



## **Red Clover - An alternative to antibiotic growth promoters?**

*By John McGregor, MFGA Extension Support*

Food has always been used to overcome illness and improve health. Human nutritionists have recently started calling foods with medicinal value functional foods. Michael Flythe, a microbiologist and Glen Aiken, a research animal scientist with the USDA-ARS Forage-Animal Production Research Unit in Lexington, Kentucky borrowed that idea to look for a functional feed, a plant, or a plant-based product, which could be used to achieve the same benefit as antibiotic growth promoter.

Cattle often receive drugs at different stages of production. Vaccines and anthelmintics are given to young calves, while steroid implants and antibiotics are typically used in backgrounding and finishing.

These drugs have revolutionized modern production systems, but they have been criticized and increasingly regulated. The use of antibiotics for growth promotion has been especially criticized because of contributions to antibiotic resistance in bacteria, so other ways need to be found.

Growth promoters that contain antibiotics are referred to as antimicrobial growth promoters. Their role is to kill the rumen bacteria that convert most of the feed amino acids into ammonia. They are called the hyper ammonia-producing bacteria (HAB). Antimicrobial growth promoters kill HAB, which increases bypass protein, feed efficiency and weight gain.

Clovers are rich in protein and can be used to meet the protein requirements of ruminants. Clovers, like many members of the legume family, also make a class of chemical compounds called isoflavones. For this reason they decided to look at red clover as a functional food.

When the compounds in red clover were extracted and tested against rumen HAB it was found that the extract could prevent the growth and ammonia production by the HAB. Once it was further screened, the compound that prevented the growth of HAB was identified as an isoflavone called biochanin A. Biochanin A was then fed in trials as red clover at an equivalent rate of approximately one-third the diet. Although the results haven't been reported in a scientific journal the results are promising in showing improved average daily gains.

Based on this early work, there are reasons to believe that the isoflavones in clover improve utilization of the protein and promote weight gain by influencing rumen bacteria

in a manner similar to antibiotic growth promoters. Clearly, more research is needed on the biologically active chemicals made by forage legumes as well as how to best utilize them as functional feed. However, the results with red clover isoflavones indicate that a new tool for cattlemen might come from forage we had all along.

**Word of caution:** Isoflavones are estrogenic, which means they have to be used carefully. For example, different feeding levels might be recommended for back grounding and finishing beef versus pre-weaning. There are also special considerations for sheep, which are believed to be particularly sensitive to reproductive effects of plant estrogens.

For more on this topic go to the Progress Cattleman link at:<http://www.progressivecattle.com/topics/range-pasture/7215-red-clover-an-alternative-to-antibiotic-growth-promoters>