Button, button, who's got the button?

Don Mercer
Associate Professor, Department of Food Science
University of Guelph

Walking down the coffee aisle in the grocery store, it's not uncommon to see people holding a package of ground or whole bean roast coffee up to their nose to sniff the pleasant aromas coming out of the package. I can readily understand the appeal of doing this, but my first reaction is to wonder how the smell of the coffee is escaping from the package.

To most of us, the function of a package is to keep the important positive attributes of a product inside, while protecting it from the negative effects on the outside that may lead to deterioration of quality. Being able to smell the coffee through the package just seems to run counter to this, but there are some very good reasons behind it.

After roasting, the processors want to get the coffee into a package as quickly as possible to maintain the flavour and quality. They purge the package with nitrogen gas during filling to remove any air that is present. Oxygen, which makes up one-fifth of the air around us, could react with various delicate flavour compounds and reduce the overall quality.

Metallized films are typically used for the bags in which the roast coffee is packaged. These films are made by spreading a very thin coating of a metal, such as aluminum, over a base layer of plastic film. They have great barrier properties to prevent the escape of aromatic compounds, and to prevent oxygen and water vapour from getting into the package.

A serious complicating factor is that coffee continues to release gases, such as carbon dioxide, for a period of time after it is roasted. If the package was sealed tightly immediately, pressure could build up causing the package seams to burst, or at least pop open. A simple solution to the problem would be to have a small opening in the package to prevent the build-up of pressure. Unfortunately, this would also allow air to enter the package.

Now, we see where the ingenuity of the packaging specialists shines through. By incorporating a small one-way valve into the metallized film bags, the problem can be overcome. The valve assembly looks like a small button. It allows gases to escape or "vent" from the package, but prevents outside air from entering. When you squeeze a sealed package of roast coffee, you are increasing the internal pressure, and are forcing the internal gases out through the openings in the vent. It is these gases which you smell. You may notice that the bag of coffee is not quite as puffy after you squeeze it, since you have forced some of the internal gases out of the package, and they have not been replaced.

You may have to hunt a bit for the “degassing valves” as these vents are called, but all the brands of coffee I’ve checked have them. There are actually two types of degassing valves. One is used on flexible packages, and the other is used on canned products. In 2018, there was a recall of a ground coffee product in cans that were not equipped with the degassing valve. The concern was that the built-up gas pressure inside the can could cause the metal lid to release suddenly when the consumer went to open it. Fortunately, no injuries were reported.

Once again, we see how technology can be used to deliver a high quality product in a deceptively simple package that we tend to take for granted.

This close-up photo shows the two openings in the degassing valve on a package of roast coffee.