

Developing new ingredients for

By: Dr George Collings

There is a lot of focus in science about the potential and development of new bio-engineered ingredients and foods. The purpose is multi-faceted in hopes of creating different plants that will in some way be more resistant to pests or diseases so as to produce more and better crops.

Bio-engineering of ingredients

Many genetically modified crops are quite common and are accepted by some countries and not by others. Another option to bio-engineer a food is to produce a better quality of protein or one that is more nutritionally dense or protected. As an example, it is possible to engineer vegetable oils to have higher levels of healthful omega-3 fatty acids. Yet another option would be to produce foods that have the higher levels of nutraceuticals to prevent chronic disease and boost overall health. For instance, the potential exists to develop a purple tomato with more beneficial anthocyanins, which are antioxidants known to neutralize potentially harmful free radicals.

All of these options come from being able to adjust the genetic composition (DNA) to make something else. Certainly, to some, this process sounds exciting and doable while to others this appears to be a slippery slope hidden with many dangers. Producing healthier and more productive crops is a very laudable goal with growing world nutrition needs. Draught and other natural conditions drive science to look for alternatives to develop more options despite concerns.

Many scientists believe there are no expected interactions or complications from consuming bio-engineered foods. This might be the case, however, in several countries, there are regulatory agencies established to approve or disapprove new ingredients or crops after assessing the impact upon health, production and

environmental concerns. The oversight of many of these is similar to the oversight given with new pharmaceuticals.

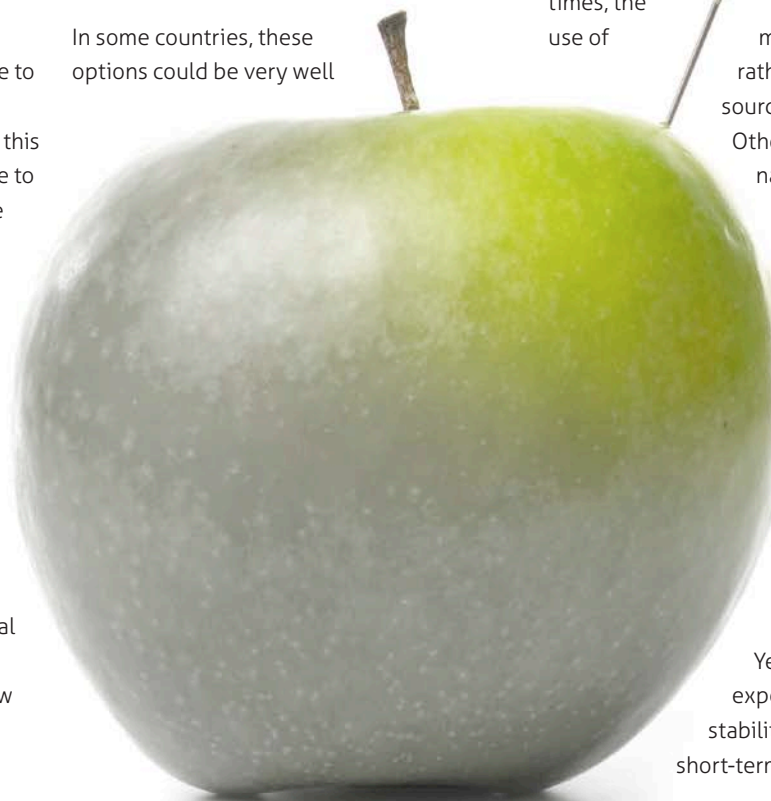
What does this have to do with the pet food industry?

The pet food industry has always been a more sensitive marketplace to the positives and negatives of ingredients. New products today are much more likely to be produced using only natural ingredients. In fact, through the years, many ingredients have been demonized for marketing reasons and with little provable science to justify the concern (corn, wheat, soybean). So, how will a genetically modified, bio-engineered ingredient be received?

In some countries, these options could be very well

received, but in the US, the consumer appears to be slow to adjust to even well-accepted ingredients. For instance, for over the last few years there have been many consumers that have complained about the use of menadione as a source of vitamin K in cat foods. While the cat requires vitamin K in the diet at times, the use of

menadione as a source rather than natural sources is not an option. Others will only want natural forms of vitamins or non-processed foods (raw). The idea of using irradiation to reduce bacteria in the final food product is also a highly divisive decision. Many consumers are quick to state the industry should go even more natural. Yet, many have never experienced life where stability of food was more short-term just forty to fifty



pet foods



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years ago. If the receptivity surrounding these recent issues is an indication, bio-engineered ingredients would be facing a potentially very sensitive consumer base in some parts of the world.

Alternatives

Bio-engineered foods might be options, but there are other ways to develop new ingredients without gene modification. Examples of this pathway are through fermentation, enzyme hydrolysis or plant extraction.

Fermentation

The concept of using beneficial or probiotic bacteria to improve immune or digestive health are well accepted, but what about using these approved organisms to produce:

- Better flavours to increase or decrease intake.
- Bacterial end products that reduce pathogen growth. Lactic acid from beneficial bacteria is a useful inhibitor of pathogens like salmonella, but many other fermentation components exist that are more effective.
- Bio-surfactants that help in cleaning production plants or even help in absorption.
- Essential amino acids (e.g. tryptophan, threonine) to help balance the more unusual food vegetable proteins that are less than balanced.
- Algal fermentation products with high levels of DHA or EPA, which are being used in cognitive and joint care conditions.
- Balanced proteins using vegetable sources that contain lower levels of

essential amino acids and are replaced with a better amino acid balance from bacteria, fungal or algal sources.

Enzymes

Enzymes are used commonly in many food processes to make a specific texture or produce a more digestible food, but what about using enzymes to produce:

- Hydrolyzed proteins to reduce the potential allergen effect of some proteins. Fish proteins have been developed that are essentially hypoallergenic.
- Flavours or intake modulators to help increase the acceptance of foods during difficult health conditions or to reduce intake by changing satiety controls.
- Biologically active peptides from milk, egg or fish that control gastrointestinal function, blood pressure or immunity.
- Increase the cook and the performance during extrusion while increasing the availability of many nutrients.

Extraction

Extraction of plant ingredients are being rapidly explored in many human health areas, but what about the potential extraction of:

- Blood, egg or milk colostrums for immunoglobulins for passive immunity and the harvesting of biological peptides for active immunity.
- Extraction of common crops and foods for use in cancer treatment as with olive leaf extract, for use in appetite control as with spinach extract or for use in preservation improvement as with rosemary extract or green tea extract.

Other unique developments that are part of this discussion include the production of specific medicinal mushrooms for viral control or immune improvement or encapsulation of nutrients to reduce the breakdown in processing or to improve the delivery for absorption. Encapsulation can also be used to protect essential fatty acids from rancidity and from harsh effects in processing. Building nutritional solutions from more natural components is something we should always be aware of. As an example, L-carnitine (which is useful in weight management), is made by one company primarily using acetic acid (the acid found in vinegar) while other companies use less than desirable components.

Opportunities

As we look ahead, there are still many exciting options to improve our pet food ingredients with or without gene manipulation of ingredients. It is always possible that global shortages of ingredients will spur the development faster. We must always press that these new options be tested well to protect our pets and their food products. ■