

**RELATION BETWEEN BLOOD CHOLESTEROL RATE WITH EGGS
YOLK CHOLESTEROL AND MEAT OF QUAIL (*Coturnix coturnix
japonica*)**

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ABSTRACT

Body cholesterol can come from two sources, which is derived from food (exogenous cholesterol), and cholesterol produced by their own body (endogenous cholesterol). If the amount of cholesterol that comes from food is a little, to meet the needs of other tissues and organs of the synthesis of cholesterol in the liver and intestines will increase. Conversely, if the amount of cholesterol in the food increase, the synthesis of cholesterol in the liver and intestines is reduced. A way that can be used to lower cholesterol of meat and eggs is by lowering blood cholesterol. A research which aims to determine the relationship between cholesterol levels of blood with eggs and meat, has been carried out with 120 quails. The parameters measured included cholesterol levels of blood, eggs, and meat. Research data were analyzed using *curve expect 1.3*. The results obtained by the relationship between cholesterol levels of blood with meat was high ($r = 0.87$) with a model estimator following a regression equation: $Y = -1.0631 + 0.0235 X - 0.0001 X^2$, and the relationship between cholesterol levels of blood with egg was high ($r = 0.89$) with a model estimator following a regression equation: $Y = -1.2059 + 0.0190 X - 0.0001 X^2$

Keywords: Quail, blood cholesterol, eggs, and meat.

INTRODUCTION

Body cholesterol comes from two sources, namely from food which is called exogenous cholesterol and produced by the body called endogenous cholesterol (Piliang and Djojosoebagio, 1990). If the amount of cholesterol that comes from food is a little, to meet the needs of other tissues and organs of the synthesis of cholesterol in the liver and intestines will increase. And vice versa, if the amount

of cholesterol in the food increases the synthesis of cholesterol in the liver and intestine will decrease (Muchtadi *et al.*, 1993).

A Way that can be used to lower cholesterol of eggs is lower blood cholesterol. To lower blood cholesterol can be done by lowering consumption, digestion, and absorption (gastrointestinal), decrease endogenous synthesis, increase spending through the bile, and feces. Nishima and Freedland (1990) state that cellulose is an insoluble fiber is still able to reduce levels of glycerol, triglycerides, and cholesterol levels in plasma. The secretion of bile is closely associated with total cholesterol content (Muslim 1989). Releasing of main pathway of cholesterol in the body occur liver through conversion into bile acids, namely cholic acid and *chenodeoxy cholic* bounded to glycine or taurine to form bile salts, and then excreted through the bile into the duodenum. Some of bile aids will be reabsorbed by the liver through the circulation and then secreted back into bile. Bile acid which is not absorbed will be degraded by microbes of the large intestine and is excreted in the feces (Muchtadi *et al.* 1993). Due to the function of cholesterol compounds is very large and many diseases associated with excess cholesterol, it is necessary to find the relationship between cholesterol levels of blood with meat and egg yolk, so that can be carried out an estimation between cholesterol levels of meat and eggs based on blood cholesterol.

RESEARCH METHOD

The Research used samples of blood, meat and egg from the 120 quail. Statistical analysis which was used a regression analysis model. Formulation of the model was carried out through the following stages:

1. Made Scattered graphed data (*scatter diagrams*) and then created a model that most closely scattered data
2. Performed regression coefficient estimation through smallest quadratic method with test

3. Choosing the most suitable model with the coefficient of determination criteria (R^2) and the remaining allegations of squares (S^2) of each model (Gomez and Gomez, 1976)

RESULTS AND DISCUSSIONS

In studying the relation between cholesterol levels of blood plasma and meat, the use of mathematical models are helping to provide a good description of predicting meat cholesterol levels based on blood cholesterol levels. In the prediction of meat cholesterol levels were not free variables (Y) and blood cholesterol levels was a free variable (X). The specification selection of good model, based on the scattered data obtained of relationship between blood cholesterol levels with meat cholesterol was high ($r = 0.87$) with model estimator following the equation of quadratic model regression $Y = -1.0631 + 0.0235 X - 0.0001 X^2$.

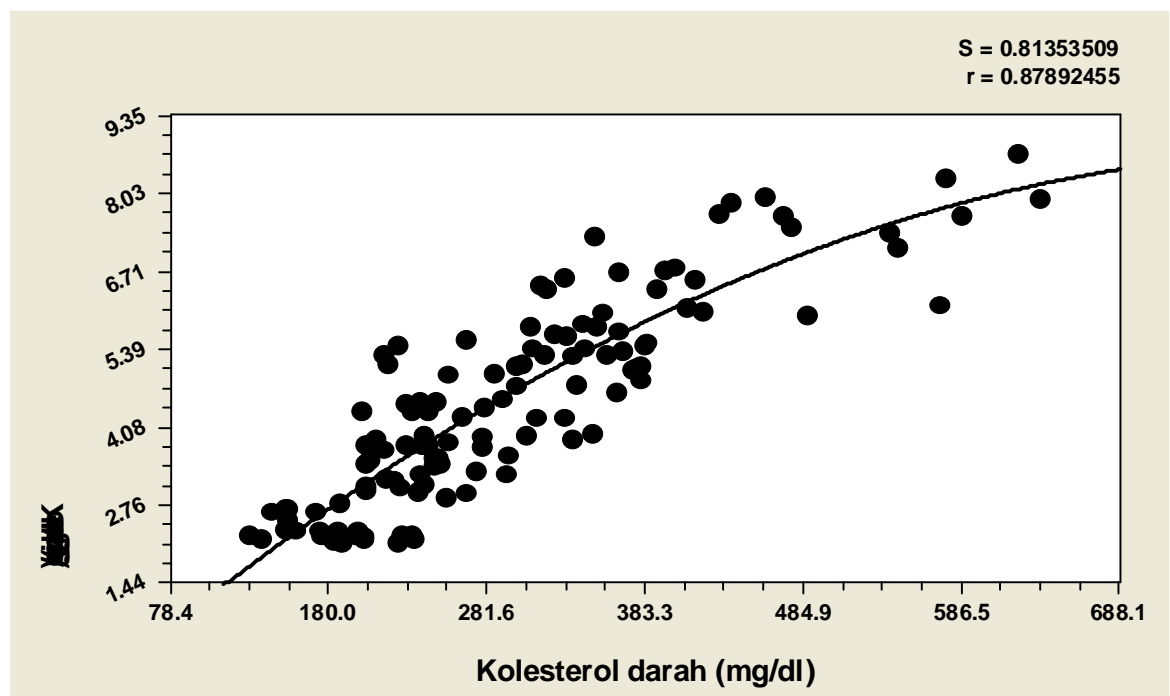


Figure 1. The relationship between cholesterol of blood and meat

The relationship between cholesterol of blood plasma and egg yolk was high category ($r = 0.89$) with model estimator $Y = -1.2059 + 0.0190 X - 0.0001 X^2$.

Based on the obtained regression model for both cholesterol levels of meat and egg yolk increased along with increased blood cholesterol levels, but increase to a maximum on blood cholesterol levels above 700mg/dl. The amount of cholesterol in cells of the human body and animals is regulated by many factors. In general, all these factors can be divided into two kinds: The first factor is the outside of cells, such as the amount of free cholesterol or in lipoprotein-bound outside the cell, free fatty acid supply, and the presence of certain hormones. The second factor is the cell, such as the activities of the enzyme systems involved in cholesterol synthesis and the role in the catabolism of cholesterol, the amount of availability of terpenoida, lanosterol, and skualen as precursors for the synthesis of cholesterol, the amount of cholesterol metabolism, the cholesterol transport activity or its derivatives out of the cell by active transport mechanisms through cell membranes, and the influence of membrane viscosity.

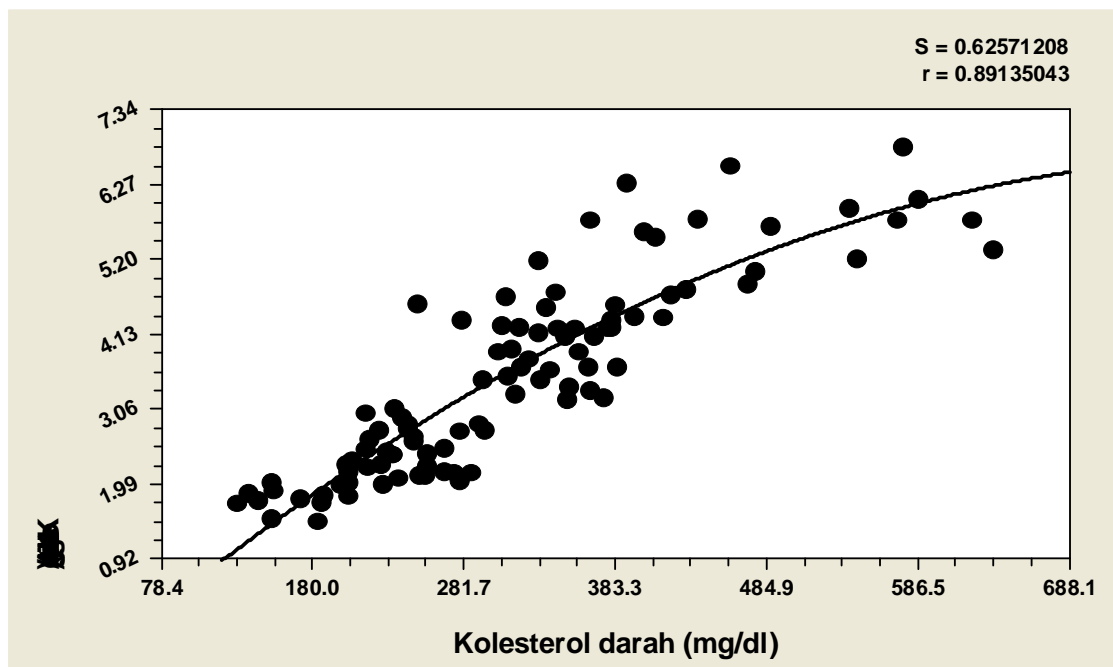


Figure 2. The relationship between cholesterol of blood and egg yolk

If in certain circumstances exceed the amount of cholesterol normal circumstances, the various process will be activated to compensate for this excess cholesterol. First, the activities of HMG-CoA reductase microsomes and HMG-CoA synthase sitosol is inhibited in a coordinated manner or individually, depending on the supply of free fatty acids in the cel. Second, the rate of catabolism of cholesterol will go up because of the stimulation of enzyme activity 7 α -hydroxylase. Third, the activity of acyl-CoA cholesterol acyltransferase is stimulated so that excess cholesterol modified by free fatty acids into its ester compound, which is then stored in the cytoplasm. Fourth, the biosynthesis of lipoprotein receptors is resisted, so the production of the receptor molecule that decreases LDL-making process by the cell is reduced. Fifth, the more cholesterol transported into the membrane, causing increased degree of order flowing multiple layers of membrane lipids will grow so that passing the membrane increase and intake process of lipoprotein (LDL) up. Sixth, he process of cholesterol expenses, through the increase in VLDL (*very low density lipoprotein*) of the liver cells or with HDL (*high density lipoprotein*) from the edge of the cell will rise (reaction 11, 12, and 14 stimulated)

Deposition of cholesterol in eggs is influenced by many factors, including genetic factors, nutrients, and drugs. According to Hargis (1988) cholesterol content in egg yolk can vary \pm 25 percent of cholesterol from food and fats. Han *et al.* (1993) state that the influence of feed fat (vegetable oils, animal oils, cholesterol, and β sitosterol) increase the liver cholesterol, serum, and egg yolk in laying chickens. Then stated that calorie restriction is a real decrease in egg production and total cholesterol.

CONCLUSIONS

1. Cholesterol of meat and eggs will increase with the increase in bbod cholesterol levels, but will reach a maximum in blood cholesterol levels above 700 mg / dl.

2. Blood cholesterol levels can be used to predict meat cholesterol with estimator model $Y = -1.0631 + 0.0235 X - 0.0001 X^2$ and egg yolks with an estimator model $Y = -1.2059 + 0.0190 X - 0.0001 X^2$.

LITERATUR

- Gomez, K.A. and A.A. Gomez. 1981. *Statistical Procedures for Agricultural Research with Emphasis on Rice*. IRRI Los Banos Laguna Philipines
- Han CK, Sung KS, Yoon CS, Lee NH, Kim CS. 1993. Effect of dietary lipids on liver, serum and egg yolk cholesterol contents on laying hens. *AJAS*. Vol.6 (No.2): 243-248
- Hargis SP. 1988. Modifying egg yolk cholesterol in the domestics fowl-a review *World Poultry Science Journal* 44: 17-29
- Muchtadi D, Sri Palupi N. Astawan M. 1993. *Metabolisme zat gizi. Sumber, Fungsi dan Kebutuhan bagi Tubuh Manusia*. Jilid. II. Pustaka Sinar Harapan. Jakarta. 43-48
- Muslim A. 1989. *Lemak dan Metabolisme dan Penyakit Jantung Koroner*. Peningkatan Pengembangan Perguruan Tinggi. Universitas Andalas . Padang.
- Nishima PM, Freedland RA. 1990. The effect of dietary fiber feeding on cholesterol metabolism in rats. *J.Nutr.* 120 : 800-805.
- Piliang WG, Djojosoebagio S. 1990. *Metabolisme Lemak, Protein dan Serat Kasar*. Fisiologi Nutrisi I. Institut Pertanian Bogor Press. Bogor