

Spotlight on Agriculture

Ministry of Agriculture, Water and Rural Development • Directorate of Agricultural Research and Training • Private Bag 13184 • Windhoek

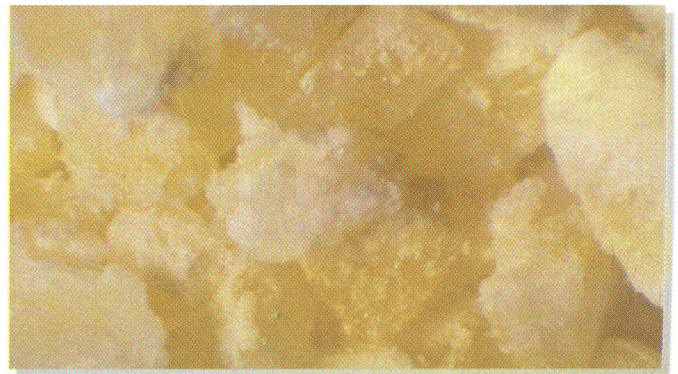
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Feed Microscopy

'AN ACT IS ONLY AS GOOD AS ITS POLICING'

When ruminant by-products were prohibited in ruminant feeds (Act 36 of 1947), it was hoped that farmers would stop using meat-and-bone meal, bone meal, carcass meal and blood meal in ruminant nutrition. However, it could not be monitored.

During the year 2000, the Ministry of Agriculture, Water and Rural Development had staff trained as Feed Microscopists. This enabled the Ministry to do more than only policing the Farm Feed Act, in fact, it opened up an entire spectrum of new services.



Yellow maize (stereo)

SCOPE

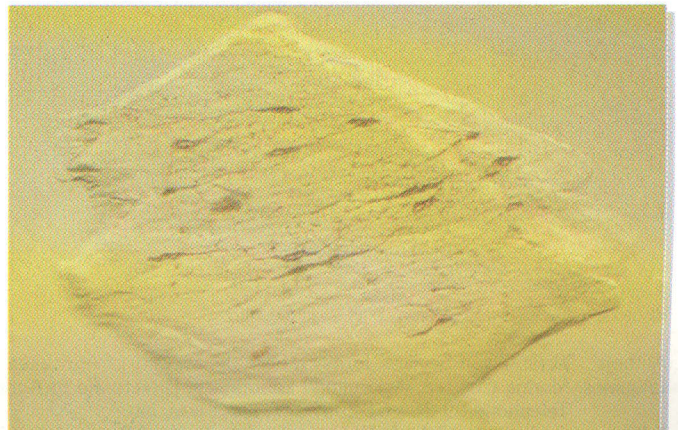
Feed Microscopy is a somewhat subjective, but very reliable method of feed analysis. Microscopy is used to determine the quality (which ingredients are present) and/or the quantity in which raw materials were mixed.

Manufacturers, farmers, consumers and law enforcement are interested alike by this service of feed microscopy. Some want to know more about the quality of raw materials purchased, others want to know the physical composition of the feed and yet others are interested in the presence, or absence, of specific substances. The experienced microscopist is able to approximate the quantity of all ingredients to within 5% accuracy.

Feed microscopy often involves forensic work. Sometimes it is necessary to distinguish between contamination and adulteration. Often ingredients are smelled before they are identified. Seal-carcass meal has a characteristic smell, leading the microscopist to look particularly for the presence thereof.



Yellow maize (stereo)



Fish bone (100x)

Certain substances (antibiotics, trace minerals, growth promoters, sugars) are determined by so-called chemical spot checks. Here, a drop of specific chemicals is added to the suspected feed particle, where after the reaction is evaluated under the microscope.

CONTAMINATION is the accidental presence of a certain substance in a feed. For example, when a dead mouse is found in a bag of feed, it was most likely not deliberately left in the bag.

ADULTERATION is the deliberate addition of an unwanted substance to a feed. Usually this is done to improve the chemical composition of a poor raw material or to get rid of toxic waste. Examples are: Fish meal with low protein content being enriched with feather meal; Dioxin (a toxic waste product "dumped" cheaply in feeds!) being mixed illegally into a feed.

Most often chemical and microscopical analyses complement each other. The adulterated fish meal, for example, looks fine chemically speaking, but the microscope can reveal the true picture. Quantification of ingredients is simplified when the chemical composition has been determined.

BSE SURVEILLANCE PROGRAM

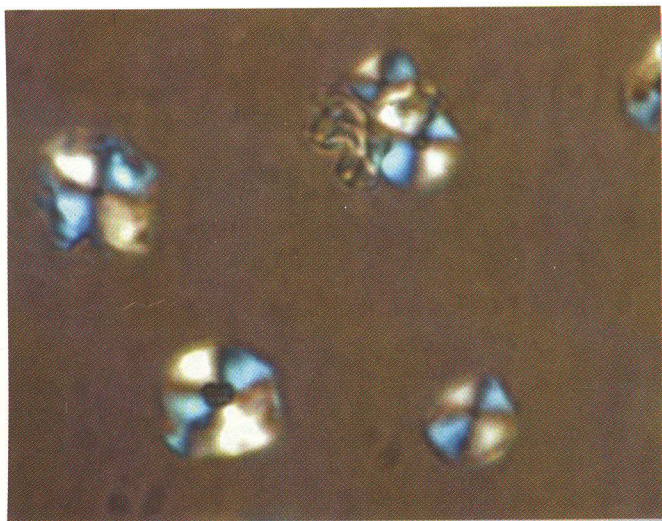
The Directorate of Veterinary Services is responsible for monitoring the BSE ('Mad Cow Disease') situation. Part of the surveillance is to police the Ban on Ruminant By-Products. Inspectors from the Ministry are instructed to take samples, at random, from farms, manufacturers and feed traders. Samples are collected from bags, feeding troughs or storage facilities.

The samples are then tested in the microscopy lab for the presence of meat, blood, bones, hair, feather or scales. If any of these are present, the microscopist determines from which group of animals these products originate. From the structure of bones, one can easily distinguish between bones from mammals, birds or fish.

Any person using illegal substances in feeds will be prosecuted and be held legally responsible.

EQUIPMENT USED

Two types of microscopes are used in the microscopy lab. The stereo microscope is like a strong magnifying lens and typically ranges from 5 to 40 x magnification. For a higher resolution, a compound microscope is needed. This allows for the distinction between species by their bone structure.



Yellow maize (stereo)



Mixture of 1:5:94 salt, CuSO₄ and P18 (stereo)

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