



**NEW NUTRACEUTICAL  
APPLE CIDER VINEGAR  
GRAPE SEED EXTRACT**

**NATURAL HEALTHCARE SUPPLEMENTS  
ACTIVE BEAUTY TREATMENT FOR HAIR AND SKINCARE**

**BOTANICAL INNOVATIONS  
INDIA PRODUCT CATALOGUE**

**BULK SALES FOR PRIVATE LABEL  
SINGLE SERVE 25ml GLASS BOTTLES**









# **AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS**

**Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders**

## **APPLE CIDER VINEGAR GRAPE SEED EXTRACT**

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**Botanical Innovations Phenolic  
Rich Phytonutrients  
For Natural Health & Wellbeing**

**Data Sheets & Specifications**

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## **PHENOLIC RICH PHYTONUTIRENTS**

### **APPLE CIDER VINEGAR & GRAPE SEED EXTRACT**

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## **BOTANICAL INNOVATIONS PHENOLIC RICH PRODUCTS**

Botanical Innovations has developed phenolic rich Apple Cider Vinegar and Grape Seed Extract for

- Cosmeceutical External Treatments
- Natural Healthcare Internal Supplements

Phenolic compounds are the chemicals produced by plants from photosynthesis.

A plant will produce phenolic compounds to adapt to changing environmental conditions flood, drought, heat, cold, nutritional stress and disease. In evolutionary terms phenols are believed to be responsible for plants migration from the sea to land when plants developed phenolic UV light screens and continued survival for millions of years.

Plants to adapt to changing environmental conditions and stress produce plant phenols, which can produce free radicals and other oxidative compounds. Plants also have the ability to synthesize phenolic compounds, which act as toxins and deterrents to insects, pathogens and other dangers as well as assist with attraction of insects for reproduction purposes.

Botanical Innovations has created a unique set of phenolic rich ingredients which contain concentrated phenolics with unique properties developed by plants over millions of years

A plants phenolic compound is divided into primary and secondary.

- Primary Phenolic Compounds (metabolites)
  - Sugars
  - Fatty Acids
  - Amino Acids
  - Nucleic Acids

Secondary Phenolic Compounds (metabolites) are more complex and believed to be responsible for the plants respiratory systems and its ability to survive in the environment.

- Secondary Phenolic Compounds include
  - Antioxidants
  - Hydroxycinnamic Acids
  - Hydroxybenzoic Acids
  - Stilbenes
  - Flavonoids
  - Flavonols
  - Flavan-3-ols

Botanical Innovations products contain both primary and secondary phenolic compounds, which provide added health and functional benefits to our products.

January 2017. The information contained in this report has been gathered from publicly available source material and is intended to provide general information to readers. No therapeutic claim in relation to the products is intended. Whilst reasonable care has been taken in the preparation of this report, General Industry Pty Ltd trading as Botanical Innovations is not responsible for any reliance readers place on the information in this report and does not represent or warrant that the information is complete or accurate. Readers rely on this information at their own risk. Disclaimer: Reasonable care has been taken in preparing this document and information is believed to be accurate however it is not intended to constitute an authoritative statement under the National Industrial Chemical Notification and Assessment Scheme Australian and New Zealand rules and regulations.



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## Botanical Innovations Products Primary Phenolic Compounds (metabolites) Profile

	Plant Extracts	Fermented Plant Extracts	Fermented Fruit & Vinegar	Grape Seed Oil	Cherry Seed Oil	Fruit Powders
Fructose (Fruit Sugar)	.	.	.			.
Fatty Acid Profile						
Myristic C14:0 Omega 9				<0.1%	<0.1%	
Palmitic C16:0 Omega 9				7%	8.10%	
Palmitoleic C16:1 Omega 7				0.30%	0.70%	
Heptadecanoic C17:0 Omega 9				0.10%	0.10%	
Heptadecenoic C17:1 Omega 9				<0.1%	0.10%	
Stearic C18:1 Omega 9				3.80%	3.30%	
Oleic C18:0 Omega 9				19%	41.50%	
Linoleic C18:2 Omega 6				68.60%	42.80%	
Alpha-Linolenic C18:3 Omega 3				0.50%	1%	
Arachidic C20:0 Omega 6				0.20%	1.20%	
Elcosenoic C20:1 Omega 9				0.20%	0.50%	
Behenic C20:1 Omega 9				<0.1%	0.40%	
Erucic C22:1 Omega 9				<0.1%	0.10%	
Lignoceric C24:0 Omega 12				<0.1%	0.20%	
Tetracosenoic C24:1 Omega 9				<0.1%	<0.1%	
Polyunsaturated				69.10%	43.10%	
Monounsaturated				19.50%	42.90%	
Saturated				11.20%	13.40%	
Amino Acids	.	.	.			.
Nucleic Acids	.	.	.			.

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## Primary Phenolic Compounds (metabolites) Found in Botanical Innovations Products

### Fruit Sugars Fructose

Natural fruit sugars.

Name: Fructose

Chemical Composition:  $C_6H_{12}O_6$

### Amino Acids

Amino acids are the building block for protein. Proteins are of primary importance to the continuing functioning of life on Earth. Proteins catalyze the vast majority of chemical reactions that occur in the cell. They provide many of the structural elements of a cell, and they help to bind cells together into tissues. Some proteins act as contractile elements to make movement possible. Others are responsible for the transport of vital materials from the outside of the cell ("extracellular") to its inside ("intracellular"). Proteins control the activity of genes.

### Fatty Acids

A fatty acid is a carboxylic acid with a long aliphatic chain which is either saturated or unsaturated.

Botanical Innovations Products contained the following fatty acids that have beneficial and essential health properties. Each fatty acid has a corresponding Omega 3, 6, 9 or 12 with different pharmacological activities.

Two fatty acids are known to be essential for humans: alpha-linolenic acid (an omega-3 fatty acid) and linoleic acid (an omega-6 fatty acid). Some other fatty acids are sometimes classified as "conditionally essential," meaning that they can become essential under some developmental or disease conditions

including Omega 6 and Omega 3 fatty acids.

### FATTY ACIDS

Myristic	C14:0	Omega 9
Palmitic	C16:0	Omega 9
Palmitoleic	C16:1	Omega 7
Heptadecanoic	C17:0	Omega 9
Heptadecenoic	C17:1	Omega 9
Stearic	C18:0	Omega 9
Oleic	C18:1	Omega 9
Linoleic	C18:2	Omega 6
Alpha -Linolenic	C18:3	Omega 3
Arachidic	C20:0	Omega 6
Elcosenoic	C20:1	Omega 9
Behenic	C22:0	Omega 9
Erucic	C22:1	Omega 9
Lignoceric	C24:0	Omega 12
Tetracosenoic	C24:1	Omega 9
Polyunsaturated		
Monounsaturated		
Saturated		

### Nucleic Acids

Nucleic Acids are essential to all known forms of life. Nucleic Acids are found in all living things where they function in encoding, transmitting and expressing genetic information. Strings of nucleotides strung together in a specific sequence are the mechanism for storing and transmitting hereditary or genetic information via protein synthesis.

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## BOTANICAL INNOVATIONS PRODUCTS SECONDARY PHENOLIC COMPOUNDS

	GRAPE SEED EXTRACT	APPLE CIDER VINEGAR
Hydroxycinnamic Acids	▪	▪
p-coumaric	▪	▪
caffeic	▪	▪
ferulic	▪	▪
Hydroxybenzoic Acids	▪	▪
Gallic	▪	▪
Gentistic	▪	▪
Salicylic	▪	▪
Stilbenes	▪	▪
Resveratrol	▪	
Viniferins	▪	
Flavonols	▪	▪
Quercetin	▪	▪
Kaempferol	▪	▪
Myricetin	▪	▪
Flavan-3-ols	▪	▪
Catechin	▪	▪
Eipcatechin	▪	▪
Epicatechin -3-O-Galleate	▪	▪
Pronthocyanidins	▪	
Anthocyanins	▪	

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## SECONDARY PHENOLIC COMPOUNDS IN BOTANCIAL INNOVATIONS PHARMACOLOGICAL ACTIVITY

	Antioxidant	Anti-infective Agent	Free Radical Scavenger	Anti-inflammatory	Anti-coagulant	Anti-hypertensive	Anti-fungal	Keratolytic	Anti-carcinogenic	Anti-eoplastic	Enzyme Inhibitor	Anti-mutagenic	Protease Inhibitor	Cholagogues Choloretics	Platelet Aggregation Inhibitor
<b>Hydroxycinnamic Acids</b>	▪	▪	▪	▪	▪	▪								▪	
p-coumaric	▪	▪	▪												
Caffeic	▪														
Ferulic	▪		▪	▪	▪	▪								▪	
<b>Hydroxybenzoic acids</b>	▪	▪					▪	▪							
Gallic	▪														
Castagin															
Vescalagin	▪														
Ellagic	▪														
Gentistic	▪														
Salicylic	▪	▪					▪	▪							
<b>Stilbenes</b>	▪			▪					▪	▪	▪	▪			▪
Resveratrol	▪			▪					▪	▪	▪	▪			▪
Viniferins	▪														
<b>Flavonols</b>	▪														
Quercetin	▪														
Kaempferol	▪														
Myricetin	▪														
<b>Flavan-3-ols</b>	▪									▪			▪		
Catechin	▪														
Eipcatechin	▪														
Epicatechin-3-O-Galleate	▪									▪			▪		
Pronthocyanidins	▪														
Anthocyanins	▪														

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## KEY PHARMACOLOGICAL ACTIVITY OF PHENOLIC COMPOUNDS IN BOTANICAL INNOVATIONS PRODUCTS

This information is a general guide only. For additional literature about the possible pharmacological activity of Botanical Innovations products please refer to our secondary literature review.

### Antioxidants

Antioxidants inhibit or retard oxidation reactions. May counteract the damaging effects of oxidation in animal tissues.

### Anti-Infective Agents

May prevent infectious agents or organisms from spreading or kill infectious agents in order to prevent the spread of infection.

### Anti-coagulants

Agents that may assist in the prevention of blood clotting.

### Free Radical Scavengers

May eliminate free radicals and among other effects, they may protect pancreatic islets against damage by cytokines and may prevent myocardial and pulmonary reperfusion injury.

### Anti-Inflammatory Agents, Non-Steroidal

Anti-inflammatory agents that are non-steroidal in nature. In addition to anti-inflammatory actions, they may have analgesic, antipyretic, and platelet-inhibitory actions. They may act by blocking the synthesis of prostaglandins by inhibiting cyclooxygenase, which

converts arachidonic acid to cyclic endoperoxides, precursors of prostaglandins. Inhibition of prostaglandin synthesis accounts for their analgesic, antipyretic, and platelet-inhibitory actions; other mechanisms may contribute to their anti-inflammatory effects.

### Cholagogues and Cholaretics

Gastrointestinal agents that may stimulate the flow of bile into the duodenum (cholagogues) or stimulate the production of bile by the liver (cholaretic).

### Anti-hypertensive Agents

May assist in the management of used in the treatment vascular hypertension.

### Anti-Infective Agents

Substances that may prevent infectious agents or organisms from spreading or may kill infectious agents in order to prevent the spread of infection.

### Anti-fungal Agents

Substances may that destroy fungi by suppressing their ability to grow or reproduce. That is a potential defence against fungi present in human or animal tissues.

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### **Keratolytic Agents**

Agents that may soften, separate, and cause desquamation of the cornfield epithelium or horny layer of skin. They are used to expose mycelia of infecting fungi or to treat corns, warts, and certain other skin diseases.

### **Anti-carcinogenic Agents**

Agents that may reduce the frequency or rate of spontaneous or induced tumors independently of the mechanism involved.

### **Anti-neoplastic Agents, Phytogenic**

Agents obtained from higher plants that may have demonstrable cytostatic or antineoplastic activity.

### **Enzyme Inhibitors**

Compounds or agents that may combine with an enzyme in such a manner as to prevent the normal substrate-enzyme combination and the catalytic reaction.

### **Platelet Aggregation Inhibitors**

Drugs or agents, which may antagonize or impair any mechanism leading to blood platelet aggregation, whether during the phases of activation and shape change or following the dense-granule release reaction and stimulation of the prostaglandin-thromboxane system.

### **Anti-mutagenic Agents**

Agents that may reduce the frequency or rate of spontaneous or induced mutations independently of the mechanism involved.

### **Protease Inhibitors**

Compounds which inhibit or antagonize biosynthesis or actions of proteases



## Glossary Secondary Phenolic Compounds found in Botanical Innovations Products

### Hydroxycinnamic Acids

#### Caffeic Acid

Name: Caffeic Acid

Chemical Composition:  $C_9H_8O_4$

Pharmacological Action

- Antioxidants

#### P-Coumaric

Name: P-Coumaric

Chemical Composition:  $C_9H_8O_3$

Pharmacological Action

- Antioxidants
- Anti-Infective Agents
- Free Radical Scavengers

#### Ferulic Acid

Name: Ferulic Acid

Chemical Composition:  $C_{10}H_{10}O_4$

Pharmacological Action

- Anti-Inflammatory Agents, Non-Steroidal
- Chologogues and Choleretics
- Free Radical Scavengers
- Anticoagulants
- Antihypertensive Agents

### Hydroxybenzoic Acids

#### Gallic Acid

Name: Gallic Acid

Chemical Composition:  $C_7H_6O_5$

Pharmacological Action

- Antioxidants

### Castalagin Vescalagin

Name: Castagin Vescalagin

Chemical Composition:  $C_{41}H_{26}O_{26}$

Pharmacological Action

- Antioxidant
- Tanin

### Ellagic Acid

Name: Ellagic Acid

Chemical Composition:  $C_{14}H_6O_8$

Pharmacological Action

- Antioxidant
- Tannin

### Benzaldehydye

Name: Benzaldehyde

Chemical Composition:  $C_7H_6O$

Pharmacological Action

- Flavouring, Perfume, Pharmaceutical

### Gentistate Acid

Name: Gentistate Acid

Chemical Composition:  $C_7H_6O_4$

Pharmacological Action

- Antioxidants

### Sallicylic Acid

Name: Sallicylic Acid

Chemical Composition:  $C_7H_6O_3$

Pharmacological Action

- Anti-Infective Agents
- Antifungal Agents
- Keratolytic Agents





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## Stilbenes

### Resveratrol

Name: Resveratrol

Chemical Composition:  $C_{14}H_{12}O_3$

Pharmacological Action

- Anti-Inflammatory Agents, Non-Steroidal
- Anti-carcinogenic Agents
- Antineoplastic Agents, Phytogenic
- Enzyme Inhibitors
- Platelet Aggregation Inhibitors
- Anti-mutagenic Agents
- Antioxidants

## Flavonoids

### Flavonols

#### Quercetin

Name: Quercetin

Chemical Composition:  $C_{15}H_{10}O_7$

Pharmacological Action

- Antioxidants

#### Kaempferol

Name: Kaempferol

Chemical Composition:  $C_{15}H_{10}O_6$

Pharmacological Action

- Antioxidants

#### Myricetin

Name: Myricetin

Chemical Composition:  $C_{15}H_{10}O_8$

Pharmacological Action

- Antioxidants

## Flavan-3-ols

### Epicatechin

Name: Epicatechin

Chemical Composition:  $C_{15}H_{14}O_6$

Pharmacological Action

- Antioxidants

### Epicatechin 3-O-Gallate

Name: Epicatechin 3-O-gallate

Chemical Composition:  $C_{22}H_{18}O_{10}$

Pharmacological Action

- Antineoplastic Agents, Phytogenic
- Antioxidants
- Protease Inhibitors

### Proanthocyanidin

Name: Proanthocyanidin

Chemical Composition:  $C_{31}H_{28}O_{12}$

Pharmacological Action

- Antioxidants

### Anthocyanin

Name: Anthocyanin

Chemical Composition:  $C_{31}H_{28}O_{12}$

Pharmacological Action

- Antioxidants



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Database. <https://pubchem.ncbi.nlm.nih.gov/compound/castalginvescalagin>  
NIH US National Library of Medicine, National Centre for Biotechnology Information PubChem Open Chemistry  
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NIH US National Library of Medicine, National Centre for Biotechnology Information PubChem Open Chemistry  
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NIH US National Library of Medicine, National Centre for Biotechnology Information PubChem Open Chemistry  
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NIH US National Library of Medicine, National Centre for Biotechnology Information PubChem Open Chemistry  
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### **APPLE CIDER VINEGAR & GRAPE SEED EXTRACT**



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Cold Pressed Oils-Essential Oils-Phenolic Rich Powders

## DATA SHEET

### PRODUCT

## AUSTRALIAN APPLE CIDER VINEGAR

Naturally Fermented Apple Cider Vinegar  
Natural Healthcare Supplement  
Natural Skincare Treatment



### INGREDIENTS

Product Name: Australian Apple Cider Vinegar  
Botanical Name: *Malus domestica*, *Malus Pumila*  
CAS: 8028-52-2  
INCI: Pyrus Malus (Apple Cider Vinegar)  
Description: 100% Naturally Fermented  
Apple Cider Vinegar

### PRODUCT RANGE

Apple Cider Vinegar Raw

Apple Cider Vinegar Filtered and Pasturised

### CONCENTRATED PHYTONUTRIENTS

#### Antioxidants

Capture oxygen delaying oxidation which  
may prevent or delay cell damage

#### Polyphenols

Large group of molecules found in plants.  
These compounds are responsible for the  
taste, colour and mouthfeel and are divided  
into phenolic acids and flavonoids.

#### Prebiotic

Natural prebiotic assisting with digestive health  
and well being.

Add new a product to your Natural  
Healthcare Supplements and  
Beauty Products.

For internal and topical  
applications.

### AUSTRALIAN APPLE CIDER VINEGAR

### APPLICATIONS NATURAL HEALTH SUPPLEMENT HAIR & SKINCARE TREATMENT

Origin  
Shelf Life

Australia  
Unopened 24 Months



Marketed by  
Canny Overseas Pvt. Ltd.

Tel - + 91 9811166215  
B - 170, PRIYADARSHINI VIHAR,  
DELHI - 110092, INDIA  
e-mail [cannyoverseas@gmail.com](mailto:cannyoverseas@gmail.com)

[www.botanicalinnovations.com.au](http://www.botanicalinnovations.com.au)





# AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS

Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders

## DATA SHEET PRODUCT AUSTRALIAN APPLE CIDER VINEGAR

### SPECIFICATIONS

#### Apple Cider Vinegar Raw

Colour: Amber  
Raw: Unfiltered  
With Mother: Unpasteurised

#### Apple Cider Vinegar

Colour: Amber  
Filtered  
Pasteurised

### NUTRITIONAL INFORMATION

	100 ml	
Energy	20	kJ
Protein	< 0.1	g
Fat	< 0.2	g
Saturated Fat	< 0.1	g
Carbohydrate		
Total	< 1	g
Sugars - Total	< 1	g
Sodium	1.3	mg
Acidity	5-8	%

Add new a product to your Natural  
Healthcare Supplements and  
Beauty Products.

For internal and topical  
applications.

**NATURAL HEALTH SUPPLEMENT  
HAIR & SKINCARE TREATMENT**



### PACKAGING

25ML Glass Bottles Single Serve,  
200 litre drums, 1,000 litre IBC,  
20' Bladder Contianer.

### SHELF LIFE

Shelf Life 2 years unopened.

### ALLERGENS

	Contains/ Potential Contamination
Cereals & cereal products + Gluten	No
Crustaceans & their products	No
Eggs & egg products	No
Fish & fish products	No
Peanuts or peanut products	No
Soybeans or their products	No
Milk or milk products	No
Nuts & nut products	No
Celery & celery products	No
Mustard & mustard products	No
Sesame seeds & sesame products	No
Sulphur dioxide & sulphites	No



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# AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS

Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders

## DATA SHEET

### PRODUCT GRAPE SEED EXTRACT

New Health Supplement for Internal Healthcare  
Natural Skincare Treatment for External Healthcare

#### INGREDIENTS

Product Name: Grape Seed Extract  
Botanical Name: *Vitis Vinifera*  
CAS: 84929-27-1  
INCI: Vitis Vinifera (Red grape) seed extract  
Description: 100% Grape Seed Extract  
Ethanol and Water Extraction

#### PRODUCT

**GRAPE SEED EXTRACT**  
**Total Phenolic Content**  
**30,000-70,000 mg/L**

#### CONCENTRATED NATURAL COMPOUNDS

**Grape Seed Extract** contains the following highly concentrated natural compounds

##### Antioxidants

Capture oxygen delaying oxidation which may prevent or delay cell damage.

##### Polyphenols

Large group of molecules found in plants. These compounds are responsible for the taste, colour and mouthfeel and are divided into phenolic acids and flavonoids.

Polyphenols found in Red Grape Seed Extract:

**Flavonoids,**  
**Anthocyanins,**  
**Resveratrol,**  
**Vitamin C**  
**Vitamin E.**



**GRAPE SEED EXTRACT  
IS MADE WITH  
100% AUSTRALIAN GRAPES**

**IT TAKES 100 kg GRAPES  
50 g GRAPE SEED EXTRACT  
30,000-70,000 PHENOLS**

##### Applications

Natural Healthcare Supplement  
Natural Skincare Treatment

Bulk Purchase for Private Label  
25ml Single Serve Glass Bottles

**Origin**  
**Shelf Life**

Australia  
Unopened 24 Months



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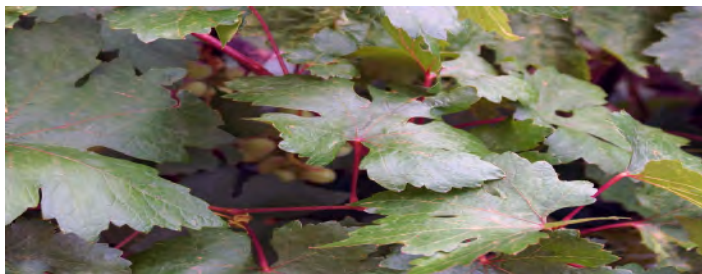


# AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS

Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders

## DATA SHEET

### PRODUCT RED GRAPE SEED EXTRACT



#### SPECIFICATIONS

##### RED GRAPE SEED EXTRACT

Colour	Light Brow Red to Deep Red
Total Polyphenol	30,000-80,000 m/L
Brix	15-30% Per 100 g
Energy	110 kg Per 100 ml
Protein	< 1.0 g Per 100 ml
Saturated Fat	< 0.1 g Per 100 ml
Carbohydrate Total	< 7 g Per 100 ml
Sodium	3.2 mg
Soluble	Complete
Soluble	Complete
Vitamin E	
Vitamin C	

**CREATE NEW FLAVOUR  
PROFILES WITH FUNCTIONAL  
HEALTH BENEFITS TO  
FOODS AND BEVERAGES  
WITH RED GRAPE SEED  
EXTRACT**

**RED GRAPE SEED EXTRACT  
IS MADE WITH  
100% AUSTRALIAN GRAPES  
IT TAKES 100 kg GRAPES  
50 g GRAPE SEED EXTRACT  
30,000-70,000 PHENOLS**

#### PACKAGING

25ml Single Serve Glass Bottles  
200 Litre Drums, 1,000 Litre IBC  
2' Bladder Containers

#### SHELF LIFE AND STORAGE

Shelf Life 2 years from date of manufacture  
Store in cool dry environment below 25 degrees  
celcius. Refrigerate once open and use with 7  
days of opening.

#### ALLERGENS

	Contains/ Potential Contamination
Cereals & cereal products + Gluten	No
Crustaceans & their products	No
Eggs & egg products	No
Fish & fish products	No
Peanuts or peanut products	No
Soybeans or their products	No
Milk or milk products	No
Nuts & nut products	No
Celery & celery products	No
Mustard & mustard products	No
Sesame seeds & sesame products	No
Sulphur dioxide & sulphites	No



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**PURE NATURE**

# **AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS**

**Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders**

**APPLE CIDER VINEGAR  
GRAPE SEED EXTRACT**

**BOTANICAL INNOVATIONS**

**MANUFACTURING PLANT**

**&**

**CENTRAL WEST  
NSW AUSTRALIA  
GRAPE & APPLE PRODUCTION**









# AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS

**Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders**

## **BOTANICAL INNOVATIONS ADVANCED MANUFACTURING FACILITY**

**Botanical Innovations was incorporated in 2011. The company has invested heavily in Research & Development over the past 6 years to create its unique range of products. Botanical Innovations has worked closely with its research partner Southern Cross University Australia's leading university for plant sciences, phytochemicals and essential oils.**

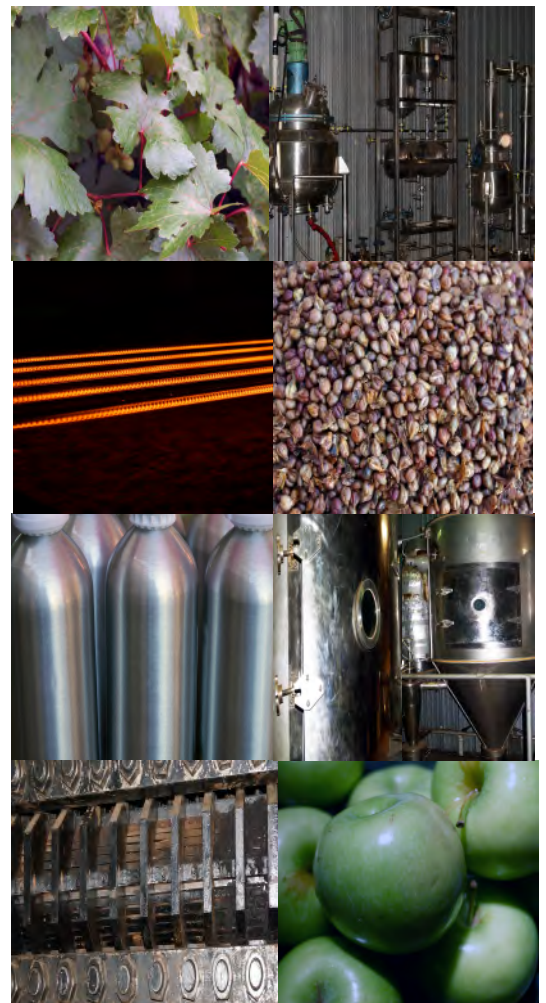
**Botanical Innovations developed proprietary technology used to create the companies core products which has led to the unique phenolic rich phytonutrients found in its apple cider vinegar and grape seed extracts which combine taste with function.**

The plant focuses on the manufacture of  
Plant Extracts

Grape Seed Extract  
Naturally Fermented Fruits & Powder  
Apple Cider Vinegar  
Cold Pressed Oils  
Essential Oils  
Phenolic Rich Powders

Botanical Innovations core manufacturing capabilities include:

Research & Development  
Phytonutrient extraction from plants  
Essential Oils extraction from woods, herbs and fruits  
Fermentation fruits & vinegar  
Cold Pressed oils from fruit and nuts  
Drying and milling of fruit powders









# AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS

**Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders**

## **BOTANICAL INNOVATIONS CENTRAL WEST NSW AUSTRALIA**

Botanical Innovations is located in the heart of Central West NSW. The Central West region is geographically west of Sydney. The area is approximately 63,500 square kilometres and has a population of 300,000 of which half live in the major towns of Bathurst and Orange and smaller towns and villages.

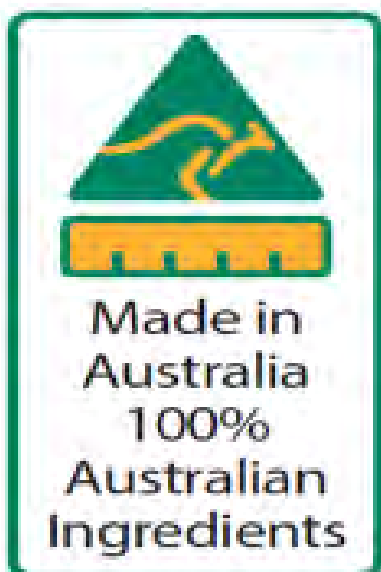
The area is known for its clean water, fresh air and natural green fresh and processed products.

Mt Canobolas, near Orange is the highest peak at 1398m above sea level. Mt Canobolas provides sloping basaltic soils, a cool climate, and consistent rainfall, which are highly suitable for cool climate grape and fruit production. The production of grapes, apples and cherries are prevalent in the area. The area grows 13.5% of NSW fruit production.

Food production in the area is valued at over \$850 million per annum accounting for 8% of Australian exports.

Botanical Innovations sources apples and grapes from local producers in the Central West and has forged long term supplier agreements to ensure secure supply and provenance of its products.

Botanical Innovations products are certified sustainable (certification pending) and made with 100% Australian Ingredients.













# **AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS**

**Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders**

## **NATURAL HAIR & SKINCARE**

### **APPLE CIDER VINEGAR & GRAPE SEED EXTRACT**





# AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS

Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders

## APPLE CIDER VINEGAR HAIR AND SKINCARE APPLICATIONS

	Apple Cider Vinegar
Acne	.
Adolescence	.
Adult-onset acne	.
Supplements	.
Alpha-Hydroxy Acids	.
Antimicrobial	.
Antioxidant	.
Astringent	.
Barrier	.
Blemishes	.
Blood Capillaries	.
Chemical Peel	.
Combination Skin	.
Dry Skin	.
Enzyme Peel	.
Exfoliant	.
Free Radicals	.
Humectant	.
Normal Skin	.
Oily Skin	.
Skin Care System	.
Tonner	.



**VINEGAR HAS BEEN USED IN WOUND CARE AND HEALING FOR THOUSANDS OF YEARS. IT ONE OF THE OLDEST FERMENTED FOODS IN WORLD WITH A RECORDED HISTORY OF CONTINUOUS USE DATING BACK 5,000 YEARS .**

**BOTANICAL INNOVATIONS SLOW FERMENTATION PROCESS ENSURES ITS APPLE CIDER VINEGAR IS TRUE TO NATURE CONCENTRATING ALL THE HEALTH AND HEALING PROPERTIES, PHENOLICS AND PREBOITIC COMPOUNDS THAT HAVE MADE VINEGAR LAST THROUGH THE CENTURIES.**

**ADD APPLE CIDER VINEGAR TO YOUR HEAIR AND SKIN CARE PRODUCTS FOR ENHANCED FUCTIONALITY.**

Apple Cider Vinegar	
Skin Care Formulations	.
Cleansers	.
Facial Products	.
Hair Care	.
Shampoo	.
Conditioners	.
Relaxers	.
Aftershave	.
Shaving Creams	.
Lotions	.
Baby and Child	.





# AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS

Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders

## GRAPE SEED EXTRACT NATURAL COSMETIC APPLICATIONS



### GRAPE SEED EXTRACT

Acne	.
Adolescence	.
Adult-onset acne	.
Supplements	.
Alpha-Hydroxy Acids	.
Antimicrobial	.
Antioxidant	.
Astringent	.
Barrier	.
Blood Capillaries	.
Chemical Peel	.
Combination Skin	.
Dry Skin	.
Enzyme Peel	.
Exfoliants	.
Free Radicals	.
Humectant	.
Normal Skin	.
Oily Skin	.
Skin Care System	.
Toner	.

**Unlock the  
Powerful  
Phenolic Rich  
Phytonutrients in  
Grapes**

**Skin Care  
Hair Care  
Bath & Shower  
Colour Cosmetics  
Mens Grooming  
Baby & Child**

**100kKG GRAPES  
MAKES 50G  
GRAPE SEED  
EXTRACT**







## **AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS**

**Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders**

## **NATURAL HEALTH & WELLNESS**

## **APPLE CIDER VINEGAR & GRAPE SEED EXTRACT**





# AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS

**Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders**

## APPLE CIDER VINEGAR HEALTH BENEFITS

Botanical Innovations has developed a Naturally Fermented Apple Cider Vinegar which combines great flavor with a range of health benefits.

Dating back 5,000 BC vinegar has been a staple part of the human diets for millennium. The first recorded use was by the Babylonians who used vinegar as a condiment and preservative. The Ancient Romans consumed vinegar as a beverage and the Ancient Greeks used vinegar to pickle meat and vegetables. The healing properties of vinegar have also been referenced in the bible and the work of Hippocrates. By 2,000BC vinegar production became commercialized and was used to treat disease and wounds.

Today vinegar is used as in foods and beverages and as a health supplement.

The potential benefits of Botanical Innovations

Today vinegar is used taken orally and topically as a health supplement, in foods and beverages and as an ingredients in skin and hair care products.

This literature review summerizes recently published literature about the potential health benefits of Apple Cider Vinegar, Fermented Vinegars and Extracts. The literature identifies the following potential health benefits:

- **Asthma symptom alleviation**
- **Diabetes prevention and treatment**
- **Antioxidant**
- **Lowers glucose intake**
- **Prevention of Cardiovascular disease**
- **Lowers cholesterol**
- **Contains anti glycemic properties**
- **Weight loss**
- **Lowers blood pressure**

January 2017. The information contained in this datasheet has been gathered from publicly available source material and is intended to provide general information to readers. No therapeutic claim in relation to the product is intended. Whilst reasonable care has been taken in the preparation of this report, General Industry Pty Ltd trading as Botanical Innovations is not responsible for any reliance readers place on the information in the datasheet and does not represent or warrant that the information in the datasheet is complete or accurate. Readers rely on the information in the report at their own risk. Disclaimer: Reasonable care has been taken in preparing this document and the information provided herein is believed to be accurate.





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## Recent Published Scientific Studies about the health benefits of Vinegar

### Published Research Abstracts

#### Examination of the antiglycemic properties of vinegar in healthy adults.

**Publication:** Annals of Nutrition and Metabolism 2010: 56 (1) pp74-9

**Authors:** Johnston CS, Steplewska I, Long CA, Harris LN, Ryals RH

#### Background

Vinegar reduces postprandial glycemia (PPG) in healthy adults. This study investigated the vinegar dosage (10 vs. 20 g), timing (during mealtime vs. 5 h before meal) and application (acetic acid as vinegar vs. neutralized salt) for reducing PPG.

#### Methods

Four randomized crossover trials were conducted in adults (n = 9-10/trial) with type 2 diabetes (1 trial) or without diabetes (3 trials). All trials followed the same protocol: a standardized meal the evening prior to testing, an overnight fast (10 h) and 2-hour glucose testing following consumption of a bagel and juice test meal (3 trials) or dextrose solution (1 trial). For each trial, PPG was compared between treatments using area-under-the-curve calculations 120 min after the meal.

#### Results

Two teaspoons of vinegar (10 g) effectively reduced PPG, and this effect was most pronounced when vinegar was ingested during mealtime as compared to 5 h before the meal. Vinegar did not alter PPG when ingested with monosaccharides, suggesting that the antiglycemic action of vinegar is related to the digestion of carbohydrates. Finally, sodium acetate did not alter PPG, indicating that acetate salts lack antiglycemic properties.

#### Conclusions

The antiglycemic properties of vinegar are evident when small amounts of vinegar are ingested with meals composed of complex carbohydrates. In these situations, vinegar attenuated PPG by 20% compared to placebo.



Vinegar supplementation lowers glucose and insulin responses and increases satiety after a bread meal in healthy subjects.

**Publication:** European Journal of Clinical Nutrition 2005 Sept: 59 (9) pp 983-8

**Authors:** Ostman E1, Granfeldt Y, Persson L, Björck I.

## Objective

To investigate the potential of acetic acid supplementation as a means of lowering the glycaemic index (GI) of a bread meal, and to evaluate the possible dose-response effect on postprandial glycaemia, insulinaemia and satiety.

## Subjects and Setting

In all, 12 healthy volunteers participated and the tests were performed at Applied Nutrition and Food Chemistry, Lund University, Sweden.

## Intervention

Three levels of vinegar (18, 23 and 28 mmol acetic acid) were served with a portion of white wheat bread containing 50 g available carbohydrates as breakfast in randomized order after an overnight fast. Bread served without vinegar was used as a reference meal. Blood samples were taken during 120 min for analysis of glucose and insulin. Satiety was measured with a subjective rating scale.

## Results

A significant dose-response relation was seen at 30 min for blood glucose and serum insulin responses; the higher the acetic acid level, the lower the metabolic responses. Furthermore, the rating of satiety was directly related to the acetic acid level. Compared with the reference meal, the highest level of vinegar significantly lowered the blood glucose response at 30 and 45 min, the insulin response at 15 and 30 min as well as increased the satiety score at 30, 90 and 120 min postprandially. The low and intermediate levels of vinegar also lowered the 30 min glucose and the 15 min insulin responses significantly compared with the reference meal. When GI and II (insulinaemic indices) were calculated using the 90 min incremental area, a significant lowering was found for the highest amount of acetic acid, although the corresponding values calculated at 120 min did not differ from the reference meal.

## Conclusion

Supplementation of a meal based on white wheat bread with vinegar reduced postprandial responses of blood glucose and insulin, and increased the subjective rating of satiety. There was an inverse dose-response relation between the level of acetic acid and glucose and insulin responses and a linear dose-response relation between acetic acid and satiety rating. The results indicate an interesting potential of fermented and pickled products containing acetic acid.



## Anti-obesogenic effect of apple cider vinegar in rats subjected to a high fat diet

**Publication:** Pubplication: Ann Cardiol Angeiol (Paris). 2016 Jun;65(3):208-13.

**Authors:** Bouderbala H, Kaddouri H, Kheroua O2, Saidi D

### Aim of the Study

The search of new anti-obesogenic treatments based on medicinal plants without or with minimal side effects is a challenge. In this context, the present study was conducted to evaluate the anti-obesogenic effect of apple cider vinegar (ACV) in Wistar rats subjected to a high fat diet.

### Materials and Methods

Eighteen male Wistar rats (140±5g) were divided into 3 three equal groups. A witness group submitted to standard laboratory diet and two groups subjected to a high fat diet (cafeteria diet); one receives a daily gavage of apple cider vinegar (7mL/kg/d) for 30 days. Throughout the experiment monitoring the nutritional assessment, anthropometric and biochemical parameters is achieved.

### Results

In the RCV vs RC group, we observed a highly significant decrease ( $P<0.001$ ) in body weight and food intake. On the other hand, the VCP decreases very significantly different anthropometric parameters: BMI ( $P<0.01$ ), chest circumference and abdominal circumference ( $P<0.001$ ), decreases serum glucose levels (26.83%) and improves the serum lipid profile by reducing plasma levels of total cholesterol (34.29%), TG (51.06%), LDL-c (59.15%), VLDL (50%) and the total lipid (45.15%), and increasing HDL-c (39.39%), thus offering protection against oatherogenic risk (61.62%).

### Conclusion

This preliminary study indicates that the metabolic disorders caused by high fat diet (cafeteria) are thwarted by taking apple cider vinegar which proves to have a satiating effect, antihyperlipidemic and hypoglycemic effects, and seems prevent the atherogenic risk.





## **Apple cider vinegar modulates serum lipid profile, erythrocyte, kidney, and liver membrane oxidative stress in ovariectomized mice fed high cholesterol.**

**Publication:** Membrane Biology Journal 2014 Aug;247(8):667-73

**Authors:** Nazıroğlu M1, Güler M, Özgül C, Saydam G, Küçükayaz M, Sözbir E.

### **Abstract**

The purpose of this study was to investigate the potentially beneficial effects of apple cider vinegar (ACV) supplementation on serum triglycerides, total cholesterol, liver and kidney membrane lipid peroxidation, and antioxidant levels in ovariectomized (OVX) mice fed high cholesterol.

Four groups of ten female mice were treated as follows: Group I received no treatment and was used as control. Group II was OVX mice. Group III received ACV intragastrically (0.6% of feed), and group IV was OVX and was treated with ACV as described for group III. The treatment was continued for 28 days, during which the mice were fed a high-cholesterol diet.

The lipid peroxidation levels in erythrocyte, liver and kidney, triglycerides, total, and VLDL cholesterol levels in serum were higher in the OVX group than in groups III and IV. The levels of vitamin E in liver, the kidney and erythrocyte glutathione peroxidase (GSH-Px), and erythrocyte-reduced glutathione (GSH) were decreased in group II. The GSH-Px, vitamin C, E, and  $\beta$ -carotene, and the erythrocyte GSH and GSH-Px values were higher in kidney of groups III and IV, but in liver the vitamin E and  $\beta$ -carotene concentrations were decreased.

In conclusion, ACV induced a protective effect against erythrocyte, kidney, and liver oxidative injury, and lowered the serum lipid levels in mice fed high cholesterol, suggesting that it possesses oxidative stress scavenging effects, inhibits lipid peroxidation, and increases the levels of antioxidant enzymes and vitamin.



## Effects of apple cider vinegars produced with different techniques on blood lipids in high-cholesterol-fed rats.

**Publication:** Journal of Agricultural Food Chemistry 2011 Jun 22;59(12):6638-44.

**Authors:** Budak NH, Kumbul Doguc D, Savas CM, Seydim AC, Kok Tas T, Ciris MI, Guzel-Seydim ZB.

### Abstract

Red delicious apples were used to produce natural apple cider with and without inclusion of maceration. Traditional surface and industrial submersion methods were then applied to make vinegar from apple ciders.

Apple cider vinegar samples produced with inclusion of maceration in the surface method had the highest total phenolic content, chlorogenic acid, ORAC, and TEAC levels.

Cholesterol and apple vinegar samples were administered using oral gavage to all groups of rats except the control group.

Apple cider vinegars, regardless of the production method, decreased triglyceride and VLDL levels in all groups when compared to animals on high-cholesterol diets without vinegar supplementation.

Apple cider vinegars increased total cholesterol and HDL and LDL cholesterol levels and decreased liver function tests when compared to animals on a high-cholesterol diet without vinegar supplementation. A high-cholesterol diet resulted in hepatic steatosis. VSBM and VSB groups significantly decreased steatosis.



## **Vinegar Published Research Papers**

### **Functional Properties of Vinegar**

Article attached

Publication: Journal of Food Science May 2014

Authors: Budak N, Akin Z, Seydum A, Greene A, Guzel-Seydum B

### **Vinegar: Medicinal Uses and Antiglycemic Effect**

Article attached

Publication: MedGenMed 2006: 8(2) 61

Authors: Johnston C, Gaas C

Contact Botanical Innovations for a copy of these papers

[KerryFerguson@botanicalinnovations.com.au](mailto:KerryFerguson@botanicalinnovations.com.au)

[www.botanicalinnovations.com.au](http://www.botanicalinnovations.com.au)





# AUSTRALIAN FUNCTIONAL NUTRACEUTICAL FLAVOURS, FRAGRANCES & INGREDIENTS

Plant Extracts-Naturally Fermented Fruits and Vinegars  
Cold Pressed Oils-Essential Oils-Phenolic Rich Powders

## LITERATURE SUPPORTS THEORY THAT GRAPE SEED EXTRACTS IMPROVE HEALTH AND WELLBEING

Botanical Innovations Grape seed extracts are a natural plant products derived from grapes (*Vitis vinifera*) grown in Australia.

Botanical Innovations Grape seed extracts contain concentrated phenolic rich phytonutrients including powerful antioxidants.

The phenols in grape seed extracts are water soluble bioflavonoids that benefits the body by fighting free radicals. Grape seed extracts also contains vitamin E, flavonoids, anthocyanins and resveratrol.

**Grape seed and skin extracts are widely used for these antioxidant properties and associated health benefits relating to:**

- **Age-related macular degeneration (AMD).**
- **Attention deficit-hyperactivity disorder (ADHD).**
- **Blood circulation problems in the legs**
- **Canker sores.**
- **Chronic fatigue syndrome (CFS).**
- **Constipation**
- **Coughs**
- **Diarrhea.**
- **Heart disease**
- **Heavy menstrual periods.**
- **Hemorrhoids**
- **High blood pressure**
- **High cholesterol levels.**
- **Liver damage.**
- **Nasal allergies**
- **Poor night vision**
- **Skin and breast cancer**
- **Varicose veins**

The following report is a review of current literature about the potential health benefits of Grape Seed Extracts.

January 2017. The information contained in this datasheet has been gathered from publicly available source material and is intended to provide general information to readers. No therapeutic claim in relation to the product is intended. Whilst reasonable care has been taken in the preparation of this report, General Industry Pty Ltd trading as Botanical Innovations is not responsible for any reliance readers place on the information in the datasheet and does not represent or warrant that the information in the datasheet is complete or accurate. Readers rely on the information in the report at their own risk. Disclaimer: Reasonable care has been taken in preparing this document and the information provided herein is believed to be accurate.



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# BOTANICAL INNOVATIONS

*The Fusion of Botany and Technology to Create Natural Solutions*

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## **Grape Seed Extract Health Benefits – Published Research Papers**

Grape Seed Extract published research papers have found a links between taking grape seed and management of a number of health conditions including:

- Type 2 Diabetes
- Breast Cancer
- Liver Disease
- Neurodegenerative Diseases
- Cardiovascular conditions
- Osteoporosis
- Oxidative Stress



## **Health Benefits Of Grape Seed Extract To Type 2 Diabetes Conditions.**

In a published report in Diabetes Medical Journal of 2009 May entitled “Effects of grape seed extract in Type 2 diabetic subjects at high cardiovascular risk: a double blind randomized placebo controlled trial examining metabolic markers, vascular tone, inflammation, oxidative stress and insulin sensitivity.” The researchers from Queen Alexandria Hospital in United Kingdom reported that grape seed extracts significantly improved markers of inflammation and glycaemia and a sole marker of oxidative stress in obese Type 2 diabetic subjects at high risk of cardiovascular events over a 4-week period, which suggests that grape seed extracts may have therapeutic benefits in decreasing cardiovascular risk.

## **Grape Seed Extract Benefits For Breast Cancer**

Researchers from The Department of Surgical Research, Beckman Research Institute of the City of Hope, Duarte California, USA, as published in the Journal of Cancer Research, June 2006 has reported that grape seed extract is an aromatase inhibitor and a suppressor of aromatase expression. Aromatase is the enzyme that converts androgen to estrogen and it is expressed at higher levels in breast cancer tissues than normal breast tissues. Grape seed extract contains high levels of procyanidin dimers that have been shown in laboratory to be potent inhibitors of aromatase. This report suggested that grape seed extract has potential benefits in the prevention/treatment of hormone-dependent breast cancer through the inhibition of aromatase activity as well as its expression.

## **Grape Seed Extract Benefits Nonalcoholic Liver Disease.**

In a report from Saudi Journal of Gastroenterology, grape seed extract has been found to improve liver function in patients with nonalcoholic fatty liver change. In a three month clinical studies, 15 patients with nonalcoholic liver disease were administered with grape seed extracts. The study suggested that grape seed extract significantly improved the grade of fatty liver change; and resulted in significant decrease in alanine aminotransferase in patients receiving the concentrate compared to those receiving vitamin C independently. The study describes the benefits of using grape seed extract for three months in patients with nonalcoholic fatty liver disease.



## **Grape Seed Extract Has Benefits For Neurodegenerative Diseases**

In a NCCAM funded research done at Mount Sinai School of Medicine, it was found that grape seed extract containing polyphenols may inhibit the misfolding of proteins in the brains that is linked to various neurodegenerative conditions including Alzheimer's disease. The results of their in vitro study showed that grape seed extract is capable of interfering with the generation of tau protein aggregates and also disassociating preformed aggregates, suggesting that grape seed extract may have beneficial effects to processes critical to the progression and onset of cognitive dysfunctions and neurodegeneration. The research concluded that grape seed extract is likely to be safe and well-tolerated in people, and may offer benefits as alternative therapy for Alzheimer's disease.

## **Grape Seed Extract Has Benefits For Cardiovascular System.**

In a review study done in Yale School of Medicine, New Haven CT, USA and published in the Journal of American Dietetic Association 2011 August, entitled "The effect of grape seed extract on cardiovascular risk markers: a meta-analysis of randomized controlled trials." It was reported that grape seed extract has beneficial effects on the cardiovascular system. Based on the currently available and reviewed literature, grape seed extract appears to significantly lower systolic blood pressure and heart rate, with no effect on lipid or C-reactive protein levels. Although it is suggested that larger randomized, double-blinded trials evaluating different dosages of grape seed extract and for longer follow-up durations are needed.

## **Grape Seed Extract Has Benefits For Platelet-Dependent Antithrombotic And Anti-Inflammatory Properties**

In a research study done in Whitaker Cardiovascular Institute and Evans Department of Medicine, Boston University School of Medicine, Boston, Massachusetts, USA. and was published in the Journal of Cardiovascular Pharmacology 2005 Oct, reported that grape seed and skin extracts inhibit platelet function and release of reactive oxygen intermediates. Grape seed extract contain polymeric flavonoids with antioxidant properties believed to be protective against cardiovascular events. Acute cardiac events are also associated with enhanced inflammation and thrombosis. In this study, the extracts from grape skins or seeds were examined for their anti-inflammatory properties and effect on platelet release of reactive oxygen intermediates. The results suggests that the extracts from purple grape skins and seeds inhibit platelet function and platelet-dependent inflammatory responses at pharmacologically relevant concentrations. These findings suggest potential benefits for platelet-dependent antithrombotic and anti-inflammatory properties.





## **Grape Seed Extract Benefits Dermal Wound Healing Of Redox-Active Grape Seed Proanthocyanidins**

In a laboratory research done in the Department of Surgery, Heart and Lung Research Institute, The Ohio State University Medical Center, Columbus, OH, USA found that topical application of grape seed extract accelerated wound contraction and closure. Grape seed extract treatment was associated with a more well-defined hyperproliferative epithelial region, higher cell density, enhanced deposition of connective tissue, and improved histological architecture. The study suggests that there are firm evidence to support that topical application of grape seed extract represents a feasible and productive approach to support dermal wound healing.

## **Grape Seed Extract Benefits Osteoporosis By Enhancing Bone Density And Strength In Experimental Animals**

In the Journal of Musculoskeletal Neuronal Interactions 2005, a research was published studying the mechanical assessment of effects of grape seed proanthocyanidins extract on tibial bone diaphysis in rats. The research was done in the Department of Paediatric Dentistry, Kyushu Dental College, Manazuru, Kokurakita-ku, Kitakyushu, Japan. The report presented data from a 6-week experimental period that showed the tibial cortical parameters were increased by grape seed extract treatment, suggesting a potential herapeutic application of this compound for treatment of bone debility.

## **Grape Seed Proanthocyanidines And Skin Cancer Prevention: Inhibition Of Oxidative Stress And Protection Of Immune System**

In a study reported in Molecular Nutrition and Food Research June 2008, suggested that the in vitro and in vivo studies of the possible protective effect of grape seed proanthocyanidins and the molecular mechanism for these effects in SKH-1 hairless mice produced a decreased UVB-induced skin tumor development in terms of tumor incidence, tumor multiplicity, and a decrease in the malignant transformation of papillomas to carcinomas. This study suggests that dietary grape seed extract supplementation could be useful in the attenuation of the adverse UV-induced health effects in human skin.



## **Hepatoprotection Benefits Of Grape Seed Extract**

In Toxicology and Applied Pharmacology. 2011 Aug, a report has been made that grape seed extract inhibited arsenic-induced rat liver injury through suppression of NADPH oxidase and TGF- $\beta$ /Smad activation. The study was made in Public Health College, Zhengzhou University, 450001, China. The report discussed that chronic arsenic exposure induces oxidative damage to liver leading to liver fibrosis. From the in vitro study, grape seed extract dose-dependently reduced arsenic-stimulated ROS production and NADPH oxidase activities.

## **Antiviral Activity Of Grape Seed Extract**

In Biology Research. 2002, it was reported that grape seed extract proanthocyanidins down regulate HIV-1 entry coreceptors, CCR2b, CCR3 and CCR5 gene expression by normal peripheral blood mononuclear cells. The study was made in the Departments of Medicine and Microbiology, Kaleida Health System, Buffalo General Hospital, Buffalo, NY, USA. It was suggested that the flavonoids and related polyphenols found in grape seed extract, in addition to their cardioprotective, anti-tumor, anti-inflammatory, anti-carcinogenic and anti-allergic activities, also possess promising anti-HIV effects.



## Published Research Abstracts

### Induction of cell cycle arrest and apoptosis by grape seed procyanidin extract in human bladder cancer BIU87 cells.

**Publication:** European Review of Medical Pharmacological Science. 2016 Jul;20(15):3282-91.

**Authors:** Liu J, Zhang WY, Kong ZH, Ding DG.

#### Objective

The aim of this study was to evaluate the effects of grape seed procyanidin extract (GSPE) on cell proliferation and apoptosis in human bladder cancer BIU87 cells and to investigate its molecular mechanism in vitro.

#### Materials and Methods

BIU87 cells were treated with different concentrations of GSPE for 24h in vitro while an untreated group was taken as control. MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide] assay, Hoechst 33258 staining, flow cytometry, RT-PCR and Western blot were used to detect the anti-proliferation and apoptotic induction effects of GSPE on BIU87 cells.

#### Results

It was found that GSPE inhibited the cell growth through cell cycle arrest at G1 phase and induced cell apoptosis in BIU87 cells in a dose-dependent manner. Semi-quantitated RT-PCR and Western blot analyses indicated that GSPE increased caspase-3 ( $p < 0.01$ ), but decreased the expression of cyclinD1, CDK4 and survivin ( $p < 0.01$ ).

#### Conclusions

GSPE inhibits cell proliferation by inducing cell cycle arrest and apoptosis in BIU87 cells, and the effect may be related with its down-regulation of cyclinD1, CDK4.





## Protective effect of grape seed and skin extract against diabetes-induced oxidative stress and renal dysfunction in virgin and pregnant rat.

**Publication:** Biomed Pharmacother. 2016 Jul 23;83:584-592.

**Authors:** Oueslati N, Charradi K, Bedhiafi T, Limam F, Aouani E.

### Abstract

The present work deal with the effect of alloxan-induced diabetes on kidney oxidative stress and dysfunction of virgin and pregnant rat as well as the protection that may be afforded by high dosage GSSE (4g/kg) treatment.

Diabetes affected negatively several kidney function parameters as creatinemia, uremia, uricemia and proteinuria without affecting kidney index. Diabetes also induced an oxidative stress characterized by increased lipid and protein oxidation, a drop in antioxidant enzyme defenses as catalase, superoxide-dismutase, glutathione-peroxidase, an alteration in transition metals as free iron, copper, selenium and associated enzymes and an increase in calpain and acetyl-cholinesterase activities. Tremendously, GSSE treatment protected efficiently against all the deleterious effects of diabetes-induced kidney dysfunction in both virgin and pregnant animals.

High dosage GSSE is a safe and potent anti-oxidant that may be further tested in clinical trials for the long-term preservation of kidney function especially in multiple pregnancies.



## Scavenging and antioxidant properties of different grape cultivars against ionizing radiation-induced liver damage ex vivo.

**Publication:** Indian J Exp Biol. 2016 Apr;54(4):280-5.

**Authors:** Singha I, Das SK.

### Abstract

Ionizing radiation (IR) has become an integral part of the modern medicine--both for diagnosis as well as therapy. However, normal tissues or even distant cells also suffer IR-induced free radical insult. It may be more damaging in longer term than direct radiation exposure. Antioxidants provide protection against IR-induced damage. Grapes are the richest source of antioxidants.

Here, we assessed the scavenging properties of four grape (*Vitis vinifera*) cultivars, namely Flame seedless (Black), Kishmish chorni (Black with reddish brown), Red globe (Red) and Thompson seedless mutant (Green), and also evaluated their protective action against  $\gamma$ -radiation-induced oxidative stress in liver tissue ex vivo.

The scavenging abilities of grape seeds [2,2-diphenyl-1-picrylhydrazyl (DPPH) ( $IC_{50} = 0.008 \pm 0.001$  mg/mL), hydrogen peroxide ( $IC_{50} = 0.49$  to  $0.8$  mg/mL), hydroxyl radicals ( $IC_{50} = 0.08 \pm 0.008$  mg/mL), and nitric oxide ( $IC_{50} = 0.8 \pm 0.08$  mg/mL)] were higher than that of skin or pulp. Gamma ( $\gamma$ ) radiation exposure to sliced liver tissues ex vivo from goat, @ 6 Gy significantly ( $P < 0.001$ ) decreased reduced glutathione (GSH) content by 21.2% and also activities of catalase, glutathione peroxidase (GPx), glutathione reductase (GR) and glutathione s-transferase (GST) by 49.5, 66.0, 70.3, 73.6%, respectively. However, it increased thiobarbituric acid reactive substances (TBARS) by 2.04-fold and nitric oxide level by 48.6% compared to untreated group. Further increase in doses (10 or 16 Gy) of  $\gamma$ -radiation correspondingly decreased GSH content and enzyme activities, and increased TBARS and nitric oxide levels. Grape extract treatment prior to ionizing radiation exposure ameliorated these effects at varying extent. The seed extracts exhibited strong antioxidant potential compared to skin or pulp extracts of different grape cultivars against oxidative damage by ionizing radiation (6 Gy, 10 Gy and 16 Gy) in sliced liver tissues ex vivo. Grape extracts at higher concentration (10 mg extract/g liver tissue) showed stronger antioxidant potential against lower dose (6 Gy) of ionizing radiation.

Our results suggest that grape extracts could serve as a potential source of natural antioxidant against lower doses of IR-induced oxidative stress in liver extracts ex vivo.



## The effect of supplementation of grape seed proanthocyanidin extract on vascular dysfunction in experimental diabetes.

**Publication:** Journal of Medicinal Food 2011, Nov 14 (11) 1298-302

**Authors:** Okudan N1, Barışkaner H, Gökbel H, Sahin AS, Belviranlı M, Baysal H.

### Abstract

Increased oxidative stress and impaired endothelium-dependent relaxation could underlie many of the vascular complications associated with diabetes.

We aimed to investigate the effect of supplementation with grape seed proanthocyanidin extract (GSPE), a natural antioxidant, on vascular responses and oxidative stress in streptozotocin-induced diabetic rats.

Male Sprague-Dawley rats were divided into three groups: control rats, untreated diabetic rats, and GSPE (100 mg/kg, for 6 weeks)-supplemented diabetic rats. Thoracic aorta rings of the rats were mounted in organ baths, and relaxant responses to acetylcholine (ACh), A23187, and sodium nitroprusside (SNP) were assayed in tissues precontracted with 60 mM KCl. Plasma samples used for the measurement of malondialdehyde (MDA) level and superoxide dismutase (SOD) activity. The endothelium-dependent relaxations in response to ACh and A23187 were impaired, but endothelium-independent relaxation in response to SNP did not change in diabetic rats.

Supplementation with GSPE significantly improved the relaxant responses to ACh and A23187. The MDA level was significantly elevated and the plasma SOD activity was decreased in diabetic rats, but supplementation with GSPE attenuated the elevated MDA levels and increased plasma SOD activity.

Thus supplementation of GSPE may attenuate oxidative stress through the inhibition of lipid peroxidation and may restore endothelial function and reduce the risk of vascular disease in diabetes.



## Grape seed and skin extract mitigates heart and liver oxidative damage induced by a high-fat diet in the rat: gender dependency.

**Publication:** Canadian Journal of Physiology and Pharmacology 2013 Dec 91 (12) pp1076-85

**Authors:** Charradi K1, Mahmoudi M, Elkahoui S, Limam F, Aouani E.

### Abstract

Obesity is a public health problem contributing to morbidity and mortality from metabolic syndrome. It has long been recognized that there is a gender dependency in several obesity-related health risks.

Using a high fat diet (HFD) to induce obesity in Wistar rats, we studied the gender dependency of fat-induced oxidative stress in the heart and liver, with a special emphasis on the distribution of transition metals, as well as the protective effects of grape seed and skin extract (GSSE). HFD induced obesity in both male and female rats, characterized by increased body weight as well as relative liver mass in both genders, and increased relative heart mass in the males only.

HFD also provoked the accumulation of triglycerides and total cholesterol into the male hearts, and into the livers of both genders. HFD induced oxidative stress in the male hearts and also in the livers of both genders. Furthermore, HFD affected cardiac levels of copper in the males, and hepatic levels of copper and zinc in both genders, whereas HFD affected free iron in the male hearts and female livers, specifically.

In conclusion, HFD treatment altered transition metal homeostasis more drastically in the male heart than in the female liver, and GSSE efficiently protected these organs against fat-induced disturbances, regardless of gender.





## Grape seed extract alleviates high-fat diet-induced obesity and heart dysfunction by preventing cardiac siderosis.

**Publication:** Cardiovascular Toxicology 2011 Mar 11(1): 28-37

**Authors:** Charradi K1, Sebai H, Elkahoui S, Ben Hassine F, Limam F, Aouani E.

### Abstract

Obesity is a tremendous public health problem, characterized by ectopic accumulation of fat into non-adipose tissues, leading to oxidative stress and chronic inflammation, in which the heart is the most severely affected organ.

We used an experimental model of high-fat-diet (HFD)-induced obesity to analyze the link between oxidative stress and heart dysfunction. We also studied the cardioprotective effect of a grape seed and skin extract (GSE).

Exposure of rats to HFD during 45 days induced heart hypertrophy, inflammation as assessed by plasma CRP elevation and contractile dysfunction as revealed after ischemia/reperfusion of Langendorff-perfused hearts. HFD also induced cardiac steatosis and lipotoxicity, which are linked to an oxidative stress status, worsened by increased siderosis and resulting in Ca(2+) overload. Importantly, GSE alleviated all the deleterious effects of HFD treatment.

These studies suggest that GSE is a safe anti-obesity and cardioprotective agent that should also find potential applications in other inflammatory damaging conditions as stroke.



## Grape seed and skin extract prevents high-fat diet-induced brain lipotoxicity in rat.

**Publication:** Neurochemical Research Journal 2012 Sep 37(9) 2004-13

**Authors:** Charradi K, Elkahoui S, Karkouch I, Limam F, Hassine FB, Aouani E.

### Abstract

Obesity is related to an elevated risk of dementia and the physiologic mechanisms whereby fat adversely affects the brain are poorly understood.

The present investigation analyzed the effect of a high fat diet (HFD) on brain steatosis and oxidative stress and the intracellular mediators involved in signal transduction, as well as the protection offered by grape seed and skin extract (GSSE). HFD induced ectopic deposition of cholesterol and phospholipid but not triglyceride. Moreover brain lipotoxicity is linked to an oxidative stress characterized by increased lipoperoxidation and carbonylation, inhibition of glutathione peroxidase and superoxide dismutase activities, depletion of manganese and a concomitant increase in ionizable calcium and acetylcholinesterase activity. Importantly GSSE alleviated all the deleterious effects of HFD treatment.

Altogether our data indicated that HFD could find some potential application in the treatment of manganism and that GSSE should be used as a safe anti-lipotoxic agent in the prevention and treatment of fat-induced brain injury.



## Resveratrol improves cardiovascular function and reduces oxidative organ damage in the renal, cardiovascular and cerebral tissues of two-kidney, one-clip hypertensive rats.

**Publication:** Journal of Pharmacy and Pharmacology 2010 Dec62(12) 1784-93

**Authors:** Toklu HZ, Sehirli O, Erşahin M, Süleymanoğlu S, Yiğiner O, Emekli-Alturfan E, Yarat A, Yeğen BÇ, Sener G.

### Objectives:

The putative protective effects of resveratrol against oxidative injury in the heart, kidney and brain tissues of rats induced with the two-kidney, one-clip (2K1C) hypertension model were investigated.

### Methods:

Wistar albino rats were divided into sham-operated (n = 8) or 2K1C groups, in which rats received either resveratrol (10 mg/kg per day, i.p., n = 8), or saline (n = 8) starting at Week 3 after the surgery and continuing for the following 6 weeks. Indirect blood pressure recordings and echocardiographic images were made to evaluate cardiac function. At the end of Week 9 the animals were decapitated and plasma, heart, kidney and brain were taken for biochemical assays, while aortic rings were prepared for vascular reactivity studies.

### Key Findings:

2K1C hypertension resulted in increased blood pressure, aortic hypercontractility and reduced left ventricular function, leading to increased lipid peroxidation and myeloperoxidase activity, concomitant with significant reductions in tissue glutathione, superoxide dismutase, Na<sup>+</sup>/K<sup>+</sup>-ATPase and catalase activities in the cardiac, renal and brain tissues, indicating the presence of oxidative tissue damage in peripheral target organs. Elevated plasma levels of lactate dehydrogenase, creatine kinase, as well as reduced plasma levels of antioxidant capacity and nitric oxide further verified the severity of oxidative injury. A 6-week treatment with resveratrol reversed all the measured parameters, ameliorated hypertension-induced oxidative injury in the target organs and improved cardiovascular function.

### Conclusions:

Resveratrol improved cardiovascular function through the augmentation of endogenous antioxidants and the inhibition of lipid peroxidation by maintaining a balance in oxidant/antioxidant status, which also ameliorated hypertension-induced oxidative injury in the cardiac, renal and cerebral tissues.



## Polyphenolics in grape seeds-biochemistry and functionality.

**Publication:** Journal of Medicinal Food 2003 Winter 6(4) 291-9

**Authors:** Shi J1, Yu J, Pohorly JE, Kakuda Y.

### Abstract

Grape seeds are waste products of the winery and grape juice industry. These seeds contain lipid, protein, carbohydrates, and 5-8% polyphenols depending on the variety.

Polyphenols in grape seeds are mainly flavonoids, including gallic acid, the monomeric flavan-3-ols catechin, epicatechin, gallic acid, epigallocatechin, and epicatechin 3-O-gallate, and procyanidin dimers, trimers, and more highly polymerized procyanidins. Grape seed extract is known as a powerful antioxidant that protects the body from premature aging, disease, and decay. Grape seeds contain mainly phenols such as proanthocyanidins (oligomeric proanthocyanidins).

Scientific studies have shown that the antioxidant power of proanthocyanidins is 20 times greater than vitamin E and 50 times greater than vitamin C. Extensive research suggests that grape seed extract is beneficial in many areas of health because of its antioxidant effect to bond with collagen, promoting youthful skin, cell health, elasticity, and flexibility. Other studies have shown that proanthocyanidins help to protect the body from sun damage, to improve vision, to improve flexibility in joints, arteries, and body tissues such as the heart, and to improve blood circulation by strengthening capillaries, arteries, and veins.

The most abundant phenolic compounds isolated from grape seed are catechins, epicatechin, procyanidin, and some dimers and trimers.





## The effect of grape seed extract on cardiovascular risk markers: a meta-analysis of randomized controlled trials.

**Publication:** Journal of the American Dietetic Association 2011 Aug 111(8) 1173-81

**Authors:** Feringa HH, Laskey DA, Dickson JE, Coleman CI.

### Abstract

Recent animal studies have suggested that grape seed extract has beneficial effects on the cardiovascular system. Randomized trials in human beings have yielded conflicting results.

The objective of this systematic review was to assess the effect of grape seed extract on changes in blood pressure, heart rate, lipid levels, and C-reactive protein (CRP) levels. We searched MEDLINE (January 1, 1950, through October 31, 2010), Agricola (January 1, 1970, through October 31, 2010), Scopus (January 1, 1996, through October 31, 2010), and the Cochrane Central Register of Controlled Trials (through October 31, 2010) for randomized controlled trials in human beings of grape seed extract reporting efficacy data on at least one of the following end points: systolic or diastolic blood pressure, heart rate, total cholesterol, low-density or high-density lipoprotein cholesterol, triglycerides, or CRP.

A manual search of references from primary and review articles was performed to identify additional relevant trials. For all endpoints except CRP, the mean change in each parameter from baseline was treated as a continuous variable and the effect size was calculated as the weighted mean difference between the means in the grape seed extract and control groups. Data on CRP were pooled as a standardized mean difference. Nine randomized, controlled trials (N=390) met the inclusion criteria, and a meta-analysis was conducted. Upon meta-analysis, grape seed extract significantly lowered systolic blood pressure (weighted mean difference -1.54 mm Hg (95% confidence interval -2.85 to -0.22,  $P=0.02$ )), and heart rate (weighted mean difference -1.42 bpm (95% confidence interval -2.50 to -0.34,  $P=0.01$ )). No significant effect on diastolic blood pressure, lipid levels, or CRP was found. No statistical heterogeneity was observed for any analysis ( $I^2<39\%$  for all). Egger's weighted regression statistic suggested low likelihood of publication bias in all analysis ( $P>0.05$  for all), except for the effect on diastolic blood pressure ( $P=0.046$ ).

Based on the currently available literature, grape seed extract appears to significantly lower systolic blood pressure and heart rate, with no effect on lipid or CRP levels. Larger randomized, double-blinded trials evaluating different dosages of grape seed extract and for longer follow-up durations are needed.



## Grape Seed Extract – Published Research Papers

### Grape pomace extract exerts antioxidant effects through an increase in GCS levels and GST activity in muscle and endothelial cells

**Publication:** International Journal of Molecular Medicine 36: 433-441, 2015

**Authors:** Goutzourelas N, Stagos D, Housmekeridou A, Karapoulou C, Kerasioti E, Aligiannis N, Skaltsounis A, Spandido D, Tsatsakis A, Kouretas D.

### The Protective Effect of Grape-Seed Proanthocyanidin Extract on Oxidative Damage Induced by Zearalenone in Kunming Mice Liver

**Publication:** International Journal of Molecular Sciences 2016, 17, 808;

**Authors:** Miao Long, Shu-Hua Yang, Jian-Xin Han, Peng Li, Yi Zhang, Shuang Dong, Xinliang Chen, Jiayi Guo, Jun Wang, and Jian-Bin He.

### Grape seed proanthocyanidin extract protects the retina against early diabetic injury by activating the Nrf2 pathway

**Publication:** Experimental and Therapeutic Medicine 11: 1253-1258, 2016

**Authors:** Yan Sun, Caimei Xiu, Wei Liu, Yuan Tao, Jianrong Wang, Yi Qu.

### Co-administration of Grape Seed Extract and Exercise Training Improves Endothelial Dysfunction of Coronary Vascular Bed of STZ-Induced Diabetic Rats

**Publication:** Iranian Red Crescent Medical Journal. 2013 October; 15(10): e7624.

**Authors:** Mohammad Badavi, Hassan Ali Abedi, Ali Reza Sarkaki, Mahin Dianat

### Neuroprotection of Grape Seed Extract and Pyridoxine against Triton-Induced Neurotoxicity

**Publication:** Oxidative Medicine and Cellular Longevity Volume 2016, Article ID 8679506, 8 pages

**Authors:** Heba M. Abdou and Mayssaa M. Wahby

### Grape Seed Proanthocyanidin Extract Ameliorates Diabetic Bladder Dysfunction via the Activation of the Nrf2 Pathway

**Publication:** PLOS ONE | DOI:10.1371/journal.pone.0126457 May 14, 2015

**Authors:** Shouzhen Chen, Yaofeng Zhu, Zhifeng Liu, Zhaoyun Gao, Baoying Li, Dongqing Zhang, Zhaocun Zhang, Xuewen Jiang, Zhengfang Liu, Lingquan Meng, Yue Yang, Benkang Shi.

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