February 2018 • e-ISSN: 1857-8187 • p-ISSN: 1857-8179

https://doi.org/10.5281/zenodo.1186432 **Research Article**

Latex Aglutination (LAT) Test for detection of Toxoplasma gondii antibodies in sera of naturally infected pigs in District of Saranda, Albania

Healthcare

Keywords: Toxoplasma gondii, pigs, Latex aglutination test, pig sera.

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Abstract

The aim of study was to determine the of Toxoplasma gondii antibodies in sera of naturally infected pigs in District of Saranda, Albania. Was collected 184 samples of pigs sera from extensive farms at the time of slaughter in slaughterhouses. Collected blood was left to express serum and it was kept in a freezer until the time when samples were processed in the laboratory of Microbiology of Faculty of Veterinary Medicine of Tirana, Albania. Serum samples were examined by Latex aglutination test (LAT). Out of 184 samples tested, 25 sera had anti-Toxoplasma IgG antibodies. Average prevalence was about 13.97%.

Introduction

Toxoplasmosis is an infectious disease caused by the parasite *Toxoplasma Gondii* and affects both animals and humans. Toxoplasma gondii infection is widespread in humans, although its prevalence varies widely from place to place (Dubey J.P. 2009). Sero-epidemiologic data suggest that ingesting improperly cooked meat containing T. gondii is a major source of infection for humans in the USA (Dubey and Jones, 2008). Infected pig meat is a source of T. *gondii* infection for humans and animals (Hassan Hajian-Bidar, 2014). The prevalence of *T. gondii* in pigs is also influenced by management systems. In poorly managed non-confinement systems, seroprevalence in pigs was as high as 68% (Gamble et al., 1999). In humans this infection is usually acquired by ingesting inadequately cooked meat or from feces of infected cats. In the United States and the United Kingdom, it is estimated that 16–40% of the population are infected, whereas in Central and South America and continental Europe, estimates of infection range from 50 to 80% (Liu Q,et al 2012). In pregnant women however, the infection acquires aspecial significance as the parasite may enter the fetal circulation through placenta and cause congenital Toxoplasmosis. Sero-diagnosis has been a more full and adequate tool for epidemiological studies in both human and animals (Hassan Hajian-Bidar, 2014). Several serological tests have been used for the serological diagnosis of toxoplasmosis. In this study for his ability to detect *T. gondii* infection in naturally infected we have used Latex aglutination test (LAT).

LAT is rapid and easy to perform to detect anti-T. gondii IgG antibodies. LAT has a sensitivity of 86–94 % and specificity of 100 % in humans, a low sensitivity of 78.6 % and specificity of 61.9 % in sheep (Mazumder P, 1988). Thus, LAT is often used as a screening tool in epidemiologic survey due to the simplicity of performance, but the positive result requires further examination using other serological tests (Holliman RE, egt al 1990). LAT has also been modified to detect anti-T. gondii IgM antibodies in humans for diagnosis of recent infection.

Sato et al. (Sato K et al 1987) isolated microsomal antigen Sp-2 reactive with anti-*T. gondii* antibodes, whose reactivity with IgM and IgG antibodies varies with the concentration. Sp-2 antigen only reacts with IgM when latex particlesare sensitized with less than or equal to 100 mg of this antigen/mg of particles. Based on this unique reaction of the antigen, a passive latex agglutination reaction to detect IgM antibodies has developed. Cambiaso et al. (Cambiaso et al 1992) utilized proteinase K-treated antigen-coated particles to establish LAT for the detection of IgM antibodies in humans, with an advantage of no significant interferences by IgG antibodies, or by rheumatoid factor or antinuclear antibodies.

Swine sera

184 blood samples were analysed. Seventy-seven sera originated from 4-month-old pigs slaughtered at an abattoir;

Latex Agglutination Test (LAT)

In this study a commercial kit Toxo (Bio-Rad, France) was used to determine antibodies of IgG and/or IgM class. The kit includes a positive and negative control serum, latex beads suspension and diluent (0.9% NaCl). The test was performed according to the manufacturer's instructions. One drop of diluted serums, and latex suspension were put on marked places on the glass sheet. Next, the reagents were mixed with a stick, and the card was shaken for 5 min. Agglutination (in the case of positive reaction) or lack of agglutination (for negative sera) was observed.

Result and Discussion

The results of pig sera examination for the presence of specific antibodies, obtained by the LAT test are shown in the tables and graphics.

Table no. 1: Number and result of pigs sera tested with LAT

Number of sera	Positive	Negative
184	25	159

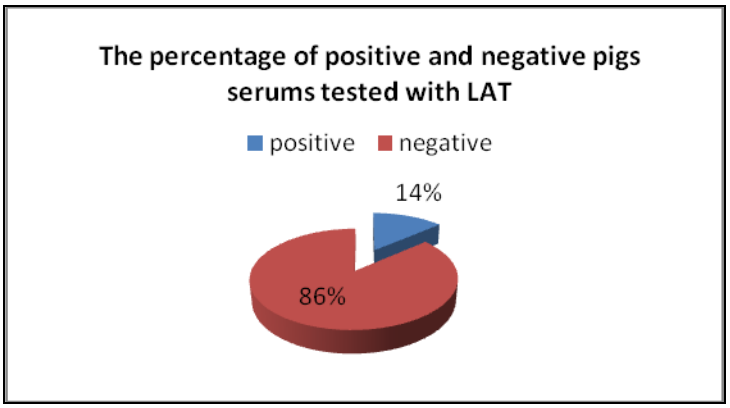
From Table 1 it is noted that were tested with LAT 184 serum samples, of which 25 were positive and 159 negative. In the table no. 2 are analytically presented to positive serum data. From the table 2 noted that all the positive pigs are from extensive breeding or feeding outdoor. According to some studies, the prevalence of toxoplasmosis in pigs varies by type of breeding. Most of these studies in the word were based on convenience samples collected from slaughtered pigs. Prevalence of T. gondii varied dramatically among the classes of pigs surveyed (market pigs versus sows, indoor pigs from biosecure housing systems versus free-range) (Dubey J.P. 2009).The recent trend of rearing pigs outdoors in European countries is likely to increase seroprevalence in pigs in The Netherlands (Meerburg et al., 2006; van der Giessen et al., 2007; Kijlstra et al., 2004, 2008).

Table nr. 2: Number, age, type of breeding of positive pigs tested with LAT

nr.	type of breeding	n.of sample	age of pigs
1	extensive	12	5 month
2	feeding outdoor	66	9 month
3	extensive	17	5 month
4	extensive	43	6 month
5	feeding outdoor	5	7 month
6	extensive	50	5 month
7	feeding outdoor	64	8 month
8	feeding outdoor	25	8 month
9	extensive	33	5 month
10	extensive	47	5 month
11	extensive	6	36 month
12	extensive	22	4 month
13	extensive	17	7 month
14	extensive	14	6 month
15	extensive	24	12 month
16	extensive	22	11 month
17	feeding outdoor	44	4 month
18	feeding outdoor	85	6 month
19	extensive	55	5 month
20	extensive	29	5 month
21	extensive	46	5 month
22	extensive	85	4 month
23	extensive	21	5 month
24	feeding outdoor	77	4 month
25	extensive	4	7 month

The results obtained by us agree with those of other researchers. In the 1990s seroprevalences also decreased in pigs under intensive managements in some European countries. For example, in Austria, seroprevalence of 14% in 1982 decreased to 0.9% in 1992 (Edelhofer, 1994). After processing obtained results, seroprevalence of *Toxoplasma gondii* infection in pigs of Saranda county was about 14% (13.97%). From the table no. 2 noted that the age of pigs which

probed positive is 4 months and older. So it is mainly fattening pigs, in which the possibility of contact with kitchen scraps unsterilized and other materials from animals intermediate host is high.



Graph. 1. The percentage of positive and negative pigs serums tested with LAT

If we compare our results with those of other authors, we shall notice that they either are lower, or are equal to those. So, the seroprevalence of infection was10.4% in pigs bred in Sicily, Southern Italy (W. Buffolano, 2009), in USA seroprevalence of toxoplasma infection was 25%, or much higher than that of diagnosed by us (Dubey J.P et al 2008).

References

Cambiaso CL, Galanti LM, Leautaud P, Masson PL. Latex agglutination assay of human immunoglobulin M antitoxoplasma antibodies which uses enzymatically treated antigen-coated particles. J Clin Microbiol. 1992;30:882–8.

Dubey, J.P., Jones, J.L., 2008. *Toxoplasma gondii* infection in humans and animals in the United States. Int. J. Parasitol. 38, 1257–1278.

Dubey, J.P. 2009. Toxoplasmosis in pigs—The last 20 years. Veterinary Parasitology 164 (2009) 89–103

Edelhofer, R., 1994. Prevalence of antibodies against *Toxoplasma gondii* in pigs in Austria- an evaluation of data from 1982 and 1992. Parasitol.] Res. 80, 642–644.

Hassan Hajian-Bidar, Heidar Heidari, Aliasghar Bahari, Jamal Gharekhani. Sero-prevalence of *Toxoplasma gondii* infection in domestic goats in western Iran. International Journal of Advanced Research Volume 2, Issue 8, 639-643, 2014

Gamble, H.R., Brady, R.C., Dubey, J.P., 1999. Prevalence of Toxoplasma gondii infection in domestic pigs in the New England states. Vet. Parasitol. 82, 129–136.

Holliman RE, Barker KF, Johnson JD. Selective antenatal screening for toxoplasmosis and the latex agglutination test. Epidemiol Infect. 1990;105:409–14.

Kijlstra, A., Eissen, O.A., Cornelissen, J., Munniksma, K., Eijck, I., Kortbeek, T., 2004. Toxoplasma gondii infection in animal-friendly pig production systems. Invest. Ophthalmol. Vis. Sci. 45, 3165–3169.

Kijlstra, A., Meerburg, B., Cornelissen, J., De Craeye, S., Vereijken, P., Jongert, E., 2008. The role of rodents and shrews in the transmission of *Toxoplasma gondii* to pigs. Vet. Parasitol. 156, 183–190.

Liu Q, Singla LD, Zhou H. Vaccines against Toxoplasma gondii: status, challenges and future directions. Hum Vacc Immunother. 2012;8:1305–8.

Mazumder P, Chuang HY, Wentz MW, Wiedbrauk DL. Latex agglutination test for detection of antibodies to *Toxoplasma gondii*. J Clin Microbiol. 1988;26:2444–6.

Meerburg, B.G., van Riel, J.W., Cornelissen, J.B., Kijlstra, A., Mul, M.F., 2006. Cats and goat whey associated with *Toxoplasma gondii* infection in pigs. Vector-Borne Zoonotic Dis. 6, 266–274

Sato K, Ise Y, Iida T, Suzuki T, Shimada K, Nishioka K. Detection of toxoplasma IgM antibody by passive latex agglutination reaction. J Immunol Methods. 1987;101:183–91.

van der Giessen, J., Fonville, M., Bouwknegt, M., Langelaar, M., Vollema, A., 2007. Seroprevalence of Trichinella spiralis and *Toxoplasma gondii* in pigs from different housing systems in The Netherlands. Vet. Parasitol. 148, 371–374.

Zhou D H, R Liang C.C. Yin, F.R Zhao Z G. Yuan R Q. Lin H Q. Song and X Q. Zhu, 2010. Seroprevalence of *Toxoplasma gondii* in Pigs from Southern China J. Parasitol., 96: 673-674.