# The Characteristics of Phytase Enzyme from Beef Cattle Rumen Liquor Obtained from Abattoir

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## ABSTRACT

The aim of this experiment is to utilize the liquor of rumen cattle from abattoir as feed additive, as source of phytase enzyme, to increase the quality of broiler ration based on local feed materials. This experiment was conducted in two stages. First stage was to identify enzymes in rumen liquor of cattle. The second stage was to characterize and stabilize enzyme which include determination of optimum temperature and pH of enzyme, examination enzyme resistance to heating at optimum temperature, and studying effect of metal ions and chemical substances. The results of the experiment show 1) optimum precipitation of rumen liquor enzymes from local cattle is reached at the concentration level of 60 % of ammonium sulphate, meanwhile from imported cattle is obtained at the level of 70 % of ammonium sulphate; 2) general characteristics of phytase enzyme from rumen liquor of local cattle differs from that of imported cattle; those from the rumen liquor of local cattle has optimum temperature at 50 °C, optimum pH at 6, resistance to heating up to 180 minutes at optimum temperature, and needs mostly methal ions as activator; on the other hand, the enzyme from the rumen liquor of imported cattle has optimum temperature at 39 °C, optimum pH at 6, resistance to heating up to 180 minutes at optimum temperature; the phytase enzyme needs mostly methal ions as activator, some compounds inhibiting the enzyme activity are EDTA and β-mercaptoethanol; and 3) activity of the phytase enzyme from the rumen liquor of local cattle is higher than that of imported cattle.

*Key words: phytase enzymes, local and imported cattle, rumen liquor, abattoir*

## INTRODUCTION

The experiment of rumen cattle liquor utilization as poultry feed in solid material still limited, however, the liquor of rumen cattle is never utilized as feed additive and feed supplement in poultry ration based on local feed. Based on Statistical Data of Animal Husbandry 2007, the numbers of slaughtered cattle every year are not less than 1.75 million heads and it is about 1.5 million heads come from local cattle with average of 300 kg and the rest is from imported cattle. The weight of rumen content is about 14.3 percent from body weight (Hungate, 1968), and a cattle can produce 42.9 kg of rumen content. Thus, the potency of rumen content from slaughtered cattle can reach 75.075 thousand tons per year. The liquor portion of rumen content reaches 31 liters per head (Priego *et al*., 1977), so that, the potency of rumen liquor reach 52.7 million litre per year. Huge amount of rumen liquor will become a potential pollutant for the environment if there is no good management in utilization.

This experiment was conducted with the objective to utilize the cattle rumen liquor from abattoir as feed additive, source of phytase enzyme, to increase the quality of broiler ration based on local feed materials. The experiment studying phytase enzyme from rumen liquor may have benefit as feed additive to increase the nutrient digestibility and the value of low quality local feed in increasing the productivity of poultry.

## MATERIALS AND METHODS

### Rumen enzyme preparation

Rumen content from local and imported cattle were taken from cattle slaughtered from the abattoir in Bogor. Sampling of rumen content from local and imported cattle was taken in two replications and each was taken from 3 – 5 cattles.