No Excuses Veggies

by Judi **Morrill, Ph.D.**

While we all know that vegetables are good for us, there used to be a lot of excuses for not eating them. One was that buying them was a waste—we'd buy them with good intentions, but before we got around to eating them, they'd get limp and fuzzy and we'd have to toss them out. Another was that they were too much trouble—we'd have to wash them, peel them, cut them up.

Well, those excuses don't fly these days. In case you haven't noticed, not only are there many ready-to-eat veggies out there, but they taste better and stay fresh much longer, thanks to advances in food science and packaging.

Vegetables Breathe?!

Just like people, plants take in oxygen and release carbon dioxide when they burn fuel for their energy needs—that's called metabolism. What?! In school, we were taught that photosynthesis is plants' big thing, where they do the reverse—take in carbon dioxide and water and solar energy to make things like sugar and starch, and release oxygen. Yes, photosynthesis is plants' big thing, but even a growing plant can't do this all the time, like when it's dark.

Metabolism is plants' small thing—they use oxygen to "burn" a constant, but relatively small amount of their fuel to meet their own needs and release carbon dioxide. Because of this process, it's not always plain air in those packets of veggies. More often it's a mixture of gases that can be tailored to specific vegetables. A typical mix is carbon dioxide and/or nitrogen gas with just a bit of oxygen. After harvesting, fresh vegetables are still alive and continue taking in oxygen for their metabolism and releasing carbon dioxide. When their oxygen is cut back, their metabolism slows and they stay fresh longer.

Slowing the metabolism of vegetables and fruits means that they're slower in producing ethylene (the gas that hastens ripening—and rotting), slower in breaking down the green chlorophyll (turning leafy greens or broccoli yellow), and slower in breaking down molecules that contribute to good taste and nutrition.

On a side note, a slower metabolism translates to longer life among plants and animals. Onions have a slower metabolism—and stay fresh longer—than mushrooms. Giant tortoises have a very slow metabolism. They live much longer than us—and much, much longer than flies.

In addition, most microbes don't survive well in places where there's little oxygen. So reducing the amount of oxygen in those packets of veggies also reduces the chance that any bad microbes on the veggies will grow to amounts that can cause damage, not only to the produce, but to people, by making us sick. But oxygen isn't eliminated entirely, because some dangerous microbes—like the ones that cause botulism—thrive in an oxygen-free environment.

Pumping gases into the sealed containers also provides a physical buffer from damage—bruising a vegetable speeds its metabolism, and its decay. (Think of what potato chips would look like if they weren't sold in puffed-up bags.)

Purposely cutting or shredding vegetables is also a form of damage. But the area of damage is minimized by using sharp blades to cut them before they're packaged. Also, a reduced-oxygen atmosphere can lessen the browning (caused by oxidation) of the cut edges. In the past, sulfite preservatives were often used on cut vegetables, like chopped lettuce, to prevent the browning. (Sulfites are still used to prevent browning of foods like dried apricots.)

Plastic Bags Breathe?!

Well, not all plastic bags or wraps breathe, but those that do—and more—deserve our respect. Fresh produce continues to use oxygen and release carbon dioxide after it's sealed in a container, so carbon dioxide increases, and oxygen decreases. Too much carbon dioxide can damage vegetables and, as mentioned earlier, too little oxygen can encourage growth of certain dangerous microbes.

Plastic film helps to restore a better balance of gases by allowing some oxygen in while letting out much more carbon dioxide. (Carbon dioxide passes through plastic film faster than oxygen.) Various

films let this happen at various speeds, and films can be customized to the gas requirements of specific vegetables.

Some veggies aren't so particular. For these, films with tiny holes let gases go in and out at the same speed, and the speed can be varied by changing the number and size of the holes. The amount of moisture that passes through can also be regulated by films with or without holes. Controlling moisture (and temperature) is also important in maintaining freshness. Some plastic films are even fancier, incorporating various compounds into the film. Some prevent water from condensing on the film, to give us a clear view of the vegetables in the package. Other compounds scavenge oxygen or etylene or have antimicrobial effects. These films are called "smart films" for good reason.

Cost

Yes, ready-to-eat veggies cost more than buying them unpackaged. But if we're not going to wash and chop them ourselves, it's cheaper and faster than hiring someone else to do it.

McDonald's was one of the first to take advantage of this in a big way. They want consistent products—Big Macs that look and taste the same wherever you buy them. In the past, they could send standardized buns, patties, and condiments from central locations—but not lettuce. Lettuce had to be processed locally, meaning a lot of variation in availability, quality, appearance, sanitation, and labor costs. But these days, their lettuce can also be standardized—centrally processed and packaged to certain specifications, arriving fresh and ready-to-use at local franchises. While the increasing number of salads offered at fast-food places has something to do with wanting to offer healthier food, it actually has more to do with the availability and profitability of ready-to-eat salad fixings. Fast-food places don't have people toiling away in the back, washing and chopping lettuce for all those salads. Many high-end restaurants don't either.

Eat More Veggies

Do potatoes count? The potato is our most popular vegetable, and it does count, but we already eat too many, particularly as chips and fries. Potato is only a modest source of vitamin C, but we eat so much of it that it's a major source of vitamin C in the American diet. About 25-30% of the vegetables that preteens and teens eat are potato chips and fries. Many of us would say that those shouldn't count.

Vegetables are rich in fiber, vitamins, minerals, and other substances that can lower our risk of cancer, heart disease, constipation, and a host of other ills. A healthy diet includes a colorful array of veggies. For example, there are handy bags of bright orange ready-to-eat carrots to take to work. It's also very simple to make a gourmet salad. Sprinkle some dressing in the packet of pre-washed spring mix or baby spinach, and eat it out of the bag with chopsticks. And for a delicious and healthy treat sauteé a container of prewashed sliced mushrooms. No more excuses!

Judi Morrill, Ph.D. *teaches in the Dept. of Nutrition and Food Science at San José State University, and is the author of* ***Are You Eating Right?*** *Compare your diet to the official recommendations using the nutrient content of 5000+ foods and Science Physiology and Nutrition for the Nonscientist.*