



Science Eyes Success with High-Tech Imagery

By Geoff Geddes, for Swine Innovation Porc

There's a lot of talk these days about enhancing the image of the pork industry in the public eye. From a science standpoint, however, it may be the use of cutting edge imagery that catches the eye of producers and plants seeking an advantage. While image might not be everything, high-tech imaging could be the next big thing for the pork industry in assessing meat and carcass quality and gathering valuable information on live animals.

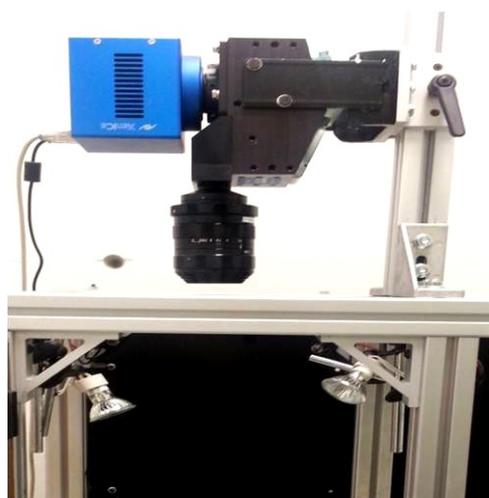
Hyperspectral imaging to assess pork quality

It may be hard to gain consensus in the pork sector, but there's one thing that producers, processors and consumers can agree upon: quality is king. Unfortunately, the current method for assessing quality in the plant is a subjective approach based on color and water holding capacity. In today's tech friendly world, "subjective" is a four letter word, as it makes consistency hard to achieve.

There is clearly a need for a reliable, objective and non-invasive option in gauging pork quality that won't compromise meat cut integrity, and filling needs is what science is all about.

In this case, researchers turned to hyperspectral imaging, which collects and processes information from across the electromagnetic spectrum. At present, this technology is finding success in grading pork quality based on standards of the National Pork Producers Council (NPPC).

Of course, any discussion of quality must include marbling, so scientists turned their focus to fat measurement. Since current practice for gauging marbling levels involves comparing a



*Line-scan hyperspectral imaging system .
Photo: Canadian Centre for Swine Improvement (CCSI)*

chart to a given pork sample, hyperspectral imaging was again used successfully to remove the subjective aspect from prediction of marbling scores.

By allowing industry to designate certain products for certain markets – such as the more marbled cuts to Japan – this imaging approach could be a game changer in maximizing revenue for a sector where profit is often hard to come by.

Those profits may be further enhanced by recent work on a marbling meter. Because it can measure marbling scores for loins without cutting them, the meter could allow industry to earn full value for those loins rather than degrading them. Perhaps of equal importance, this “made in Canada” solution is the first of its kind in the world. Combine that with excellent research here at home on hyperspectral imaging, and it might be grounds for doing something un-Canadian: blowing our own horn.

For more information, contact Dr. Michael Ngadi, McGill University at michael.ngadi@mcgill.ca.

3-D technology

In large part, success with pork production is about the 3 P's: profit, profit and profit. Of course, profit is closely tied to carcass quality, so measuring that quality quickly and accurately is essential to farmer livelihoods; that's where 3-D technology comes in.

Deriving maximum revenue from a carcass depends on a reliable grading system. As it turns out, the system in Canada is flawed in measuring carcass composition, as it focuses on the amount of fat and lean on a carcass rather than where that fat and lean is located. That's a problem, as value is linked to location, and leanness in one area like the shoulder produces a different value than leanness in the ham or loin.

For a solution, scientists tapped 3-D imaging, and they liked what they saw. Not only were they able to measure lean and fat distribution – and thus value - more precisely with a 3-D system, but they could also sort and assess carcasses more efficiently. The latter point is significant for plants, offering them guidance in how

best to cut a particular carcass to maximize the revenue it generates.

As well, the 3-D approach could help geneticists identify animals with the most genetic value and aid nutritionists in crafting swine diets around carcass quality.

Researchers are now seeking funding to develop an automatic 3-D scanner that would speed the process and give staff instant data on carcass value and how to maximize it. If 3-D can help drive the 3 P's in an often cash-strapped industry, it's like money in the bank for the pork sector.

For more information, contact Dr. Candido Pomar, Agriculture and Agri-Food Canada (AAFC), at: candido.pomar@agr.gc.ca.



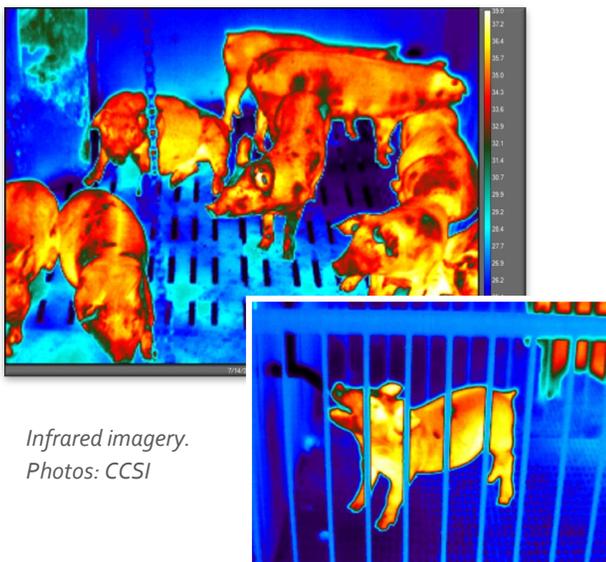
Portable 3D scanner and carcass 3D models. Photos: AAFC

Infrared imaging to detect disease

While getting pigs to smile for a picture can be a challenge, taking that shot is still worth the trouble if you do it with a thermographic camera. This technology – which uses infrared radiation to form an image – has been used to gather vital information on beef cattle, so science is exploring the potential applications in the pork industry.

One such use is early disease detection based on measuring heat loss with the device, which would allow for prompter treatment and less chance of disease transmission to pen-mates. Since pigs are intensively housed, researchers sought to save time and effort for producers by gauging if one camera could take a group shot of a pen rather than each animal individually. When this proved successful, they asked a classic question of science: “What else can we do with this technology?”

As it turns out, the answer is “a lot”.



Infrared imagery.
Photos: CCSI

If there's one thing that causes more sleepless nights for producers than disease, it is feed costs. Training an infrared camera on an automatic feeder will gauge the internal temperature of each animal as they enter. Since a drop in a pig's radiated temperature means a lower metabolism, which equates to greater feed efficiency, the camera can single out highly efficient animals. This could make the genetic selection process for that trait faster and cheaper.

Meanwhile, producers would custom feed based on this data and target their resources to the most efficient animals. Clearly, infrared technology could have multiple benefits, and, used properly, it may turn even the most camera-shy pig into a picture of health.

For more information, contact Dr. Nigel Cook, Government of Alberta Agriculture and Forestry at nigel.cook@gov.ab.ca.

Whether it's gauging carcass quality or detecting disease, cutting edge imaging may well mean a competitive edge for producers both at home and abroad. ☺

For further reading....

The research activities presented in this article were part a larger national project titled *Use of novel technologies to optimize pig performance, welfare and carcass value*.

You may find additional resources related to the project by consulting our website:

swineinnovationporc.ca/research-technology

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