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A Deeper Look at the Nutrient Content of Lettuce

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A lively debate was triggered by Tamar Haspel's provocative August 23, 2015 piece in the *Washington Post* entitled "Why salad is so overrated." Because Haspel made use in her reporting of results from our Nutritional Quality Index (NQI), we feel some obligation to both correct the record and place some of the points she makes into a broader, and we think more accurate, perspective.

The following quotes in the August 23rd piece are factually wrong or highly questionable:

1. "A head of iceberg lettuce…is only marginally more nutritious" than a liter of Evian water.

A head of lettuce has far more than "marginal" amounts of nutrients. USDA's medium head weighs 539 g, or 9.5 standard, 1-cup servings (57 g). Each of these servings has an NQI of 0.021 for adult women. Accordingly, the NQI per head of lettuce is 0.20 (9.5 × 0.021). An NQI of 0.20 represents about 20 percent of a woman's daily need for 27 nutrients essential to good health. This is obviously far more than in a liter of Evian.

In terms of the Recommended Dietary Allowances, the medium head of lettuce contains 10 percent or more of the RDAs for 16 nutrients—7 vitamins (A, B_6, C, and K, folate, thiamin, and riboflavin), 6 minerals (potassium, magnesium, phosphorus, copper, iron, and manganese), plus fiber, omega-3 fatty acids, and lutein.

Plus, it has nearly 5 g of protein, and at the "expense" of only 75 calories.

Many people consider head lettuce a highly nutritious food, because a head of lettuce delivers 20 percent of a typical woman's daily nutrient needs (based on NQI), at the expense of only about 3 percent of daily caloric needs, such as 2,200 calories.

2. “Salad vegetables are pitifully low in nutrition.”

This is not true if one takes advantage of their low-calorie nature and consumes sufficient amounts. Many people consume salads that use a quarter head of iceberg lettuce, with an NQI of 0.050 in only 19 calories. Some people are known to eat a cucumber like an apple, with an NQI of 0.054 in only 23 calories. These NQI values rank up there with many other foods that Haspel surely never would call “pitifully low in nutrition,” even though many have far more calories than salad vegetables. For example:

	NQI	Calories
Egg, large	0.056	72
Apple, medium	0.055	67
Cucumber, 8-inch	0.054	23
Lettuce, 1/4 head	0.050	19
Banana, medium	0.049	105
Oatmeal, dry, 1 oz	0.049	108
Buttermilk, 1 cup	0.048	98
Green beans, 1/2 cup	0.047	22
Bell pepper, 1/2 cup	0.046	15
Potato, boiled, 1/2 c.	0.034	68
Cheese, Cheddar, 1 oz	0.034	114
Cauliflower, 1/2 cup	0.034	14

As Haspel notes, the “problem” with salad vegetables is their high water content. But their watery nature also has benefits. Penn State University nutrition professor and book author Barbara Rolls advocates “volumetric” diets for weight loss and health. Volumetric diets favor foods with high volume compared to calories, meaning foods with high water content. Haspel also notes this benefit. Near the end of her article, she says a big salad bowl on the dinner table keeps her from eating a second serving of lasagna.
http://nutrition.psu.edu/foodlab/barbara-rolls
http://health.usnews.com/best-diet/volumetrics-diet

Our real concern about foods with “pitifully low nutrition” is foods with low NQI *and* high calories, the polar opposites of salad vegetables. Some examples follow.

	NQI	Calories	NQI/100 Calories
Cola drink, 12 fl. oz	0.002	136	0.001
Oil, olive, 1 Tbsp	0.015	119	0.013
Cream, whipping, 2 Tbsp	0.016	104	0.015
Cookie, animal cracker, 1 oz	0.020	127	0.016

3. “....we get all the nutrition we need in a fraction of our recommended daily calories....”

This is clearly incorrect. In their introductory paragraph to the *Dietary Guidelines for Americans, 2010*, the secretaries of the U.S. Departments of Agriculture and Health and Human Services describe the purpose of the *Guidelines* as follows (page i):

> ...this document provides information and advice for choosing a healthy eating pattern—namely, one that focuses on nutrient-dense foods and beverages....
>
> http://health.gov/dietaryguidelines/dga2010/dietaryguidelines2010.pdf

If it were true that we so easily “get all the nutrition we need,” there would be no need for the 112-page *Guidelines* to advise Americans to focus on “nutrient-dense foods.”

To nutritionists, nutrient-dense foods are foods with high nutrient amounts per calorie. Salad vegetables are much more nutrient-dense than most foods. In our NQI values for 196 common foods, lettuce, cucumber, celery, and radish rank in the top 10 to 20 percent of NQI values per calorie.

Regarding Americans getting “all we need” even in our *full* daily calories, the *Dietary Guidelines for Americans* refer to “a number of nutrients that are underconsumed in the United States, including folate, magnesium, potassium, dietary fiber, and vitamins A, C, and K” (page 35).

Speaking of vitamin K, head lettuce was the largest reported dietary source in Harvard's Nurses Health Study of hip fractures in 73,000 women—29 percent of dietary intake, compared to spinach 18 percent, broccoli 15 percent, and Romaine lettuce 6 percent. Further, lettuce eaters had a 45 percent lower risk of hip fractures (*Am J Clin Nutr* 1999; 69:74, ajcn.nutrition.org/content/69/1/74.full).

4. “... I could buy more than two pounds of broccoli, sweet potatoes or just about any frozen vegetable going, any of which would make for a much more nutritious side dish [than] say, a head of lettuce, a cucumber and a bunch of radishes...”

Yes, broccoli and some other vegetables have more nutrients per calorie than salad vegetables, and they are excellent choices. Nevertheless, a strong case can be made for increasing consumption of salad vegetables, because they still deliver so much more than a fair share of nutrients for the calories they contain.

Haspel may not have considered the trade-offs in her suggested alternatives to a head of lettuce, a cucumber and radishes:

	NQI	Calories	NQI/100 calories
Head of lettuce, etc.	0.27	129	0.21
2.3 lb sweet potato	0.71	794	0.09
2.3 lb broccoli	1.61	365	0.44

The 2.3 pounds of sweet potatoes supply 2.6 times more NQI, but at the large cost of 6.2 times more calories. The NQI per 100 calories is relatively low (but still good). If the calories are needed, sweet potatoes are a fine substitution. If not, food containing 665 calories, and their nutrients, would need to be removed elsewhere in the diet to make room for the sweet potatoes—no small matter.

The 2.3 pounds of broccoli supply 6.0 times more NQI than head lettuce, at the cost of 2.8 times more calories. The NQI per 100 calories is unusually high, which is great.

But if we limited ourselves always to broccoli and other foods with the highest NQI per 100 calories (mostly leafy greens), we would have many fewer choices, including no sweet potatoes. Taste, variety, nutrients, and ease of preparation are all valid considerations. Salad vegetables score well in each category. We just need to learn, as Haspel points out, that some restaurant “salads” are unworthy of the name, and that salad vegetables need to be eaten in quantity to really shine.

5. “[Lettuce is] the top source of food waste, vegetable division, becoming more than 1 billion pounds of uneaten salad each year.”

This top ranking follows primarily from the probably surprising fact that lettuce of all types is the second most-produced vegetable in the U.S. (after potatoes). But in terms of percentage waste, lettuce ranks far down from the top. According to Haspel’s reference (which deals only with supermarket waste), percentage losses of Romaine and leaf lettuces place them 16th out of 31 vegetables, while head lettuce comes in at 22nd place. Turnip and mustard greens top the list at 63 and 61 percent waste, compared to 20 percent for Romaine and leaf lettuces, and only 8 percent for head lettuce. In Haspel's terms of pounds, stores discard 2.6 times more potatoes than head lettuce. It's misleading to use supermarket waste alone to single out and disparage lettuce in our food supply.

6. “Green leafies [are]....the chief culprit for foodborne illnesses...account[ing] for 22 percent of all food-borne illnesses from 1998-2008.

This top ranking, too, has caveats. Illnesses from leafy greens are typically less serious and lead to fewer complications than those from dairy, poultry, and other foods. Thus, in Haspel's reference, leafy greens drop to 2nd place for hospitalizations (following dairy foods), and to 5th place for deaths (following poultry, dairy, fruit-nuts, and vine-stalk vegetables such as tomatoes and peppers). During 11 years ending in 2008, the CDC attributed 278 U.S. deaths to poultry and 88 deaths to leafy greens including cabbage, spinach, and others.

Further, it is useful to know that 85 percent of illness outbreaks from leafy vegetables during 40 years ending in 2012 traced to restaurants and caterers, most often caused by an ill food worker (*Epidemiol Infect* 2015; 141:3011, www.ncbi.nlm.nih.gov/pubmed/25697407). Home-prepared, large salads stand out for both their safety and their nutrient contribution per calorie consumed.

At the end of her article, Haspel suggests that revising our view of salad from “wholesome staple” to “resource-hungry luxury” would help “rejigger our food supply to grow crops responsibly and feed people nutritiously.”

We beg to differ. Salad vegetables supply more nutrients per calorie than most other foods, and are as wholesome, responsible and resource-efficient as many other foods. But Haspel is right to criticize many restaurant salads and their excessive dressings.