

1. Introduction

Efficient poultry production depends on knowing exactly the feed quality. Protein is an important portion of the diet, enough of which must be provided for poultry, quantitatively and qualitatively. Quality of protein depends firstly on feed amino acid (AA) contents, secondly on amount digested and thirdly on amount utilised by body tissues. While AA digestibility is defined as the difference between the amounts of AA provided from the diet and voided in ileal digesta or in faeces, divided by the amount provided from the diet, bioavailability of AA is a function of the two processes of digestion and utilisation of AA by body tissues. The bioavailability of AA is obtained directly by growth assays or indirectly from estimates of digestibility. Recognition that growth assays are time-consuming, expensive and relatively imprecise has led to increasing reliance on digestibility measurements. Describing the protein in feed ingredients in terms of their digestible AAs, although perhaps not ideal, is clearly closer than total AAs in reflecting the amount that actually becomes available for maintenance and production purposes (Low, 1982; Parsons, 1986; Johnson, 1992; Siriwan *et al.*, 1993; Sohn *et al.*, 1994; Dalibard and Paillard, 1995; Adeola *et al.*, 1997; Ravindran and Bryden, 1999; Sauer *et al.*, 2000).

Therefore accurate diet formulation requires information on digestible rather than total AA contents of dietary ingredients. Formulation of poultry diets based on digestible AA values provides the feed formulator with a cost effective way of meeting the bird's AA requirements whilst improving the overall efficiency of protein use. This helps to ensure minimal nitrogen (N) pollution of the environment, provide opportunity to substitute routine feedstuffs with locally grown feed ingredients correctly and reduce the competition between foods and feedstuffs (Douglas *et al.*, 1997; Douglas and Parsons, 1999; Ravindran and Bryden, 1999; Ishibashi and Yonemochi, 2002; Ishibashi and Yonemochi, 2003; Campbell and Golian, 2004; Papesova *et al.*, 2005). In order to generate meaningful digestibility values, the method of determination needs to be standardised.

Standardisation of methods for studies with laying hens was the objective of the present studies.

2. Current State of Knowledge – Literature Review

The present chapter introduces the different AA digestibility measurements and correction methods by considering the terminology improved during these studies. The advantages and disadvantages of them will be discussed and finally the references that studied these factors will be mentioned briefly. When these methods are studied, the different stages of digestibility, absorption and metabolism of ingested protein in animals as shown in Figure 1-1 are considered.

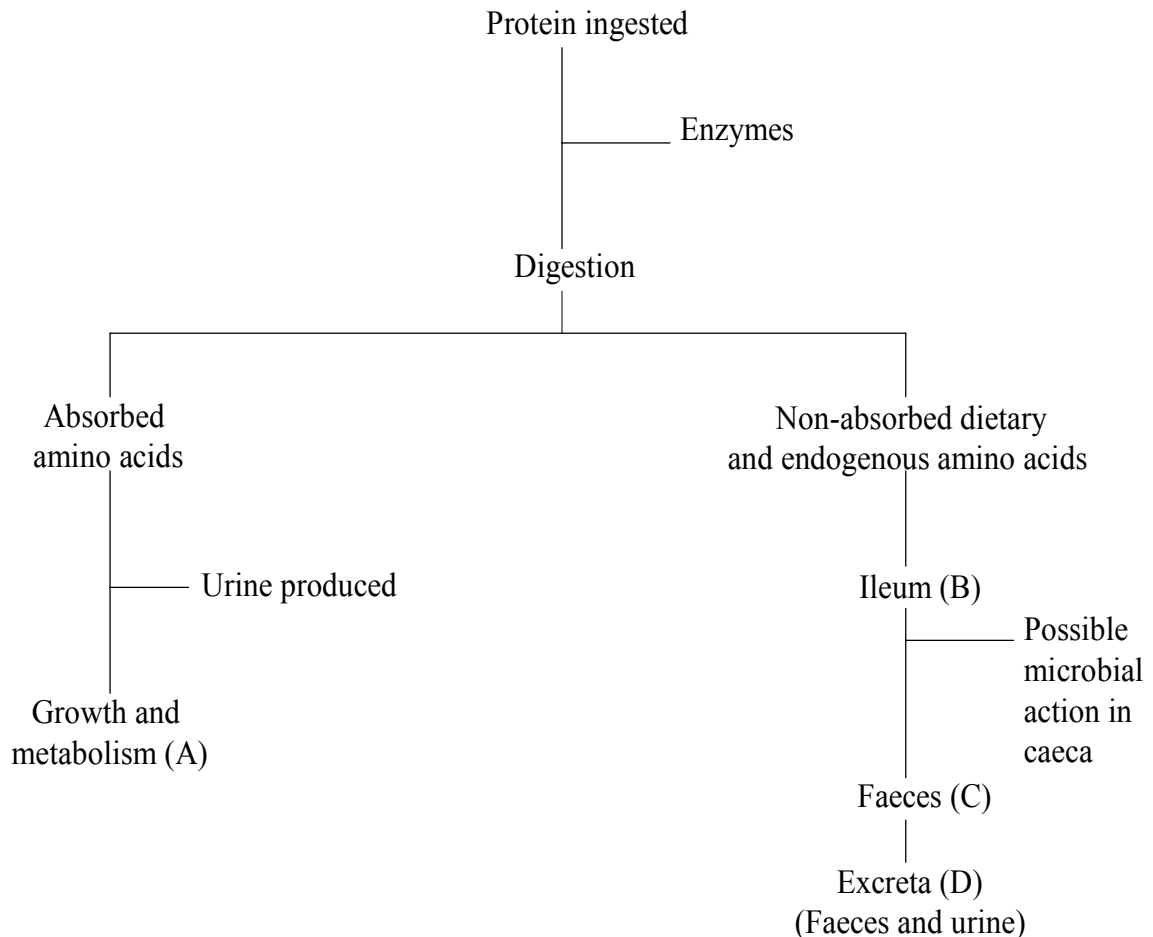


Figure 1-1. Schematic diagram of measurements of AA availability (A), precaecal AA digestibility (B), faecal AA digestibility (C) and excreta AA digestibility (D) (Johnson, 1992)