



Broiler ration plus *Curcuma longa* extracts for protection against diseases-causing viruses



Ngampong Kongkathip¹, Chanin Teerawattanawanich², Sirirak Chantakru²,
Boonsong Kongkathip¹, Taveesak Songserm², Yupa Pankaew³, Supaporn Isariyodom⁴



¹Natural Products and Organic Synthesis Research Unit (NPOS), Department of Chemistry, Faculty of Sciences, ²Faculty of Veterinary Medicine, ³Kasetsart Agro-and Ago-industrial Product Improvement Institute, ⁴ Faculty of Agriculture, Kasetsart University, Chatuchak, Bangkok, Thailand 10900

Abstract

This developed broiler ration can be used for antibiotics replacement and protection from pathogens. The significant properties of our broiler ration are better feed conversion ratio (FCR), weight gain and percentage livability, less feed intake, better reduction of oxidative stress and enhancement of immunity when compared to the control and antibiotic groups. Our broiler ration also contains new anti H5N1 substance isolated from *Curcuma longa* rhizomes.

Background

Expansion of the poultry industry in Thailand leads to an increasing amount of the antibiotic utilization, for promoting growth, enhancing feed consumption as well as infections control. The result is high amount of antibiotic residues in chicken products which has a direct impact on consumers' health. Based on the increasing magnitude of this phenomenon, the ban on antibiotic supplement in animal products was raised by the European Union. With our rich natural resources, the use of herbs as antibiotic substitute is the best solution. *Curcuma longa*, a native plant is a potential candidate since it contains high amounts of curcuminoids, anti-oxidants has a high safety margin. Thus, we invented the Broiler spiced with plus *Curcuma longa* extract for protection against disease-causing viruses. This ration is intended to be antibiotic-free feed for broilers with anti-viral activity, and eventually for use in the poultry industry.

Special features

- The broiler ration plus *Curcuma longa* extract for protection against disease-causing viruses contains *Curcuma longa* extract which acts as antibiotic substitutes.
- The Broiler ration plus *Curcuma longa* extract stimulates immune responses to New Castle Virus vaccine in broilers
- The Broiler ration plus *Curcuma longa* extract reduces stress and enhances innate immune response in broilers
- The *Curcuma longa* extract in the ration contains sesquiterpene which shows anti-viral activity for Avian Influenza virus in a laboratory.

Protocols used for production and evaluation of the Broiler ration plus *Curcuma longa* extract for protection against disease-causing viruses

Figure 1) Extraction of dried rhizomes of *Curcuma longa* with several solvents using Soxhlet extraction

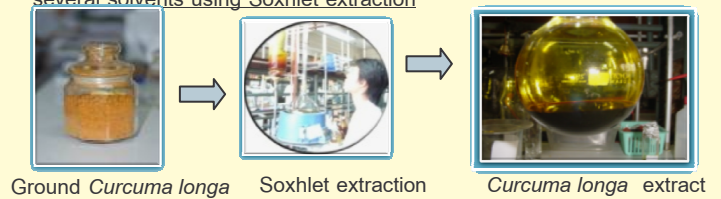


Figure 2) Extraction and isolation of curcuminoids which show anti-oxidant activity from *Curcuma longa* rhizomes

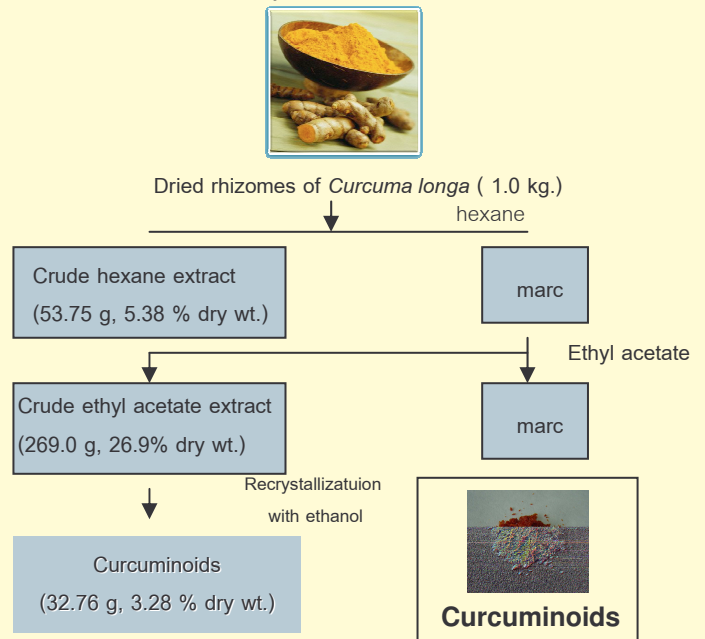


Figure 3) Extraction and isolation of sesquiterpene which has anti Avian Influenza virus

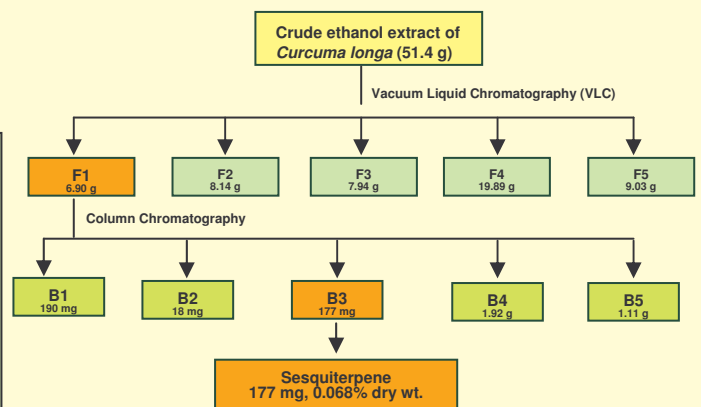
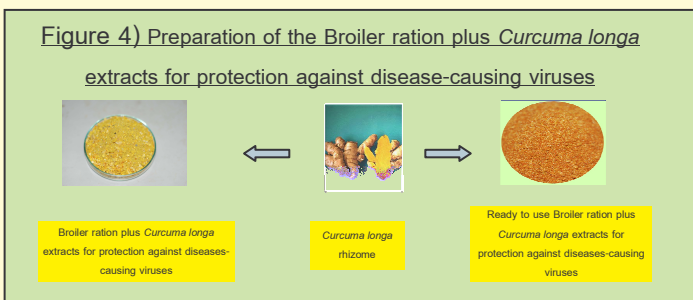


Figure 4) Preparation of the Broiler ration plus *Curcuma longa* extracts for protection against disease-causing viruses



Evaluation of the Broiler ration plus *Curcuma longa* extract for protection against disease-causing viruses

1. Evaluation of immune-stimulant activities to New Castle disease virus vaccine in broilers using the hemagglutination inhibition test
2. Evaluation of anti-stress activities in broilers using Heterophilto/lymphocyte ratios as indicators for stress levels, GSH/GSSG ratios for anti-oxidant and macrophage phagocytic activities for enhancing innate immune response



The test results in broilers using the ration

The test results of the Broiler ration plus *Curcuma longa* extract for protection against disease-causing viruses showed positive results. We found that broilers fed the Broiler ration plus *Curcuma longa* extract at 0.05% showed higher immunity to New Castle disease virus and less stress level than the controls given the conventional feed. In addition, the Broiler ration plus *Curcuma longa* extract enhanced anti-oxidant activity and promoted innate immune response.



Laboratory evaluation of an anti-Avian Influenza Virus activity in *Curcuma longa* extracts using the hemagglutination test

The results of the in vitro anti-Avian Influenza virus activity

We used chicken red blood cells as the target cells for the Avian Influenza hemagglutination test. The chicken red blood cells incubated with the *Curcuma longa* extracts with several solvents such as hexane, ethyl acetate, ethanol and water were not agglutinated by the Avian Influenza viruses. The concentrations of the extracts that gave protection to chicken red blood cells ranged from 0.1-1.0 mg/ml. Sesquiterpene isolated from the *Curcuma longa* extract has anti-viral activity at concentrations of 0.25-250 ng/ml

Significance of the Broiler ration plus *Curcuma longa* extract for protection against disease-causing viruses

•On public health

The use of the Broiler ration plus *Curcuma longa* extract in poultry farming gives antibiotic-free products which are safe for consumers

•On economics and poultry industry

- The Broiler ration plus *Curcuma longa* extract costs less compared to conventional feed with imported herb mixtures
- The use of *Curcuma longa* as an active ingredient in the production of the Broiler ration plus *Curcuma longa* extract for protection against disease-causing viruses will add beneficial values to *Curcuma longa* and generate more income for farmers who grow it.

- The use of the Broiler ration plus *Curcuma longa* extract for protection against disease-causing viruses can replace the antibiotic used in poultry farms and reduces antibiotic imports.

•On environment

The use of *Curcuma longa* in poultry industry can reduce antibiotic residue contamination in the environment



Broiler ration plus *Curcuma longa* extracts Products

Patent

Ngampong Kongkathip, Sirak Chantakru, Chanin Tirawattanawanich, Boonsong Kongkathip, Taveesak Songserm, Virus and target cell interaction inhibition, International Application (2010), 24 pp. CODEN:PIXXD2 WO 2010062260 A1 20100603 CAN 153:21014 AN 2010:683175 CAPLUS

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