herbal coatings: A review. *International Journal of Agriculture and Food Science Technology*, *5*(3), 211–218. Retrieved from http://www.ripublication.com

Singh, V., Haque, S., Niwas, R., & Srivastava, A. (2017). Strategies for fermentation medium optimization : An in-depth review. *Frontiers in Microbiology*, *7*(2087). https://doi.org/10.3389/fmicb.2016.02087

Singh, Z., Singh, R. K., Sane, V. A., & Nath, P. (2013). Mango - postharvest biology and biotechnology. *Critical Reviews in Plant Sciences*, *32*(4), 217–236. https://doi.org/10.1080/07352689.2012.743399

Situ, H., Wei, G., Smith, C. J., Mashhoon, S., & Bobek, L. A. (2003). Human salivary MUC7 mucin peptides: Effect of size, charge and cysteine residues on antifungal activity. *Biochemical Journal*, *375*(1), 175–182. https://doi.org/10.1042/BJ20030779

Sivakumar, D., Jiang, Y., & Yahia, E. M. (2011). Maintaining mango (*Mangifera indica* L.) fruit quality during the export chain. *Food Research International*, *44*(5), 1254–1263. https://doi.org/10.1016/j.foodres.2010.11.022

Sjogren, Magnusson, Broberg, Schnurer, K. (2003). Antifungal 3-hydroxy fatty acids from *Lactobacillus plantarum* MiLAB 14. *Applied and Enviornmental Microbiology*, *69*(12), 7554–7557. https://doi.org/10.1128/AEM.69.12.7554

Slippers, B., Johnson, G. I., Crous, P. W., Coutinho, T. A., Wingfield, B. D., & Wingfield, M. J. (2005). Phylogenetic and morphological re-evaluation of the *Botryosphaeria* species causing diseases of *Mangifera indica*. *Mycologia*, *97*(1), 99–110. https://doi.org/10.1080/15572536.2006.11832843

Solovchenko, A., Yahia, E. M., & Chen, C. (2019). Pigments. In *Postharvest Physiology and Biochemistry of Fruits and Vegetables* (pp. 225–252). Elsevier.

Souza, V. G. L., Fernando, A. L., Pires, J. R. A., Rodrigues, P. F., Lopes, A. A. S., & Fernandes, F. M. B. (2017). Physical properties of chitosan films incorporated with natural antioxidants. *Industrial Crops and Products*, *107*, 565–572. https://doi.org/10.1016/j.indcrop.2017.04.056

Spalding, D. H. & Reeder, W. F. (1986). Decay and acceptability of mangos treated with combinations of hot water, imazalil, and ϒ-Radiation. *Plant Disease*, *70*(12), 1149. https://doi.org/10.1094/pd-70-1149

Sridevi, V., Padmaja, M., Sahitya, A., Vardhan, N., & Rao, G. (2015). Application of Box-Behnken design for the optimized production of lactic acid by newly isolated *Lactobacillus plantarum* JX183220 using cassava (*Manihot esculenta* Crantz) flour. *British Biotechnology Journal*, *9*(2), 1–9. https://doi.org/10.9734/bbj/2015/20236

Stead, D. (1993). The effect of hydroxycinnamic acids on the growth of wine-spoilage lactic acid bacteria. *Journal of Applied Bacteriology*, *75*(2), 135–141.

Stiles, M. E. (1996). Biopreservation by lactic acid bacteria. *Antonie van Leeuwenhoek*, *70*, 331–345.

Ström, K., Sjögren, J., Broberg, A., &, & Schnürer, J. (2002). *Lactobacillus plantarum* MiLAB 393 produces the antifungal cyclic dipeptides cyclo (L -Phe – L -Pro) and 3-phenyllactic acid. *Applied and Enviornmental Microbiology*, *68*(9), 4322–4327. https://doi.org/10.1128/AEM.68.9.4322

Sun, Harris, McCann, Guo, Argimon, W., Sun, Z., Harris, H. M. B., Mccann, A., Guo, C., Argimo, S., &Toole, P. W. O. (2015). Expanding the biotechnology potential of lactobacilli through comparative genomics of 213 strains and associated genera. *Nature Communications*, *6*. https://doi.org/10.1038/ncomms9322

Svanström, Å., Boveri, S., Boström, E., & Melin, P. (2013). The lactic acid bacteria metabolite phenyllactic acid inhibits both radial growth and sporulation of filamentous fungi. *BMC Research Notes*, *6*(1). https://doi.org/10.1186/1756-0500-6-464

Syvash, O. O., & Zolotareva, O. K. (2017). Regulation of chlorophyll degradation in plant tissues. *Biotechnologia Acta*, *10*(3).

Tang Jialing, Wang, X., Hu, Y., Zhang, Y., & Li, Y. (2016). Lactic acid fermentation from food waste with indigenous microbiota : Effects of pH , temperature and high OLR. *Waste Management*, *52*, 278–285. https://doi.org/10.1016/j.wasman.2016.03.034

Tang, T. S. (2001). Quality and characteristics of Malaysian palm kernel cake/expellers. *Palm Oil Developments*, *34*, 1–3.

Taniguchi, M., Ochiai, A., Takahashi, K., Nakamichi, S. I., Nomoto, T., Saitoh, E., Kato, T., & Tanaka, T. (2016). Effect of alanine, leucine, and arginine substitution on antimicrobial activity against C*andida albicans* and action mechanism of a cationic octadecapeptide derived from α-amylase of rice. *Biopolymers*, *106*(2), 219–229. https://doi.org/10.1002/bip.22817

Tashiro, Y., Inokuchi, S., Poudel, P., Okugawa, Y., Miyamoto, H., Miayamoto, H., & akai, K. (2016). Novel pH control strategy for efficient production of optically active L -lactic acid from kitchen refuse using a mixed culture system. *Bioresource Technology*, *216*, 52–59. https://doi.org/10.1016/j.biortech.2016.05.031

Tavassoli-Kafrani, E., Shekarchizadeh, H., & Masoudpour-Behabadi, M. (2016). Development of edible films and coatings from alginates and carrageenans. *Carbohydrate Polymers*, *137*, 360–374. https://doi.org/10.1016/j.carbpol.2015.10.074

Terefe, N. S., Scientific, T. C., Gamage, M., Vilkhu, K., Simons, L., Mawson, R., & Versteeg, C. (2009). The kinetics of inactivation of pectin methylesterase and polygalacturonase in tomato juice by thermosonication. *Food Chemistry Journal*, *117*, 20–27. https://doi.org/10.1016/j.foodchem.2009.03.067

Thaipong, K., Boonprakob, U., Crosby, K., Cisneros-Zevallos, L., & Hawkins Byrne, D. (2006). Comparison of ABTS, DPPH, FRAP, and ORAC assays for estimating antioxidant activity from guava fruit extracts. *Journal of Food Composition and Analysis*, *19*(6–7), 669–675. https://doi.org/10.1016/j.jfca.2006.01.003

Thevissen, K., Terras, F. R. G., & Broekaert, W. F. (1999). Permeabilization of fungal membranes by plant defensins inhibits fungal growth. *Applied and Environmental Microbiology*, *65*(12), 5451–5458. https://doi.org/10.1128/aem.65.12.5451-5458.1999

Thokchom, R., & Mandal, G. (2019). Effect of postharvest treatments on physical characteristics of mango. *Journal of Pharmacognosy and Phytochemistry*, *8*, 2239–2243.

Thongsook, T., & Tiyaboonchai, W. (2011). Inhibitory effect of sericin on polyphenol oxidase and its application as edible coating. *International Journal of Food*

Science and Technology, *46*(10), 2052–2061. https://doi.org/10.1111/j.1365-2621.2011.02716.x

Tian, M. S., Prakash, S., Elgar, H. J., Young, H., Burmeister, D. M., & Ross, G. S. (2000). Responses of strawberry fruit to 1-methylcyclopropene (1-MCP) and ethylene. *Plant Growth Regulation*, *32*(1), 83–90.

Tian, S., Liu, J., Zhang, C., & Meng, X. (2010). Quality properties of harvested mango fruits and regulating technologies. *Fresh Produce*, *4*(sp 1), 49–55. Retrieved from http://www.nal.usda.gov/fnic/foodcomp/cgi-bin/list-nut-edit.pl

Tongnuanchan, P., Benjakul, S., & Prodpran, T. (2013). Physico-chemical properties, morphology and antioxidant activity of film from fish skin gelatin incorporated with root essential oils. *Journal of Food Engineering*, *117*(3), 350–360. https://doi.org/10.1016/j.jfoodeng.2013.03.005

Torrieri, E., Cavella, S., & Masi, P. (2009). Modelling the respiration rate of fresh-cut Annurca apples to develop modified atmosphere packaging. *International Journal of Food Science and Technology*, *44*(5), 890–899. https://doi.org/10.1111/j.1365-2621.2007.01615.x

Treviño-Garza, M. Z., García, S., Flores-González, M. del S., & Arévalo-Niño, K. (2015). Edible active coatings based on pectin, pullulan, and chitosan increase quality and shelf life of strawberries (*Fragaria ananassa*). *Journal of Food Science*, *80*(8), 1823–1830. https://doi.org/10.1111/1750-3841.12938

Trias, R., Bañeras, L., Badosa, E., & Montesinos, E. (2008). Bioprotection of golden delicious apples and iceberg lettuce against foodborne bacterial pathogens by lactic acid bacteria. *International Journal of Food Microbiology*, *123*(1–2), 50–60. https://doi.org/10.1016/j.ijfoodmicro.2007.11.065

Trias, R., Bañeras, L., Montesinos, E., & Badosa, E. (2008). Lactic acid bacteria from fresh fruit and vegetables as biocontrol agents of phytopathogenic bacteria and fungi. *International Microbiology*, *11*(4), 231–236. https://doi.org/10.2436/20.1501.01.66

Tripathi, K. D. (2008). Antimicrobial drugs: Essentials of medical pharmacology. *New Delhi, ND. JP Brothers Medical Publishers (p) Ltd*, *733*.

Tung, Y., Lee, B., Liu, C., & Pan, T. (2011). Optimization of culture condition for ACEI and GABA production by lactic acid bacteria. *Journal of Food Science*, *76*(9), 585–591. https://doi.org/10.1111/j.1750-3841.2011.02379.x

Udhayashree, N., Senbagam, D., Senthilkumar, B., Nithya, K., & Gurusamy, R. (2012). Production of bacteriocin and their application in food products. *Asian Pacific Journal of Tropical Biomedicine*, *2*(1), 406–410. https://doi.org/10.1016/S2221-1691(12)60197-X

United State Department of Agriculture. (2006). Treatments for fruits and vegetables. Rules and Regulations. *Federal Register*, *71*, 4451–4464.

Usha, R., & Pothakamury, U. R. (1995). Fundamental aspects of controlled release in foods. Trends in. *Food Sci and Technol*, *6*(12), 397–406.

Valencia-Chamorro, S. A., Pérez-Gago, M. B., del Río, M. Á., & Palou, L. (2009). Effect of antifungal hydroxypropyl methylcellulose (HPMC)-lipid edible composite coatings on postharvest decay development and quality attributes of cold-stored "Valencia" oranges. *Postharvest Biology and Technology*, *54*(2), 72–79. https://doi.org/10.1016/j.postharvbio.2009.06.001

Valerio, F., Di Biase, M., Lattanzio, V. M. T., & Lavermicocca, P. (2016). Improvement of the antifungal activity of lactic acid bacteria by addition to the growth medium of phenylpyruvic acid, a precursor of phenyllactic acid. *International Journal of Food Microbiology*, *222*, 1–7.

Valero, D., Díaz-Mula, H. M., Zapata, P. J., Guillén, F., Martínez-Romero, D., Castillo, S., & Serrano, M. (2013). Effects of alginate edible coating on preserving fruit quality in four plum cultivars during postharvest storage. *Postharvest Biology and Technology*, *77*, 1–6. https://doi.org/10.1016/j.postharvbio.2012.10.011

Van Der Weerden, N. L., Bleackley, M. R., & Anderson, M. A. (2013). Properties and mechanisms of action of naturally occurring antifungal peptides. *Cellular and Molecular Life Sciences*, *70*(19), 3545–3570. https://doi.org/10.1007/s00018-013-1260-1

Vargas, M., Albors, A., Chiralt, A., & Gonz, C. (2006). Quality of cold-stored strawberries as affected by chitosan-oleic acid edible coatings. *Postharvest Biology and Technology*, *41*, 164–171. https://doi.org/10.1016/j.postharvbio.2006.03.016

Vegas, C., Zavaleta, A. I., & Zarzoso, B. (2018). Optimization of fermentation process conditions for chili pepper (*Capsicum frutescens*) fruit using Response Surface Methodology optimización del proceso de fermentación de frutos de ají. *Agronomía Colombiana*, *36*(1), 89–97. https://doi.org/10.15446/agron.colomb.v36n1.69164

Vela, J. D., Totosaus, A., & Cruz, A. (2013). *In vitro* evaluation of the fermentation of added-value agroindustrial by- products : Cactus pear (*Opuntia ficus-indica* L.) peel and pineapple (*Ananas comosus*) peel as functional ingrdients. *International Journal of Food Science and Technology*, *48*(7), 1460–1467. https://doi.org/10.1111/ijfs.12113

Velickova, E., Winkelhausen, E., Kuzmanova, S., Alves, V. D., & Moldão-Martins, M. (2013). Impact of chitosan-beeswax edible coatings on the quality of fresh strawberries (*Fragaria ananassa* cv Camarosa) under commercial storage conditions. *LWT - Food Science and Technology*, *52*(2), 80–92. https://doi.org/10.1016/j.lwt.2013.02.004

Von Wright, A., & Axelsson, L. (2011). Lactic acid bacteria: an introduction. *Lactic Acid Bacteria: Microbiological and Functional Aspects*, *4*, 1–16.

Vukotića, Strahinića, Begovića, Lukića, Kojića, and F., & AInstitute. (2016). Survey on proteolytic activity and diversity of proteinase genes in mesophilic *Lactobacilli*. *Microbiology*, *85*(1), 33–41. https://doi.org/10.1134/S002626171601015X

Wade, N. L., Kavanagh, E. E., Hockleyo, D. G., & Bradyb, C. J. (1992). Relationship between Softening and the Polyuronides in Ripening Banana Fruit. *Journal of the Science of Food and Agriculture*, *60*, 61–68.

Wang, A. K., Wu, K., Xiao, M., & Kuang, Y. (2017). Structural characterization and properties of konjac glucomannan and zein blend films. *International Journal of Biological Macromolecules*, *105*, 1096–1104. https://doi.org/10.1016/j.ijbiomac.2017.07.127

Wang, H. K., Sun, Y., Chen, C., Sun, Z., Zhou, Y. C., Shen, F. Di, Shang, H. P., & Dai, Y. J. (2013). Genome shuffling of *Lactobacillus plantarum* for improving antifungal activity. *Food Control*, *32*(2), 341–347. https://doi.org/10.1016/j.foodcont.2012.12.020

Wang, H. K., Yan, Y. H., Wang, J. M., Zhang, H. P., & Qi, W. (2012). Production and characterization of antifungal compounds produced by *Lactobacillus plantarum* IMAU10014. *PLoS ONE*, *7*(1). https://doi.org/10.1371/journal.pone.0029452

Wang, Lina, Liu, F., Jiang, Y., Chai, Z., Li, P., Cheng, Y., Jing, H., & Leng, X. (2011). Synergistic antimicrobial activities of natural essential oils with chitosan films. *Journal of Agricultural and Food Chemistry*, *59*, 12411–12419. https://doi.org/10.1021/jf203165k

Wang, Liqun, Hu, W., Deng, J., Liu, X., Zhou, J., & Li, X. (2019). Antibacterial activity of: *Litsea cubeba* essential oil and its mechanism against *Botrytis cinerea*. *RSC Advances*, *9*(50), 28987–28995. https://doi.org/10.1039/c9ra05338g

Wang, S. Y., & Gao, H. (2013). Effect of chitosan-based edible coating on antioxidants, antioxidant enzyme system, and postharvest fruit quality of strawberries (Fragaria x aranassa Duch .). *LWT - Food Science and Technology*, *52*(2), 71–79. https://doi.org/10.1016/j.lwt.2012.05.003

Wang, Ying, Tashiro, Y., & Sonomoto, K. (2015). Fermentative production of lactic acid from renewable materials: Recent achievements, prospects, and limits. *Journal of Bioscience and Bioengineering*, *119*(1), 10–18.

Wang, Yonghong, Fang, X., An, F., Wang, G., & Zhang, X. (2011). Improvement of antibiotic activity of *Xenorhabdus bovienii* by medium optimization using response surface methodology. *Microbial Cell Factories*, *10*(1), 1–15.

Wang, Z., & Wang, G. (2004). APD: the antimicrobial peptide database. *Nucleic Acids Research*, *32*, 590–592. https://doi.org/10.1093/nar/gkh025

Wehr, H. M., Frank, J. F., & Association, A. P. H. (2004). *Standard methods for the examination of dairy products*. American Public Health Association Washington, DC.

Wei Zhou, He, Y., Liu, F., Liao, L., Huang, X., Li, R., & Zou, Y. (2021). Carboxymethyl chitosan-pullulan edible films enriched with galangal essential oil : Characterization and application in mango preservation. *Carbohydrate Polymers*, *256*(August 2020), 117579. https://doi.org/10.1016/j.carbpol.2020.117579

Wels, M., Overmars, L., Francke, C., Kleerebezem, M., & Siezen, R. J. (2011). Reconstruction of the regulatory network of *Lactobacillus plantarum* WCFS1 on basis of correlated gene expression and conserved regulatory motifs. *Microbial Biotechnology*, *4*(3), 333–344. https://doi.org/10.1111/j.1751-7915.2010.00217.x

WHO. (1998). *Surface decontamination of fruits and vegetables eaten raw: a review*. World Health Organization,. https://doi.org/Available online: http://apps.who.int/iris/handle/10665/64435

Willem, A., Thibault, J., & Lacroix, C. (2002). *Lactobacillus helveticus* growth and lactic acid production during pH- controlled batch cultures in whey permeate / yeast extract medium. Part I. multiple factor kinetic analysis. *Enzyme and Microbial Technology*, *30*, 176–186.

Wills, R. B. H., & Ku, V. V. V. (2002). Use of 1-MCP to extend the time to ripen of green tomatoes and postharvest life of ripe tomatoes. *Postharvest Biology and Technology*, *26*, 85–90.

Wisniewski, M., Droby, S., Norelli, J., Liu, J., & Schena, L. (2016). Alternative management technologies for postharvest disease control: The journey from simplicity to complexity. *Postharvest Biology and Technology*, *122*(July 2016), 3–10. https://doi.org/10.1016/j.postharvbio.2016.05.012

Woolford, M. K. (1975). Microbiological screening of the straight chain fatty acids (C1-C12) as potential silage additives. *Journal of Science Food and Agriculture*, *26*, 219–228.

Wu, Y., Ma, H., Zheng, M., & Wang, K. (2015). Bioresource technology lactic acid production from acidogenic fermentation of fruit and vegetable wastes. *Bioresource Technology*, *191*, 53–58. https://doi.org/10.1016/j.biortech.2015.04.100

Xing, Y., Li, X., Xu, Q., Yun, J., Lu, Y., & Tang, Y. (2011). Effects of chitosan coating enriched with cinnamon oil on qualitative properties of sweet pepper (*Capsicum annuum* L.). *Food Chemistry*, *124*(4), 1443–1450. https://doi.org/10.1016/j.foodchem.2010.07.105

Xu, D., Qin, H., & Ren, D. (2018). Prolonged preservation of tangerine fruits using chitosan/montmorillonite composite coating. *Postharvest Biology and Technology*, *143*, 50–57. https://doi.org/10.1016/j.postharvbio.2018.04.013

Yahia, E. M. (2015). *Postharvest Handling of Mango*. Agricultural Technology Utilization and Transfer/RONCO *technical staff, Egypt. Accessed*, *4*, 2000..

Yan, T., Id, Y., Feng, R. J., Zhou, D. B., Pan, Y. Y., Chen, Y. F., Wang, F., Yin, L. Y., Zhang, Y. D., & Xie, J. H. (2018). Optimization of fermentation conditions through response surface methodology for enhanced antibacterial metabolite production by *Streptomyces* sp . 1-14 from cassava rhizosphere. *PLoS ONE*, 1–21.

Yang, E. J., & Chang, H. C. (2010). Purification of a new antifungal compound produced by *Lactobacillus plantarum* AF1 isolated from kimchi. *International Journal of Food Microbiology*, *139*(1–2), 56–63. https://doi.org/10.1016/j.ijfoodmicro.2010.02.012

Yang, S. O., Kim, S. H., Cho, S., Lee, J., Kim, Y. S., Yun, S. S., & Choi, H. K. (2009). Classification of fermented soymilk during fermentation by 1H-NMR coupled with principal component analysis and elucidation of free-radical scavenging activities. *Bioscience, Biotechnology and Biochemistry*, *73*(5), 1184–1188. https://doi.org/10.1271/bbb.80743

Yeaman, M. R., & Y. N. Y. (2003). Mechanisms of antimicrobial peptide action and resistance. *Pharmacological Reviews*, *55*(1), 27–55. https://doi.org/10.1016/B978-012526451-8/50011-4

Yenjit, P., Issarakraisila, M., Intana, W., & Chantrapromma, K. (2010). Fungicidal activity of compounds extracted from the pericarp of *Areca catechu* against *Colletotrichum gloeosporioides* in vitro and in mango fruit. *Postharvest Biology and Technology*, *55*(2), 129–132. https://doi.org/10.1016/j.postharvbio.2009.09.003

Yépez, A., Luz, C., Meca, G., Vignolo, G., Mañes, J., & Aznar, R. (2017). Biopreservation potential of lactic acid bacteria from Andean fermented food of vegetal origin. *Food Control*, *78*, 393–400. https://doi.org/10.1016/j.foodcont.2017.03.009

Yezhi, F., Preetam, S., Bhunia, A. K., & Yaoa, Y. (2019). *Delivery Systems of Antimicrobial Compounds to Food Yezhi Fu*.

Youssef, K., Roberto, S. R., & de Oliveira, A. G. (2019). Ultra-structural alterations in *Botrytis cinerea*, the causal agent of gray mold treated with salt solutions. *Biomolecules*, *9*(10), 1–17. https://doi.org/10.3390/biom9100582

Yousuf, B., Qadri, O. S., & Srivastava, A. K. (2018). Recent developments in shelf-life extension of fresh-cut fruits and vegetables by application of different edible coatings: A review. *LWT - Food Science and Technology*, *89*, 198–209. https://doi.org/10.1016/j.lwt.2017.10.051

Zaharah, S. S., & Singh, Z. (2011). Mode of action of nitric oxide in inhibiting ethylene biosynthesis and fruit softening during ripening and cool storage of "Kensington Pride" mango. *Postharvest Biology and Technology*, *62*(3), 258–266. https://doi.org/10.1016/j.postharvbio.2011.06.007

Zeynep Kalaycıoglu, Emrah Torlak, G., Akın-Evingur, I. O., & Erim, F. B. (2017). Antimicrobial and physical properties of chitosan films incorporated with turmeric extract. *International Journal of Biological Macromolecules Received*. https://doi.org/10.1016/j.ijbiomac.2017.03.174

Zhang, N., Liu, J., Li, J., Chen, C., Zhang, H., Wang, H.-K., & Lu, F.P. (2016). Characteristics and application in food preservatives of *Lactobacillus plantarum* TK9 isolated from naturally fermented congee. *International Journal of Food Engineering*, *12*(4), 377–384.

Zhang, Q., Zhang, J., Shen, J., Silva, A., Dennis, D. A., & Barrow, C. J. (2006). A simple 96-well microplate method for estimation of total polyphenol content in seaweeds. *Journal of Applied Phycology*, *18*, 445–450. https://doi.org/10.1007/s10811-006-9048-4

Zhang, Y., & Vadlani, P. V. (2014). Lactic acid production from biomass-derived sugars via co-fermentation of *Lactobacillus brevis* and *Lactobacillus plantarum*. *Journal of Bioscience and Bioengineering*, 1–6. https://doi.org/10.1016/j.jbiosc.2014.10.027

Zhang, Z., Pang, X., Xuewu, D., Ji, Z., & Jiang, Y. (2005). Role of peroxidase in anthocyanin degradation in litchi fruit pericarp. *Food Chemistry*, *90*(1–2), 47–52. https://doi.org/10.1016/j.foodchem.2004.03.023

Zheng, Y., Fung, R. W. M., Wang, S. Y., & Wang, C. Y. (2008). Transcript levels of antioxidative genes and oxygen radical scavenging enzyme activities in chilled zucchini squash in response to superatmospheric oxygen. *Postharvest Biology and Technology*, *47*(2), 151–158. https://doi.org/10.1016/j.postharvbio.2007.06.016

Zhou, M., Hu, Q., Wang, T., Xue, J., & Luo, Y. (2016). Effects of different polysaccharides on the formation of egg yolk LDL complex nanogels for nutrient delivery. *Carbohydrate Polymers*. https://doi.org/10.1016/j.carbpol.2016.07.105

Zhou, R., Li, Y., Yan, L., & Xie, J. (2011). Effect of edible coatings on enzymes, cell-membrane integrity, and cell-wall constituents in relation to brittleness and firmness of Huanghua pears (*Pyrus pyrifolia* Nakai, cv. Huanghua) during storage. *Food Chemistry*, *124*(2), 569–575. https://doi.org/10.1016/j.foodchem.2010.06.075

Zhu, X., Wang, Q., Cao, J., & Jiang, W. (2008). Effect of chitosan coating on postharvest quality of mango (*Mangifera indica* L. cv. Tainong) fruits. *Journal of Food Processing and Preservation*, *32*, 770–784.