NUTRITIONAL SUPPLEMENTS IN OBESITY: WHAT ARE THEY, DO THEY WORK, & ARE THEY SAFE?

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The Great Remedy for Corpulence

ALLAN’S ANTI-FAT

is composed of purely vegetable ingredients, and is perfectly harmless. It acts upon the food in the stomach, preventing its being converted into fat. Taken in accordance with directions, it will reduce a fat person from two to five pounds per week.

“Corporulence is not only a disease itself, but the harbinger of others,” so wrote Hippocrates two thousand years ago, and what was true then is true the less so today.

Before using the Anti-Fat, make a careful note of your weight, and after one week’s treatment note the improvement, not only in diminution of weight, but in the improved appearance and vigor of the body. It is an unsurpassed blood-purifier and has been found especially efficacious in curing Rheumatism.

CERTIFICATE— I have subjected Allan’s Anti-Fat in chemical analysis, examined the process of its manufacture, and can truly say that the ingredients of which it is composed are entirely vegetable, and cannot but act favorably upon the system, and be well calculated to attains the object for which it is intended.

W. H. BRAKE, Thalberg Osteopath.

Sold by all druggists, or sent, by express, to any address, upon receipt of $1.50; quarter-dozen $4.00, or half-dozen for $7.50. Address,
Could dietary supplements be “perfectly harmless”? 
Googling “deals on obesity pills”……

[Images of various dietary supplements with prices and sources:
- SMARTX, $54.95, eSupplements.com
- diurex, $5.43, Jet.com
- APIDREN, $43.95, eSupplements.com
- Fat Loss Pills, $79.16, Jet.com
- CARALLUMA, $7.99, Jet.com
- Belly Pause, $24.00, Jet.com
- MD Multivitamins, $34.39, Jet.com
- LEPTOPRI, $31.34, iHerb.com]
It’s located right next to the Tylenol, therefore it is probably just as safe.
Learning Objectives

1. Describe commonly used supplements in the management and treatment of obesity.

2. Apply evidence related to the safety and efficacy of supplements in patients with obesity.
Supplements are not regulated by the FDA
Describe commonly used supplements in the management and treatment of obesity.
Bitter Orange

- Specific orange plant
- Contains synephrine, a stimulant
  - Products usually also contain caffeine and/or ephedra (banned)

**Proposed MOA:** Increases energy expenditure and lipolysis, acts as a mild appetite suppressant

**Efficacy:** may cause slight increase in metabolism and/or reduce calorie intake but long term impact on weight is unknown

**Safety:** might be unsafe and cause angina, anxiety, tachycardia, hypertension

Caffeine (*including kola/cola nut, guarana, mate and yerba mate*)

- Stimulant
- Found in many drinks and supplements, but *not always listed in the ingredients*

**Proposed MOA:** Stimulates central nervous system, increases thermogenesis and fat oxidation

**Efficacy:** may cause slight weight loss, but a tolerance can develop

**Safety:** low doses are safe, but can cause tremor, anxiety, insomnia. High doses are unsafe (>400mg/day) and can cause N/V, tachycardia, seizures.

https://ods.od.nih.gov/factsheets/WeightLoss-HealthProfessional/
Calcium

• Mineral

Proposed MOA: Increases lipolysis and fat accumulation, decreases fat absorption

Efficacy: not likely based upon several large clinical trials

Safety: adult recommended doses are safe (1000-1200mg/day), but excess calcium can cause constipation, urinary stones, and reduce absorption of other vitamins like zinc or iron. Excess calcium intake may increase risk of MI.

Chitosan

• From crab, lobster or shrimp shell

Proposed MOA: Binds dietary fat in the digestive tract

Efficacy: Minimal effect on body weight seen in small trials of poor quality

Safety: Few safety concerns, but allergies can occur. Flatulence, bloating, constipation, indigestion, nausea, and heartburn can occur

https://ods.od.nih.gov/factsheets/WeightLoss-HealthProfessional/
Chromium

- Trace element

**Proposed MOA:** Increases lean muscle mass; promotes fat loss; and reduces food intake, hunger levels, and fat cravings

**Efficacy:** Minimal effect on body weight and body fat seen in several trials of varying quality

**Safety:** No safety concerns reported at recommended intakes. Can cause headache, watery stools, constipation, weakness, vertigo, nausea, vomiting, and urticaria.

Coleus Forskohlii

- Flowering perennial plant

**Proposed MOA:** Enhances lipolysis and reduces appetite

**Efficacy:** No effect on body weight

**Safety:** No safety concerns reported in small trials

https://ods.od.nih.gov/factsheets/WeightLoss-HealthProfessional/
Linoleic Acid (conjugated)

- Omega 6 Fatty Acids

**Proposed MOA:** Promotes apoptosis in adipose tissue

**Efficacy:** Minimal effect on body weight and body fat seen in several trials

**Safety:** Few safety concerns reported, but can cause abdominal discomfort and pain, constipation, diarrhea, loose stools, dyspepsia, and (possibly) adverse effects on blood lipid profiles

Ephedra

- Plant extract

**Proposed MOA:** Stimulates CNS, increases thermogenesis, reduces appetite

**Efficacy:** Modest effect on short-term weight loss seen in several trials of good quality. Long term results unknown.

**Safety:** Significant safety concerns reported; banned as a dietary supplement ingredient.
**Fucoxanthin**

- Pigment from brown algae

**Proposed MOA:** Increases energy expenditure and fatty acid oxidation, suppresses adipocyte differentiation and lipid accumulation

**Efficacy:** Insufficient research to draw firm conclusions

**Safety:** No safety concerns reported but not rigorously studied

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**Garcinia cambogia**

- Tropical fruit

**Proposed MOA:** Inhibits lipogenesis, suppresses food intake

**Efficacy:** Little to no effect on body weight

**Safety:** Few safety concerns reported, but can cause headache, nausea, upper respiratory tract symptoms, and gastrointestinal symptoms

https://ods.od.nih.gov/factsheets/WeightLoss-HealthProfessional/
**Glucomannan**

- Component of the cell wall of some plants

**Proposed MOA:** Increases feelings of satiety and fullness, prolongs gastric emptying time

**Efficacy:** Little to no effect on body weight

**Safety:** Significant safety concerns reported with tablet forms, which might cause esophageal obstructions, but few safety concerns with other forms. Can cause loose stools, flatulence, diarrhea, constipation, and abdominal discomfort

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**Green coffee bean extract**

**Proposed MOA:** Inhibits fat accumulation, modulates glucose metabolism

**Efficacy:** Possible modest effect on body weight seen in a few trials of poor quality

**Safety:** Few safety concerns reported but not rigorously studied; also contains caffeine. Can cause headaches and UTIs.

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https://ods.od.nih.gov/factsheets/WeightLoss-HealthProfessional/
**Green tea (or extract)**

**Proposed MOA:** Increases energy expenditure and fat oxidation, reduces lipogenesis and fat absorption

**Efficacy:** Possible modest effect on body weight seen in several trials of good quality (+/- caffeine)

**Safety:** No safety concerns reported when used as a beverage, contains caffeine; some safety concerns reported for green tea extract. Can cause constipation, abdominal discomfort, nausea, increased blood pressure, liver damage

**Guar gum**

- Made from guar beans

**Proposed MOA:** Acts as bulking agent in gut, delays gastric emptying, increases feelings of satiety

**Efficacy:** No effect on body weight seen in several trials of good quality

**Safety:** Few safety concerns reported with currently available formulations, but can cause abdominal pain, flatulence, diarrhea, nausea, and cramps
Hoodia

- Spiny succulent

**Proposed MOA:** Suppresses appetite, reduces food intake

**Efficacy:** No effect on energy intake or body weight based on results from one study

**Safety:** Some safety concerns reported, increases heart rate and blood pressure. Can also cause headache, dizziness, nausea, and vomiting.

Pyruvate

- Key intermediate in several metabolic pathways

**Proposed MOA:** Increases lipolysis and energy expenditure

**Efficacy:** Possible minimal effect on body weight and body fat seen in few trials of weak quality

**Safety:** Few safety concerns reported, but can cause diarrhea, gas, bloating, and (possibly) decreased high-density lipoprotein levels

Raspberry ketone

- Aroma compound of red raspberries

**Proposed MOA:** Alters lipid metabolism

**Efficacy:** Insufficient research to draw firm conclusions

**Safety:** No safety concerns reported but not rigorously studied

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White kidney bean (or pod)

**Proposed MOA:** Interferes with breakdown and absorption of carbohydrates by acting as a “starch blocker”

**Efficacy:** Possible modest effect on body weight and body fat seen in several trials of varying quality

**Safety:** Few safety concerns reported, but can cause headache, soft stools, flatulence, and constipation

https://ods.od.nih.gov/factsheets/WeightLoss-HealthProfessional/
Yohimbe

- Bark of an African tree

**Proposed MOA**: Has hyperadrenergic effects; stimulant

**Efficacy**: No effect on body weight; insufficient research to draw firm conclusions

**Safety**: Significant safety concerns reported, including headache, anxiety, agitation, hypertension, and tachycardia

https://ods.od.nih.gov/factsheets/WeightLoss-HealthProfessional/
Apply evidence related to the safety and efficacy of supplements in patients with obesity.
Self Assessment Question 1

• Michelle, a 46 year old female with a PMH of CAD s/p MI, anxiety, and obesity, presents to your office for her yearly checkup. She shows you several graphs and charts that illustrate the effectiveness of a new weight loss product that she learned about called CafOrang. She also brought her sample bottle for you to examine, and you note that it contains caffeine and bitter orange. Since it is quite expensive, she wants to get your opinion before she purchases any more. What is your best response?

A. Supplements are approved as safe and effective by the FDA, so this product is safe to initiate.

B. Supplements are approved as safe and effective by the FDA, but this product is not safe with your medical history.

C. Supplements are not regulated by the FDA, so contents are not guaranteed, but this product is safe and effective for use in obesity.

D. Supplements are not regulated by the FDA, so contents are not guaranteed, and this product is not safe with your medical history.
Self Assessment Question 2

Thomas is a 27 year old male with no PMH who presents to your office for his first appointment. His BMI is noted to be 35 and you discuss weight loss options with him. He tells you that his friend bought this product on the internet called Lipodrene Hardcore and he wants to try it out for weight loss. You look it up and note that it contains **ephedra**. What is your best response?

A. Ephedra has been found to be safe and effective for weight loss.

B. Ephedra has been found to be effective for weight loss, but its safety has not been established.

C. Ephedra has been found to be safe, but not effective for weight loss.

D. Ephedra has been found to be unsafe and should not be used for weight loss.
Supplementary and Useful Resources

American Pharmacists Association (APhA) fact sheet
• https://www.pharmacist.com/dietary-supplements-obesity

NIH Website assessing safety and efficacy
• https://ods.od.nih.gov/factsheets/WeightLoss-Consumer/

Known tainted weight loss products
• https://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/MedicationHealthFraud/ucm234592.htm
THANK YOU!
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Food for thought: Is there a role for stimulants in the treatment of obesity?

Co-morbid SUDs and genetic susceptibility for addiction

Cardiovascular Safety