Cognitive health: Understanding The Brain Food Trend

An examination of the most promising product categories for brain health ingredients

Food Matters Live 2014
Outline

• Macro economics & consumer segments.
• Current and prospect ingredients for cognitive health.
  - *Ingredients for brain development*;
  - *Ingredients protecting against cognitive diseases when ageing*;
  - *Ingredients acting as natural uppers*;
  - *Ingredients acting as natural downers*.
• Labelling strategies and product cases needs.
• Trending products.
• Aspects of forces affecting today’s decisions when creating new products for the category.
Brain Foods

The brain uses up to 50% of our energy intake.

Controls us via:
- Electrical Signals.
- Chemical Signals (Neurotransmitters).
Consumers

- Macro Trends & Stakeholder Issues.
General Consumers - Life Stage Needs & Demographics

Early - Brain Development
- Foetus Brain & Spinal Development;
- Childhood Cognitive Skills;
- Children's Mental Wellbeing.

Adult Life Balance
- Mental Energy;
- Relaxation & Sleep.

Ageing Prevention
- Sleep;
- Dementia;
- Alzheimer's;
- Parkinson's.
### Development: Children and Adolescents (0-17 Years)

<table>
<thead>
<tr>
<th>Cognitive Performance Issues</th>
<th>Economic Burden</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ADHD 5% of children</td>
<td>• Children and Adolescents $42.5 Bn (US)</td>
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</tbody>
</table>
**Adult Life: General Population (18-59 Years)**

**Cognitive Performance Issues**
- Headache (47% once a year)
  - Hydration;
  - Electrolytes;
  - Blood Sugar.

**Economic Burden**
- Migraine: $ 17 Bn (US)

**Sleep Disorders**
- 56% in the USA;
- 31% in Western Europe;
- 23% in Japan.

**Annual Employee Cost : +45% (US)**

**GAD:**
- Generalized anxiety disorder 10%.

**Anxiety disorders: € 11.6 Bn (EU)**
Cognitive Performance Issues

- MCI 3-20% depending on test
- Alzheimer’s 3-7%
- Parkinson’s 0.3-1%
  - Anxiety;
  - Sleep;
  - Dementia.

Economic Burden

- Dementia € 105.2 Bn
  (27 EU countries, Switzerland, Norway & Iceland)

The two top concerns amongst persons above 55 Years
1. Mental Health & Cognition
2. Sleep
Market & Drivers

- Market value and key applications.
- Discoveries of Ingredients.
Drivers – Demographics – Generation Issues

2013

- 0-14: 12%
- 15-59: 26%
- 60+: 62%

Above 60 years: 840 million

Est. 2030

- 0-14: 16%
- 15-59: 24%
- 60+: 60%

Above 60 years: 1.4 billion

Est. 2050

- 0-14: 21%
- 15-59: 58%
- 60+: 21%

Above 60 years: 2 billion

Source: United Nations
Drivers – Economic & Life Style

Mega Consumer Trends
Natural.
Prevention - Responsibility Own Health.
Holistic Body & Soul Focus.

Energy Drinks
$ 34 Bn

Psychotherapy Drugs
$ 70 Bn

Spec. Food & Drinks
$ 200 Mn

Supplements
$ 800 Mn

Source: Canadean Ingredients & BCC Research
Ingredients - Current Options & Potentials

- Main streamers.
- Trends from traditional use.
- Discoveries.
### Main Stream Relevant Nutrients

<table>
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<th>Nutrients</th>
<th>Allowed EU Claims (EFSA)</th>
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<td>Carbohydrate &amp; Water (Glucose)</td>
<td>• maintenance of normal brain function</td>
</tr>
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</table>
| Omega 3 – DHA              | • normal brain development of the foetus & breastfed infants  
|                            | • maintenance of normal brain function                                                |
| Iron                       | • normal cognitive development of children  
|                            | • normal cognitive function                                                            |
| Vit B6                     | • normal psychological function                                                        |
| B12                        | • normal psychological function                                                        |
| Iodine                     | • normal cognitive function                                                            |
| Zinc                       | • normal cognitive function                                                            |
| Magnesium                  | • normal cognitive function                                                            |
| Pantothenic Acid           | • normal mental performance                                                            |
| Folate                     | • contributes to the reduction of the risk of NTD                                       |
| Melatonin                  | • reduction of time taken to fall asleep                                               |

Source: Canadean Ingredient Profiles
Traditional Use and Growing Indications

1. Rosavin Salidroside from Arctic Root (Rhodiola rosea)
2. Alkaloids including withanine, somniferine, somnine, tropine from Ashwagandha (Withania somnifera)
3. Anthocyanidins from Blueberry or Blackcurrant (Vaccinium myrtillus and Ribes nigrum)
4. Apigenin from Chamomile (Matricaria recutita)
5. Melatonin Synthetic or from Cherry (Prunus cerasus)
6. Theobromine from Cocoa (Theobromine cacao)
7. Caffeine from Coffee, Cola nut, Guarana (guaranin), Yerba Mate
8. Ginkgolides, Myricetin & Quercetin from Ginkgo (Ginkgo biloba)
9. Ginsenosides from Ginseng (Panax ginseng)
10. Asiaticoside from Gotu Kola (Centella asiatica)
11. Mesembrenone Mesembrine from Kanna (Sceletium tortuosum)
12. Citral, citronellal, citronellol, eugenol, limonene from Linden (Tilia cordata)
13. Anthocyanins & Punicic acid from Pomegranate
14. Safranal from Saffron (Crocus sativus)
15. Hypericin from St John's Wort (Hypericum perforatum)
16. Citicoline is Synthesized
17. Curcumoids from Turmeric (Curcuma longa)
18. Apigenin 6-C-glucoside from Passionflower (Passiflora incarnata)
19. Ursolic acid from Holy Basil (Ocimum tenuiflorum)
20. 5HTP from Griffonia (Griffonia simplifolia)

1. Botanical Registrations -HMPC
2. Sold as a Food (Indian Ginseng) -EFSA concern raised
3. Food – or Additives Registration (E163) – Colorant
4. Food Registration
5. Food Registration
6. Food Registration
7. Food Registration
8. Food Registration
9. Food Registration
10. Food Registration
11. Botanical Registrations –HMPC EFSA concern raised
12. Botanical Registrations -HMPC
13. Food Registration – or Additives Registration – Colorant
14. Food Registration – or Novel Process
15. Botanical Registrations -HMPC
16. Food Registration
17. Food – or Additives Registration (E100) – Colorant - Novel Process
18. Botanical Registrations -HMPC
19. Food – EFSA concern raised
20. Sold as a Food - EFSA concern raised

Source: Canadean Ingredient Profiles
Neuro Modulators

- **Serotonin**: Mood
- **Adrenalin/Epinephrine/ Norepinephrine**: Alertness, Fight or Flight
- **Dopamine**: Feel Good
- **GABA**: Fear and Anxiety
- **MOA-A**: Regulates levels of above
Attention: Curcumin from Turmeric (Curcuma longa)

Mode of Action

- Improving the maintenance of energy levels and ability to meet energy demands through its effects on mitochondrial function, AMP-activated protein kinase and glucose uptake and regulation.
- Linked to modulation of serotonergic system.

Study

- 60 healthy humans 60 and 85 years;
- Randomized, double-blind, placebo-controlled trial;
- 400 mg per day of Optimized Commercial Curcumin Ingredient or placebo for four weeks.

Result

- Curcumin group reported an average 1.82% decrease in fatigue (increased by 17% in the placebo group);
- Measures of calmness and contentedness improved in the curcumin group;
- Single dose effects indicated that curcumin was associated with significantly improved measures of sustained attention.

"Investigation of the effects of solid lipid curcumin on cognition and mood in a healthy older population"
Mental Energy: Ginsenosides from Ginseng (Panax ginseng)

Mode of Action

• Underlying mechanism of action of the ginsenosides appears to be similar to that for steroid hormones.
• Neuroprotection by slowing or blocking of neuroprodegenerative processes either prematurely or in old age.

Study

• 90 humans with idiopathic chronic fatigue;
• Double-blind 1 or 2 g a day vs. placebo;
• 4 weeks.

Results

• Mental score was significantly improved on self assessment;
• 2 g P. ginseng significantly reduced visual Analogue Scale test.

Memory: Blueberry or Blackcurrant Anthocyanins

Mode of Action

• **Antioxidant and anti-inflammatory effects, improves microcirculations in cerebral arteries and thereby prevents formation factors developing brain amyloid plaques – cause of Alzheimer’s’ and dementia.**
• **Selective MAO-A inhibition, serotoninergic/noradrenergic.**

Study 1

- **APdE9 mice – an mouse model of AD fed with anthocyanin-rich blueberry or blackcurrant extracts.**

**Result 1**

- Mice on anthocyanin-rich extracts showed decreased APP C-terminal fragment levels in the cerebral cortex as compared to mice on the control diet.
- Soluble Aβ40 and Aβ42 levels decreased
- The berry diets alleviated the spatial working memory deficit of supplemented aged AD model mice as compared to mice on the control diet.

Study 2

- **9 elderly persons avr. 76.2 Years;**
- **Established early memory changes;**
- **Daily intake of blueberry juice in 12 weeks.**

**Result 2**

- Improved impaired learning;
- Improved word list recall;
- Suggested reduced depressive symptoms.


Blueberry supplementation improves memory in older adults. 2010. Krikorian et al.
De-stress:
Passionflower, Chamomile, Citrus - Apigenins

Mode of Action

- **Central noradrenergic, dopaminergic and serotonergic activity.**
- **MAO-A inhibition, acting through hypothalamic pituitary adrenal axis.**

Study

- 57 participants
- 19 anxiety with comorbid depression;
- 16 anxiety with a past history of depression;
- 22 had anxiety with no current or past depression.
- Intervention and placebo groups received identically appearing 220-mg capsules containing either pharmaceutical-grade chamomile extract standardized to a content of 1.2% apigenin or a placebo.

Results

- Hamilton Depression Rating (HAM-D) questionnaire among treatment groups.
- All showed significantly greater reduction over time in total HAM-D scores for chamomile vs. Placebo;
- Clinically meaningful - but no significant trend for a greater reduction in total HAM-D scores for Chamomile vs. on comorbid depression subjects;
- HAM-D core mood item significantly greater reduction over time for Chamomile vs. Placebo in all;
- Clinically meaningful - but no significant trend for a greater reduction over time for Chamomile vs. Placebo in anxiety participants without current or past depression.

Chamomile (Matricaria recutita) may provide antidepressant activity in anxious, depressed humans: an exploratory study. 2012. Amsterdam et al
De-stress: Griffonia Seed extract – 5-HTP

Mode of Action

- **Source of 5-hydroxytryptophan (5-HTP) a metabolite of the essential amino acid tryptophan used for biosynthesis of serotonin.**
- **Shown to disrupt dopaminergic function in the human forebrain.**

Study

- 15 non-depressed young subjects (avr. 23Y) with high levels of romantic stress
- 60 mg Griffonia simplicifolia extract containing 12.8 mg 5-HTP
- 6 wks. trial

Results

- Significant improvements in romantic stress scores from weeks 0 through 3
- Wk. 6 blood test showed increased serum brain-derived neurotropic factor and serotonin

An open-label trial of L-5-hydroxytryptophan in subjects with romantic stress. 2010; Emanuele et al..
Concept Innovations

- New product categories.
- Ingredients in EU – and beyond.
- 5 forces assessment for product innovators and business developers.
Fresh Research Finds Organic Milk Packs In Omega-3s

by ALLISON AUBREY
December 10, 2013 - 11:08 AM ET
Adult Products: Brain Cell Maintenance
Omega DHA - What Products Works?

**Milk Alternatives**
- Silk Soy Milk
  - Discontinued since 3 years

**Granola Bars**
- Brainbar
  - Selling

**Breads**
- Head Start Omega3
  - Discontinued since 3 years

**Confectionery Bars**
- Live Bright
  - Discontinued since 3 years

**Medical Foods**
- Souvenaid
  - Selling

*Desk Research Canadean Ingredients*
Kids Products: Developing Brain
Omega DHA - What Products Works?

**Beverage**
- Complan Memory
  - Selling India/Bangladesh

**Gummies**
- Nordic Omega 3 Gummy Worms
  - Selling Europe, North America & Latin America

**Snacks/Bars**
- Zac Omega
  - Selling US

**Snacks/Biscuits**
- Bisto Oatmeal
  - Selling US

**Multivit + Gummies**
- Kids Complete Gummies
  - Selling US

**Cheese**
- 50% Reduced Fat Cheddar Cheese
  - Discontinued since 3 years
Adult Mental Performance
Natural Drink Trends: Guarana, Turmeric, Ashwagandha, Fruit Polyphenols & Ginseng

- Guarana + Polyphenols
- Guarana + Ginseng
- Guarana + Yerba Mate
- Nat Caffeine, Ginseng + Polyphenols
- Turmeric
- Ashwagandha
- Pomegranate & Blueberry Polyphenols
- Grape Polyphenols
- Mixed Fruit Polyphenols
Adult Mental Energy: Drink Trends: Citicoline and Ginkgo

Citicoline

Ginkgo
Relax – From Chamomile, Linden to Passionflower, Kava Kava…. “Lilo”

Linden Flowers

Chamomile Flowers

Passion Flowers

Kava Kava

Tilo

Canadean Ingredients Product Profiles 2014
Canadean Ingredients Desk Research
Take Away

✓ Increasing Consumer Interest For Cognitive Health
✓ Adults Psychoactive Drinks Innovation is Exploding
✓ Kids Brain Nutrition has Products Opportunities
✓ Ageing Population Concerns a Huge Opportunity for Products of Memory Foods
✓ Natural Caffeine, Fruit Polyphenols, Traditional Herbs Trending and High Potential
✓ US vs. EU Regulation – Consumer Protection or Governance in Medical Ingredients vs. Food Ingredients
Considerations for Success - Positioning

- Mums getting involved
- Students social media
- Ageing forums

Understanding and Talking with Consumers

- Creativity in formulation assistance
- Safety & quality
- Scalable supply

Own Concept

Role Models Successful Products

- Taste, taste & taste
- Convenience
- Sexy packaging

Choice of Suppliers

- Products trending & selling now
- New formulas and concepts
- Brand new ingredients

Blue or Red Ocean .. New Categories or Formulations
Thank you!

Want to learn more:

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