

ENZOGENOL®

A broad spectrum of **antioxidants** purified from fresh New Zealand **pine bark** using **pure water** technology



ENZOGENOL®

Free radical damage

Free radical damage is implicated in a number of disease states and even in the ageing process itself¹. Free radicals are unstable molecules that have an unpaired electron. They rob electrons from anything they can such as healthy cells in our bodies to make an electron pair. The process of losing an electron is commonly known as 'being oxidised' and it is by this process that free radicals cause us damage. The sources of free radicals are many including metabolic by-products, fatty foods, pollution, chemicals, cigarette smoke, exercise, infection, radiation and tissue damage.

Antioxidants

Antioxidants protect against oxidation. They sacrifice themselves to free radicals to prevent damage. Our bodies have natural antioxidant defence systems. Some of the defenders are produced by us (enzymes such as superoxide dismutase), however key defences rely on a variety of elements in our diet. Vitamins C and E for example are well recognised for the importance of their antioxidant activity. Other potent antioxidant compounds that we are unable to produce are flavonoids. These compounds, originally classed as vitamin P, are obtained from plant sources such as fruits and vegetables. Researchers are increasingly studying flavonoids to counter illnesses such as cardiovascular disease and cancer, as well as inflammatory and allergic disorders^{2,3}.

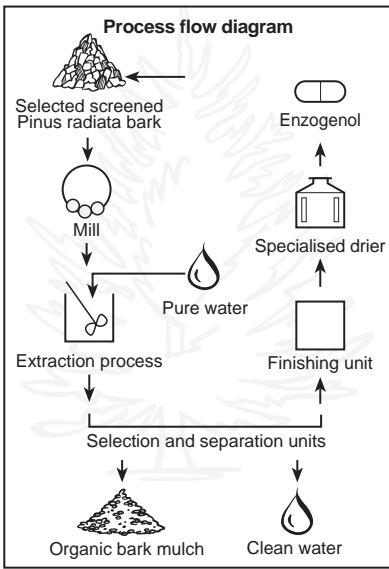
Oxidative stress

As a part of normal activity our bodies continually produce free radicals and other reactive oxygen species. People today are also subjected to many things that increase free radical levels. If an imbalance occurs with more free radicals than our antioxidant levels can defend against, this imbalance is known as oxidative stress. Oxidative stress is caused by a number of conditions:

- Increases in free radicals where the antioxidant defence systems are unable to cope
- Declining antioxidant levels with age. Older people are more likely to suffer from oxidative stress.
- An increase in the available transition metal ions causing greater amounts of the body's free radicals to be changed into the more reactive 'peroxyl' species.

Cells are able to cope with small amounts of oxidative stress as they are quite ingenious and can repair minor damage. However major oxidative stress can cause grave disturbances in cell metabolism and has been linked to diseases^{3,4} such as:


- | | | |
|----------------------|------------------|------------------------|
| • Cancer | • Cardiovascular | • Rheumatoid arthritis |
| • Cataracts | • Allergies | • Alzheimer's |
| • Pancreatitis | • Parkinson's | • Cystic fibrosis |
| • Diabetes | • Glaucoma | • Huntington's |
| • Multiple Sclerosis | • Schizophrenia | • Tardive dyskinesia |




Enzogenol

Flavonoids are potent antioxidants with which we can boost our defences⁵. In seeking a source of flavonoids it is important to achieve a range of molecule types and sizes to provide activity within a range of sites and conditions. The source should be free from contaminants. To achieve diversity, long-lived plants are a particularly rich source of flavonoids where protection is required across decades and even centuries. New Zealand pine bark provides an ideal source.

Enzogenol: a balanced extract



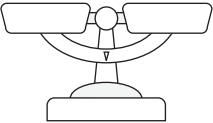
Bark of *Pinus radiata*



Enzogenol

- Proanthocyanidins
 - Monomeric
 - Oligomeric
 - Polymeric
- Flavonoids
- Organic acids
- Flavonoid glycosides
- Natural sugars
- Esters

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Enzogenol provides the widest range of flavonoids by processing both the inner and outer bark layers. The patented pure water extraction process releases the compounds in their natural state, provides 'nature's' balance of molecule types and molecular weights, and avoids the introduction of solvent residues. As an added bonus, by-products of the process are environmentally friendly.

Enzogenol is especially rich in the critical, potent, higher molecular weight proanthocyanidins.

Molecular weight profile

Compound type	Enzogenol	PBE	GSE 1	GSE 2	GTE
Carbohydrates, esters and organic acids	15%	33%	13%	13%	75%
Monomer, dimer and trimer proanthocyanidins	22%	27%	56%	44%	25%
Oligomeric proanthocyanidins	25%	22%	25%	30%	<1%
Polymeric proanthocyanidins	38%	18%	6%	13%	0%

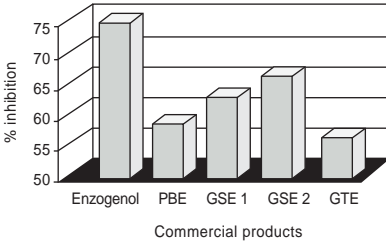
PBE: Pine bark extract (solvent based)
GTE: Green tea extract

GSE1: Grape seed extract 1
GSE2: Grape seed extract 2

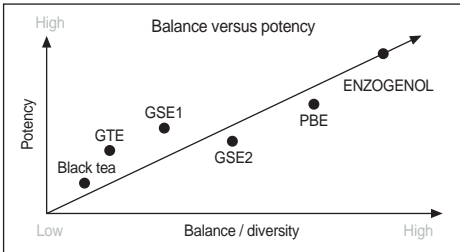
Antioxidant activity

The peroxy radical scavenging assay measures the ability of compounds to stop lipid oxidation chain reactions. Each compound was assessed at the concentration of 1µg/ml. The decrease in rate of lipid oxidation that the test compounds caused is shown as a percentage of the control mixture where no inhibitor antioxidants were added. One hundred percent inhibition would indicate that the antioxidant was able to completely stop the chain reaction.

Comparison of antioxidant activity of commercially available antioxidants

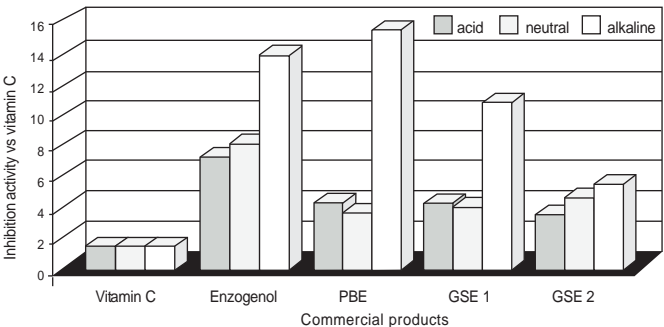


The natural balance of all compounds which work together to form part of the tree's defence system, is not found in extracts obtained with chemical solvents. Other sources of flavonoids lack the important oligomeric groupings and/or have few of the flavonoid glycosides and esters.



A balanced extract requires a range of compounds to be active in a variety of sites and under conditions from acidic through to alkaline. Enzogenol contains well over 2,000 compounds providing strong antioxidant activity throughout required conditions.

Superoxide inhibitory activity⁶



Enzogenol

- Powerful broad spectrum of natural antioxidants
- Bark from South Pacific sub-alpine plantation
 - Age selected trees
 - Inner and outer bark extraction
 - Plantation free of pesticides and synthetic fertilisers
 - Environment not affected by large population
- Patented pure water extraction process
 - Compounds retained in native state
 - Broadest range of antioxidant compounds
 - Unique profile of compounds
 - A balanced blend of compounds in 'natures' proportions
 - Avoids introduction of solvent residues
 - No waste streams, with environmentally friendly by-products
- Rich in the critically important oligomeric and polymeric proanthocyanidins
- Free radical scavenging activity across acidic, alkaline and neutral conditions
- Ability to restore other antioxidants e.g. vitamins C and E from free radical changes.
- Effective levels of extract in formulations

This pamphlet is not intended as a substitute for medical advice. This material is for informational and educational purposes only. Always consult your medical practitioner for advice on any medical condition.

These statements have not been evaluated by the Food and Drug administration. This product is not intended to diagnose, treat, cure or prevent any disease.



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A recipe for healthy living (By Dr. Kelvin Duncan⁷)

If we are right then:

- Consult a medical practitioner in all cases where you have an obvious illness.
- Consult a medical practitioner for regular (yearly) check-ups. This is especially important to men. From one bloke to another - don't be too macho and think you are invincible and do not need to go to a doctor. Plenty of younger men in the graveyard would sorrowfully attest to the foolishness of that attitude!
- Enjoy eating plenty of green vegetables and fruits in the least processed form possible for you.
- Follow sensible dietary advice. Cut down on fatty foods, especially those that are known to raise blood cholesterol levels.
- Enjoy regular exercise appropriate to your age and condition. If your current exercise regimen isn't enjoyable, then change it. You are doing the wrong exercise.
- Listen to your body. You have a great number of powerful feedback mechanisms that are designed to tell you when something is going wrong. Help your body to heal itself. Humans are wonderfully endowed with regenerative capacities that can heal and repair if given the chance. Use them.
- Avoid undue exposure to damaging radiation, such as UV and sunlight - cover up when outside using clothing or an effective sunblock.
- Enjoy regular and plentiful sleep.
- Avoid stress at work or in your personal life. If your life is in a mess then seek professional help. You may not be able to sort yourself out alone and great damage can be done by the stress that you are experiencing.
- Enjoy all things in moderation.
- Take antioxidant supplements, such as Enzogenol, in a dose appropriate for your size and level of activity. Let your body tell you the appropriate dosage.

References:

1. Ames BN, Shigenaga MK, Hagen TM (1993) Oxidants, antioxidants, and the degenerative diseases of aging. Proc. Natl. Acad. Sci. USA 90: 7915-7922
2. Hazen SL (2000) Oxidation and Atherosclerosis, Free Radical Biology and Medicine 28(12): 1683-1684
3. Papas AM (ed), (1999) Antioxidant Status, Diet, Nutrition, and Health, CRC Press
4. Basu TK, Temple NJ, Garg ML (ed), (1999) Antioxidants in Human Health and Disease, CABI Publishing
5. Manthey A, Buslig BS (1998) Flavonoids in the living system. Adv. Exp. Med. Biol. 349
6. Wood, JE, Senthilmohan, ST, Peskin, AV (2002) Antioxidant activity of pro-cyanidin-containing plant extracts at different pHs. Food Chem 77, 155-161
7. Duncan K (ed), (1998) Fighting Free Radicals, The Enzogenol Story. The Pacific Scientific Press