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The Extract division of Iprona

Future opportunities for the production and marketing of Blackcurrant standardised active compounds

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Marketing and Sales Director

BerryPharma – A division of Iprona AG/SPA

BerryPharma

- Extract Division of Iprona AG
- Production in Graz, Austria and Lana, Italy
- Producing Blackcurrant Extracts since 1998
- Specialist in Membrane Filtration extracts

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Contents

- What are BC standardised active compounds
- Production
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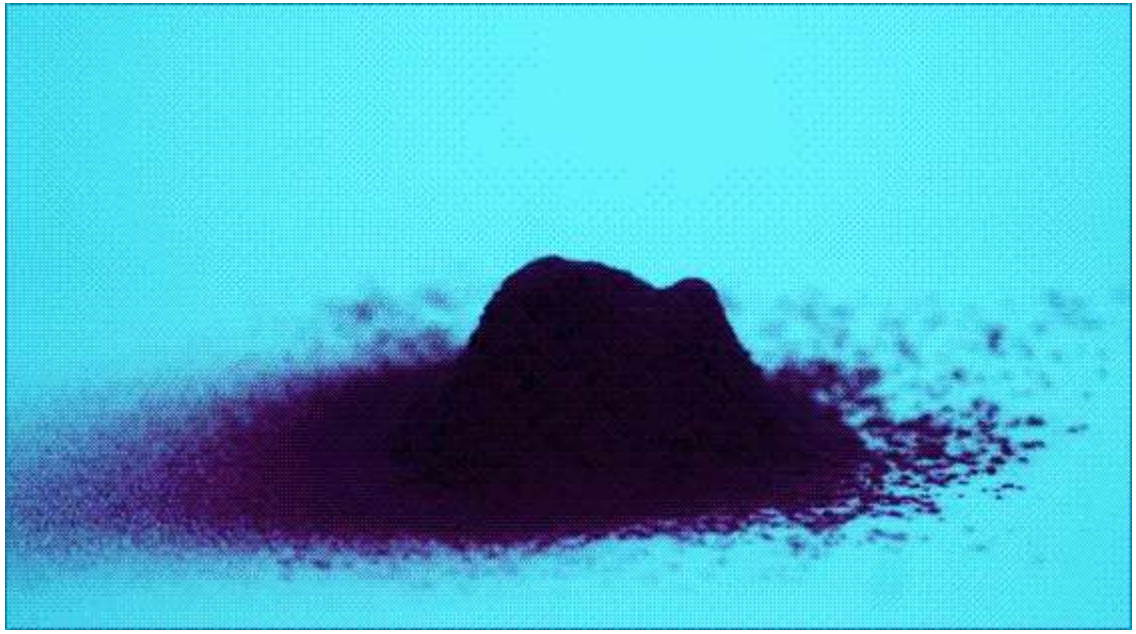
What are Blackcurrant „Standardised Active Compounds“



What are Blackcurrant „Standardised Active Compounds“

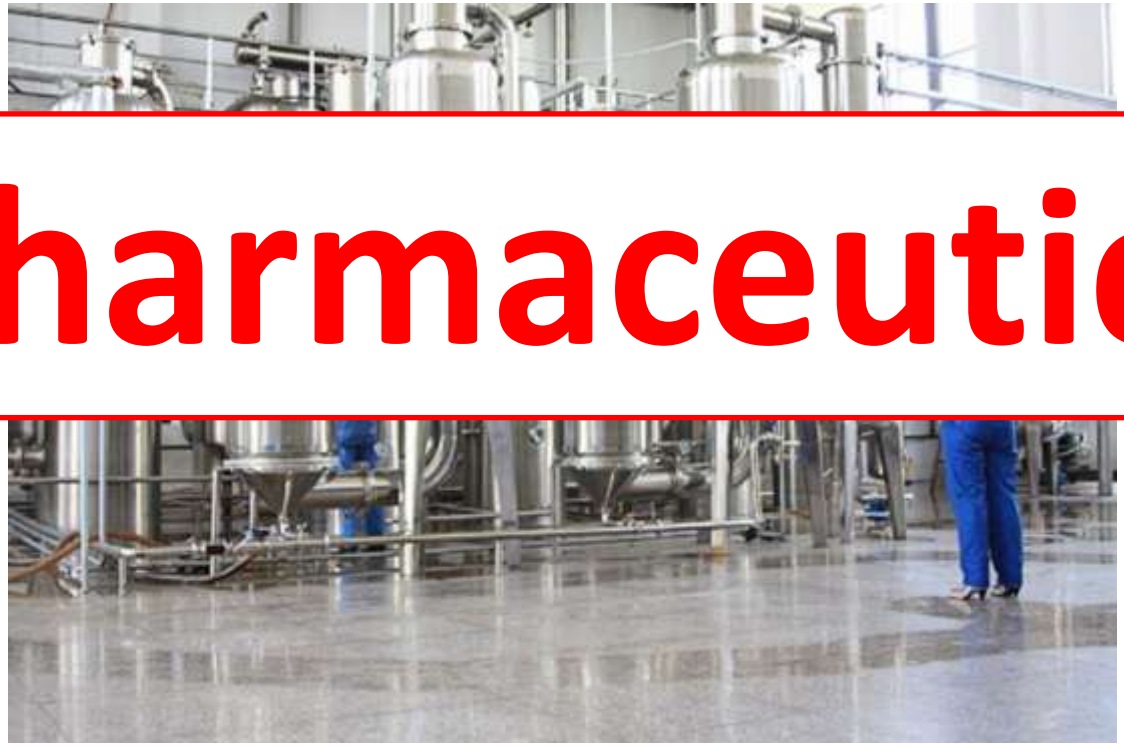
Liquids or Powders

Standardised on
Polyphenols or Anthocyanins

Produced by either?

Alcohol Extraction

- Used to maximise Anthocyanin Concentration



Pharmaceutical

- Approx 120 kg of blackcurrants = 1 kg of extract

Membrane Ultra Filtration Extract

- Broader spectrum of concentrated active compounds

Nutritional

- 60 kg of blackcurrants = 1 kg of extract

How Did we decide ?

Alcohol Extraction

Or

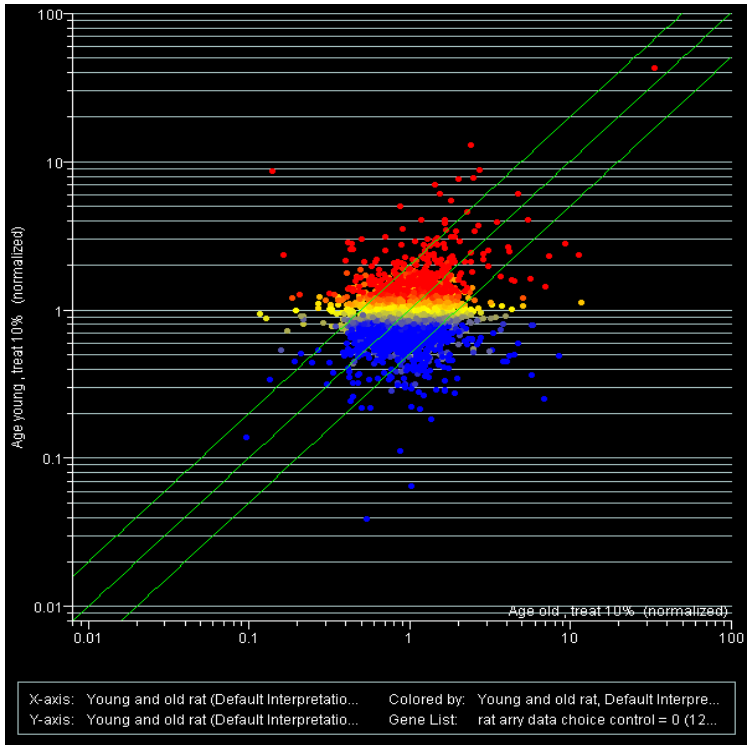
Membrane Ultra Filtration

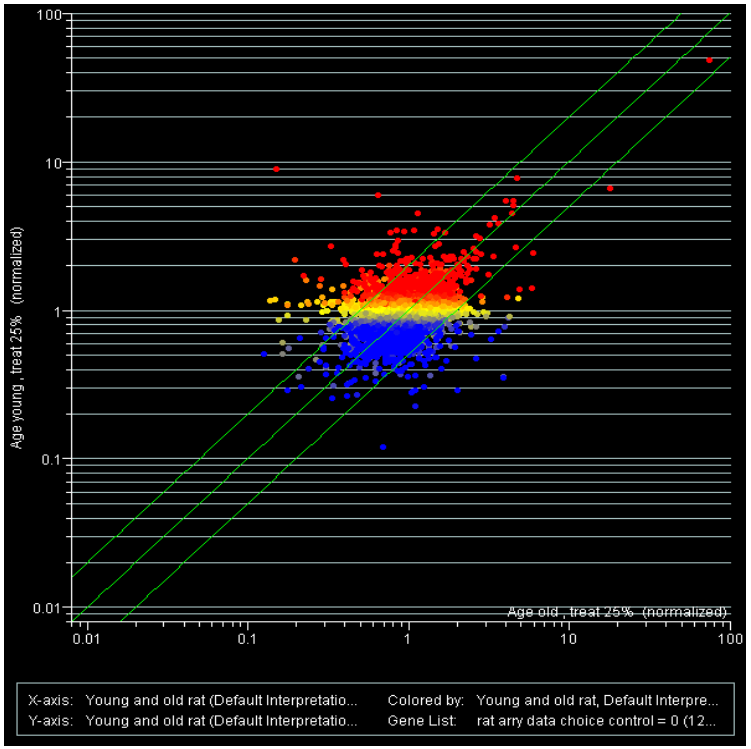
Nutrigenomic Microarray Analysis

BC 10% Membrane Concentrate

BC 25% Ethanol Extract

Young Rat





Young Rat

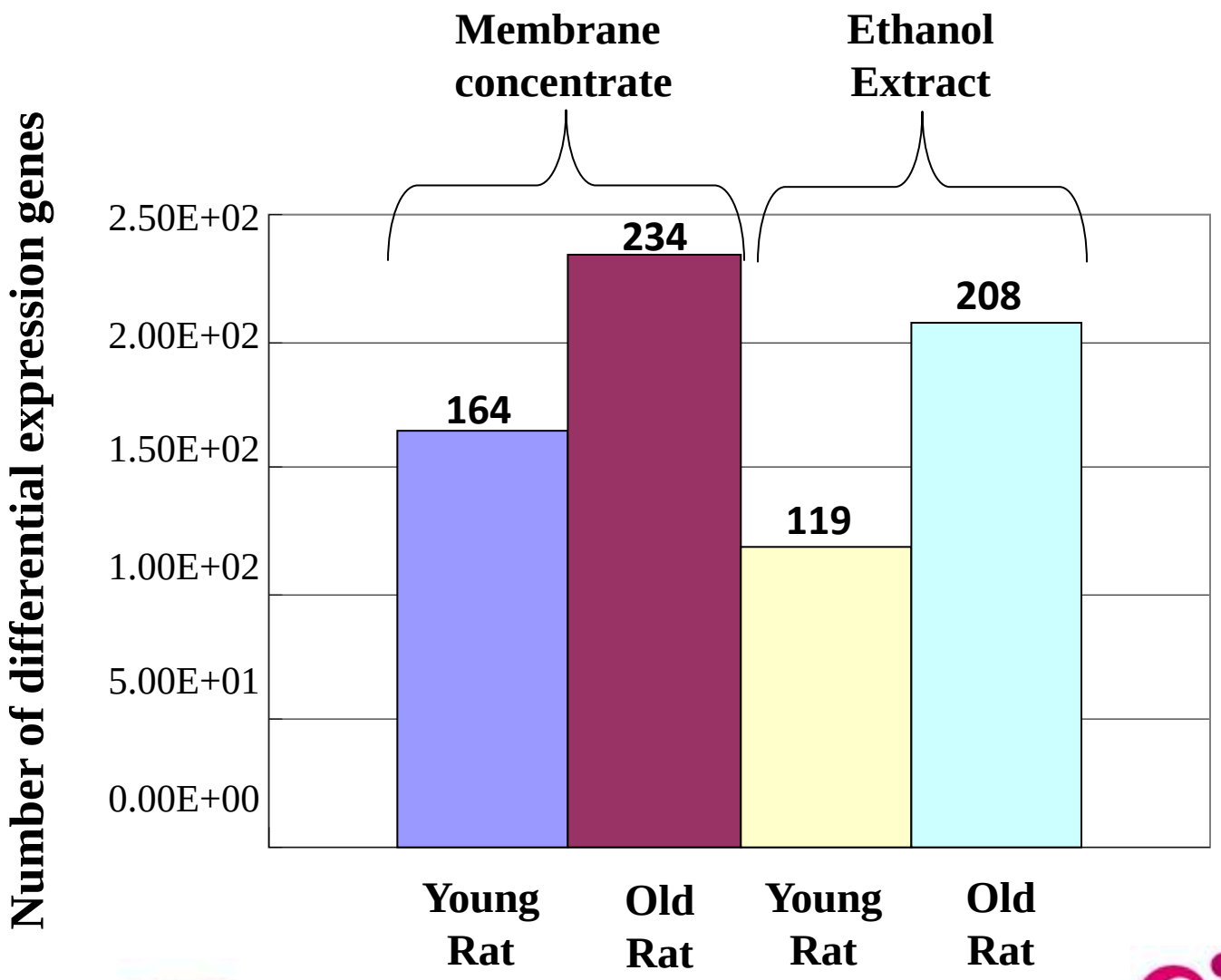
Old Rat

Old Rat

WEDAR

WELGENE

Number of Differential Expression Genes by Feeding Rats with Blackcurrants



WEDAR

WELGENE

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Differentially expressed genes in rat liver responsive to black currant feeding of different manufacturing process.

			Membrane filtrate		Ethanol extract	
			old	young	old	young
GO biological process	Description	Gene symbol	Ratio	Ratio	Ratio	Ratio
Stress response						
	Metallothionein 1a	Mt1a	0.33	0.38	0.78	1.01
	Metallothionein-2	ENSRNOT00000047663	0.48	0.37	0.93	0.87
	mRNA for hydroxysteroid sulfotransferase subunit	Sult2a1	0.48	0.55	1.32	1.22
	Alpha-1-B glycoprotein	A1bg	1.20	0.27	1.74	2.18
Metabolic process						
	Fatty acid synthase	Fasn	2.82	2.40	0.97	1.59
	Solute carrier family 1 (glial high affinity glutamate transporter), member 3	Slc1a3	5.38	4.04	0.39	2.20
	Aldo-keto reductase family 1, member B8	Akr1b8	0.56	0.22	0.90	1.14
	VI ADH=class VI alcohol dehydrogenase	S79716	0.42	0.39	0.84	0.89
Differentiation						
	Uroplakin 1B	Upk1b	1.19	1.13	0.29	0.54
	Plasticity-related protein 3	LOC298062	0.41	0.41	1.13	0.88
Signal transduction						
	Olfactory receptor 1057	Olr1057_predicted	0.74	0.34	1.23	1.07
	Phospholipase C, delta 4	Plcd4	0.64	0.63	1.65	1.26

WEDAR

WELGENE

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Differentially expressed genes in rat liver responsive to blackcurrant feeding

Biological process	Description	Gene symbol	Average ratio
Immune response			
	Chemokine (C-C motif) ligand 11	Ccl11	4.56
	Secretory leukocyte peptidase inhibitor	Slpi	4.31
Metabolic process			
	ATP citrate lyase	Acly	2.73
	Carnitine acetyltransferase	Crat	0.37
	UDP glycosyltransferase 2 family, polypeptide B	Ugt2b	7.63
Oxidoreduction			
	Cytochrome P450, family 4, subfamily a, polypeptide 14	Cyp4a14	0.34
	Cytochrome P450, subfamily 4A, polypeptide 11	Cyp4a11	0.36
Peroxisome biogenesis			
	Peroxisomal biogenesis factor 11A	Pex11a	0.33
Signal transduction			
	Protein phosphatase 1, regulatory subunit 14c	Ppp1r14c	5.80
	Olfactory receptor 1337	Olr1337_predicted	3.84
Cell cycle			
	Pleiomorphic adenoma gene-like 1	Plagl1	4.39
Cell differentiation			
	Delta-like 1 homolog	Dlk1	4.88

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Commissioned a Study at the Berlin Charité Medical University

BC-MFE anthocyanins cause a flow-dependent increase in blood perfusion in isolated human intracerebral arteries, reducing endothelial dysfunction.

G. Siegel[1,2], A. Becker[1], E. Ermilov[1], S. Hammersen[3]

[1]Charité – University Clinic Berlin, Institute of Physiology, Berlin, Germany
[2]University of Uppsala Biomedical Center, Uppsala, Sweden
[3]Charité – University Clinic Berlin, Dept of Neurosurgery, Berlin, Germany

Flow Measurement Model

We adopted the Flow Measurement Model which is also used by the pharmaceutical industry to test the efficacy of fluvastatins.

This provided a benchmark for evaluation of BC-MFE.

Human Brain Tissue Results

BC- MF Liquid produced:

- 40.4% reduction in tension,
- 45.2% increase in flow-dependent relaxation,
- 50.7% rise in blood perfusion

Results comparable to Fluvastatins!

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Conclusion from First Study Phase:

These experiments impressively show that BC-MF extract liquid clearly improves ***endothelial*** and cardio vascular micro circulation.

The Study Team concluded that BC-MFE should have a beneficial effect on the cognitive functions in dementia of the Alzheimer type and in the prevention of stroke.

We also commissioned further ellipsometry work, just printed in „Circulation“, the American Heart Association Journal which further confirms earlier findings including VLDL resistance and placque reduction.

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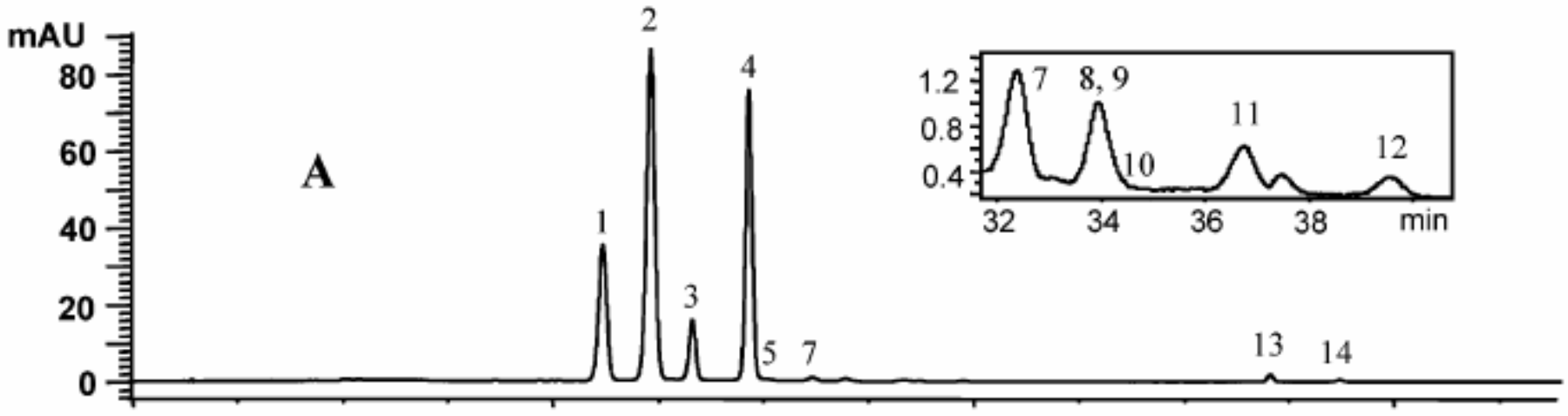
Why is Blackcurrant Extract so Active?

It has a Unique „delphinidin“ Composition

BC contains four main dominant anthocyanins:

delphinidin-3-glucoside,
cyanidin-3-glucoside,
delphinidin-3-rutinoside,
cyanidin-3-rutinoside

Matsumoto 2004, Relaxes smooth muscle...



Reverse-phase HPLC chromatogram of anthocyanins detected at 520 nm from blackcurrant (cv. Ben Alder). Elution gradient 1 was used to separate anthocyanins (Wu et al., 2004)

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Why support the Marketing of BC Std Active Compounds?

- Health Benefits already accepted by consumers
- Health Claims already exist for marketing
- Built on 1000 years of recorded traditional use
- Stable with up to 3 years shelf life.

- Profitable – value adding
  - 1 Kg of fresh Blackcurrants 80 pence per Kg
  - 1 Kg of Blackcurrant 25% Extract, 350 EUR p/Kg

- Global Nutraceutical Market shows continuous Growth

Global Nutraceutical Market

- Global nutraceutical market:
  - 2011: estimated at about **$151 billion**
  - 2016: estimated at about $207 billion

  → projected compound annual growth rate (CAGR) of 6.5% between 2011 and 2016
- Functional beverages market:
  - 2011: expected to be worth **$57 billion**
  - 2016: expected to be worth $87 billion

  → expected CAGR of 8.8%
- Nutraceutical food market: second largest market
  - 2011: estimated **$49 billion**
  - 2016: estimated $67 billion

  →estimated CAGR of 6.4%

Source: http://www.bccresearch.com/report/nutraceuticals-markets-processing-technologies-fod013d.html

Application Opportunities

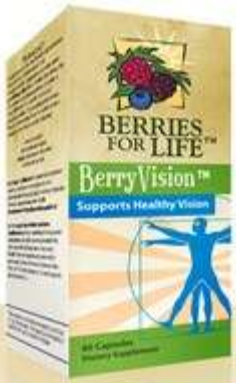
Established

- Powerful Antioxidant
- Eye Health
- Coughs Colds and Flu treatment

New Opportunities

- Micro circulation and Brain Health
- Migraine
- Anti-inflammatory
- Cardiovascular Health
- Metabolic Syndrome


MIGRA3
DOPPLER HEALTH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BLACKCURRANT ANTHOCYANINS


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Blackcurrant (Cassis)
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New Zealand
20% POLYPHENOLS
Promotes Eye Comfort & Antioxidant Protection*
60 Vegetarian Capsules
Dietary Supplement


VISION Smart 500
VISION Smart 500
VISION Smart 500


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くっきり。実感。
カシス
アントシアニン
50mg
β-カロテン
ルテイン
栄養機能食品
(栄養素β-カロテン)
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Meiji
カシス-i
A50
くっきり。実感。
カシス
アントシアニン
50mg
β-カロテン
ルテイン


Meiji
カシス-i

Opportunities are built from Clinical Studies confirming Benefits and Claims

Research Driven

Eye Stress Relief – Meiji and Cerebos

Eye Ring Shadow – beauty (microcirculation)

Migraine Relief – Complen Germany

Microcirculation – improved endothelial function Meiji & BerryPharma

Oxidative Stress – Science in Sport UK

Metabolic Syndrome – New EU Sponsored Initiative

Promising Future

1. Consumer demand for Nutraceuticals has a projected 6.5% compound annual growth rate.

2. We are still to realise the marketing potential of the unique delphinidin compounds

3. Scientists are building even stronger cases for further health claims including brain health

4. Quality of the extracts can only continue to improve with new Blackcurrant Fruit Cultivars and improved extraction technology

Acknowledgements

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Thank you for your attention!

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