

Phytomedicine – fighting parasites for healthier animals and people

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Preparing dilutions of plant extracts

Phytomedicine is an area of pharmacology in which plant materials are used for both preventive and therapeutic treatments.

With the increasing resistance of parasites and micro-organisms to commercially available anti-parasitic and antimicrobial drugs (for more on antimicrobial resistance [click here](#)), the need to find treatments that improve animal and human health directly, and improve food security indirectly, is becoming an essential area of research. Prof Lyndy McGaw, Programme Leader of the Phytomedicine Programme at the Department of Paraclinical Sciences in the Faculty of Veterinary Science, explains the necessity of developing alternative treatments for the potentially devastating effects of diseases caused by parasites. Considering that up to 25% of prescription medication is derived from plants, it seems an obvious pursuit to develop medicines made up predominantly of plant-based products.

The Phytomedicine Programme at the University of Pretoria started in 1995 and has developed to such a degree that in 2007, it was designated as a National Research Foundation (NRF) Developed Research Niche Area. In 2012, Prof Kobus Eloff, founder of the Programme and its leader at the time, received the National Science and Technology Forum award for research capacity development from the Minister of Science and Technology. The Programme has produced as many as 200 publications and close to 70 MSc and PhD graduates from across Africa and Europe. Several patents and two products on the market have also come out of the UP Phytomedicine laboratory. It has a very large research group, with an annual complement of more than 20 postgraduate students.

The Programme attracts researchers from a variety of backgrounds and disciplines, from across Africa and Europe, resulting in a pool of considerable knowledge and expertise. The Programme's research team is

largely made up of botanists, veterinarians and microbiologists. One might think that such diversity results in too wide an area of research focus, but being situated on the Faculty of Veterinary Science's campus gives researchers a clear focus on ethno-veterinary study areas, looking into plants that can be used in animal health.

The aims of the Programme are to find anti-parasitic, anti-fungal and antibacterial properties in plants, and also to investigate other uses of plants in coping with disease – for example, stimulating the immune system of animals. With the continuous increase in zoonotic diseases, the Programme's research does not merely focus on animal health, but also looks at human health, thereby upholding the fundamental ethos of the Faculty's [One Health](#) drive.

When selecting plants to research, McGaw explains, the researchers use not only traditional knowledge, but also a chemo-taxonomic approach, which entails looking at the chemistry of the plant families. If a plant shows promising active properties, one would look to other plants of that same family. This approach is based on the premise that related species would have related chemicals, with only slight modifications. These modifications might have greater activity and less toxicity.

While the process of removing the bulky, inactive compounds from a plant can be arduous, McGaw says that there are some very promising plant extracts that the postgraduate students are working on. Several of the plants tested are showing synergistic effects between their components; in other words, these components are working together to increase their medical efficacy. With such promise, McGaw is positive that the Programme will soon achieve its objective of developing more products for the public.

The Phytomedicine Programme is driven to do more than just publish internationally acclaimed papers, and is inspired to improve the lives of rural communities and industry alike. Building on the foundation laid by Prof Eloff, McGaw emphasises that they want to continue to produce marketable products. A fundamental component of their research is to develop low-cost products that are of value and service to the communities who need them most.

Apart from the previously mentioned issue of antimicrobial resistance, phytomedicine products would be much cheaper to produce than purified pharmaceutical compounds; thus, the incentives for such products are great. Understanding prominent animal diseases, such as those caused by helminths or other parasites that have a growing resistance to orthodox medicines, is a major component of the Programme's work.

The Programme is in the fortunate position that once research in the laboratory has developed to the point where it shows promise, the researchers are able to test their products in the field, specifically in the Bushbuckridge area of Mpumalanga. The Faculty of Veterinary Science has a long-standing relationship with the [Mnisi Community](#). The Faculty is committed to improving the health and welfare of this

community and its livestock. The Phytomedicine Programme appreciates the opportunity to contribute positively to this area.

McGaw says she is very excited for the future of the Phytomedicine Programme and looks forward to further collaboration across the University's faculties and departments. With fundamental objectives that include creating products that will improve the lives of rural farmers and their animals, the Phytomedicine Programme is on its way to making a significant difference for the South African public.

- Author Louise de Bruin