



Food packaging for a New Age

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What a difference a few months have made in our attitude toward packaging. In 2019, the hot topic was sustainable packaging and reducing packaging waste. Last June, Prime Minister Justin Trudeau announced a ban on single-use plastics to come into effect as early as 2021. The buzz words were “circular economy” and “zero plastic waste.” Now consumers are focused on their well-being and health. The COVID-19 pandemic has changed consumers’ view on packaging. There is less concern about sustainability and more on hygienic packaging.

Rise in packaging use

Until recently, baked goods were often placed on shelves without packaging. Stores were selling bulk foods in bins. Based on the recent spread of COVID-19, these practices are changing. Food products that are not usually sold in packaging are being packaged to prevent food exposure to the virus. Disposable packaging is perceived to be more hygienic and as a result packaging use is increasing.

Interest in sterile and antiviral packaging

The COVID-19 pandemic has changed consumer attitudes and behaviours. There are concerns about viral exposure and the ability of the virus to survive on surfaces. With handling throughout the supply chain, there is concern about the presence of viable viruses on the surfaces of packaged foods. A recent study from the National Institutes of Health, CDC, UCLA and Princeton University (*The New England Journal of Medicine*) found that COVID-

19 was detected up to three hours later in aerosols, up to 24 hours later on cardboard and up to two or three days later on plastic. Can people contract the virus not only through the air but after touching contaminated objects? The FDA has stated in a release dated March 17, that, “Currently there is no evidence of food or food packaging being associated with transmission of COVID-19.” It is important to note that the virus will not grow on packaging surfaces. The virus requires a living host (i.e. people, plants or animals) to multiply.



Given the current anxiety concerning the COVID-19, the time is right for innovation in the area of antibacterial and antiviral packaging

Antimicrobial packaging

Until now, the development of antimicrobial food packaging has been focused on destroying or inhibiting the growth of bacteria and fungi that affect food safety or food quality. Antimicrobial packaging is a type of active packaging that changes the condition of the packaged food to extend shelf life or improve food safety or sensory properties of the packaged food. Antimicrobial food packaging can reduce, inhibit or retard the growth of microorganisms that may be present in the packed food or packaging material by extending the lag period and reducing the growth rate or decreasing live counts of microorganisms.

Antimicrobial packaging can take the form of sachets/pads with volatile agents, coatings on packaging surfaces and incorporation into or immobilization to polymers.

Antimicrobial substances include organic acids and their salts, enzymes, bacteriocins and miscellaneous compounds (triclosan, silver and fungicides). Antimicrobial agents act by inhibiting essential metabolic or reproductive pathways of microorganisms or by altering cell membrane/wall structure. The method of antimicrobial function is by release, absorption and immobilization. The release mechanism works by migration of the active ingredients into the food or head-space of packages such as ethanol emitters to prevent mould growth for baked goods. Sachets can also be inserted into dry food packages to absorb moisture and oxygen to create an inhospitable environment that inhibits growth of microorganisms. Active ingredients can also be immobilized into the package material to suppress the growth of microorganisms at the contact surface, such as immobilized lysozyme and glucose oxidase enzyme on polymer packaging for cheese and beef.

Currently antimicrobial materials predominantly apply to biomedical applications as opposed to food applications. There are some commercially available food packaging materials with antimicrobial activity (Zeomic, Microban® and Novaron®). There is also much research into use of different antimicrobials such as metals, chemicals, various essential oils, enzymes and bacteriocins. Only limited information or research on antiviral packaging is available for human enteric viruses and none to date on the coronavirus.

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