Ask the Expert:
Fat-soluble Vitamins: Why Are They Important?

Written by Clara Vasquez-Mejia, Food Scientist, B.Sc, M.Sc, Department of Food Science, Purdue University

Vitamins are essential nutrients that our bodies need in trace amounts for normal growth and functioning. Fat-soluble vitamins include vitamin A, vitamin D, vitamin E, and vitamin K. They naturally accumulate in the liver. Since the body uses fat-soluble vitamins at a slow rate, it can be dangerous to take these vitamins in large quantities. Eating a diet that follows MyPlate can help you get the proper amount of fat soluble vitamins.

**Vitamin A** is essential for bone development, vision, reproduction, regulation of the immune system, and healthy skin. It is found in foods of animal origin, such as dairy products, fish and liver. It is also present in the form of beta carotene in orange and dark green fruits, and vegetables. The Recommended Dietary Allowance (RDA) is 900 microgram/day for males and 700 micrograms/day for females over 14 years of age. Vitamin A toxicity can cause birth defects and may increase the risk of hip fractures.

**Vitamin D** is essential for calcium and phosphorous absorption. It can be found in two forms: D2 and D3. Exposing the skin to sunshine 10-15 min three times a week, without sunscreen, will allow you to get the amount of vitamin D3 necessary for good health. Vitamin D2 is found in fortified dairy, oily fish, liver, and egg yolk. The RDA for vitamin D is 15 micrograms/day. Vitamin D deficiency causes bone deformities known as rickets (among children), and mineralization defects in the skeleton that may cause osteomalacia (in adults). On the contrary, vitamin D toxicity can cause high blood calcium levels, resulting in poor appetite, nausea and vomiting.

**Vitamin E** acts as an antioxidant, which protects body cells from damage by free radicals. Good sources of vitamin E include nuts, seeds, vegetable oils, leafy greens, and fortified foods. The RDA for vitamin E is 15 milligrams/day for males and females age 14 and older. Excessive amount of vitamin E may increase unwanted bleeding.

**Vitamin K** is naturally produced by gut microbes, and found in leafy greens. It helps with blood clotting. There is not sufficient data on vitamin K to create an RDA. However, the amount of vitamin A that is adequate for most people is 120 micrograms/day for males, and 90 micrograms/day for females over 19 years. Deficiency of vitamin K can lead to excessive bleeding. People taking blood thinners should moderate vitamin K intake, to avoid interfering with the metabolism of the medication. Impacts of vitamin K toxicity on human health are still being studied.

Food Safety: How to Handle Home Delivered Meals

Written by Christina Wilder, Undergraduate Student in College of Pharmacy, Purdue University

Home delivered meals from restaurants, church groups, senior assistance societies, social groups, and health care organizations benefit many individuals who may have difficulty leaving their homes for short or extended time frames. However, improper handling of these meals allows bacteria to grow at a fast pace; therefore, it is essential to ensure the food is safe to consume. Bacteria grows rapidly between 40°F and 140°F, otherwise known as the “Danger Zone.” Leaving food out too long at these temperatures may support the growth of bacteria to unsafe levels, which may cause foodborne illness. Proper food handling minimizes the risks of food-related poisonings.

Perishable food items should not be left at room temperature for longer than two hours. If the temperature rises above 90°F, the food should be discarded after one hour. It is important to refrigerate or freeze food immediately if food is not consumed right away.

Keep refrigerate foods at temperatures of 40°F or below. Shallow containers that allow all of the food inside to cool faster are recommended. Divide or cut the food into smaller portions, and remove any stuffing from whole cooked poultry.

To reheat meals, heat the food to an internal temperature of at least 165°F, and let it stand 2-3 minutes after heating. If using a microwave, use a rotating dish so the food is heated evenly for 3 minutes on high. If using an oven, heat for 30 minutes at 350°F. The food temperature should reach 165°F throughout in order to avoid “cold spots” that harbor harmful bacteria.

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<tr>
<th>REFRIGERATOR STORAGE AT 40°F OR BELOW</th>
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<td>Cooked meat or poultry</td>
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<td>Pizza</td>
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<td>Luncheon meats</td>
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<tr>
<td>Egg, tuna, and macaroni salads</td>
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<th>FREEZER STORAGE AT 0°F OR BELOW</th>
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<td>Pizza</td>
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<td>Luncheon meats</td>
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EATING RIGHT

DRIs- Guidelines for Healthy Diets
Written by Sasha Harrison, HHS Class of 2014, Dietetics and Nutrition, Fitness and Health, Purdue University

The dietary reference intakes (DRIs) are a collection of nutritional reference values based on age and gender for macronutrients (carbohydrates, fat, protein), micronutrients (vitamins, minerals), fiber and water intake. The most relevant section of the DRIs to daily individual diets is the Recommended Dietary Allowance (RDA), which states the average amount of nutrients and vitamins that generally healthy people should aim to consume daily.

The DRI guidelines are used in menu planning to ensure nutritional adequacy. Using the DRIs to plan meals promotes healthy eating and aims to prevent diseases. Portion sizes can also be developed based on the DRIs.

The DRIs in general and the RDA in particular are used to develop the Dietary Guidelines for Americans (DGA), which focuses more on food and lifestyle changes that are easy to understand and to incorporate regularly. For instance, you can use a free online tool like Super Tracker and ChooseMyPlate.gov to check and adjust your diet. These resources also provide information on portion sizes, physical activity, and budgeting with seasonal and affordable meal ideas.

Supplemental nutrition programs may also apply these guidelines. For example, the National School Lunch Program is informed by the current DGA. A school lunch menu must offer a variety of vegetables and whole grain-rich options throughout the week. There are restrictions on sodium and fat content of the meals. Following the DRIs and DGA allows supplemental nutrition programs, families, and individuals to plan a healthy diet.


Garden Pasta Salad
Ingredients (6 servings)
- 1/2 cup macaroni, cooked
- 1/4 cup onion, finely chopped
- 1/2 cup cucumber, finely chopped
- 1/4 cup green pepper, diced
- 1 tablespoon vinegar
- 1/2 tablespoon vegetable oil
- 1/4 teaspoon salt
- 1/4 teaspoon pepper
- 1 teaspoon parsley, chopped (optional)

Directions:
1. In a medium-size bowl, combine macaroni, onions, cucumbers, and green peppers. Mix well.
2. In a separate bowl, mix vinegar, vegetable oil, salt, and pepper. If using parsley, add that too.
3. Pour the prepared dressing over the pasta. Mix well.
4. Cover bowl and refrigerate for 30 to 45 minutes. Serve cold.

Per serving: 34 Calories, 1g Total Protein, 5g Total Carbohydrate, 1g Total Dietary Fiber, <1g Total Sugars, 1.3g Total Fat, 0g Total Saturated Fat, 98mg Sodium

Colorful Tuna Pasta Salad
Ingredients (4 servings)
- 6 ounces dried rotini
- 6 ounces diced tomatoes
- 1/2 small cucumber
- 1/2 medium red bell pepper
- 2 to 2.5 ounces sweet onion
- 2 tablespoons fresh cilantro
- 2 6-ounce cans very low sodium chunk tuna
- 1/4 cup light balsamic vinegar dressing
- 1/4 cup light mayonnaise

Directions:
1. Prepare the pasta using the package directions, omitting the salt and oil.
2. Drain the pasta in a colander. Rinse with cold water and drain well. Transfer to a large bowl.
3. Chop the tomatoes, cucumber, bell pepper, onion, and cilantro.
4. Drain the tuna.
5. Add the dressing and mayonnaise to the cooked pasta. Stir gently to coat.
6. Serve immediately or refrigerate for up to 24 hours.

Per serving: 336 Calories, 29g Total Protein, 40g Total Carbohydrate, 7g Total Dietary Fiber, 6g Total Sugars, 8g Total Fat, 1.0g Total Saturated Fat, 320mg Sodium

Recipe Sources: https://whatscooking.fns.usda.gov/sites/default/files/featuredlinks/HarvestofRecipes.pdf; http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/Colorful-Tuna-Pasta-Salad_UCM_468656_Recipe.jsp#WmtfimeQy70

Underlining denotes TEFAP commodity ingredient
Food and Nutrition Policy Updates
Written by Nicolette Mehas, Research Assistant, Department of Nutrition Science, Purdue University

The Indiana General Assembly is currently in session, and over 1000 bills have been filed this year. While there is an emphasis on infrastructure, education, and drug addiction, there are also bills that focus on nutrition. For example, bill SB277 the Healthy Food Initiative Program, aims to make healthier options more accessible across Indiana. It would provide funding to businesses and communities to bring fresh foods and outreach programs to underserved areas. It has passed the Senate and is now in the House.

In July 2016, Congress passed GMO labeling legislation that intends to improve food-labeling transparency. Information about GMOs will be provided by an on-package label or through a QR code. The USDA will be responsible for developing regulation details.

Also in policy news, the Grocery Manufacturers Association and the Food Marketing Institute are advising manufacturers and stores to use two standard phrases on packaging. “Best if used by” will be used to express product quality, and “use by” will be used on perishable items that could become unsafe to eat over the recommended date. These new labeling changes may help decrease confusion and lead to less food waste.


WHAT: Want to learn more about legislation in Indiana or contact your legislators?
WHERE: Visit iga.in.gov. You can find your legislators at http://iga.in.gov/legislative/find-legislators/
WHEN: The Indiana legislative session runs from January to April, but you can contact your Senator or Representative at any time.
WHY: To better understand the policies that affect your community, express your ideas, and let your voice be heard.