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## Effect of Crude Papain Extract Added in Mash and Pellet Form of Diets on Digestibility of Broiler Chickens

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### Abstract

This study is a part in assessing the role of crude papain, in poultry feed, produced from papaya plants as a natural resources that are widely available in the humid tropics regions as well as in Indonesia. This study was conducted to evaluate the effect of crude papain extract adding in two physical forms of diets on digestibility of broiler chicken. Ninety-six male broiler chickens were randomly divided in eight treatments combination using the completely randomized design in 4 X 2 factorial arrangements with three replications, each consisted of four chickens. The factors were physical form of ration (mash and pellet) and crude papain extract level (0, 0.03, 0.05, and 0.07% of diets). The variables measurement were apparent digestibility of dry matter, protein, and energy metabolizable corrected by nitrogen balance (AMEn). An interaction ( $P < 0.05$ ) was observed on dry matter digestibility, but no interaction ( $P > 0.05$ ) found on protein digestibility or on apparent energy metabolizable corrected by nitrogen balance (AMEn). The digestibility of the chickens fed diet adding with 0.05% of crude papain extract in mash form was higher than in the pellet form.

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## 1. Introduction

In many regions, it is common that the harvest of papaya fruits is abundant while the price become low even an important part of the harvest is unsold. To encourage the efforts of profit improvement value of this tropical plant production then it is required various efforts by applying diversification of papaya fruits function both for food and for others utilization. The empowerment of papaya latex in animal nutrition could be contributed to these efforts. Papaya latex synthesized by papaya plant (*Carica papaya*) that has dried into powder form is also called crude extract papain or proteases (Li et al., 2010; Nitsawang et al., 2006) has long been known as a meat tenderizer (Ionescu et al., 2008). Other usages in beer chill-proofing applications, leather and textiles has been reported by Chaiwut et al., (2009). Despite being highly utilized worldwide for its nutritional qualities, the effect of crude extract papain adding in several physical forms of ration on digestibility of broiler chickens has been poorly investigated. Fitasari (2012) has applied the crude extract papain in broiler diets to evaluate the size and height of ileum cells and also to observe external performances of these experimental animals. The study of crude papain in animal nutrition is interesting to be associated with the physical form of feed in the hope that papain can improve the digestibility. This point is in line with the report of Zang et al. (2009) particle size and feed form is an important factor that effect the results of the animal nutrition process, even though the balance of nutrients and energy value of the diets is absolute needed to assure the external performance development of chicken (Houndonougbo et al., 2009). To maintain the balance of nutrients in animal feed ingredient, NRP (1984) could be used as a reference for the nutrient requirement of poultry. In addition research report from Plumstead et al. (2007) showed that dietary metabolizable energy and protein strongly influenced in amino acids dietary for broiler growth.

## 2. Material and Method

### 2.1. Experimental Design

Ninety-six male broiler chickens, starting from 35 until 42 days old, were housed in 24 pens (four chickens in 1 pen) with a dimension of 70\*70\*75 cm. All pens were equipped with feeders and drinkers. The chicken were randomly divided in eight treatments combination using the completely randomized design in 4 X 2 factorial arrangement of 8 treatments with three replications. The factors were physical form of ration: mash (M) and pellet (P) and crude papain extract (CEP) level (0, 0.03, 0.05, 0.07% of ration). Feed and water were supplied ad libitum. The variables measurement were consumption of dry matter, crude protein, and energy value, apparent digestibility of dry matter, crude protein, and energy value. The rations were formulated as shown in Table 1 and the rations were added with crude papain extract (CEP) according to the level of treatments, excepted in the control (CEP 0.00%).

Table 1. Nutrient values in each treatment.

Treatment**	DM	OM	CP	Nutrient values*		EM	Ca	P
				CF	L			
	----- % -----			----- % -----		Kcal/kg	----- % -----	
<b>Mash</b>								
CEP 0.00	84.6	94.8	17.0	4.01	5.22	2899	0.70	0.89
CEP 0.03	84.3	94.8	17.1	4.06	5.40	2939	0.69	0.87
CEP 0.05	84.2	94.8	17.1	4.18	5.14	2935	0.72	0.90
CEP 0.07	84.4	94.8	17.1	4.12	5.33	2923	0.74	0.92
<b>Pellet</b>								
CEP 0.00	84.5	94.9	17.0	4.08	5.44	2912	0.74	0.92
CEP 0.03	84.2	94.8	17.1	4.12	5.48	2939	0.76	0.95
CEP 0.05	84.6	94.7	17.1	4.26	5.53	2935	0.78	0.97
CEP 0.07	84.6	94.8	17.1	4.22	5.60	2921	0.75	0.94

\* The calculation of nutrient values of diets was based on laboratory approximate analysis

\*\* The papain was added respectively 0.03%, 0.05% and 0.07% in treatments of E3, E5, and E7

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