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SYSTEM FOR CONDUCTING STAINED ANTIGEN TESTS

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SYSTEM FOR CONDUCTING STAINED ANTIGEN TESTS

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1 Claim. (Cl. 73-51)

This invention relates to an improved method for facilitating the making, interpretation and recordation of blood and serum tests in biological determinations. In its more specific aspects, the present invention provides an improved method for conducting and recording stained antigen tests for the determination of pullorum disease in poultry, although the said method is applicable to contagious abortion tests in cattle, in blood typing tests prior to transfusions and in other analogous capacities.

In conducting stained antigen tests on fowls, it has been customary to employ white opal plates or mirrors. On these plates or mirrors, the blood of each fowl tested is separately admixed with the stained antigen and the reactions visually noted to determine the presence of agglutination. With the use of such vitreous testing plates or mirrors, washing thereof is necessary after each operation to permit of their reuse. The cleaning or washing of the plates completely removes all traces of the tests previously made thereon, so that insofar as the actual evidence of the original test is concerned, the same becomes lost or destroyed. As a result of this condition, the poultry raiser is without actual proof or evidence of the results of the tests made and in practice is forced largely to rely upon oral statements.

In accordance with the present invention, the antigen tests are made directly on appropriate sheets of paper, or other corresponding relatively inexpensive material, so that said sheets, following the making of the tests thereon, may be filed in appropriate receptacles and kept as a durable permanent record, and one capable of being produced at any future time to disclose the actual results of the tests set forth thereon.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawing, wherein:

The figure is a plan view of a testing and recording sheet for conducting biological tests and made in accordance with the present invention.

As shown in the accompanying drawing, the test sheet 1, made of paper or other equivalent material, such as certain types of cardboards, tracing cloths, or synthetic films, is marked or printed to provide a plurality of substantially square areas, as indicated at 2. I have found that a good grade of paper, known to the art as ledger sheet, is well suited for the purpose and, in addition, is quite economical. The square areas 2 may be consecutively numbered and provided with such other data as may be desired in determining the subjects of the tests. Blanks are

left at the bottom of a sheet for the recordation of other data pertinent to the tests made and the certificate of those conducting the tests.

In use, the paper sheet is preferably placed on a mildly heated surface and the blood from each fowl, admixed with stained antigen in situ, is deposited in one of the squared spaces, spreading over a considerable area of each space so treated so that the results of such tests may be readily determined by visual inspection. Care should be used in the selection of the paper upon which the tests are made, as all papers are not suitable for the purpose. For example, some papers that have too much acid, left in the same from their process of manufacture, seem unsuitable, since apparently the acids or bleaching liquids detrimentally affect the antigen and record permanency. Other papers that absorb the antigen too rapidly are not suitable, nor are papers that contain certain earths, as sizing materials, since the latter seem to absorb the color from the antigen and leave dark colored spots. Ledger sheet paper, however, appears to be entirely satisfactory, although many other grades may be suitable. This paper shows a minimum of stain from the antigen where drops of antigen are left in contact for a few minutes. It is practically free from acidity, or at least there is not enough acid left in the paper to influence the test. In fact, there appears to be no interference in any way when this particular grade of paper is used. Thus one may mix a loop full of blood with antigen and spread it out in a circle of approximately one inch in diameter on the spaces of the paper provided for that purpose. The paper sheet may then be quite vigorously rocked and there would be little or no tendency on the part of the materials to spread beyond their originally allotted positions. This is not true with the use of the opal plates or mirrors, since if the latter are vigorously rocked, the separate tests appearing thereon readily tend to run together.

Those tests on which there are definite reactions show a rapid formation of flakes and the reaction is quite clear on the paper sheet. After a moment, the paper begins to curl from being wet and a depression as well as a few higher spots formed in each wet circle. By rocking the sheet, the larger flakes are caught on the fibers of the paper and stay up on the higher portions. The liquid drains away from these flakes into the depression and leaves the flakes quite prominent. Since the formation of these fine confusing flakes occurs a little later, they take place after the depression is made in the paper and form down

in these spots and should the paper be rocked sufficiently to draw these fine flakes out of the depression which does not often occur since because of their lightness they stay in suspension in the liquid longer, are not caught on the fibers of the paper and flow back in the depression. In this depression where the liquid is deep, these fine flakes are invisible. In other words, this procedure eliminates from view the fine confusing flakes and makes more prominent the reaction denoting flakes.

An important feature of the present invention resides in the fact that when tests have been conducted on the sheets and the results thereof noted, the sheets are permitted to dry and may then be filed away, thus furnishing the hatcherymen, poultry raiser or regulatory officials with a permanent indisputable record that a particular flock was tested and the results thereof. At the present time, when these tests are conducted on white plates or mirrors, they are frequently washed, thereby destroying all record of the tests.

In the present invention, permanent records may be obtained without additional effort as the test films must be made whether they are washed away or retained. The value of this permanent record possesses great possibilities. For instance, it gives public authorities and others a method of checking as to whether or not a certain flock was tested and the accuracy of the test without actually being present at the time the test was conducted; it furnishes hatcherymen or veterinarians protection to settle disputes and offers a method of comparing at leisure the correlation between whole blood and tube tests. These test papers are also entirely serviceable for use with rapid serum tests. These test papers may be advantageously used in connection with the abortion control work in cattle as well as pullorum diseases in fowls, or in the testing of human blood as in typing for transfusions.

If the antigen is mixed with fowl's blood or blood serum which do not contain antibodies, no reaction takes place, the mixture remaining uniform as when first mixed. On the other hand, if the antigen is mixed with fowl's blood or blood serum containing antibodies against this germ, the antibodies will react on the dead germs of the antigen, causing them to form in stained colored masses or clumps. This clumping of the germs in the antigen is known as agglutination.

It is a fundamental physiological response for an animal to attempt to overcome an infection. One of the ways this is accomplished is by the development within the animal's body of substances that are capable of combating the infect-

ing agent. These combative substances are called antibodies, and are present in various tissues and blood of the animal.

Then conducting tests for pullorum disease in fowls, it is these antibodies that are tested for and not the germs, since the germs themselves are not circulating in the blood. The material used to determine whether or not the fowl's blood contains these antibodies is called antigen, and consists of a vast number of dead pullorum disease germs mixed in salt water and containing a preservative and a violet dye. Blood is withdrawn from a fowl to be tested and admixed with antigen in situ, the mixture being made on the squares provided on the test sheet 1. The operator, by noting whether or not agglutination is present, which may be easily determined through visual inspection, can quickly and accurately note an infection in the fowls tested. The infected fowls may be readily determined and removed, thus enabling the non-infected fowls comprising the balance of the flock to be maintained in a healthy condition.

By conducting these tests on the paper sheet provided by the present invention, a complete lasting record of each test is available. It may be produced at any future time to show the results of any given test or tests and is thus of considerable value to the poultry raiser. The tests conducted on the sheets are quite decisively negative and positive, and the slight undulation of the paper when wet renders reaction floccules very distinct and most all of any fine confusing specks of foreign particles invisible. Following the drying of the test papers, reactions recorded thereon are as easily observable as when wet or immediately after original application to the paper.

After the tests have dried, it may be helpful in certain instances in reading the tests to place the papers before a strong light, which will develop the colors and show them in the same manner as when wet.

What is claimed is:

The method of conducting stained antigen tests for pullorum disease in fowls, which comprises producing a liquid mixture of stained antigen and the fowl's blood to be tested on a localized area of a sheet of paper which, when wetted with said mixture in an amount for test purposes, undulates or wrinkles and thereby retains agglutinated reactants on the higher regions of the undulated portions of the paper, and causing the mixture to dry on the paper to produce a lasting record thereon of said test.

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