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Pork For Victory

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Pork For Victory

Anti-cholera serum and virus aiding increased production

K. S. Preston, D.V.M.

Now that our nation has allied itself with other peace-loving countries to completely subdue those nations who have by reason of aggression set out to destroy us, we are realizing the paramount importance of producing more food. With the exception of dairy products, there is probably no single food item which is so vastly important in our war effort as pork. Pork not only offers our fighting forces a meat product highly nutritious and rich in vitamins, but by-products from pork are playing a big role in the manufacture of glycerin, fats, soaps, and ammunition. It would be difficult to estimate the true value of our swine industry as it is related to our war effort.

Fortunately our government agencies which are in a position to execute judgment in this respect have realized the vital importance of the swine industry and have formulated definite plans to increase the swine population again this year, an increase which will repeat the heroic increase of 1942. Such an increase in the swine population of this country cannot be accomplished by the stroke of a magic wand. It can only be accomplished through a full and complete understanding of swine breeding, sanitation, feeding, and swine disease control.

By reason of the specialized training which veterinarians have had in all phases of animal production, it is only fitting that the profession be ready and willing to take an active part in accomplishing this gigantic task of raising more pork. Vigilance should be practiced on every hand, for it is ever true that an ounce of prevention is worth a pound of cure.

Fortunately, we are equipped with a few weapons to combat swine plagues. Such a weapon is the use of anti-hog-cholera serum and hog-cholera virus administered simultaneously for the prophylactic treatment of hog-cholera. Probably no other animal disease has been more devastating than hog-cholera. Before the classical findings of Dorset, McBryde and Niles, hog-cholera ran rampant throughout the midwest making it most impossible for the swine grower to raise hogs with a certainty that he would some day market his hogs. Since the advent of anti-hog-cholera serum and hog-cholera virus thirty years ago, the veterinarian has had at his disposal biological products that put an end to hog-cholera ravages.

Efficiency Appreciated

Those who are actively engaged in the production of the products are probably in the best position to appreciate their remarkable efficiency. One realizes the protective value of the serum and virus treatment after seeing thousands of immune hogs stand hyperimmunization, a procedure which is carried out in the manufacture of anti-hog-cholera serum. This is done by giving an intravenous dose of whole blood obtained from cholera-sick pigs to immune hogs in the amount of 5 cc. per pound of body weight. If such hogs were not immune, a fractional dose of 1 cc., regardless of size or age, would be sufficient to produce death. Further confidence in the product is established in the
minds of the production man when he is privileged to see each serial of serum pass B.A.I. required potency tests. The test dose of serum is approximately one-half that suggested as a prophylactic dose on the label. This is not mentioned to convey the idea that the practitioner could use less in the field, but it does convince the producer that his serum has safe, sure protective values.

Value To Swine Raiser

The value of serum and virus as it concerns the swine raiser cannot be minimized. What has been saved in dollars and cents no one can estimate, but the fact remains that the livestock man can now continue his swine operation without the fear of losing his entire herd from hog-cholera. It is to be admitted that there are certain herds in which the use of anti-hog-cholera serum and virus are contraindicated. Pigs already sick with enteric or respiratory diseases are poor risks. Furthermore, the handling and distribution of these products must be done under refrigeration. Careful handling and refrigeration of the product after it is in the hands of the user also are important. For these reasons, many biological houses limit their sales to the graduate veterinarian, the only man who is sufficiently trained to handle and administer these products. Those producers who now sell directly to the profession realize the true value of such a policy. The so-called "vaccination break" is uncommon in the practice of the competent veterinarian.

Serum Production Increased

A study of figures showing a comparison between the amount of serum produced by licensed establishments in this country and the number of hogs raised for the past three years, reveals the fact that serum production has kept pace with the increase in the hog population. This is conclusive evidence that there are more livestock men using the simultaneous method to protect their animals. There are probably many reasons for this change. In the first place, hogs for the past three years have become higher in price and consequently the hog owner does not want to risk the possibility of losing his herd from the ravishes of hog-cholera. Secondly, through the combined efforts of veterinarians, sanitarians and the serum industry, the swine owners of this country have become more cognizant of the importance of protecting their animals with a product that establishes a safe and lasting immunity.

Because of the increased demand for serum and virus, manufacturers have had to increase their production. To accomplish this, industrial units found it necessary to increase the efficiency of production by adopting newer production methods and the employment of equipment which facilitated the manufacturing procedure. Fortunately the industry has been given high priority ratings, making it possible to obtain most of the necessary materials to construct the equipment for increased production.

Credit To U.S.B.A.I.

One should bear in mind that in the production of the products, all establishments which engage in interstate commerce are under the direct regulatory control of the United States Bureau of Animal Industry. Much credit should be given the U.S.B.A.I. in establishing production requirements which insure the potency and safety of these products. Before an establishment is permitted to engage in the manufacture of these products they must first prove to the satisfaction of the Bureau that they are properly equipped from the standpoint of plant, equipment and personnel. No operations are permitted in a licensed plant without one or more Bureau inspectors present to observe production procedure. Violation of this regulatory measure or any other regulatory measure would constitute grounds for cancellation of the producer's license.

As has been stated before, to completely appreciate the products, serum and virus, one would have to be active in their production. The details which enter into the process of admitting animals to the plant, hypering of the immune serum hogs, inoculating of virus pigs, the

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It in the flank or side with their snouts. In support of the supposition that the swine in Lot 1 may have been carriers of the infection and transmitted it to the cattle is the nonexistence of any fatalities occurring among the cattle in Lot 2, to which the pigs did not have access. In addition, following the removal of the pigs from the cattle pen, no more fatalities have been reported on the farm.

(The writer is indebted to Dr. S. H. McNutt of the Veterinary Research Institute, Iowa State College, who diagnosed the case and furnished valuable material.)

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**SERUM VIRUS PRODUCTION**

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bleeding process, defibrinating of the blood, clarifying and pasteurizing of serum, the mixing, phenolization and bottling of both products to the final step of testing, are long and complex.

**Virus**

Briefly, simultaneous virus as it is used in conjunction with anti-hog-cholera serum is phenolized, defibrinated whole blood (i.e., blood with fibrin removed) obtained from inoculated cholera sick pigs which weigh between 40 to 110 pounds. Before bleeding, these animals are observed clinically for symptoms of hog-cholera. Rectal temperatures must reveal a pronounced elevation. Bleeding is done by way of the throat using an aseptic surgical technic. The carcass of the virus pig is then observed officially for lesions indicative of hog-cholera. Bleedings from pigs which pass official inspection are defibrinated to remove the fibrin which has formed in the sterile collecting vessel. After sufficient blood has been pooled to make a representative mix or serial, 5 percent phenol is added, quantity sufficient to make a final dilution of .5 percent. After the product is bottled it is held under government lock and key until it has passed all official tests. Not until it is proved that the product is pure and potent is it released for marketing.

**Serum**

Anti-hog-cholera serum, as it is known in commerce, is the defibrinated, clarified (i.e., red cells removed), pasteurized and phenolized blood from hogs hyperimmunized against hog-cholera. Before a hog can be brought into the production of anti-hog-cholera serum, it must first be immunized against hog-cholera by the simultaneous method for at least 90 days. After this time the animal is admitted to the plant and observed to make sure that it is free from all other swine diseases. The hyper-immunization process, which has already been referred to, consists of an intravenous injection through an ear

**MEXICO**

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that do maintain them merely as a sideline.

With this education we feel that the veterinarian can help the government advance the livestock industry by teaching farmers to avoid and control disease in their flocks and herds, and improve the breeding of domestic animals. In general, we hope to accomplish the noble and sincere labor of the veterinarian the world over, that of increasing comfort to both animal and man by the avoidance of disease and by supplying wholesome animal foods and products of animal origin for the use of humanity.
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vein of whole blood taken from cholera sick pigs. Five cc. of blood are transfused for every pound of body weight. In other words, a 300 pound hog would receive 1500 cc. of hypering virus. This is approximately as much blood as is obtained from one 100 pound virus pig.

After the animal has been hyper immunized, it is permitted to rest ten days in which time, through a physiological response, the circulating blood contains a greatly increased amount of antibodies. Bleeding of the animal is done at weekly intervals. Three bleedings are taken from the tail, the fourth and final bleeding from the throat. Sterile equipment and aseptic technic are employed in every step.

In the production of serum, removal of the fibrin is accomplished in a similar manner as the removal of the fibrin from virus blood. However, from this point on the whole blood from which the serum will be recovered is handled differently. To the blood is added a saturated salt solution to produce crenation of the red cells. A bean extract is also added to agglutinate or clump the crenated red cells. This procedure facilitates the removal of the red cells as the blood is centrifuged. The blood, as it comes from the centrifuge, is clear or straw colored.

**Pasteurization**

Pasteurization is the next step, a step which is carefully watched and controlled. Official recording thermometers, which are held under government seals, record the heating temperatures. The temperature must be held constant between 58 and 59°C. for 30 minutes. After heating the product, it is cooled and 7.5 percent phenol is added, quantity sufficient to make a final dilution of .5 percent. All bleedings, that is, 1st, 2nd, 3rd and final bleedings from a particular group of hogs, are mixed into “batches” or “serials” of serum. The serial is bottled and returned to the custody of the government until such a serial has demonstrated by various tests to be satisfactory. One test is a potency test which is conducted on eight cholera-susceptible pigs weighing between 40 to 90 pounds. Five pigs are given a test dose of 15 cc. of serum and 2 cc. of virus. The remaining three pigs receive virus alone and are held in the same pen as controls to prove the susceptibility of the test pigs. The five pigs which received serum and virus must be well at the end of the fourteen day testing period, whereas the three controls must have sickened and produced lesions indicative of hog-cholera.

**Other Tests**

Many other tests, some of which are non-official, are conducted in most laboratories. The government does not restrict the producer from carrying out auxiliary tests if these tests are conducted to further safeguard the purity and potency of the product. Such tests include bacteriological examination of the products by culturing and plating. Laboratory animals such as pigeons, mice and guinea pigs are used by many producers for the further possible detection of extraneous contamination.

The foregoing has been a very brief description of the production of anti-hog-cholera serum and hog-cholera virus. It is hoped, however, that the information presented will reveal the fact that in this era of scientific advancement, much is being done to safeguard the purity and potency of these products. Also, it should be stated at this time when our country is at war, that the serum industry is making every effort to produce the volume of serum and virus which will be needed to safeguard an all time record pig crop in 1943. Our swine raisers, our veterinarians and the producers of these products face a serious responsibility in their efforts to conserve this record crop of pork.

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