

How Important is Colostrum to a Newborn Piglet?

Abstract-

For my science fair project I chose to research the importance of colostrum to a newborn piglet. I chose this topic because I like spending time with the newborn piglets and I find it interesting how quickly they grow. I also chose this topic because learning and researching more about this topic is useful information to my family as we live on a pig farm and always try our best to raise strong and healthy piglets. My hypothesis is that my project will work well and will have a big impact on the size and weight of the pigs. By doing split suckling with the piglets and gaining data about the piglets' growth, I could prove how impactful colostrum is during the first days of a piglet's life. I did my experiment on two weeks worth of sow (mother pig) farrowings (births) on our farm. Each week I had a control group and the other a split suckled group. Split suckling is when you take a litter of piglets and split them into two groups (red and green). For my experiment, the first half of the litter that was born first was marked with a green marker and the second half was marked with a red marker. I put the red or green group in a box for one hour where they rested. The other group that wasn't in the box was with the sow drinking colostrum. They would also have one hour with the sow and were able to drink as much as they wanted for the hour without competition to get to a nipple first. Then I switched the two groups. I did this four times so that each group would get two one-hour intervals with the sow and two one-hour intervals in a warm box. My goal was to make sure all the piglets were getting colostrum intake as soon as they were born. Now that I am done with my experiment my data shows me that there is a very small amount of difference in the average weight of the piglets. However, the time and effort to do split suckling is still worthwhile as it keeps the piglets healthier and stronger. Doing split suckling is most effective on larger litters of 16-20 piglets. The more piglets there are, the less chance that each piglet will have good colostrum intake. The smaller, weaker newborns that are born tend to get pushed away from the nipples by the stronger piglets. I have also learned that even if the impact is very small, it makes a difference as the piglets continue to grow. Doing split suckling takes time but in the long run, it gives each piglet a strong start and empowers them with nutrition and antibodies that will help them grow and thrive making the process worth it.

Introduction-

I chose this project because I enjoy learning about pigs, but more specifically about piglets. This project will allow me to spend a lot of time with the piglets while getting the data I need. I am excited to learn more about colostrum and why it is so important to newborn piglets. I also chose this project because I am interested in pigs and learning about how they grow and get stronger so quickly. I am determined to find out if split suckling is worth the time and effort or if it is not.

Background-

For my science fair project I researched a lot about colostrum. Colostrum is the first milk the mother produces prior to giving birth. Colostrum is highly nutritious because it contains antibodies which are proteins that fight bacteria and infections. It is very important that newborn piglets get colostrum because it makes them strong and able to fight disease. Colostrum helps with strength and growth changes. Colostrum lasts twenty four hours and then the sow starts to produce regular milk. Colostrum will help the piglets get stable on their feet and warm up their bodies after being exposed to the cool air. It is possible for piglets to survive without colostrum, but not very likely. They will lack necessary strength and will not be able to fight bacteria or infections if

they do not receive a drink from the sow's colostrum. The second thing I researched was split suckling and when it is most useful. Split suckling is where you split a litter of piglets into two groups to make sure all the pigs are getting enough colostrum intake. This is done by leaving half the piglets with the sow to drink and putting the others in a contained area. Then the groups are switched. This procedure is most useful when there is a big litter because the more piglets there are, the harder it is for all of them to get colostrum intake. When I was doing background research it made me excited for the experiment to come. I was determined to find the answers. I was eager to assist each litter and to chart my findings. I was excited to give each piglet a great start right after birth!.

Purpose-

My Science Fair Project's purpose is to help farmers take the best care they can of their newborn piglets. When piglets are born, they are weak and need to be in warmth. They need to get colostrum into their bodies so they can stay warm and have energy to move. Farmers can assist piglets when they are born by helping them find warmth and colostrum. My main goal for this project is to be able to learn more about newborn piglets and how to help them stay strong and get the amount of colostrum they need to be healthy.

Hypothesis-

How does each piglet having the same proportion of colostrum affect its health and growth?

My Predicted Answer:

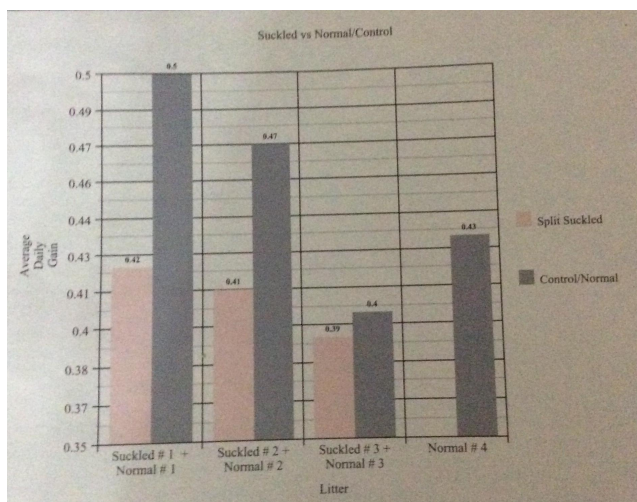
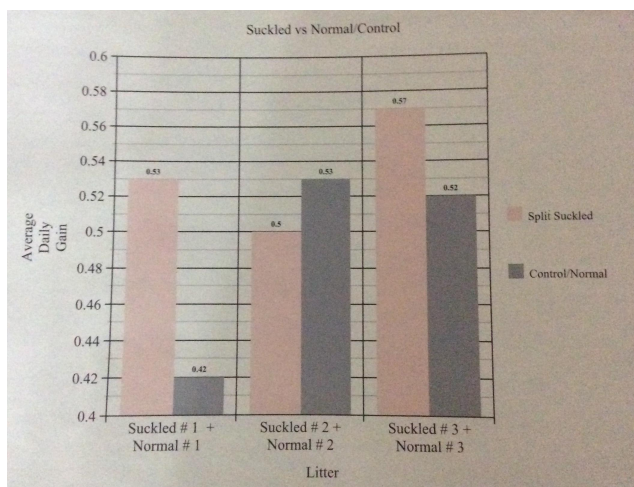
This project could have many possible answers. I think by doing split suckling, it will help with the overall health and strength of each piglet. Since every piglet will be around the same size, they should be healthy because they each receive the same amounts of colostrum right after they are born. I think it will help the whole growing process. There shouldn't be any piglets that are much weaker than the others unless they don't get enough regular milk after the colostrum period. In conclusion, I think that the experiment to ensure all the piglets are getting an even amount of colostrum will work.

Methodology-

For my science fair project I used many materials and methods to complete my experiment properly. One material I used was pig markers. Pig markers are like crayons. This is how you mark a pig. I used pig markers to mark the red and green groups for split suckling. Another material I used was a box/divider. This is what I used to separate the two groups when they were not drinking. When I switched the piglets, I put a one hour timer on, so another material was my watch. I also used a cart and scale to weigh the pigs the two times I weighed them. I also used farrowing powder. This is what you put on the piglets when they are born to help them dry off. The last material I used for my experiment was the computer to type all of my data and information in. My science fair experiment had a structured method: I took 6-7 litters of piglets. I worked with 3-4 of them and the other 3-4 litters were my control litters. The 3-4 I worked with, I did a procedure called split suckling. The other 3-4 litters were my control litters which I did not do split suckling to but were still weighed to compare. Split suckling is where you take a litter and split them into

two groups, red and green. The green group was the first half of the litter born and the red was the second half of the litter born. Then I start with the green group and let them have a one-hour interval in a box where the piglets can't access the mother's colostrum. The red group however is with the sow for the one hour while the green group is in the box drinking. After the one hour was up I switched the two groups. I switched them until each group had two one-hour intervals with the sow drinking colostrum and two one hour intervals in the box away from the mother. This procedure is supposed to help prevent piglets from getting pushed away from the udder by the stronger piglets. It will help each piglet get a chance to drink the sow's colostrum, giving each one a chance to thrive. These materials and methods worked well as I worked through each step of my experiment.

Results-



Discussion-

I learned a lot about split suckling and colostrum while doing this project. When I was researching split suckling, I found out that split suckling is most useful on big litters. The more piglets the mother sow has, the less chance all of them will get enough colostrum intake. I also learned that split suckling is the most useful when there are many different sizes of piglets in the litter. I was ready to begin my experiment just before the seven sow's farrowed (gave birth). This made it impossible to pick and choose certain

litters; I had to use the litters that farrowed the last week of January. My results were based on if the sow was a good milker, how the farrowing process went, how many piglets and their sizes. The first round of my experiment I did split suckling to three litters and had three litter as my control group. My numbers turned out positive and showed an improvement in Average Daily Gain (ADG). This made me excited and almost positive that my experiment was working. When I did my second round, it went the opposite way. My results were worse and the ones I split suckled had a lower ADG than my control group. There are many reasons why this could have happened. Some of the variables that could affect my experiment are listed below:

~how did the farrowing process go? ~was it stressful on sow? piglets?

~is the sow a gilt (new mom)?

~is the sow a good milker? sow's overall health?

~size variation of piglets?

Overall I am pleased with the results of my experiment. Thinking about all these variables has taught me the importance of excellent animal care on the farm. It makes me think about further research ideas. It makes me curious to continue to watch and monitor the litters that I closely cared for just after birth. I expect had I done the experiment over many more farrowings, my results would have proved the consistent benefits of split suckling.

Christian Perspective-

Throughout this project I have learned how amazing God's creation is. I saw this through both the cute piglets and the complexities of the mother's colostrum. I find it so amazing how God created colostrum in the mother sow that is so powerful and nutritious for her piglets. This shows me how God specifically created the mother sow to be with her piglets and their dependence on her for a healthy beginning. I have learned how important the mother is to the piglets. God created newborn animals to need their mother and depend on their mother to raise them healthy and strong. I find it amazing how the mother's colostrum is filled with the goodness of proteins and antibodies so the piglets can fight disease and bacteria. I have also noticed how God created piglets to grow quickly. Within three and a half weeks of being born, each piglet is already around twenty pounds. The piglets grow fast because they are drinking their mother's warm milk. God tells us to take care of the animals and by doing this project, I am taking care of the piglets so they can grow healthy and strong. God blessed them and said to them, "Be fruitful and increase in number; fill the earth and subdue it. Rule over the fish in the sea and the birds in the sky and over every living creature that moves on the ground." God made humans to take care of the animals. This project allowed me to exercise this command in this very specific way. When piglets are born they are weak and cold, but God made piglets very smart. It only takes piglets a little while to get used to their new surroundings and find their mother's colostrum. I have enjoyed watching, assisting and being a part of this amazing process that God created.

Conclusion-

My hypothesis was similar to my results but also very different. In my hypothesis I thought that by doing split suckling it would make a big impact on the piglets' size. My two sets of results are very different. My result from the first round shows that it

made a big impact on the size and weight which makes my hypothesis true. The second round shows me that my hypothesis is wrong and that it didn't help much at all. Overall I have learned that my experiment would need to be repeated many times before I would be sure of my results. My science fair project didn't give me enough time to do so, but I could continue this experiment on my own. This experiment not only taught me how important colostrum is to newborn piglets but it also let me learn more about split suckling. Before I did this experiment, I didn't think there would be anything that would impact a newborn litter. I have learned that there are many things that could impact the growth and health of piglets. While doing this experiment I learned that split suckling is not worth the time in certain circumstances. Some reasons split suckling wouldn't be worth the time would be if the mother has good nipples and is a good milker. Another would be if it isn't a very big litter and there are enough nipples for all the piglets to get colostrum or milk. These are some reasons why split suckling wouldn't be worth the time. Doing this experiment helps our family farm because we now will do split suckling more often on big litters when we think it will be useful. If split suckling continues to have an impact on the health of the piglets, we will tell other pig farmers so they can raise their piglets the best they can. This is how it can have an impact on society. The more people that know about split suckling and the impact it has, the more pig farmers who will be raising their piglets better. This prevents unhealthy piglets and preventable losses.

Future Directions/Improvements-

My science fair project had many hiccups along the way. If I did this experiment again I would do some things differently. One thing I would do differently is start doing my experiment earlier and try to do it three or four times instead of two. This would help get more accurate results. I would also be more organized with my data. When I did my experiment I was unorganized because I had so many different sheets with data on it. I didn't have a good chart to keep track of my numbers. If I would do my experiment again I would have had one sheet for each litter. On it I would record any notes or data about this one specific litter. I would later transfer it to a spreadsheet when all my data/recording was collected. I also would have taken more pictures. I found it hard to take pictures in the moment because I was really busy with the piglets. If I did this experiment again I would try my best to take more photos of the growing stage in between weighing. If I were to continue this project I would do the experiment four to five more times to get a better average. I would also do two-hour intervals instead of one-hour because my mentor Ken said it would have a clearer effect on the outcome. It would also be way easier to continue with this experiment because there would be no deadline. I could choose which litters I would want to do. Also, I would be doing it more "for fun" so there would be less time stress and I could pick and choose the litters more easily. I am happy with how my science fair project went and I have learned a lot about colostrum and split suckling.

Acknowledgements-

There are a few people who have helped me so much with my experiment and project. One person would be my dad. He helped me in the barn and helped me with my research numbers. My dad's interest and knowledge about the piglets helped me along the way. He encouraged me to do my best and work hard. My mom was also a big help. Mom helped with the written report and editing. Mom encouraged me to keep going even when I was overwhelmed. The last person who helped me is the farm's

swine nutritionist, Ken VanderHeyden. He gave his opinion and expertise on split suckling and colostrum. He also read my results and gave me some ideas with how I could improve if I did this experiment again. Thank you mom, dad and Ken for helping and supporting me throughout my whole science fair project, I couldn't have done it without you.

Bibliography-

"Colostrum Management for Pigs." AHDB,

ahdb.org.uk/knowledge-library/colostrum-management-for-pigs#:~:text=Piglets%20are%20born%20with%20little%20energy%20and%20very%20few%20protecting%20antibodies.&text=Colostrum%20is%20the%20first%20milk,to%20that%20representing%20so%20w%20milk.

"Importance of Pig Colostrum." Purina Animal Nutrition,

www.purinamills.com/swine-feed/education/detail/importance-of-pig-colostrum.

"Maximising the Production of Colostrum." The Pig Site, 17 Feb. 2021,

www.thepigsite.com/articles/maximizing-the-production-of-colostrum.

"Tips for Managing Newborn Piglets." The Pig Site, 17 Feb. 2021,

www.thepigsite.com/articles/tips-for-managing-newborn-piglets.

Material List-

- Cart
- Box/Divider
- Pig markers
- Data sheets
- Timer
- 13 litters of pigs to do the experiment on

Procedure-

= The 4 litters I will do split suckling to

= The 4 litters that I will be comparing/control

- On the day of the experiment I will bring to the barn...
- My sheets for the Data
- A cart for the pigs to be in while not drinking
- 2 different colored pig markers (red, green)
- A watch with a timer for timing drinking intervals
- Paper and pen for writing any extra information
- When the first Pig is born I will...
- Make sure it gets put on the heating pad
- Write down what time it was born
- Mark it with the green marker
- Repeat this pattern with all the pigs in this litter and the other 3 litters if they are born
- When they are all born split them into two groups

=Green- First half born

=Red- Second half born

- Weigh each litter in a cart (both split suckled litters and control litters) and write the weight of all of them together down under: Newborn Weight (Subtract the weight of the cart)
- Each group(green and red) will get two intervals of 1 hour at a time
- Then record the data into the google spreadsheet you have prepared
- For all litters I will weigh them when they are weaned
- I will write down the weight for the designated area (Weight weaned:) in my spreadsheet
- Then make sure all the data is recorded on the google sheet you made earlier and make it clear on the google sheet the 4 litters you did split suckling on and the ones you didn't, make sure all of your information is sectioned by each litter.

