CO2: From critical shortages to a critical role this holiday season

By **Sam A. Rushing** on Dec 24, 2018

As I move ahead with the holiday season, it is interesting to find how carbon dioxide (CO2) touches our lives even more than those times outside of the holidays.

With respect to one of the most common applications for the commodity sold on a global basis, beverage carbonation, this includes in the taverns for beer, as well as the primary use in soft drink carbonation.

The US demand for beverages is near 20% of total merchant demand, depending upon region. For the developing world, this represents more like 80% and beyond, in many cases.

When I was working in Kenya in recent years, for the region's dominant independent CO2 producer and supplier, Carbacid, it was well known that its primary market was beverage carbonation. When spending time in Nairobi, the hotel I was staying in was moving along with festive holiday parties which served soft drinks, and largely the well-known branded beverages such as Coca-Cola. This was and is a constant in such developing markets.

Critical role this Christmas

After a year in which CO2 has hit the headlines for all the wrong reasons, notably its shortage in the Europe and Mexico regions, it's a welcome reprieve to discuss CO2 in a positive light – albeit, this is still a demand-side discussion of course.

At the time of writing, I am due to attend a corporate-sponsored Christmas party later, which will be serving all forms of soft drinks, generally in cans, and served at the bar, which is consuming CO2 at the fountain, as well as in the canned and bottled products. The beer served also uses CO2 cylinders when being served.

Dinner is planned to include meat products, such as beef, pork, fish, and shrimp. The company sponsoring the party is a shrimp farming operation, using CO2 MicroBulk units to enhance photosynthesis in the algae production operation. The young shrimp feed on algae, and CO2 is critical to algae production. As for the meat, poultry and seafood products being delivered to the resort, these are sourced through distributors which, in turn, purchase from the major processors. As for the processors, CO2 is widely used in a wide range of applications.

At the front end of meat, poultry, and seafood operations, CO2 can be found as a relatively humane method of rendering the livestock unconscious for processing; this is commonly found in many pork and poultry operations, and was of course in the headlines during times of critical shortage last summer.

Once the meat and allied food products are processed down the line, the application of CO2 is commonly found in cooling and cryogenic freezing of various foodstuffs, and for bulk boxed shipped meat products. Another example for such an application is the chopping, and grinding of various meat related products (from pork, to beef, and on to poultry and fish). Further, there are uses in cooling and cryogenic freezing within various tunnel and spiral configured systems; all of which are applications for the food products being sourced for such an occasion and perhaps the more 'classic' applications for which CO2 is associated with the food business. Later, MAP applications are found along the production supply chain for various food products, some of which end up in such a dinner setting.

An extended take on CO2 in the distribution chain this festive season can be found in the trucking of food products. There is ever more biodiesel being used in this region for the trucks which move up and down the highway, and CO2 can be a component in the growth of algae, which is a component of many biodiesel blends. Further, dry ice is used to maintain temperatures of certain food and beverage products which are brought to the beach, where some of those attending the party find a comfortable place to dine and relax.

Next, is the dinner occasion itself, of course. The dinner selection includes meat, poultry, and seafood entrees, plus vegetarian options. The vegetarian options include some of the appetisers and entrees which can use CO2 in cooling and freezing these products; some of which are made in California. Then, as mentioned earlier, on the front end of the food supply chain, CO2 is used in everything from rendering the animals unconscious, to chilling, and freezing the food products, as well as packaging. I know regionally, there is significant use of CO2 in the poultry industry, including chilling and freezing.

As to the beverages served, again the soft drinks are fully dependent upon the CO2 used when serving at the fountain or the bar, as well as packaged in aluminum cans. The party serves champagne and carbonated wines, all of which are fully dependent upon the product. The spices used in the kitchens can be borne from processes which use CO2 in supercritical extraction; and temperature reduction in grinding operations.

This event is being hosted in the Florida Keys, while the largest closest city is Miami, which has *The Nutcracker* playing on stage this week. In such productions, it is common to find CO2 usage in the creation of the 'fog' effect on stage.

Throughout the city, as well as in my smaller community, holiday festivities are well underway – such festivities are taking place in private homes, resorts, restaurants, *and* on the stage. I can only imagine how much carbonated beverage demand is underway in such a sizeable city as Miami. When considering the use for beverage production and carbonation alone, this demand total is extraordinary, by far. When adding food processing to the mix too, it really is a further extraordinary demand!

The festive season – and beyond

We are reminded here of the critical role of CO2 throughout our lives, and not just at this special time of year. It is extraordinary to think of how it effects virtually every aspect of our lives, and this continues to grow.

It will become ever-more common to find CO2 sequestered in concrete, for example, which is as basic a commodity as we can find and a source of demand that can only proliferate for new concrete, pre-cast and poured product.

There are more requirements for cleaning and preparing buildings too, and a wide range of surfaces prior to holding many of these holiday events, for which CO2 blast cleaning is an integral part of the industrial cleaning market.

When sitting down for dinner, one can imagine how the product is used in the paper mills which produce paper-related products found at the diner table, and which are critical to the service and transport of various products used along the supply chain. The CO2 in paper mills is much more 'green' than sulfuric acid; not leaving behind harmful sulfates, in applications for effluent treatment.

When considering the growth of various fruits, vegetables, flowers, and bedding plants, many of which end up surrounding us or on our tables, it is common to find CO2 usage key to producing a premium crop. For example, premium tomato crops on the US west coast and Canada have used CO2 in the greenhouses, to enhance the crop on a natural level, supporting photosynthesis. Other crops including bedding plants, flowers, and other vegetables which have CO2 enhancement in greenhouse operations.

Rightly or wrongly, the use of cannabis will no doubt be on the rise during the holiday season as well, for all products including edibles, the crop which is inhaled legally via prescription, or otherwise. What has become truly extraordinary and is something on the horizon which will explode as the legalisation of cannabis continues across the US, is where CO2 can commonly be used to support and enhance the growth of the product in both indoor and outdoor settings. The use of cannabis oils, for what is claimed to be medicinal applications, is sometimes extracted in supercritical (CO2) environments. Since the crop has become widely legal and available in Canada, and is gaining traction is the US for medicinal purposes, and even for casual use, this crop will continue to result in a growth engine for CO2 from the merchant sector.

I find this phenomena for cannabis demand to be rather extraordinary; which has a tainted history. Today, this expensive crop will find more use during the holiday festivities. Through my lens, the cannabis revolution seems rather surreal; as would be what we see on the stage during *The Nutcracker* performances, and many other presentations during this time of the year, which represent other surreal events, are all cloaked in a CO2 fog.

On that note, may I extend my best wishes for the Season to you all!

About the author

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