NUTRACEUTICALS AND FUNCTIONAL FOODS

Nutraceuticals and Functional Foods: Chemistry and Health Promoting Properties of Fruits and Beverages Involved In Prevention of Chronic Diseases

No. of Pages: 354

ISBN: 978-1-78021-037-7 (eBook)
ISBN: 978-1-78021-537-2 (Print Volume)

For more information of e-book and Print Volume(s) order, please click here Or contact : eolssunesco@gmail.com
CONTENTS

Preface vii

Chemistry and Health Promoting Properties Of Tea Polyphenols For Life Supporting Systems 1
Babasaheb Bhaskar Rao Borse and Lingamallu Jagan Mohan Rao, CSIR-Central Food Technological Research Institute, Mysore-570020, India

1. Introduction
   1.1. Origin and History
   1.2. World Scenario of Production and Trade
   1.3. Botanical and Taxonomical characteristics
   1.4. General Characteristics
   1.5. Chemical composition

2. Health-Promoting Properties of Tea Polyphenols for Life Supporting Systems - In Vitro and In Vivo Studies
   2.1. Antioxidant activity
      2.1.1. Reactive Oxygen Species and Interaction of Biomolecules and Scavenging Of Different Types of Radicals
      2.1.2. Protection of low-density lipoprotein from oxidation
      2.1.3. Studies on Animal Models
      2.1.4. Oxidative Stress
   2.2. Antimutagenic Activity
   2.3. Anticancer Activity
      2.3.1. Oral Cancer
      2.3.2. Esophageal And Gastric Cancer
      2.3.3. Intestinal / Colon / Rectal Cancer
      2.3.4. Lung Cancer
      2.3.5. Prostate Cancer
      2.3.6. Breast Cancer
      2.3.7. Liver Cancer
      2.3.8. Skin Cancer
      2.3.9. Blood Cancer
      2.3.10. Urinary Tract Cancer
      2.3.11. Anticancer Activity of Tea and Mechanism
         2.3.11.1. Induction of Apoptosis
         2.3.11.2. Inhibition of Activation of Indirect Acting Mutagens
         2.3.11.3. Inhibition Of Carcinogen DNA Adducts Formation
         2.3.11.4. Cancer Chemoprevention
         2.3.11.5. Prevention of Heterocyclic Amine Formation
      2.3.12. Miscellaneous
   2.4. Effect of Black Tea on Cardiovascular System
      2.4.1. Prevention of LDL Oxidation
      2.4.2. Effect on Lipid Profile
   2.5. Effect on Gastrointestinal Tract
   2.6. Antiarthritic Action
   2.7. Other Biological Activities
      2.7.1. Role In Muscle Contraction
      2.7.2. Antitoxic Activity
      2.7.3. Enzyme Activity
      2.7.4. Hypoglycaemic Effect
      2.7.5. Neurological Effects of Tea
      2.7.6. Effect on Cell Swelling
      2.7.7. Antimicrobial Activity
      2.7.8. Allied Biological Activities
3. Studies on Human Models
   3.1. Antioxidant Activity
   3.2. Anticancer Activity
      3.2.1. Effect on Lung Cancer
      3.2.2. Effect on Prostate Cancer
      3.2.3. Effect on Breast Cancer
      3.2.4. Effect on Skin Cancer
      3.2.5. Mechanism of Anticancer Activity of Tea in Human
   3.3. Role of Tea in Human Cardiovascular System
      3.3.1. Platelet Function
      3.3.2. Homocysteine Levels
      3.3.3. Blood Flow
      3.3.4. Effect on Lipid Profile
      3.3.5. Epidemiological Studies
      3.3.6. Effect on Stroke Incidence
   3.4. Intestinal Tract – Effect of Tea
   3.5. Effect on Bone Cells and Minerals
   3.6. Anti-Inflammatory Activity of Tea
   3.7. Antiviral Activity
   3.8. Neurodegenerative Diseases
   3.9. Antidiabetic Effect
   3.10. Dental Protection
   3.11. Effect on Immune System
   3.12. Effect on Malaria
   3.13. Effect on Dehydration
   3.14. Effects on Central Nervous System
   3.15. Effect of Tea in Topical Wound Healing Activity
   3.16. Antimicrobial Action of Tea in Humans
   3.17. Regulation of Intestinal Microflora
4. Conclusions and Future Scope

Coffee: The Rationale Behind 4 Centuries Of Consumption
Sherweit H. El-Ahmady and Mohamed L. Ashour, Pharmacognosy Department, Faculty of Pharmacy, Ain Shams University, Cairo, Egypt

1. Origin and History
2. Taxonomy and Botanical Features
3. Production and Processing
4. Phytochemicals in Coffee
   4.1. Chlorogenic and Other Organic Acid Derivatives
   4.2. Methyl Xanthines and Other Alkaloids
   4.3. Diterpenes and Sterols
   4.4. Sugars and Polysaccharides
   4.5. Volatile Compounds
5. Coffee and Health
   5.1. Folk Medicine
   5.2. Antioxidant Activity
   5.3. Antimicrobial and Antiviral Activity
   5.4. Anti-inflammatory Activity
   5.5. Hepatoprotective Activity
   5.6. Antihyperlipidemic, Antiobesity and Diabetes
   5.7. Cardiovascular Diseases
   5.8. Coffee and Cancer
   5.9. Neurodegenerative Diseases
      5.9.1. Neuroprotective Activity
      5.9.2. Alzheimer’s Disease
      5.9.3. Parkinson’s Disease
   5.10. Reproductive Hormone Levels and Phytoestrogen Activity
5.11. Children Behavior and Health
5.12. Coffee and Digestion
5.13. Mutagenic, Genotoxic and Teratogenic Activities
5.14. Other Medicinal Uses
5.15. Bioavailability of Coffee Constituents
6. Non-medicinal Uses
7. Economic Importance
8. Cultural Impact
9. Relevance to Human Welfare and Peace
10. Future and Sustainable Development

Nutritional Value, Functional Properties And Industrial Applications Of Fruit Juice

R L Bardwaj and Urvashi Nandal, Krishi Vigyan Kendra, Sirohi, Maharana Pratap University of Agriculture & Technology, Udaipur, Rajasthan, India.

1. Introduction
2. Role of Fruit Juices in Therapeutic Nutritional Security: A Concept
3. Categories and Products of Fruit Juices
   3.1. Fruit Juice
   3.2. Fruit Nectar
   3.3. Juice Drink
   3.4. Concentrated Fruit Juice
   3.5. Dehydrated/Powdered Fruit Juice
   3.6. Juice Blends
   3.7. Cordial
   3.8. Squash
   3.9. Fermented Fruit Juice
   3.10. Sweetened Beverages
   3.11. Fruit Juice From Concentrate
   3.12. Cold Drinks
   3.13. Ready-to-serve (RTS)
4. Bioactive Compounds in Fruit Juices
   4.1. Flavonoids And Polyphenols
   4.2. Aroma Producing Compounds
   4.3. Colour Giving Compounds
5. Proximate Composition and Nutritional Properties of Fruit Juices
   5.1. Water in Fruit Juices
   5.2. Carbohydrates
   5.3. Proteins and Amino Acids
   5.4. Lipids
   5.5. Organic acids
   5.6. Vitamins
   5.7. Minerals and Trace Elements
   5.8. Energy
   5.9. Dietary Fibre
6. Interaction Mechanism of Fruit Juice Components in Human Body
   6.1. Bioavailability and Pharmacokinetics
   6.2. Molecular Mechanisms of the Neuroprotective Effects of Resveratrol
7. Industrial Applications of Fruit Juices and Future Prospects of Fruit Juice Industry
8. General Dietary Recommendations of Fruit Juice
9. Therapeutic Role of Fruit Juices
   9.1. Glycemic Index and Diabetes
   9.2. Cardiovascular Health
   9.3. Bone Health
   9.4. Brain Health, Cognition and Ageing
   9.5. Anti Cancer and Anti-Inflammatory Activities
   9.6. Skin Health
   9.7. Control Iron Deficiency Anaemia
Pomegranate as A Source of Nutraceuticals And as A Functional Food

Krishna Murthy Nagendra Prasad, School of Engineering, Monash University, Selangor, Malaysia & Universiti Putra Malaysia, Selangor, Malaysia
Anand Pandurang Kulkarni, Central Drug Research Institute, Lucknow, India
Aradhya Somaradhya Mallikarjuna, Central Food Technological Research Institute, Mysore, India
Jian Sun, Institute of Agro-food Science and Technology, Guangxi Academy of Agricultural Sciences, China
Amin Ismail, Universiti Putra Malaysia, Selangor, Malaysia

1. Introduction
2. Origin and History
3. Botanical Classification
4. Vernacular Names
5. Commercial Varieties of Pomegranate
6. Primary Metabolite Composition
7. Nutritional Composition
8. Bioactive Compounds
9. Health Promoting Properties
   9.1. Antioxidant Activity
   9.2. Anticancer Activity
   9.3. Cardiovascular Activity
   9.4. Diabetes
10. Concluding Remarks

Citrus: A Treasure Trove Of Health-Promoting Phytochemical

Amit Vikram, Ram M. Uckoo, Kotamballi N. Chidambara Murthy, Bhimanagouda S. Patil, and Guddarangavahahally K. Jayaprakasha, Vegetable and Fruit Improvement Center, Department of Horticultural Sciences, Texas A&M University, College Station, TX 77843, USA

1. Introduction
2. Bioactive Molecules in Citrus and their Analysis
   2.1. Vitamin C and Organic acids
   2.2. Carotenoids
   2.3. Amines
   2.4. Flavonoids
   2.5. Terpenoids
      2.5.1. Monoterpenes
      2.5.2. Limonoids
   2.6. Phenolic acids
   2.7. Furocoumarins
3. The Health-Promoting Properties of Citrus
   3.1. Prevention of Scurvy
   3.2. Cardiovascular Health
   3.3. Bone Health
   3.4. Cancer Prevention
   3.5. Antioxidants are Guardians of Health
   3.6. Antimicrobial Effects
   3.7. Antifeedant Activity
4. Human Studies
5. Citrus and Food-Drug Interactions
6. Citrus in ancient Folk Medicine
7. Concluding Remarks
Chemistry And Biological Activities Of Grapes
John M. Pezzuto and Tamara P. Kondratyuk, College of Pharmacy, University of Hawaii at Hilo, 34 Rainbow Drive, Hilo, HI 96720, USA

1. Introduction
2. Health Promoting Grape Nutrients
3. Polyphenols
   3.1. Multiple Biological Functions of Dietary Polyphenols
   3.2. Antioxidant Activities of Dietary Polyphenols
   3.3. Anticancer Effect of Polyphenols
4. Resveratrol
   4.1. Antioxidant Activity of Resveratrol
   4.2. Resveratrol and Cancer
   4.3. Resveratrol Metabolism and Pleiotropic Effects
5. Chemistry of Wine
6. Concluding Remarks

Composition And Health-Promoting Properties Of Kiwifruit And Annona
Giuseppe Gattuso and Davide Barreca, Dipartimento di Scienze Chimiche, Università di Messina, Messina, Italy

1. Introduction
2. Kiwifruit
   2.1. Facts and figures about kiwifruit
   2.2. Kiwifruit composition
   2.3. Kiwifruit antioxidant activity
   2.4. Kiwifruit nutritional and pharmacological properties
3. Annona
   3.1. Facts and figures about Annona
   3.2. Annona composition
   3.3. Annona antioxidant activity
   3.4. Annona pharmacological properties
4. Concluding remarks

Anthocyanins From Berries: Chemistry And Roles In Inflammation And Diabetes
Elvira Gonzalez de Mejia, University of Illinois, Department of Food Science and Human Nutrition, 228 ERML, 1201 W. Gregory Dr., Urbana, IL, 61802, USA.
Michelle H. Johnson, University of Illinois, Division of Nutritional Sciences, 228 ERML, 1201 W. Gregory Dr., Urbana, IL, 61802, USA.

1. Introduction to Berries
   1.1. Botanical and Common Definitions
   1.2. Horticulture and Geographical Significance: Berries around the World (Figure 2)
   1.3. Production and Potential Future Markets
2. Berry Composition
   2.1. Structure of Anthocyanins
   2.2. Main Anthocyanins in Berries
3. Biological Activity of Anthocyanins
   3.1. Absorption, Distribution, Metabolism, and Excretion of Anthocyanins in Humans
   3.2. Antioxidant Capacity
4. Health Benefits: Inflammation
5. Health Benefits: Diabetes
   5.1 Anti-Diabetic Human Studies
   5.2. Anti-Diabetic Studies Using Animal Models
   5.3. In Vitro Clinical Targets
6. Other Health Benefits
7. Concluding Remarks
8. Acknowledgments

Heart Health Benefits and Regulatory Status of Plant Sterols
Jerzy Zawistowski and David D. Kitts, University of British Columbia, Food, Nutrition and Health,
Vancouver, British Columbia, Canada

1. Introduction
2. Chemistry, Properties and Source of Sterols
   2.1. Solubility
   2.2. Oxidation Reactions
3. The Effect of Plant Sterols on Coronary Heart Disease
   3.1. Efficacy of Sterols and Functional Foods
   3.2. Efficacy of Sterols and Dietary Supplements
   3.3. Effect of Sterols on Intake Frequency
   3.4. Effect of Sterols on Plasma Triacylglycerides
   3.5. Anti-inflammatory Properties of Sterols
4. Mechanism of Cholesterol Lowering by Sterols
5. Safety of Sterols
6. Regulations and Health Claims on Functional Foods Enriched with Sterols
   6.1. European Union
   6.2. United States of America
   6.3. Australia and New Zealand
   6.4. Japan and Other Asian Countries
   6.5. Canada
7. Concluding Remarks

Index

About EOLSS