
# FACULTY OF APPLIED SCIENCES

## DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

## PROJECT TITLE

**In ration (or feed) formulation using by-products of the brewing industry as feed ingredients**

**By**

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# Abstract

In ration or feed formulation was done using three by-products of the brewing industry as feed ingredients. The three feed ingredients used were dried spent grains, malt dust and dried spent yeast. All three feed ingredients were obtained from National Breweries in Bulawayo. Prior to feed formulation, all three feed ingredients were quantitatively assayed for the following nutrients: % crude protein, % moisture, % crude fibre, % fat, % ash, % carbohydrates, % total digestible nutrients and metabolizable energy (MJ/Kg). Spent grains had the highest crude fibre content at 17.9 % compared to 3.8 % and 0.0 % for malt dust and dried spent yeast respectively. This made spent grains the fibre source for the feed formulations. With crude protein content of 38.4 % dried spent yeast was the ultimate protein source whilst malt dust was the main energy source with metabolizable energy of 13.5 MJ/Kg. Feed formulations were done using the three feed ingredients by mathematical calculation using the trial-and-error method with respect to the following nutrients: crude protein, metabolizable energy and crude fibre. Feeds judged to be satisfactory by comparing nutrient targets to the feed formulation were formulated for the following: broilers, layers, pigs, rabbits, sheep and ostriches. The feed formulations for beef cattle, dairy cattle and goats had to be redone as the fibre content of the formulated feeds was too low. Re-formulations for the beef cattle, dairy cattle and goats were done using by-products of the brewing industry and roughage sources, which were not by-products of a brewing industry. It was concluded that brewing by-products made very good feed ingredients as they managed to meet the nutritional requirements of most of the feeds formulated. In ration formulation allowed for more feeds to be formulated for many different animals than is possible by use of a single by-product.