



Felicitas Esnart
Mukumbo
2015 AWARD Fellow

Position	PhD Student
Institution	University of Fort Hare
Country	Zambia
MSc	Agriculture, University of Fort Hare, 2014
Mentor	Professor Patrick Julius Masika, Principal, Fort Cox College of Agriculture and Forestry
Research Area	Assessment of the effect of low-cost, non-conventional feed sources on pig growth performance, health, pork nutritional composition, and meat quality.



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Felicitas Esnart Mukumbo was born in Ndola, a mining town in Zambia, where her father was a miner. Her father enrolled in Bible school in Wales when she was eight months old and the family spent the next seven years there.

Mukumbo was interested in companion animals when she was young and planned to study veterinary medicine. “My father’s interest in farming—he started a small farm after I finished secondary school—made me realize that farms also have animals and there was such potential to contribute to economic development through livestock farming,” she says. “I would never have thought of going into agriculture if not for this.”

Her love for animals and the outdoors prompted Mukumbo to register for animal science at university. After graduating she kept herself busy on the family farm. During this same time, she attended a workshop on behalf of her aunt, where she learned about multipurpose medicinal plants that can be used to improve human nutrition and can grow in the tropics, but are underused. “I learned that these plants could also be used to feed animals, but not much research had been done on this,” she states. “This inspired me to study their use as animal feed.”

Mukumbo was awarded a scholarship by the Canon Collins Legal and Educational Trust to do this research at master’s level at the University of Fort Hare in South Africa.

She studied whether the multipurpose medicinal plant *Moringa oleifera* was a suitable pig feed and whether it could improve meat quality and nutritional composition. The possible limitation with the plant is that it has some anti-nutritional factors such as tannins, which have the

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AWARD is a career-development program that equips top women agricultural scientists across sub-Saharan Africa to accelerate agricultural gains by strengthening their research and leadership skills through tailored fellowships. AWARD is a catalyst for innovations with high potential to contribute to the prosperity and well-being of African smallholder farmers, most of whom are women.

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potential to bind nutrients in the feed so that they may become less available to the animal. This would make the animals eat more feed, which would not be cost-effective.

"I found that the acceptable levels of inclusion of Moringa in pig feed were 2.5 to 5 percent of the feed given," says Mukumbo. "These levels also improved the shelf life of the meat, maintaining the color for a longer time. I therefore concluded that Moringa is a good supplement for pigs." Mukumbo has published a paper on this study in the South African Journal of Animal Science.

This study prompted Mukumbo to begin thinking about a career in agricultural research and development, concentrating on using multipurpose plants to lower the cost of animal feed, which constitutes a major constraint to starting a small enterprise; and to explore the use of this multipurpose plant in meat processing. Her master's supervisor encouraged her to continue with her studies so she could continue to look for less expensive alternatives that provide the same nutrients.

Mukumbo obtained a scholarship from the National Research Foundation of South Africa for her doctoral studies at the University of Fort Hare. She is currently working on expanding the nutrition study by looking at other properties of Moringa and how they can improve productivity and lower feed costs.

Specifically, Mukumbo is looking at the natural antibiotic and antioxidant properties because of current restrictions on using chemical antibiotic growth promoters and synthetic antioxidants. She is also studying the effect of adding Moringa directly to pork products by making an extract to add during processing to make the meat more nutritional and prolong the shelf life by preventing oxidation.

"I expect the AWARD Fellowship to help guide me to make my research more relevant to the practical challenges being faced in livestock production on the continent," says Mukumbo. "This will help me achieve my goal of going into commercial pig farming using affordable, locally available feeds, and to help make pig farming more profitable for small-scale farmers through lowered feed costs."