Move Over Multi-Vitamins and Supplements: Here Comes Carnosine

By Geoff Geddes, for Swine Innovation Porc

Did your mother ever tell you to eat all your carnosine before you left the table? Unless she was a scientist ahead of her time, probably not, but current research on the benefits of carnosine for pork and people suggests it might be a good idea moving forward.

Carnosine, a molecule made up of two amino acids (β-alanine and L-histidine), is naturally produced in the body. It is mainly concentrated in the skeletal muscles and brain, and is also found in the heart and other tissues.

Generating interest

"I first became interested in carnosine 15 years ago when I saw its potential to improve meat quality," said Dr. Claude Gariépy, meat scientist at the Food Research and Development Centre with Agriculture and Agri-Food Canada (AAFC). ''It was already known that carnosine was an anti-oxidant that could also reduce the effects of acidity in the muscles due to its buffering capacity, but recently it has been reported to do much more.''

That ''more'' includes improving muscle contraction efficiency and reducing muscle fatigue, and research on carnosine has exploded over the last ten years. Its ability to neutralize different reactive species involved in chronic disease has positioned it as a remarkable anti-aging compound with therapeutic potential on many fronts, such as in Alzheimer's and Parkinson's and reducing diabetes complications.

A healthy outlook

While all of this information is quite recent and lacks much human clinical study, there is a large body of evidence to support the claims. Because carnosine is found only in meat, poultry and some fish and is passed along to meat and fish eaters, increasing its quantity in pork could mean better health for consumers and pigs alike.

Clearly, carnosine bears a closer look, prompting a recent research project that was a joint effort of Agriculture & Agri-food Canada (AAFC) and the Canadian Centre for Swine Improvement (CCSI). The CCSI's Chief Executive Officer, Brian Sullivan, was a co-leader on the project and instrumental in obtaining matching funds from Swine Innovation Porc. Sullivan also created a steering committee to gather input for the research and share some of the results with industry.

Dr. Ellen Goddard, an agricultural economist at the University of Alberta, was part of the steering committee and also conducted surveys and focus groups to understand how consumers might react to the idea of carnosine-enhanced pork. Her results suggest that, given greater familiarity with carnosine, Canadian consumers would purchase more pork if it was identified as having enhanced carnosine levels, similar to studies on consumer interest in other functional foods.

"In this study, we looked at three different pig breeds: Duroc, Landrace and Yorkshire," said Marie-France Palin, research scientist - animal genomics with AAFC.

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"We found Duroc pigs had a higher level of carnosine in their muscles than the other two. This variability suggests that the pig's genetic background may be a factor in regulating muscle carnosine content. Most importantly, we saw the effects of high muscle carnosine levels in improving meat color and water holding capacity. It caused pork to lose less water when cooking or thawing it and led to better meat quality."

Digesting the results

In conjunction with the genetics project, Claude Gariépy's team also examined in vitro digestion of carnosine and observed the roles that molecules play at this level regarding consumer health; further research is underway.

Though more work must be done, researchers on this project were amazed at the power of carnosine and excited by its potential.

Gene shopping

"If we can genetically select for pigs with more carnosine in their muscles, we could boost pork quality and potentially develop a niche market, where carnosine would be promoted for its health attributes," said Dr. Palin.

"The idea is to provide a natural source of carnosine. Supplements usually contain 500 mg per caplet, whereas pigs present about 200 to 400 mg per 100 grams of meat, with the potential to be increased. Getting that message to consumers could go a long way to boosting pork market share."

Based on the findings so far, parents could soon be urging kids to finish their carnosine-rich pork. That's somehow fitting, because if carnosine lives up to its promise of enhancing both pork quality and human health, producers and consumers may just have their cake and eat it too.

Learn more...

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This research was part a larger national project titled *Increasing Canadian pork consumption, market share and competitiveness through enhanced nutritional values and overall quality with a functional molecule in pork meat* . You may find additional resources related to the project by consulting our website:

www.swineinnovationporc.ca/research-pork-quality

The work presented in this article was part of Swine Innovation Porc's Swine Cluster 2: Driving Results Through Innovation research program. Funding was provided by Agriculture and Agri-Food Canada's AgriInnovation Program, provincial producer organizations and industry partners.