Valorization of kiwi by-products for the recovery of bioactive compounds: circular economy model

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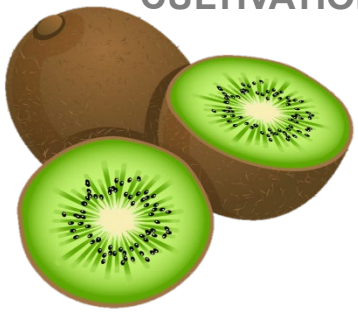
INTRODUCTION

KIWI CULTIVATION



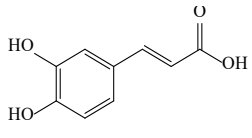
MARKET

NEW PRODUCTS

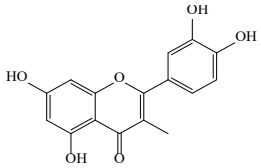
- Food additives
- Nutraceuticals
- Supplements
- Cosmetics

DIRECT CONSUMPTION

BIOACTIVE COMPOUNDS



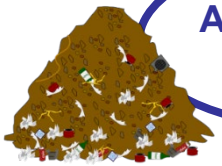
Caffeic acid



Quercetin

Secondary metabolites

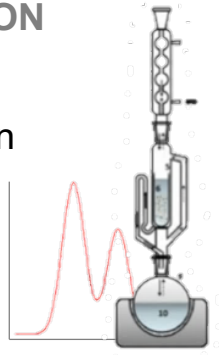
ASSOCIATED WASTE



ACCUMULATION INCINERATION

VALORIZATION

- ID
- Quantification
- Extraction
- Purification



BIOACTIVITIES

- Antioxidant
- Antimicrobial
- Antitumor
- Anti-inflammatory
- Anti-diabetic

INTRODUCTION

BOTANICAL STRUCTURES of *Actinidia* spp.

MAINTENANCE WASTE

FRUITS **FLOWERS** **LEAVES** **STEMS**




- PULP
- SKIN
- SEED

Delicious actinidia

Actinidia chinensis

Actinidia arguta

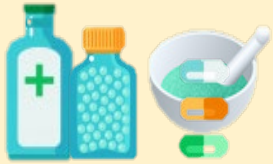
INTRODUCTION

Industrial processing

Industrial applications

Nutraceuticals

Pharmaceutical/ cosmetics



WASTE

Skin

Pulp

Seeds

Agricultural maintenance

Leaves

Flowers

Pruning

Residues

Bioactive compounds

- Phenolic compounds
- Vitamins
- Pigments
- Others

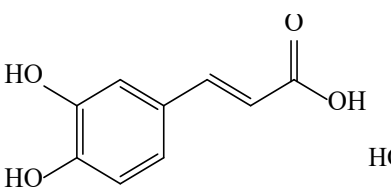
Bioactive properties

- Antioxidants
- Anti-inflammatory
- Antitumor
- Prebiotic

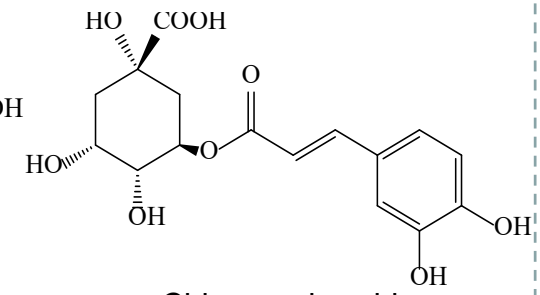
RESULTS

RESIDUES FROM INDUSTRIAL PRODUCTION: **PULP**

PHENOLIC ACIDS

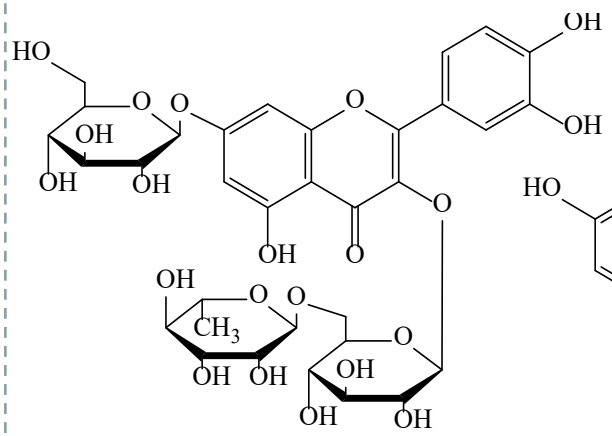


Caffeic acid

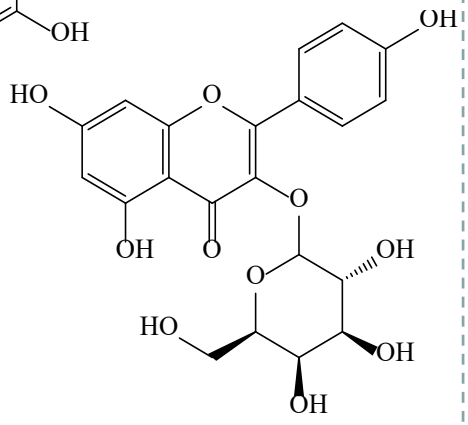


Chlorogenic acid

FLAVONOLES



Quercetin-3-*O*-rutinoside



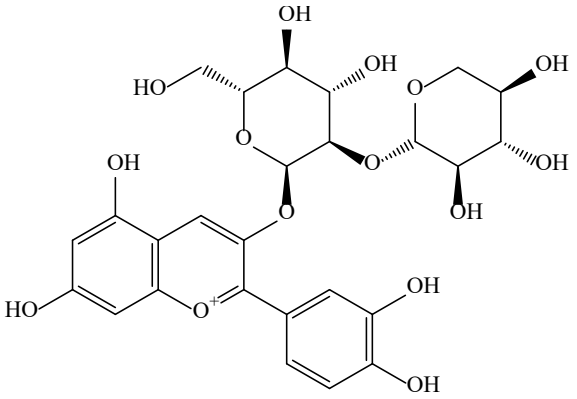
Kaempferol-3-*O*-galactoside

COMPOUNDS PHENOLICS

- Preservatives
- Colorants
- Active packaging
- Pharmacological
- Nutraceuticals

ANTIOXIDANTS
ANTITUMOR
ANTIMICROBIALS

ANTOCIANINS

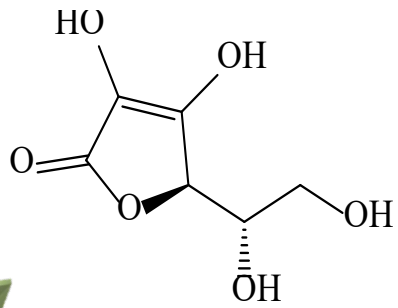


Cianidin-3-O-sambubioside

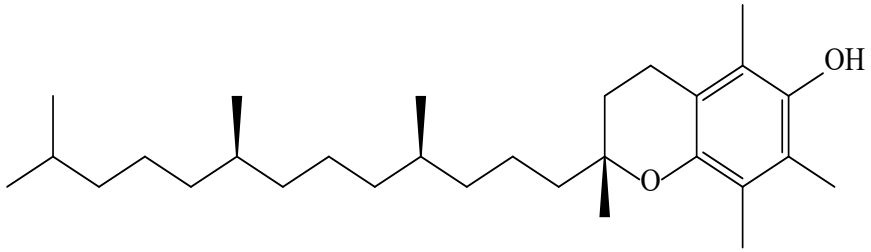
RESULTS

RESIDUES FROM INDUSTRIAL PRODUCTION: **PULP**

VITAMINS



Ascorbic acid



Vitamin E

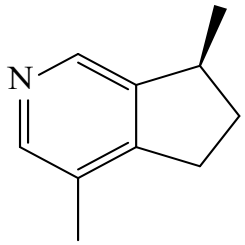
ANTIOXIDANTS

- Preservatives
- Nutraceuticals
- Active packaging

RESULTS

RESIDUES FROM INDUSTRIAL PRODUCTION: **PULP**

PROTEIN



Actinidin

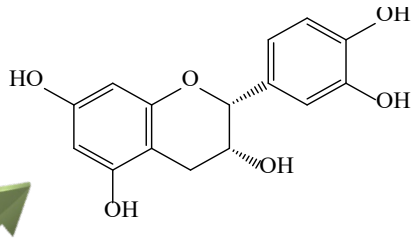
ENZYME PROTEOLITICS

- Anticoagulant milk
- Tenderizer
- Pharmacological: protease

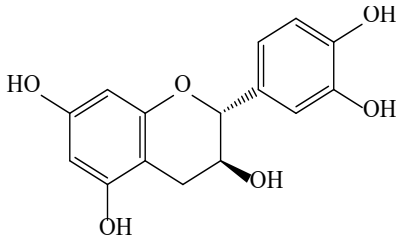
RESULTS

RESIDUES FROM INDUSTRIAL PRODUCTION: **SKIN**

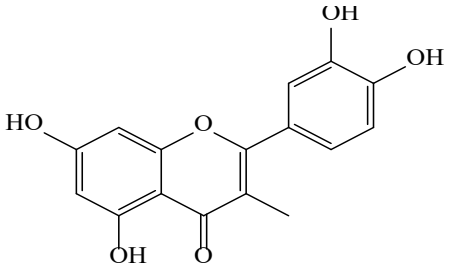
FLAVONOLES



Epicatechin



Catechin



Quercetin

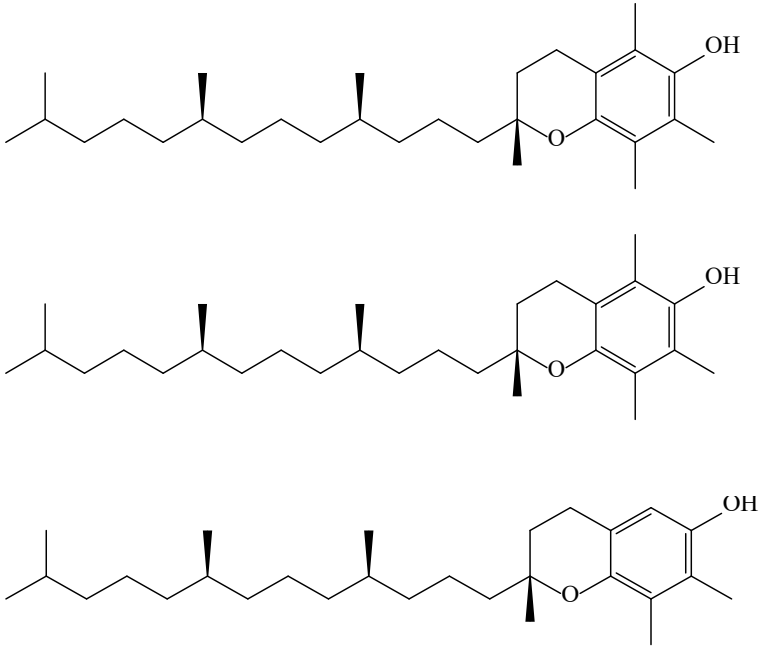
BACTERIOSTATIC
ANTI-INFLAMATORY
ANTITUMOR
INMUNOMODULATOR

- Preservatives
- Cosmetics
- Active packaging
- Pharmacological
- Nutraceuticals

RESULTS

RESIDUES FROM INDUSTRIAL PRODUCTION: **SKIN**

TOCOPHEROLS



α-tocopherol

β-tocopherol

γ-tocopherol

ANTIOXIDANTS

- Preservatives
- Cosmetics
- Active packaging
- Pharmacological
- Nutraceuticals

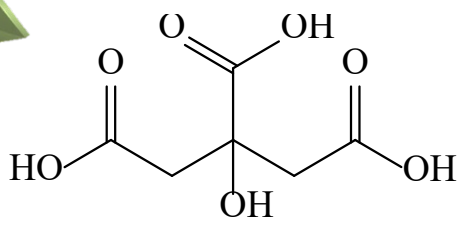
RESULTS

RESIDUES FROM INDUSTRIAL PRODUCTION: **SKIN**

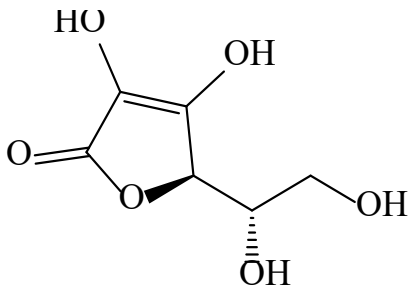
- Antioxidants
- Food additives

ANTIOXIDANTS

ORGANIC ACIDS



Citric acid



Ascorbic acid

RESULTS

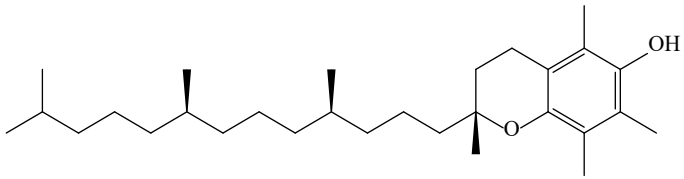
RESIDUES FROM INDUSTRIAL PRODUCTION: **SEEDS**

FATTY ACIDS

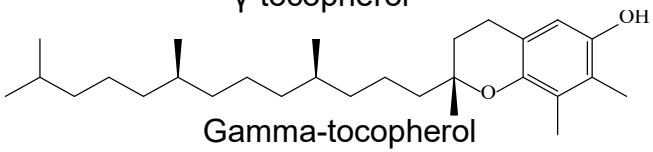
Linoleic acid

ANTIDIABETICS
ANTIOXIDANTS
ANTI-INFLAMATORY
HYPOLIPEMIANTS

TOCOPHEROLS



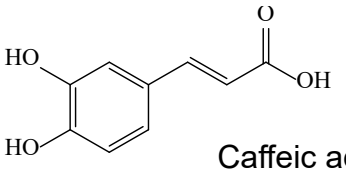
γ-tocopherol



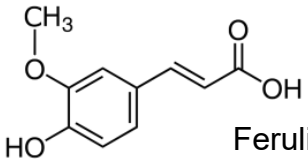
Gamma-tocopherol

- Antioxidants
- Food additives

PHENOLIC ACIDS



Caffeic acid



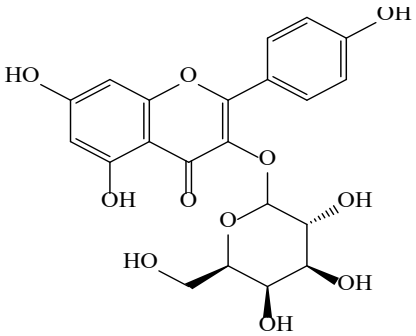
Ferulic acid

- Preservatives
- Cosmetics
- Active packaging
- Pharmacological
- Nutraceuticals

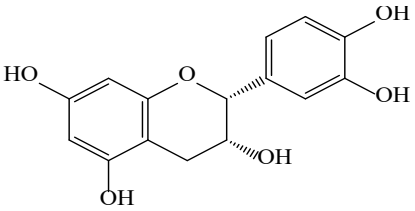
RESULTS

AGRICULTURAL MAINTENANCE WASTE: **LEAVES**

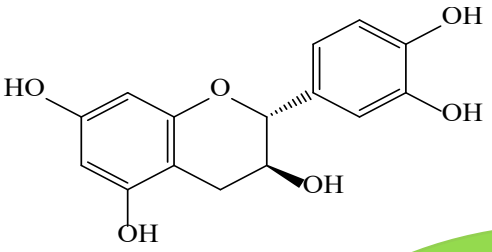
FLAVONOLES



Kaempferol-3-*O*-galactoside



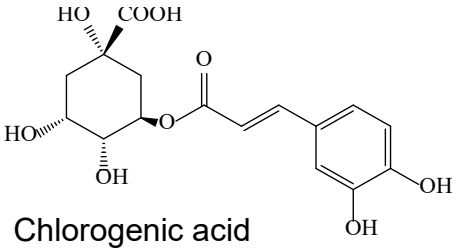
Epicatechin



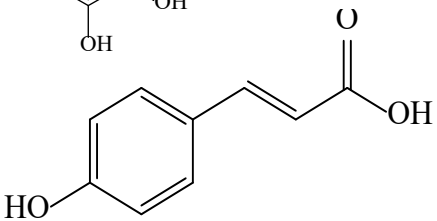
Catechin

ANTI-INFLAMMATORY
ANTIOXIDANT
ANTIMICROBIAL
ANTI-CANCER
(COLORECTAL CA)

PHENOLIC ACIDS



Chlorogenic acid



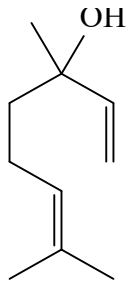
P- coumaric acid

- Pharmacological
- Nutraceutical

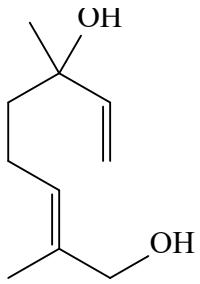
RESULTS

AGRICULTURAL MAINTENANCE WASTE: **FLOWERS AND STEMS**

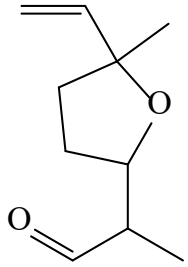
TERPENOIDS



Linalol



8-Hydroxylinol

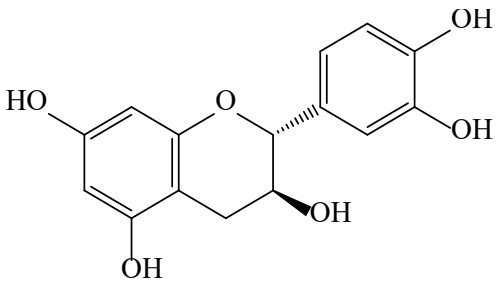


Lilac aldehyde

FLAVORINGS

-Flavoring
-Cosmetics

FLAVONOIDES



Catechin

ANTITUMORAL
ANTI-INFLAMMATORY
ANTICANCER
HYPOGLYCEMIC

-Pharmaceutical
-Nutraceutical
-Cellulose films
-Bioethanol

CONCLUSIONS