

Chitosan and Weight Loss:

Will it help the battle of the bulge?

By:

Amy Harris and Lorena Ferchaud

What is chitosan?

- **Source:**

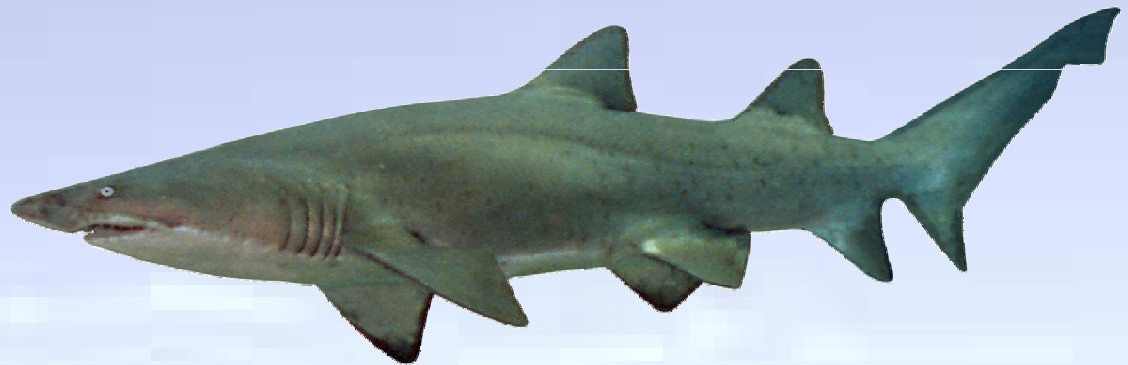
- Only available in supplement form
- Found in the exoskeleton of crustaceans
- The shells are ground up into a powder which is then deacetylated (stripped of certain chemical groups) so that it can “soak up fats”



Clicker time!!!

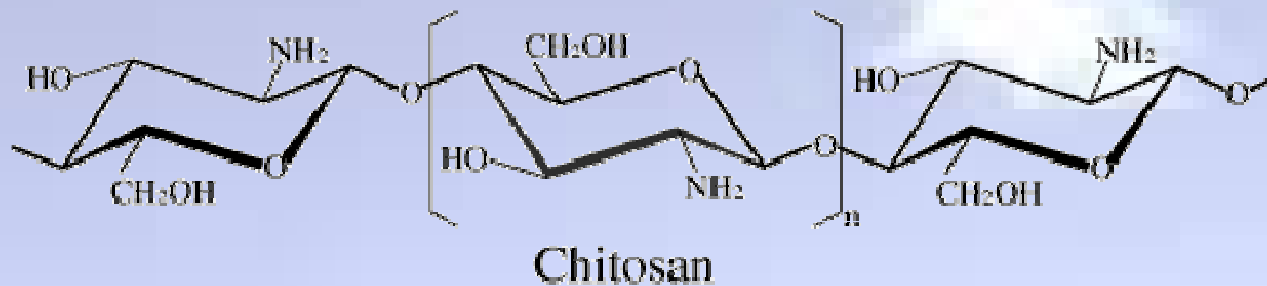
Chitosan can be obtained from all the following animals EXCEPT:

- A.) Lobsters
- B.) Crabs
- C.) Sharks
- D.) Shrimp



Chemical structure/Dosage

- Linear polysaccharide



- Take 1-3 g before meals. Suggested to take with Vitamin C because it activates chitosan in the stomach creating a fat-absorbing gel



Metabolism of chitosan

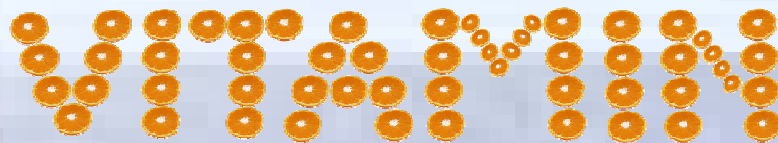
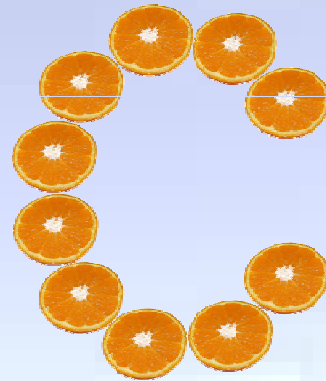
- Prevents bile and fat absorption
- Able to absorb 4-6 times its weight in fat and cholesterol
- Enhances excretion which:
 - Lowers cholesterol
 - Enhances weight loss
- Chemically processed fiber so it's not absorbed by the body at all



Clicker time!!

Which vitamin should be taken with chitosan to activate it in the stomach creating a fat absorbing gel?

- A.) Vitamin A
- B.) Vitamin D
- C.) Vitamin C
- D.) Vitamin E



Biological Activities - How does it work??

- Forms a gel trapping the fat from the meal
- The “grease ball” formed by the chitosan/fat mixture is too large to be absorbed by the body so it’s excreted
- Soaks up toxins and excretes them as well
- Be sure to drink plenty of water to prevent intestinal blockage
- May bind with essential fatty acids



Media Hype and Marketing Claims

Las Vegas Buffet Buster

“Throws a net over the fat, trapping it and sinking it to the bottom of your stomach.” (Nature’s Health)

Makes all foods Fat Free!

“The amazing ability to encapsulate fats and cholesterol before they can be absorbed!” (NutritionalSupplement4Fitness)

“Binds to the fats in the intestine and blocks their absorption by the body...these ‘bound’ fats are then excreted...” (Nature’s Science)

A dieter's dream

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease

Clicker time!!

Which foods should not be eaten at the same time as taking chitosan supplements?

- A.) Essential fatty acids
- B.) Fat-soluble vitamins
- C.) French fries
- D.) Both A and B

Both A and B

Relevant Research article #1: Evaluating Efficacy of a Chitosan Product Using a Double-Blinded, Placebo-Controlled Protocol

Objective: To examine the safety and efficacy of a chitosan dietary supplement on body composition under free-living conditions.

Design: In a **randomized, double-blinded, placebo-controlled** dietary intervention protocol, subjects were assigned to a treatment group (TRT), a placebo group (PLA) and a control group (CTL).

Subjects: A total of 150 overweight adults enrolled; **134 (89.3%) completed this 60 day study**; 111 (82.8%) were women who were similarly distributed in the three groups.

Intervention: The TRT group took six 500 mg (3 g total) chitosan capsules per day and both TRT and PLA groups wore pedometers during their waking hours and recorded daily step totals. The CTL group followed weight loss programs of their choice, and took the same baseline and ending tests.

Measures of Outcome: Outcome measures were Dual Energy X-ray Absorptiometry tests, fasting blood chemistries, and self-reported daily activity levels and caloric intakes.

Results: Compared to CTL, the TRT group lost more weight (-2.8 lbs vs. -0.8 lbs, $p = 0.001$) and fat mass (-2.6 lbs vs. -0.1 lbs, $p = 0.006$). Compared to PLA, the TRT group lost more weight (-2.8 lbs vs. -0.6 lbs, $p = 0.03$), % fat (-0.8% vs. -0.4% , $p = 0.003$), fat mass (-2.6 lbs vs. -0.6 lbs, $p = 0.001$) and had a greater body composition improvement index (BCI) (-2.4 lbs vs. -1.9 lbs, $p = 0.002$).

Conclusions: **These data provide evidence for the efficacy of a chitosan compound to facilitate the depletion of excess body fat under free-living conditions with minimal loss of fat-free or lean body mass.**

Relevant Research Article # 2 - The effect of the dietary supplement, Chitosan, on body weight: a randomized controlled trial in 250 overweight and obese adults

Objective: To evaluate the efficacy of chitosan for weight loss in overweight and obese individuals.

Design: 24 week (168 days) randomized double-blind placebo controlled trial.

Participants: 250 participants consisting of 82% women with a mean BMI of 35.5(sd 5.1) and age 48 years (sd 12yr)

Intervention: Participants were randomly assigned to receive 3g chitosan per day or placebo. All participants received dietary and lifestyle advice.

Main outcome measures: Primary outcome measure was change in body weight. Secondary outcomes included changes in BMI, anthropometric and biochemical measurements, fecal fat and health related quality of life.

Results: The chitosan group lost more body weight than the placebo group (0.4lb loss vs .02 gain) during the 24 week intervention, but the effects were small. There were similar small changes in total cholesterol, LDL and glucose. There were no other significant differences between the groups for any other measured outcomes.

Conclusion: In this 24 week trial, **chitosan did not result in a clinically significant loss of body weight compared with placebo.**

Marketing claims and efficacy

- An investigation found that there is no valid scientific evidence to support claims that the ingestion of chitosan causes fat to be "trapped" or "bound" in the human G.I. tract, or that the use of chitosan-based dietary supplements causes any significant or noticeable weight loss results.
- 2003 – An article in the Obesity Journal found the fat trapping claims and subsequent weight loss from the chitosan product to be unsubstantiated.



Marketing claims and efficacy cont.

- 2000 - “Fat Trapper”
Marketers were charged by the FTC of deceptive advertising “eat what you want and never, ever, ever have to diet again.”



Safety

Not recommended for people who:

- Are allergic to shellfish
- Have intestinal malabsorption
- Are pregnant or lactating
- Don't drink plenty of water

All in all, chitosan is seen as a very safe supplement with basically no side effects among healthy people



Questions

1.) Which other supplement was recently presented that also contains chitin?

Glucosamine Chondroitin

2.) **T or F** Chitosan is a branched polysaccharide

False

3.) **T or F** To insure that the chitosan is well absorbed it must be taken along with an Omega 3 supplement

False

References

- Kaats G., Michalek J., Preuss H. (2006) Evaluating Efficacy of a Chitosan Product Using a Double-Blinded, Placebo-Controlled Protocol. Journal of the American College of Nutrition. 25: 389-394.
- Mhurchu C., Poppitt SD., McGill A., Leahy FE., Bennett DA., Lin RB., Ormrod D., Ward L., Strik C., Rodgers A. (2004) The effect of the dietary supplement, Chitosan, on body weight: a randomized controlled trial in 250 overweight and obese adults. International Journal of Obesity. 28: 1140-1156.
- “Chitosan”. March 29 2009
<<http://www.evitamins.com/healthnotes.asp?ContentID=2826007>>.
- <http://www.natureshealthcompany.com/chitosan.htm>
- Fritch, Jamie. “Chitosan – Revolutionizing weight loss?” March 29 2009
<http://www.vanderbilt.edu/ans/psychology/health_psychology/chitosan.htm>.
- “Chitosan”. March 24 2009. March 29 2009
<<http://www.diagnoseme.com/treat/T321707.html>>.
- “Chitosan”. November 2008. Aurora Health Care. March 29 2009
<<http://www.aurorahealthcare.org/yourhealth/healthgate/getcontent.asp?URLhealthgate=%2221656.html%22>>.
- “Chitosan”. 2006. March 29 2009 < <http://www.drugs.com/npc/chitosan.html>>.
- “Chitosan fails to reduce the weight”. April 27 2009
<<http://www.thefactsaboutfitness.com/news/chitosan.htm>>.