SABINSA CORPORATION

- Pharmaceuticals
- Phytochemicals
- Fine Chemicals
- Herbal Extracts
- Cosmeceuticals
- Specialty Chemicals

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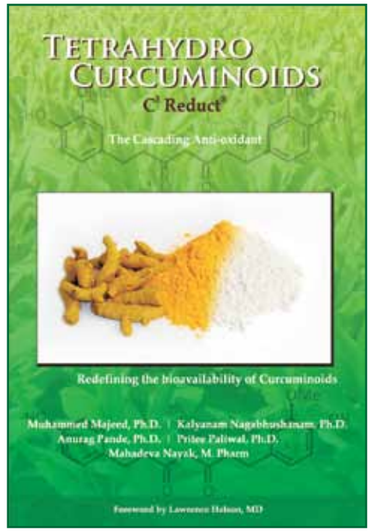
Book on Tetrahydrocurcuminoids - C^3 Reduct®

Tetrahydrocurcuminoids are among the major metabolites of curcuminoids irrespective of mode of administration. The recent discovery that intestinal organisms in human gut possess specific enzymes for metabolizing curcuminoids into Tetrahydrocurcuminoids has further accentuated the importance of Tetrahydrocurcuminoids.



Tetrahydrocurcuminoids are devoid of the yellow color of curcuminoids and have long found applications in cosmetic industry. Sabinsa pioneered their use in many cosmetic applications with its branded products such as SabiWhite®.

Recent research has uncovered that the Tetrahydrocurcuminoids are in fact superior anti-oxidant than curcuminoids themselves. In addition Tetrahydrocurcuminoids possess interesting array of pharmacological activities that accord Tetrahydrocurcuminoids a separate status for being considered for their health promoting properties.

Keeping in pace with future of studies on curcuminoids, Sabinsa's scientific team has brought out its latest book "Tetrahydrocurcuminoids, C^3 Reduct® - The Cascading Antioxidant". This book discusses many aspects of tetrahydrocurcuminoids including its chemistry, pharmacology, preclinical, clinical and safety profile.

This book provides a fresh look at Tetrahydrocurcuminoids not only as metabolites of curcuminoids but also as a dietary supplement. The book also discusses the role of Tetrahydrocurcuminoids in field of Cosmeceuticals and Nutricosmetics.

A Case Of Unscientific Product Development, Promotion and Commercialization in The Curcumin Market

What is BCM-95®† / Biocurcumax™*

- Standardization of BCM-95®/ BIOCURCUMAX™
- Curcuminoids Complex with volatile compounds : Not less than 95%

Indian patent on Biocurcumax™

- Year 2002-Indian Patent Application filed at Chennai Patent Office (Patent No. 200430). A process and technique to enhance the absorption of curcuminoids.
- Patent method discusses enhancement of bioavailability of 98% pure curcumin from a presumptive benchmark of 60-65% to 90-97% with added turmerone-enriched oil.
- Bioavailability studies were done feeding Albino rats with Curcumin and Curcumin + turmerone-enriched oil (4:1) and measuring excreted curcumin in feces.

Is fecal estimation of curcumin, a proper method to estimate absorbed curcumin in the body?

- Presumption in the patent:
  - Bioavailable curcumin = [Fed curcumin] minus [Excreted curcumin in feces]
  - The methodology in the patent estimates bioavailability of curcumin by measuring excreted curcumin in feces and assuming the remainder of curcumin as bioavailable
- The methodology in the patent refers to collection of feces from rats 24 hours after administration of oral curcumin. This is a wrong methodology.

The estimation of an active in feces only, to assess its bioavailability, is highly unscientific.

Conceptual problems with the study

- The patent in question shows 60%-65% absorption for unmodified curcumin, which would be considered an extremely bioavailable compound in the pharmaceutical realm. This being the case, where is the need to increase its bioavailability further?
- The use of spectroscopic estimation of curcumin in the feces is an unacceptable method to estimate curcumin bioavailability. It amounts to misrepresentation of curcumin bioavailability using an inappropriate methodology.

Conclusion on bioavailability of Biocurcumax™

- Measure of curcumin in feces is not a measure of bioavailability.
- Claims of increased bioavailability (90%-97%) based on curcumin estimation in feces is unscientific.

Published facts on safety of turmeric essential oil

- Turmeric oil is not proven safe for long term use.
- Turmeric oil may show detrimental activity over the protective function of curcuminoids.

> "The remaining components of the turmeric fraction, other than the three major curcuminoids (compounds 1–3), may actually inhibit the protective, anti-arthritic effect of the curcuminoids, a finding that runs counter to the prevailing notion that complex botanical agents may provide increased efficacy for disease treatment"

Janet L. Funk et al. J Agric Food Chem. 2010; 58 (2): 842-849.
Janet L. Funk et al. J Nat Prod. 2006 March; 69(3): 351–355.

† Registered trademark of DOLCAS BIOTECH LLC in USA
* Biocurcumax™ is the trademark of ARJUNA NATURAL EXTRACTS LIMITED in India
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OUR INNOVATION IS YOUR ANSWER®
info@sabinsa.com

SABINSA SHOWS

SupplySide West
November 05-09
Las Vegas, NV

In-Cosmetics Asia
November 06-08
Bangkok, Thailand

Health Ingredients
November 13-15
Frankfurt, Germany

Visit Sabinsa's Websites

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PRESS RELEASES

Sabinsa's LactoSpore® Chosen For Tutti Frutti, World's Top Selling Self-Serve Frozen Yogurt

Sabinsa's LactoSpore® has been selected by Wellspring Industry, Inc. to provide the beneficial probiotic ingredient for Tutti Frutti Frozen Yogurt, the world's top-selling self-serve frozen yogurt brand.

"The taste and quality of our frozen yogurt is simply unmatched, so it makes sense that we would seek out a probiotic that will provide our customers with the benefits of the best, most stable probiotic we could find," said Paul Lee, head of Wellspring's Research and Development team.

"Even as probiotics gain unprecedented consumer acceptance, mainstream media coverage highlights confusion as to which forms are most beneficial, which is where LactoSpore's established efficacy becomes particularly compelling," said Sabinsa Marketing Director Shaheen Majeed. "We are very pleased to have LactoSpore® included in such a popular product as Tutti Frutti."

LactoSpore® is the trade name for Sabinsa's probiotic *Bacillus coagulans*, formerly known as *Lactobacillus sporogenes*. LactoSpore® withstands the acidic environment of the stomach and then germinates and proliferates in the GI tract within a few hours. Due to its spore-forming nature, LactoSpore® is resistant to most chemical and physical conditions (e.g., heat and acid) and survives manufacturing, shipping and storage with no loss of viable count, making it an excellent functional food ingredient. LactoSpore® does not require refrigeration and is room-temperature stable. LactoSpore® powder is standardized to 15 billion spores per gram although lower spore counts (e.g., 6 billion spores per gram) are also produced. LactoSpore® is self-affirmed GRAS (Generally Recognized As Safe) by an independent panel of experts.

About Wellspring Industry, Inc.
Wellspring Industry, Inc., the holding company of Tutti Frutti Frozen Yogurt, is a manufacturer and international wholesaler of soft-serve frozen yogurt mixes, no sugar added mixes, smoothie base-mixes, over 20 natural flavors, and soft serve frozen yogurt equipment. Tutti Frutti is a specialty frozen yogurt retailer worldwide, with distribution in many different countries including Australia, Brazil, Cambodia, Canada, China, Dominican Republic, UAE, Hong Kong, Indonesia, Malaysia, Mexico, New Zealand, Peru, Philippines, Tahiti, Taiwan, United Kingdom, and Vietnam. Visit www.tfyogurt.com and www.wellspringusa.com for more information.

Sabinsa Continues Global Functional Food Expansion of LactoSpore® With Launch of Colombia's Perman Bread

Sabinsa's LactoSpore® can now be found in Perman sliced bread in Colombia. "Perman Pan Tajado" is the first non-dairy use of Sabinsa's shelf-stable probiotic in a functional food.

"Providing the benefit of a quality probiotic that readily survives the baking process in our breads is very much is keeping with Perman's mission to nourish families," said Eduardo Posada, Plant Director, from Perman.

"Consumers world wide are aware of the benefits of probiotics, and that added value in foods has strong appeal," said Sabinsa Marketing Director Shaheen Majeed. "Because LactoSpore's shelf stability makes it relatively easy for inclusion in foods, we expect rapid growth in the functional foods category."

LactoSpore® is the trade name for Sabinsa's probiotic , formerly known as *Lactobacillus sporogenes*. LactoSpore® withstands the acidic environment of the stomach and then germinates and proliferates in the GI tract within a few hours. Due to its spore-forming nature, LactoSpore® is resistant to most chemical and physical conditions (e.g., heat and acid) and survives manufacturing, shipping and storage with no loss of viable count, making it an excellent functional food ingredient. LactoSpore® does not require refrigeration and is room-temperature stable. LactoSpore® powder is standardized to 15 billion spores per gram although lower spore counts (e.g., 6 billion spores per gram) are also produced. LactoSpore® is self-affirmed GRAS (Generally Recognized As Safe) by an independent panel of experts.

Perman, a Colombian company with more than six decades of presence in the market, makes sliced bread, whole wheat bread, hamburger buns, hot dog buns, toasted bread and croissant. The focus of the Perman brand is taste, quality and health. www.panperman.com

Recently, Wellspring Industry, Inc. chose LactoSpore® to provide the beneficial probiotic ingredient for Tutti Frutti Frozen Yogurt, the world's top-selling self-serve frozen yogurt brand.

Sabinsa's Curcumin C³ Complex® Shows Significant Reduction In Serum Triglycerides

A placebo-controlled, randomized double-blind clinical trial published in Phytotherapy Research titled Effects of Supplementation with Curcuminoids on Dyslipidemia in Obese Patients: A Randomized Crossover Trial (Mohammadi *et al*, 2012) reported that Sabinsa's Curcumin C³ Complex® led to a significant reduction in serum triglycerides concentration in a randomized crossover clinical trial.

Abnormal amount of lipids in the blood is a leading risk factor for cardiovascular disease. It is also a common feature of obesity and metabolic syndrome, and precedes Alzheimer's disease.

This study investigated the lipid lowering activity of curcumin in obese individuals. Thirty participants received curcuminoids (1g/day) with natural bioavailability-enhancer BioPerine®, or placebo in a randomized, double-blind, placebo-controlled, crossover trial. Serum concentrations of total cholesterol, triglycerides, low-density lipoprotein cholesterol and high-density lipoprotein cholesterol, together with anthropometric parameters and high-sensitivity C-reactive protein were measured before and after each treatment period.

Serum triglycerides were significantly reduced following curcumin supplementation (first period 105.7 → 95.1 mg/dL, and second period 120.7 → 104.7 mg/dL). The findings of the present study indicated that curcuminoids supplementation (1g/day for 30 days) leads to a significant reduction in serum triglycerides concentrations. The result of this clinical trial is also a good confirmation of systemic effect of Curcumin C³ Complex®.

To read the article:
http://onlinelibrary.wiley.com/doi/10.1002/ptr.4715/abstract

For more information on Sabinsa's Curcumin, visit: www.curcuminoids.com.

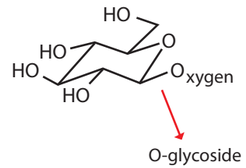
C-Glycosides

A sugar appendage in a natural terrestrial plant product can occur via a hetero atom such as oxygen (O-glycoside) or through a carbon (C-glycoside). Exceedingly large numbers of plant glycosides are O-glycosides. The C-glycosides are not common if not rare. Glycosidic linkages confer aqueous solubility on the entire molecule and also contribute to unique pharmacological activity.

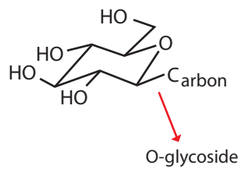
The O-glycosides are hydrolytically unstable especially in acidic medium. In contrast C-glycoside linkage is quite to stable to hydrolytic conditions and enzymatic degradation (not substrates for glycosidases). This renders C-glycosides stable in systemic circulation for longer time.

The importance of C-glycosides in the recent past was enhanced especially with reference to their SGLT2 (Sodium-Glucose co-transporter 2) enzyme inhibition for diabetes treatment. The inhibition of this enzyme helps the removal of sugar from blood by kidneys. SGLT2 inhibition has implications in weight reduction also. Also selective SGLT2 inhibition is considered a novel way of controlling blood sugar without the risk of hypoglycemia. A recent review in NatureReviews: Drug Discovery Highlights 2010: 9, 552-559 dwells on this aspect of SGLT2 inhibition and lists several potential compounds undergoing clinical trials for diabetes by every major pharma company.

Hence it is to be anticipated that future treatment of diabetes and metabolic syndrome symptoms will be very heavily influenced by this new structural type namely C-glycosides.



Hydrolytically/enzymatically Unstable



Hydrolytically/enzymatically Stable

PATENT'S CORNER

Sabinsa Granted New Zealand Patent For SelenoForce®

The New Zealand Patent Office has awarded Sabinsa Corporation a patent (568233) for the company's SelenoForce®, a selenium-enriched garlic product manufactured by a soil-less culture process. The patent, titled Compositions Containing *Allium sativum* Linn. Garlic) And A Concentrate Of Organic Selenium Compounds For Nutritional Supplementation, is valid until December 2026.

New Zealand Patent No. 568233 must be included on product labels that contain SelenoForce® in New Zealand.

Garlic bulbs are naturally enriched with a unique composition of organic selenium compounds for nutritional supplementation, using a proprietary hydroponics method. The selenium enriched bulbs are dried, powdered and standardized, to yield SelenoForce® containing 1000 ppm selenium, in bioavailable organic form, in a base of natural garlic powder.

"This patent is particularly important for us, as it opens new possibilities for fortifying Selenium in the diet in New Zealand, which has selenium deficient soil. Selenium status in population of New Zealand remains low compared to other countries," said Dr. Anurag Pande, Vice President, Scientific Affairs of Sabinsa.

In 2010 Sabinsa Corporation's New Dietary Ingredient notification for SelenoForce® to the US FDA was accepted and filed by that agency. The company also holds US and EU patents on SelenoForce®. For more information please visit: www.selenoforce.com

Sabinsa Granted United States Patent for Selenium Dipeptides

The US Patent Office has awarded Sabinsa Corporation a patent (US 8193156) for the preparatory route for dipeptides incorporating selenoamino acids.

The patent is titled "Dipeptides incorporating selenoamino acids with enhanced bioavailability- synthesis, pharmaceutical and cosmeceutical applications thereof," is specific to the preparatory route for L-Selenomethionine peptide having not only excellent vascular endothelial growth factor (VEGF) and anti-5-alpha reductase activity, which are important properties for maintaining perfect homeostasis for "hair care", but also increased water solubility and bioavailability, enhancing their benefits in hair care industry.

Sabinsa Wins Patent in Japan For Coleus Derived Glaucoma Treatment Product

Drug Approval Granted in India, Sought in Additional Countries

The Japan Patent Office has awarded Sabinsa Corporation, headquartered in East Windsor, New Jersey, a patent for the company's water-soluble form of naturally available diterpenes derived from *Coleus forskolii*. The patent covers both the method for solubilizing diterpenes using randomly methylated β-cyclodextrin molecules and applications thereof in glaucoma. Sabinsa will market the product under the name OcuFors®.

OcuFors® is another breakthrough from Sabinsa: it is the first naturally derived pharmaceutical product that has been approved by the Drug Controller General of India. The company is seeking approval as a drug for glaucoma treatment in several other countries.

OcuFors® has been found to be superior drug for treatment of open-angle glaucoma and reducing the intraocular pressure better than Timolol, a non-selective beta blocker used in glaucoma treatment.

Dr. Muhammed Majeed, Chairman & Founder of the Sami & Sabinsa group of companies said, "The patented water-soluble forskolin solution exemplifies the stringent research, development, safety and efficacy standards that constitute the Sabinsa group's forte."

Sabinsa's Saberry® + Cococin™ Formulation Granted US Patent

Sabinsa Corporation's SABERRY® + COCOCIN™ synergistic formulation has been granted US patent 8247003.

Saberry® from Sabinsa Corporation is a proprietary extract from the fruits of *Emblica officinalis* (*Phyllanthus emblica*) or more commonly amla. Saberry® is the result of efforts to prepare an authenticated amla extract, standardized using a valid biomarker, β-glucogallin. Cococin™ from Sabinsa Corporation is patented freeze-dried coconut water solids manufactured by a proprietary lyophilisation technique. Devoid of added sugar and carbohydrates, the product retains intact the nutritive value of tender coconut water in terms of minerals, vitamins, aminoacids and electrolyte content.

The newly patented SABERRY® + COCOCIN™ synergistic formulation protects dermal papilla cells from stress signals. Dermal papilla cell clusters are mesenchyme cells, which perform several important functions that include:

1. Being reservoirs of multi-potent stem cells which are critical assets in the area of regenerative medicine.
2. Having the physical inductive influence on the cells of undifferentiated epidermis to push into the dermis as part of processes involved in skin appendage formation.
3. Acting as body's antidote mechanisms for preventing unwarranted inflammatory reactions.
4. Producing useful anti-microbial proteins.

Dr. Muhammed Majeed, Founder and Chairman of the SAMI-SABINSA group said "It is a pleasure to note Sabinsa's continued success in providing technological solutions in the alternative medicine sector, the latest being the combination of amla extract standardized with the biomarker β-glucogallin and Cococin™ for dermal papilla protection. My hearty congratulations to the Phytochemistry and Biological research teams at SAMI/SABINSA for their combined effort in creating such useful science."

PEOPLE's CORNER

Daisy Herpin, M.S.

Daisy Herpin M.S. has joined the Utah facility staff as Quality Assurance / Quality Control Manager.

With 10 years experience managing quality assurance programs, Daisy brings a strong background in laboratory management, QA/QC, compliance with regulatory requirements and agencies, operations management, new products development, product testing and analytical method development among many other related areas of expertise.

Her education includes a double major B.S. in Psychopharmacology and Basic Science at the New Mexico Institute of Mining and Technology and a M.S. in Organic Chemistry from the University of Utah. Her research was focused on new cancer chemotherapeutic approaches.

"We are pleased to have Daisy leading our Quality program in the Utah facility," said Sabinsa Marketing Director Shaheen Majeed. "Her research background gives her a deep understanding of the work that goes into developing Sabinsa's ingredients and the importance of strict quality standards in everything we do."