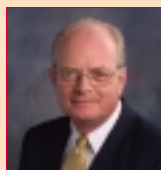




*fusing science and compliance*

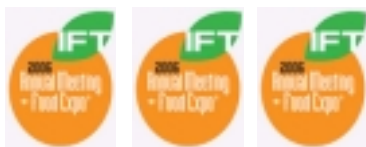


Dr. George A. Burdock is the 2006 recipient of the *Bernard L. Oser Food Ingredients Safety Award* for his contribution to the scientific knowledge of food ingredient safety and leadership in establishing principles for food ingredient safety evaluation and regulation. The *Awards Ceremony* will be held on Saturday, June 24<sup>th</sup> at the Orange County Convention Center in Orlando, Florida between 5:30—6:45 pm.

### Burdock Group Attending Institute of Food Technologists (IFT) Annual Meeting & Food Expo

From June 25-27<sup>th</sup> Burdock Group will be showcasing their diverse scientific experience and their regulatory know-how at the IFT FOOD Expo, which will be held at the Orange County Convention Center in Orlando, Florida. Please visit us at **Booth #1664** or contact Shirley Reul, Client Relations Coordinator to schedule a FREE 15-minute consultation.

For more information on Burdock Group symposiums and posters, see "In The News" on page 2.



#### INSIDE THIS ISSUE:

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### Binge on Berries for Better Health

By Berna Magnuson, Ph.D.

Berries have been part of our diet since time immemorial, as there are historical accounts of indigenous ancestral "hunter-gatherers" using wild berries as a source of food. Scientists are discovering the many health benefits of consuming those berries. In the United States, blueberries have been in the forefront of this research, and recently, raspberries and blackberries are receiving attention. Berries contain many bioactive compounds, including carbohydrates, vitamins, minerals, and fiber and are rich sources of hydroxycinnamic acids, ellagitannins, flavonol glycosides, anthocyanins, flavan-3-ols, and proanthocyanidins. These compounds contribute to the very high antioxidant activity of berries and berry extracts. Currently, the compounds responsible for the beautiful range of red, purple, and blue colors of berries, the anthocyanins, are considered to be the most bioactive compounds. Health effects that have been studied include prevention and decreased incidences of cancer, age-related cognitive function, heart disease, and obesity.

Animal models have demonstrated that feeding either dried berries, berry extracts, or anthocyanin-rich extracts will prevent the development of cancers of the gastrointestinal tract, including oral cancer, esophageal cancer, and colorectal cancers. Cancerous cell line growth is also inhibited by the addition of berry extracts or anthocyanin-rich extracts, and several clinical studies are under

*(Continued on page 3)*

### Dietary Supplements – A Special Case of Regulations

By Sabine Teske, Ph.D.  
and Jim Griffiths, Ph.D.

*Part II of a two-part article  
(Part I published in March  
2006 Newsletter)*

According to the 1994 Dietary Supplement Health and Education Act (DSHEA), a dietary supplement is a "product taken by mouth that contains a dietary ingredient intended to supplement the diet of man." Examples of dietary supplements include concentrates, metabolites, constituents, extracts, or combinations of vitamins, minerals, amino acids, enzymes, herbs, or botanicals (excluding tobacco). In order for these products to fulfill the definition of a dietary supplement under DSHEA, they have to be manufactured for oral consumption in the form of tablets, capsules, softgels, gel-caps, liquids, powders, or bars. Products administered by other routes (e.g., topical) cannot be sold as dietary supplements. For example, vitamin B<sub>12</sub>-containing nasal gel, which has to be applied onto the mucosal membranes of the nasal cavity, must be classified as a drug based on its method of intake (nasal administration vs. ingestion).

DSHEA requires that any products sold as dietary supplements be unequivocally labeled as such to distinguish dietary supplements from ordinary food items. Furthermore, dietary supplements cannot be represented as meal replacements or sole items of food. For example, dietary supplements sold in formulations resembling ordinary food items (e.g., food bars) must clearly state that

*(Continued on page 3)*



*(Continued from page 1—Dietary Supplement article)*

that these products are neither conventional foods nor meal replacements. Likewise, dietary supplements cannot be represented as drugs or therapeutic agents. Under DSHEA products that “diagnose, cure, mitigate, treat, or prevent disease in man” do not constitute dietary supplements.

Dietary supplements do not need FDA pre-market approval, and FDA does not have uniform safety standards for marketing dietary supplements. FDA only requires that manufacturers of dietary supplements comply with Good Manufacturing Practices (GMP) and label their products adequately, as well as substantiate any claims made for their products. FDA requires that the label of a dietary supplement contains the following: the product name; description of the product, including its intended use as a supplement; name and place of manufacturer or distributor; complete list of all ingredients, including inert ingredients, such as fillers, artificial colors, and flavors; net contents of ingredients; and directions for use. According to FDA, basic information (*i.e.*, list of ingredients and net amount of ingredients) has to be provided in a “Supplement Facts” panel present on a label affixed to the dietary supplement and not just as a package insert.

With regard to safety, dietary supplements are subject to different safety requirements than drugs, food ingredients, and food products. Among these four categories of products, food items are subject to the highest standard of safety. FDA requires that “articles used for food and drink in man or animals, chewing gum, and articles used for components of any such article are not ordinarily injurious to man or animals.” This does not allow any leeway on the part of the food manufacturer/distributor to argue a decrement in safety by a potential benefit.

The “not ordinarily injurious standard” for food items is followed by the “reasonable certainty of no harm” safety standard for food ingredients. The “reasonable certainty” standard for food ingredients is met *via* a Food Additive Petition (FAP) or a Generally Recognized as Safe (GRAS) determination. Both procedures require the objective review of scientific data by qualified experts to ascertain whether a food ingredient fulfills this safety standard.

Unlike the “reasonable certainty” safety standard for food ingredients, drugs are subject to the “risk-benefit” safety standard, which acknowledges that even after several tiers of pre-clinical and clinical testing, risks are always associated with drugs. Given that the benefits of drugs used to treat life-threatening conditions (*e.g.*, cancer) outweigh the risks, a certain risk level is acceptable for these drugs. In contrast, this risk-benefit standard does not apply to dietary supplements, which are subject to the lesser “reasonable expectation” safety standard. Dietary supplement manufacturers can market their products as long as they are not proven unsafe.

In 2004, FDA issued a warning regarding

the labeling of the proclaimed dietary supplement “Better than Formula Ultra Infant Immune Booster 117.” The labeling of this product was branded misleading, as it implied that “Better than Formula Ultra Infant Immune Booster 117” has greater nutritional benefits than infant formula. Additionally, the labeling of this product stated that infants “should have small feedings every two to three hours...,” inferring—and therefore misleading consumers—that this product can be used as a meal replacement in lieu of regular infant formula. The latter statement is not allowed for dietary supplements.

By marketing their product as a dietary supplement to infants, a life-stage population with specific dietary needs, the manufacturers of “Better than Formula Ultra Infant Immune Booster 117” committed an even steeper regulatory infraction. Infant formula is considered a special dietary use product, which, unlike dietary supplements, requires the supplier’s notification to FDA 90 days prior to marketing. This example not only illustrates the intricacies of labeling regulations of dietary supplements, but also shows that a fine line governs the definition of what constitutes a dietary supplement.

Another special set of regulations governing labeling of dietary supplements is effective in the State of California (Proposition 65). Manufacturers selling dietary supplements with laxative properties, commonly used for weight loss, in California are required to clearly label these products by affixing a warning label to the container that indicates the presence of laxatives. Herbal teas containing senna, aloe, rhubarb root, buckthorn, cascara, and/or castor oil are examples of supplements with laxative properties; although products in capsule or pill form may also contain these herbs.

In addition to labeling issues, self-administration of dietary supplements—for apparent or perceived health benefits—is sometimes not without serious adverse health consequences. In particular, patients taking prescription drugs have to exercise precautions when simultaneously taking dietary supplements, as some supplements can lead to serious, if not life-threatening, drug interactions. Some recent examples of adverse reactions between prescription drugs and dietary supplements show that although dietary supplements are freely available for purchase, they should not be consumed in an uninformed manner.

For example, the herbal dietary supplement St. John’s Wort (*Hypericum perforatum*) is contraindicated with several prescription drugs as it can lead to accelerated metabolism and elimination of these drugs. Examples of prescription drugs adversely affected by consumption of St. John’s Wort are: Gleevec® (imatinib mesylate), which is used to treat chronic myelogenous leukemia; Cyclosporin A, which is used to counteract immune-mediated rejection of donor organs; Crixivan® (indinavir sulfate), which is an anti-viral drug used to fight HIV infections; and oral contraceptives.

With an increasingly health-conscious

public, current revenue of over 20.5 billion dollars from dietary supplements in 2004 will likely rise in the future. This will prompt manufacturers to develop and market more and more innovative dietary supplements to satisfy the general public’s quest for the newest elixir. Concomitant with an expanding arsenal of dietary supplements will be enhanced risks and incidence of contraindications, requiring consumers to be more informed than ever about dietary supplements.

*The end.*

*(Continued from page 1 - Berry article)*



way in individuals with a high risk of gastrointestinal cancer.

The potent antioxidant activity of anthocyanins is well known and led to the hypothesis that these compounds may be protective against health conditions thought to be due to accumulation of oxidant damage, including age-associated loss of memory and cognitive function, and heart disease. Anthocyanins from berries, including blueberries, have very recently been shown to enhance memory and slow or reduce age-associated loss of cognitive function in rats.

Another health benefit of berries that has been investigated is the potential for berry extracts and/or anthocyanins to improve vision pathologies or reduce the loss of vision with age; however, the clinical studies to date have shown no significant improvement in vision or pathologies with supplementation.

Similarly, the high antioxidant capacity of berries, including blueberries, has led to the speculation that berries would offer protection against heart disease, although the evidence for this association is not well documented. One explanation may be that the current level of consumption of these fruits is too low in the diet to be identified as an important dietary factor in the populations studied. Clinical studies with anthocyanin-rich pomegranate juice have provided convincing and impressive results showing dramatic improvement in cardiac disease patients. However, further work needs to be done to determine whether anthocyanins and other phenolics in berries would yield similar results.

Prevention of obesity by anthocyanins has been demonstrated in several mouse studies. Mice had lower liver lipid accumulation, and lower serum levels of glucose, insulin, and leptin.

In summary, current research is showing that our berry-gathering ancestors were adding more than just tasty, attractive treats to their diets. Furthering our understanding of the components responsible for these beneficial effects will be useful in developing value-added foods and in developing plant varieties rich in the health-promoting phytochemicals.

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**Burdock Group** offers focused expertise to three principal industries:

- \* **Food and Beverage**
- \* **Dietary Supplements**
- \* **Cosmetic and Personal Care Products**

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Burdock Group offers a unique mix of capabilities to bring your product to market: access to proprietary databases of the most up-to-date research, vast experience in regulatory compliance, and critical project management skills.

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### Select Pending and Recent Publications

G. A. Burdock, I. G. Carabin and J. C. Griffiths (2006). **The Importance of GRAS to the Functional Food and Nutraceutical Industries.** *Toxicology* 221, 17-27.

M.G. Soni, G.A. Burdock, M.S. Christian, C.M. Bitler and R. Crea (2006). **Safety assessment of aqueous olive pulp extract as an antioxidant or antimicrobial agent in foods.** *Food and Chemical Toxicology* (IN PRESS).

R. Matulka, O. Noguchi and N. Nosaka (2006). **Safety Evaluation of a Medium-and Long-Chain Triacylglycerol Oil Produced from Medium-Chain Triacylglycerols and Edible Vegetable Oil.** *Food and Chemical Toxicology* (IN PRESS).

J.C. Griffiths and S. Teske (2006). **Dietary Supplement Regulations—A Special Case.** *UPDATE Food and Drug Law, Regulation, and Education.*

I. G. Carabin and B. Magnuson (2006). **New Labeling Requirements for Food Allergens.** *Nutritional Outlook.*

I. G. Carabin and R. Matulka (2006). **Providing Efficacy.** *The World of Food Ingredients.*

J. C. Griffiths (2006). **U.S. Regulated Colors for Food and Beverage Applications.** *Intl Food & Beverage Ingredients China.*

I. G. Carabin and Phillip L. Casterton (2006). **Allergen Labeling: Protecting the Public.** *Asia Food Journal.*

G.A. Burdock and James C. Griffiths (2006). **Aflatoxin basics: Penicillin's deadly cousin-past and present.** *Petfood Industry.*

For a more in-depth listing of our publications, visit [www.burdockgroup.com/publications](http://www.burdockgroup.com/publications)

### UPCOMING MEETINGS & SYMPOSIA

#### June

**US FDA/Center for Food Safety and Applied Nutrition (CFSAN)**  
Washington, DC

**Institute of Food Technologists (IFT)**  
Booth #1664  
Orlando, FL

**Intl Food Nanotechnology Conference**  
Orlando, FL

#### September

**Council for Responsible Nutrition (CRN ) Science Day**  
Washington, DC

#### October

**SupplySide West (SSW)**  
Booth #4076-78  
Las Vegas, NV

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