*Available online at* www.scholarsresearchlibrary.com

Scholars Research Library

**Annals of Biological Research, 2011, 2 (6):464-468**
***(http://scholarsresearchlibrary.com/archive.html)***

Annals of Biological Research
Scholars Research Library
**ISSN 0976-1233**
**CODEN (USA): ABRNBW**

# Thyme essential oils (thymus vulgaris) alleviate vaccination reactions in broiler chickens

**Adel Feizi[1*] and Mehrdad Nazeri[2]**

[1]*Department of Clinical Science, Tabriz branch, Islamic Azad University, Tabriz, Iran*
[2]*Young Researchers Club, Tabriz branch, Islamic Azad University, Tabriz, Iran*

---

## ABSTRACT

*Vaccination plays an important part in the health management of the poultry flock. There are numerous diseases that are prevented by vaccinating the birds against them. Vaccination is a way of obtaining a controlled result with a minimum of harm to the birds. Vaccines are generally fragile products some of which are live but in a state of suspended animation. The aim of this study was to assessment of preventive effect of thyme essential oils in the vaccination reactions in chickens. In this study, 450 one year old Lohman chicks were selected. Chicks were divided into 5 groups. From day 1 to end of the study, thyme essence was used as mentioned in materials and method section. The results showed that there were low reactions in treatment than control group. Thus can be conclude that thyme essence has protective effect in emergence the vaccination reactions.*

**Key words:** thyme essential oils, vaccination, reaction, broiler chicks.

---

## INTRODUCTION

Vaccination plays an important part in the health management of the poultry flock. There are numerous diseases that are prevented by vaccinating the birds against them (1,8). The purpose in using a vaccine to prevent a particular disease is to trigger or boost the bird's immune system to produce antibodies that in turn fight the invading causal organisms. A natural invasion that actually causes the disease will have the same result – the bird will produce antibodies that fight future invasion. Unfortunately the damage done to the bird suffering such disease is usually too great and the bird either dies or becomes unthrifty and non-productive. A natural invasion caused infection will be uncontrolled and has the possibility of causing severe damage. Vaccination is a way of obtaining a controlled result with a minimum of harm to the birds. Vaccines are generally

fragile products some of which are live but in a state of suspended animation (4). Others are dead. All have a finite life that is governed by the way they are handled and used. Handling and administration procedures also influence the potency of many vaccines and consequently the level of immunity the bird develops. After administering a live vaccine in poultry, the vaccine virus must infect target cells and replicate, increasing their numbers in order to stimulate the immune system (2). If the vaccine is administered properly to healthy birds, a 'normal' vaccine reaction will occur (2). This normal reaction can vary considerably among flocks (1). A good basic rule is that a mild respiratory reaction should be detected 2-3 days after administering a vaccine, and should last for 5-7 days. The clinical reaction in the birds will include respiratory noise (snicking), head shaking and watery eyes (3). These reactions should be self-limiting. If no reaction is seen, it is likely that little or no stimulation of the immune system has occurred (3,4). In this case, the birds are still susceptible to field disease challenge. If the reaction is more severe than desired or it is not self-limiting, this is cause for concern and should be investigated. The key point here is to understand that a mild respiratory reaction following vaccination is normal and necessary for the vaccine to stimulate the immune system. For this normal reaction, no intervention is necessary (5). Excessive vaccine reactions it is often reported in the commercial poultry industry that chickens routinely need to be treated with antibiotics following vaccination to 'buffer' the reactions and to control secondary E.coli septicemia and airsacculitis. Many of these flocks finish with poor body weights, poor uniformities, high feed conversions, and even increased mortality due to the severe or prolonged vaccine reactions. It is common for a farm manager to describe a respiratory disease that always starts at 21 days of age, for example. It is believed that this is due to an Infectious Bronchitis (IE) or Newcastle disease (ND) field virus challenge. Analyses of these flocks often demonstrate that the problem is really a severe reaction following vaccination at 18 days of age and that actual field disease challenge is of little significance (7). There are many causes for excessive vaccine reactions. A farm manager must closely monitor any excessive reactions and implement a practical plan to control the problem. The losses resulting from excessive vaccine reactions are often higher than the potential field challenge against which the birds are vaccinated. The essential oil of common thyme (*Thymus vulgaris*) is made up of 20-54% thymol (12). Thymol, an antiseptic, is the main active ingredient in Listerine mouthwash (10). Before the advent of modern antibiotics, it was used to medicate bandages (6). It has also been shown to be effective against the fungus that commonly infects toenails (11). It can also be found as the active ingredient in all-natural, alcohol-free hand sanitizers. A tea made by infusing the herb in water can be used for cough and bronchitis (12). Medicinally thyme is used for respiratory infections in the form of a tincture, tisane, salve, syrup or by steam inhalation. Because it is antiseptic, thyme boiled in water and cooled is very effective against inflammation of the throat when gargled 3 times a day. The inflammation will normally disappear in 2-5 days. The thymol and other volatile components in the leaf glands are excreted via the lungs, being highly lipid-soluble, where it reduces the viscosity of the mucus and exerts its antimicrobial action. Other infections and wounds can be dripped with thyme that has been boiled in water and cooled. In traditional Jamaican childbirth practice, thyme tea is given to the mother after delivery of the baby. Its oxytocin-like effect causes uterine contractions and more rapid delivery of the placenta, but this was said by Sheila Kitzinger to cause an increased prevalence of retained placenta.

## MATERIALS AND METHODS

In this study, 450 one year old Lohman chicks were selected. After salon preparation (disinfection of salon and equipments) chicks were divided into 5 groups (4 treatments and 1 control). Each group contains 3 replications and each replication includes 30 chicks. In each 1×2 meter cage, 30 one year old chicks were located. Nurturing period considered as same for all groups. To assessment of thyme effects on prevention the vaccination reactions, thyme essence were used according table 1 program.

**Table 1: thyme essence usage in treatment groups**

| Week | Treatment 1 | Treatment 2 | Treatment 3 | Treatment 4 |
|---|---|---|---|---|
| 1 | 0.12 | 0.18 | 0.24 | 0.3 |
| 2 | 0.23 | 0.35 | 0.46 | 0.5 |
| 3 | 0.46 | 0.7 | 0.92 | 1 |
| 4 | 0.92 | 1.15 | 1.85 | 2 |
| 5 | 1.38 | 1.7 | 2.8 | 3 |
| 6 | 1.84 | 2.3 | 3.7 | 4 |

Essence was used through mixed in drinking water with 1:10 ratio at 10 o'clock every morning. Essence usage was determined weekly based on chicks growth rate then vaccination carried out according table 2 program.

**Table 2: vaccination program**

| Vaccine | Administration route | Time of administration (day) |
|---|---|---|
| H120 | Spray | 1 |
| Newcastle + B1 | Injection + eye drop | 11 |
| D78 | Eye drop | 14 |
| LaSota | Eye drop | 19 |
| D78 | Drinking water | 21 |
| LaSota | Spray | 28 |

After vaccination, from each treatment groups numbered 10 chicks on days 6,17,24 and 44 were selected by chance and euthanized by electrocution. Then sampling was done from upper respiratory tract (trachea, lungs) and cecal tonsils. Finally, cytopathology slides were provided.

## RESULTS

On day sixth, no observed significant microscopic and macroscopic evidences with exception brief nasal and lacrimal discharges in control and treatment 1. In control group some mucosa in trachea and lungs and brief hyperemia was evident.

On day Seventeenth, no observed significant clinical signs and in control group inflammation and hemorrhage in trachea macroscopically was obvious. Hemorrhage also was obvious in some treatments 1 and 2 chicks.

On Twenty-fourth day, lethargy, depression and sometimes panting were obvious. Also airsacculitis, dilatation of heart and trachea hemorrhage were evident. No observed microscopic and macroscopic signs in treatments.

On day Forty-Fourth, conjunctivitis and green diarrhea were evident in control group. In necropsy of treatments 1 and 2 mild reactions was observed in air sacs. These reactions also were observed in cecal tonsils as petechiae. There was hyperemia in trachea, lungs and cecal tonsils in control groups.

## DISCUSSION

In the case of some vaccines, an important part of the procedure is to ascertain whether the vaccine has worked or "taken". A good example of this is fowl pox vaccine administered by wing stab. Within 7 to 10 days after vaccination a "take" should appear at the vaccination site. This is in the form of a small pimple one half to one centimeter in diameter. If the take is larger and has a cheesy core, it indicates that contaminants have been introduced either with the vaccine or with dirty vaccinating equipment. A check for takes would involve inspecting approximately 100 birds for every 10,000 vaccinated.

Another example of whether the birds are reacting satisfactorily to the vaccination is the systemic reaction found in chickens vaccinated against infectious bronchitis disease. In many cases the birds react approximately 5 to 7 days after vaccination by showing signs of ill health – slight cough, a higher temperature and lethargy. In cases where there are no obvious signs of success, blood samples may be taken and sent to the laboratory for examination. The usual test is for the presence of an adequate number of the appropriate antibodies (called the titer) in the blood. If the vaccination has been unsuccessful, it may be necessary to re-vaccinate to obtain the desired protection.

Failure to find evidence of success could be because of:
•Faulty technique resulting in the vaccine not being introduced into the vaccination site.
•Faulty vaccine – too old or not stored or mixed correctly. It would be unusual but not impossible for the vaccine to be faulty from manufacture.
•The birds are already immune i.e. the immune system has already been triggered as a result of parental (passive) immunity, previous vaccination or other exposure to the causal organism.

In one study revealed that administration of thymus vulgaris at the dose of 1-100 mg/kg is effective in prevention of passive cutaneous anaphylaxis (5). In one other study demonstrated that after Newcastle vaccine, edema cased in mucosa or submucosa with congestion in vessels and cells infiltration in lamina propria. Also revealed that if reactions were severing, hemorrhage and erythrophagocyte may be seen (3,9). Finally, reactions subsequent vaccination is common and to reduce these reactions use of thyme essence is recommended.

## REFERENCES

[1] Bacon, L. D., **1992**. *Poult. Sci. Rev*. 4:187–195.

[2] Baxendale, W., **1996**. Current methods of delivery of poultry vaccines. Pages 375–387 in: Poultry Immunology. T. F. Davison, T. R. Morris, and L. N. Payne, ed. Carfax Publishing Company, Oxfordshire, UK.
[3] Brandly, C.A. in: disease of poultry. Edited by Biester H.E. and Schwarte L.H. 4th edition. Ames. Lowa, state university press.**1959**, 464-503.
[4] Cook, M. E., **1991**. *Crit. Rev. Poult. Biol*. 3:167–189.
[5] czygan C.F. Thymian, Thyme Herba. In: Wichtl M. Ed. Teedrogen, 2nd Ed. Stuttgart, Wissenschaftliche Veralagsgesellschaft, **1989**: 498-500.
[6] Grieve, Maud. Thyme. A Modern Herbal. Hypertext version of the **1931** edition. Accessed: February 9, **2008**.
[7] Jeurissen, S. H. M., L. Vervelde, and E. M. Janse, **1994**. *Crit. Rev. Poult. Biol*. 6:183–207.
[8] Keck, L. D., J. K. Skeeles, and R. W. McNew, **1993**. *Avian Dis*. 37:825–828.
[9] Mayor, D.Y. the histopathology of certain common poultry disease. United nations and FAO, 1st edition, 48-46.
[10] Pierce, Andrea. **1999**. American Pharmaceutical Association Practical Guide to Natural Medicines. New York: Stonesong Press. P. 338-340.
[11] Ramsewak RS, et al. *Phytother Res*. **2003**;17(4):376-9.
[12] Thymus Vulgaris. PDR for Herbal Medicine. Montvale, NJ: Medical Economics Company. p. 1184.