

Evaluation of Dietary Supplements for Inborn Errors of Metabolism

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Overview



Evening Primrose
Oenothera biennis

- A Brief History of (Dietary Supplement) Time
- Office of Dietary Supplements (ODS)
- Issues in Dietary Supplement Research
- Dietary Supplements and Inborn Errors

Dietary Supplement: DSHEA Definition

- Product intended to supplement the diet
- Contains one or more of the following:
 - Vitamin
 - Mineral
 - Herb or other botanical (*not tobacco*)
 - Amino acid
 - Other dietary substance



Regulation of Dietary Supplements in the United States

Rules for
foods, *not drugs*,
apply to dietary supplements

*An ingredient is presumed safe
based on its history of
use in humans*



Top 10 Dietary Supplements for 2006

Multivitamins/minerals

Calcium

B vitamins

Vitamin C

Glucosamine/Chondroitin

Fish oils

Vitamin E

Coenzyme Q10

Vitamin A

Probiotics

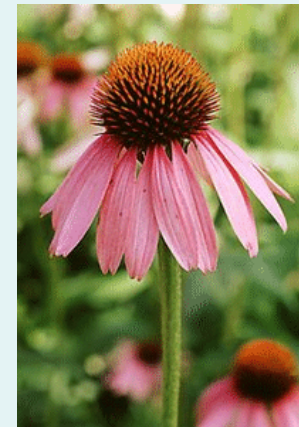
Nutrition Business Journal



OFFICE OF
DIETARY
SUPPLEMENTS

ODS Mission Is to Strengthen Knowledge and Understanding of Dietary Supplements

- Evaluate Scientific Information
- Stimulate and Support Research
- Disseminate Research Results
- Educate the Public to Foster an Enhanced Quality of Life and Health for U.S. Population



Echinacea
Echinacea purpurea

ODS Evidence-Based Review Program

- Systematic review of the literature, with meta-analysis as appropriate, on DS efficacy and safety
- Most in collaboration with the Agency for Healthcare Research and Quality (AHRQ) Evidence-Based Practice Center Network
- Major reason for conducting these reviews is to assist NIH in the development of research agendas



ODS Evidence-Based Review Program

- Chromium and insulin sensitivity*
- Ephedra for weight management and athletic performance enhancement* (with NCCAM)
- Omega-3 fatty acids for cardiovascular disease prevention* (with NHLBI) and other health indications
- Health effects of soy (with NCCAM)
- Antioxidant phytochemicals/B vitamins and neurodegenerative diseases* (with NCCAM)
- Multivitamins/multimineral and chronic disease prevention (with OMAR)
- Coagulation, diet, and dietary supplements
- Health effects of vitamin D (with multiple partners)

*Congressional mandate

Evidence

- Pre-Clinical
- Ecologic
- Observational
- Cohort
- Intervention
- RCT



Health Effects of Omega-3 Fatty Acids

- Asthma
- Cancer
- **Cardiovascular Disease**
- **Cardiovascular Disease Risk Factors**
- Arrhythmogenic Mechanisms
- Child and Maternal Health
- Cognitive Function
- Eye Health
- Type II Diabetes, Rheumatoid Arthritis, and Other Diseases
- Mental Health
- Organ Transplantation



Omega-3 Fatty Acids, cont.

- Exposures
 - EPA, DHA, ALA
 - Dietary supplements and foods (fish and vegetable oils)
- Studies
 - CVD > child/maternal health > mental health
 - Fish oil > Fish diets > ALA
 - ¼ good quality; ¼ poor quality



Omega-3 Fatty Acids, cont.

- Evidence generally inconclusive
 - Paucity of high quality studies
 - Heterogeneity of interventions
 - Conflicting findings
- Secondary prevention of CVD
 - Evidence → health benefit of fish oil/fish
- Adverse events
 - Appear to be minor
 - Only 1/3 had information
 - Incomplete and inadequate reporting



Omega-3 Fatty Acids

Research Priorities

- **NHLBI Workshop**
 - Need for primary prevention studies
 - Fish oil and ALA supplements
- **NIEHS Workshop**
 - Prevention trial to assess impact on asthma and allergy during pregnancy and infancy



Rationale for DS in IEM

- Nutritional interventions - a mainstay in management
- Diet (low Phe...) + individual ingredients (CoQ10, carnitine...)
 - Systematic evaluation for some, not all
- Supplements vs. drugs
 - Very different rules, processes
- Population use relies on benefits seen in patients with IEM



Dietary Supplement Research: Product Concerns

Product Concerns:

- Identification
- Characterization
- Reproducibility



Black Cohosh
Cimicifuga racemosa L.

Dietary Supplement Research: Protocol Concerns

Protocol Concerns:

- Population(s)
- Endpoints
- Dose
- Earlier Phase Studies



Red Clover
Trifolium pratense



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