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# Effectiveness of Pet Remedy in reducing aggression in pigs

Caroline Harper Bsc.



## Abstract

Aggression in pigs is commonly seen in farmed environments due to their continuous regrouping and need to establish a hierarchy. As a result of this, poor welfare indicators such as skin lesions, high cortisol levels and growth reduction are commonly seen. Pet Remedy is a product available which promotes itself in reducing stress and anxiety aimed at companion animals. This posed the question, could this product reduce aggression in pigs? To see if aggression in pigs can be reduced, 3 Large white, landrace and large white x landrace weaner piglets (*Sus scrofa*) from 3 groups of up to 40 were observed for 45 minutes with no addition, then for 45 minutes with cloths sprayed with Pet Remedy placed around the enclosure. Behavioural observations for state behaviours were taken at 1minute intervals, whilst event behaviours were observed continuously. Results showed that aggressive behaviour did decrease after the addition of Pet Remedy ( $P=0.000$ ) whilst resting behaviours increased ( $P = 0.000$ ). These alongside the other results supported the alternate hypotheses. These findings can provide a framework for future research and can begin the work needed to increase the quality of welfare of our farmed pigs.

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## 1. Introduction

Aggression in pigs is commonly seen in their natural environments when establishing hierarchy, and whilst driving other pigs out of their territory (Clark & D'Eath, 2013) however, this natural behaviour is increased dramatically in pigs under commercial production (Turner et al., 2017). In the livestock industry, aggression seen between housed pigs has long since raised concerns relating to the animals welfare, though little efforts have been made to reduce these behaviours (Marchant-Forde & Marchant-Forde, 2016). This behaviour is most prominent when pigs are grouped together for the first time, after being removed from the sows at a young age and aggression is shown in order to establish a dominance hierarchy within the group. However, most livestock pigs are regrouped with different individuals in unfamiliar surroundings, multiple times during their lives dependent on their commercial viability, resulting in a constant cycle of aggression (Camerlink & Turner, 2016). Increased aggression has proven to cause a higher occurrence of injury resulting in skin lesions on the pigs (Turner et al., 2006), stress (Escribano, Gutiérrez, Tecles, & Cerón, 2015) and reduction in growth rate (Camerlink, Bijma, Kemp, & Bolhuis, 2012).

Some research has been carried out in terms of reducing aggression seen in pigs. One of these found that by socialising groups of piglets pre weaning, shorter, though more intense, bouts of aggression were seen, resulting in hierarchy being established far quicker than un-socialised pigs (D'Eath, 2005). A later study supported their hypotheses and showed that fewer bouts of aggression were seen and for shorter intervals than in those who had not been socialised pre weaning (Verdon, Morrison, & Hemsworth, 2016).

Pet Remedy is a natural calming agent commonly used on companion species. One of the main components is valerian oil, which is used in humans as a mild traditional sedative to treat anxiety, stress and insomnia (Safaralie, Fatemi, & Salimi, 2010). This is blended with calming herbs basil, sage and vetiver (Pets at home LTD, 2017) and works by enhancing GABA (Gamma Amino Butyric Acid) production in the brain which then transmits to the nerves resulting in calming effects (Barklett-Judge, 2016). Clinical trials on their website suggest that the product does have a positive effect on companion animals behaviour (Barklett-Judge, 2016). However one particular study did not appear to reduce any stress indicators in dogs and further research was suggested (Taylor & Madden, 2016).

This study will attempt to reduce the aggressive behaviours seen in pigs by using the addition of Pet Remedy to test its calming effects. If proven to do so, this will provide a way of improving the welfare of livestock pigs

### Null hypothesis

- The addition of Pet Remedy to an enclosure will have no effect on the behaviour of the pigs.

### Alternative hypotheses

- The addition of Pet Remedy will have a significant effect on the behaviour of the pigs compared to pigs which have not been exposed to Pet Remedy.

- The addition of Pet Remedy will show a significant decrease in aggression in the pigs compared to pigs which have not been exposed to Pet Remedy.

## 2. Methodology

### 2.1 Participants:

Across the duration of the study at Sparsholt College, 3 different pens each containing 15 to 40 Large White, Landrace and Large White x Landrace weaner piglets (*Sus scrofa*) were used. From this 3 pigs were randomly selected for each researcher and marked using animal friendly sprays (blue, pink and black), meaning that 9 were studied per session. All subjects are born in captivity and housed in groups of similar ages, they are fed on an adlib basis of concentrate with all husbandry needs met to a high standard. Precautions were evaluated before the procedure of the experiment in the form of risk assessments and ethical review (See appendix A & B) to ensure welfare was never compromised.

### 2.2 Design and Materials:

Pet Remedy is the independent variable used which is a calming agent that contains a herbal remedy suspected to calm a variety of mammals. Small sheets of fabric were placed into the weaner pens on the roof of the sleeping area to be kept out of reach of the animals. Each containing the same amounts of the Pet Remedy solution; 5 compressions per cloth and 4 cloths were placed in the enclosure. The weaners behaviour before and after the provision of the Pet Remedy samples are the dependent variables. An ethogram (see table 1 & 2) containing predicted behaviours of the weaners was referred too during the study with observations being recorded on a behavioural data sheet (Appendix C).

Behaviour (State)	Definition
Solitary walking	Individual is engaging in slow movement from one area to another using all 4 limbs whilst alone.
Group walking	Individual is engaging in slow movement from one subject area to another with at least one other pig.
Solitary Running	Individual is engaging in fast movement from one subject area to another whilst alone.
Group Running	Individual is engaging in fast movement from one subject area to another with at least one other pig.
Obtaining food	Individual uses lips and teeth to transport food item into mouth.
Drinking	Individual consumes water and possible other liquids found within its enclosure.
Mastication (stationary)	Individual uses teeth to grind food whilst standing still.
Mastication (moving)	Individual uses teeth to grind food whilst engaging in locomotion.
Sleeping	Individual's body is in contact with the ground with eyes closed for an extended period.
Resting (lying down)	Individual's body is in contact with the ground whilst awake.
Rooting	Individual uses either its mouth, nose or legs to disturb substrate.
Stationary	Individual not engaging in any other behaviour with no locomotion and eyes open.
Rolling	Individual's body is in contact with the ground and complete or partial revolving from side to side occurs.
Sniffing	Individual repeatedly inhales air through nostrils in direction of interest.
Spook	Individual rapidly runs away from stimuli in the opposite direction in an irrational manner.
Physical interaction (positive)	Individual makes intentional, affiliative contact with another individual.
Physical interaction (negative)	Individual makes intentional, agnostic contact with another individual.
Interaction with object	Individual makes intentional, physical contact with foreign object in enclosure.
Other	Any behaviour not described above.
Out of Sight	Individual not within sight range.

Behaviour (Event)	Definition
Defaecation	Individual excretes faeces.
Urination	Individual excretes urine.

Yawning	Individual opens mouth, with teeth showing and takes a deep, long intake of breath before resigning to ordinary breathing pattern.
Scratching	Individual rubs body repeatedly, either using legs or against an object.
Head shake	Individual repeatedly moves head from side to side.
Muscle twitch	A vibration of muscles under individual's skin causing momentary wrinkles to be seen.
Wind Sucking	Individual grasps and pull a fixed object using teeth. Mouth open with air drawn in and then expelled.
Tail flick	Individual swings tail in repeat motion, side to side or up and down. May have contact with rear.
Ear flick	Individual moves ears in a fast, sudden motion.
Vocalisation (stationary)	Individual produces a varying pitch, volume and array of sounds from its mouth whilst standing still.
Vocalisation (moving)	Individual produces a varying pitch, volume and array of sounds from its mouth whilst engaging in locomotion.

### 2.3 Procedure:

Prior to the investigation, brief literature was investigated into natural pig behaviours to help formulate an extensive ethogram, comprising both state and event behaviours. After the ethogram was finalised, hypotheses were decided upon, highlighting the possible outcomes that were predicted. Once the hypotheses were written up, behavioural recording sheets were designed based around instantaneous focal sampling (sample interval of 1 minute) for state behaviours and ad-libitum continuous sampling for event behaviours. The weaners were observed for a minimum of 30 hours, with equal time given pre and post addition of Pet Remedy, this being 45 minutes before exposure and 45 minutes during exposure. These 30 hours occurred during December 2016 to February 2017, and were sampled to be recorded around the same time of day being 12pm. Each group was selected every 3 weeks due to new groups being introduced from the farrowing house every 3rd Thursday.

Individuals were marked with animal friendly spray so they could be identified at each observation. Once a new group of weaners were moved into the enclosure on a Thursday, recording started and was also repeated on Friday and Monday. They were marked and observed to ensure the controlled variables were kept the same. Four cloths were placed in a 1m<sup>2</sup> diameter from each corner of the bedding area and placed on the roof so it was out of the reach of the animals. Five compressions of Pet Remedy

were sprayed onto each cloth before being placed in the enclosure. When recording the pigs for the first 45 minute interval, behaviours were recorded onto a behavioural data collection sheet which stated that no Pet Remedy was used. This was repeated for the other 45 minute interval and the Pet Remedy used was recorded. When noting the behaviours seen on each of the data recording sheets, the ethogram was referred to which ensured the correct behaviour was recorded. Any behaviours seen which were not described in the ethogram were recorded as other, notes were made to state what the 'other' behaviours were. Throughout the observation any environmental factors which could affect the investigation were recorded. After all data was collected, Microsoft Excel was used to tabulate both state and event behaviours into referable data, pre and post data for state behaviours was put into a graph which forms the activity budget. Then, as out of site was not considered in the final results, behaviours were calculated into the same time scale to allow for complete comparable data. State behaviours were then analyzed using the chi squared method

### 3. Results

There was a significant difference in activity budget of % time spent showing resting behaviour pre the addition of Pet Remedy (9% SD = 4%) and post Pet Remedy (20% SD = 1%) (*See Figure 1 below*).

There was a significant decrease in the activity budget of % time spent showing physical interaction (negative) behaviour from pre Pet Remedy (17% SD= 1%) to post Pet Remedy (7% SD = 5%) (*See figure 1 below*)

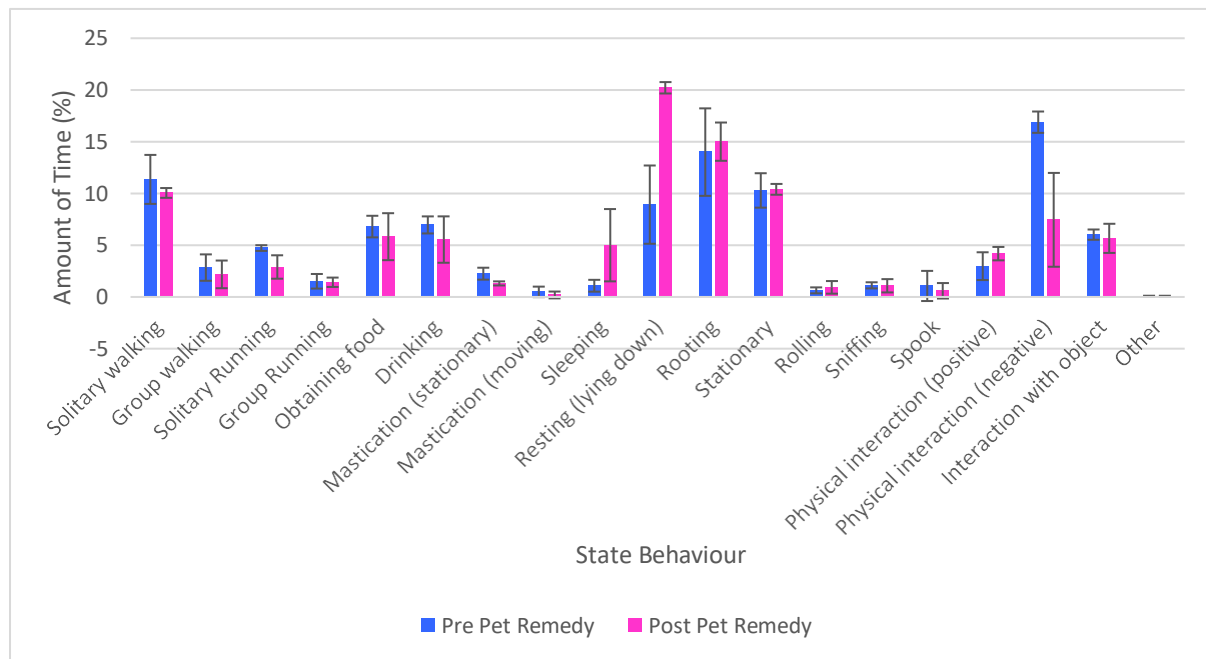


Figure 1 Activity budget - State behaviours

The addition of Pet Remedy to the enclosure caused a significant difference in the increase of the behaviour physical interaction (positive) (Chi-squared = 6.19328, N= 51.5344, DF = 1, P= 0.013). There is also a significant difference seen in the increase of resting behaviour (Chi squared = 146.705, N = 953.910, DF = 1, P =  $\leq 0.0019$ ). Mastication whilst moving and stationary also differed significantly, decreasing after the addition of Pet Remedy (Moving - Chi-squared = 4.02681, N = 21.2505, DF = 1, P = 0.45; stationary – Chi squared = 7.84997, N = 116.202, DF = 1, P = 0.005) as did solitary running (Chi squared = 14.0995, N = 251.55, DF = 1, P = 0.000) (See table 1 below).

There was a significant difference in the decrease of aggressive behaviour (physical interaction – negative) after the addition of Pet Remedy (Chi-squared 117.163, N = 805.135, DF= 1, P=0.000) (See table 1 below).



*Table 1 Chi-squared table - State behaviours*

Behaviour	Pre-enrichment	Post-enrichment	Chi-squared	N value	Degrees of freedom	P value	Significant? - Yes or No
Solitary walking	371.095	330.000	2.40886	701.095	1	0.121	No
Group walking	94.5531	72.000	3.05393	166.553	1	0.081	No
Solitary Running	155.555	96.000	14.0995	251.55	1	0.000	Yes
Group Running	50.835	47.000	0.150327	97.835	1	0.698	No
Obtaining food	221.641	189.000	2.59450	410.641	1	0.107	No
Drinking	229.774	184.000	5.06382	413.774	1	0.024	Yes
Mastication (stationary)	73.2024	43.000	7.84997	116.202	1	0.005	Yes
Mastication (moving)	15.2505	6.000	4.02681	21.2505	1	0.045	Yes
Sleeping	35.584	162.000	80.8812	197.584	1	0.000	Yes
Resting (lying down)	289.90	664.000	146.705	953.910	1	0.000	Yes
Rooting	454.465	491.000	1.41181	945.465	1	0.235	No
Stationary	335.511	341.000	0.0445360	676.511	1	0.833	No
Rolling	21.3507	30.000	1.45685	51.3507	1	0.227	No
Sniffing	36.012	35.000	0.0358072	71.6012	1	0.850	No
Spook	32.5344	19.000	3.55452	51.5344	1	0.059	No
Physical interaction (positive)	99.637	138.000	6.19328	237.637	1	0.013	Yes
Physical interaction (negative)	556.135	249.000	117.163	805.135	1	0.000	Yes
Interaction with object	198.256	185.000	0.458530	383.256	1	0.498	No
Other	2.0334	2.000	0.0002766	4.0334	1	0.987	No

The addition of Pet Remedy saw an increase in the total count of yawning behaviour seen (Pre = 46, Post = 66) and urination behaviour (Pre = 55, Post = 57) All other behaviours saw a decrease in the total count post Pet Remedy (See Figure 2 below)

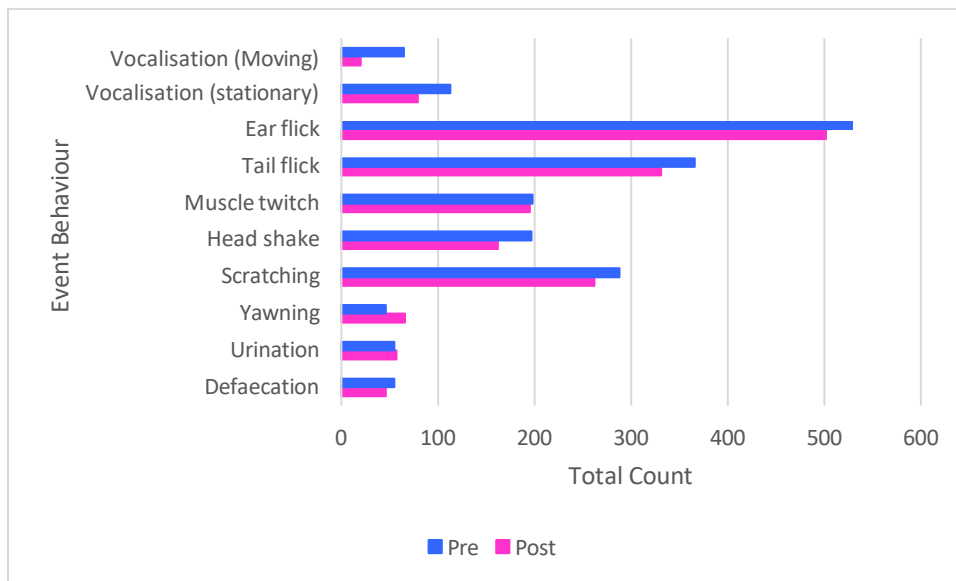


Figure 2 Total count - Event behaviours

#### 4. Discussion

This study's aim was to explore the effect Pet Remedy had on the behaviour of weaner pigs, with a particular interest on the occurrence of aggressive behaviours.

The results found that the addition of Pet Remedy resulted in an increase of physical interaction (positive) and resting state behaviours, whilst showing a significant decrease in mastication (both moving and stationary), solitary running, and physical interaction (Negative) state behaviours. This rejects the null hypothesis that the addition of Pet Remedy to an enclosure will have no effect on the behaviour of the pig, and accepts both alternate hypotheses -The addition of Pet Remedy will have a significant effect on the behaviour of the pigs compared to pigs which have not been exposed to Pet Remedy and the addition of Pet Remedy will show a significant decrease in aggression in the pigs compared to pigs which have not been exposed to Pet Remedy. After the addition of Pet Remedy, the event behaviours urination and yawning increased, whilst other observed event behaviours decreased.

In terms of state behaviours, it can be said that the increase in resting behaviour was due to the calming agents in Pet Remedy (Safaralie, Fatemi, & Salimi, 2010) which would have made the pigs more relaxed, and therefore more prone to resting, this also could explain why the positive interactions increased, as the Pet Remedy agents are said to make the animal less anxious, and therefore more inclined to socialise in a positive manner. Mastication, solitary running, and negative interactions all decreased, this can be explained as a direct effect of the addition of Pet Remedy as the agents would have calmed them, making them less likely to perform behaviours that may take up energy. On to event behaviours, both yawning and urination increased. The valerian oil in Pet Remedy can be used to treat insomnia (Safaralie, Fatemi, & Salimi, 2010), this would have resulted in the pigs yawning, as they felt more inclined to sleep,

which would have a direct correlation with the increase in resting behaviour seen. Urination increasing does not seem to be a result of the addition of Pet Remedy, as it has no bladder stimulants included, and therefore can be put down to chance. The other event behaviours decreasing, again can be put down to the calming effects of Pet Remedy and conservation of energy. There is the some possibility that the presence of the observers had unsettled the weaners, and the observed changes in behaviour are seen due to them settling after the initial disturbance.

A study in 2000, showed that the valerian oil used in Pet Remedy can be used to treat insomnia in patients, finding that it does have sedative effects (Bravo-Valverde, Kaplowitz, & Cott, 2000), whilst it has also been studied to show that it has anxiolytic effects when inhaled by mice (Komori, Matsumoto, Motomura, & Shiroyama, 2006). These two studies both support this reports findings, as it further concludes the effectiveness of valerian oil as a relaxant, however, in the study using humans, the valerian oil was taken as a tablet form, with a control group receiving a placebo, whereas the study with the rats used inhalation, as did this study, however they were tested under laboratory conditions, in comparison with this study being carried out in the pig pen, where external variables could affect results.

Supporting these findings further, a study carried out in 2014 using Pet Remedy in dogs, saw statistically significant differences in behaviour and excitement levels between dogs on a placebo and those on Pet Remedy (Barklett-Judge, 2016), however their methodology varied from this study as the Pet Remedy was used in conjunction with behavioural therapy.

One study found that refutes the findings of this study was carried out in 2016 using dogs, that had, similarly to the mixing of pigs in this study, been placed in a unfamiliar environment. Like the other studies they also used a placebo however found that there were no significant differences in their behaviour indicating a stress response (Taylor & Madden, 2016).

The methods used to carry out this study had both their strengths and weaknesses. Firstly, the use of the ethogram and instantaneous focal sampling (sample interval of 1 minute) for state behaviours provided a clear description of behaviours being monitored, and the sample interval was short enough to ensure that behaviours were not being missed, and focal sampling allowed for higher accuracy of results (Fragaszy, Boinski, & Whipple, 1992; Gilby, Pokempner, & Wrangham, 2010). However it can be noted that due to the way the individual pigs were marked (with an animal friendly spray) there was some rub off of the colour on other pigs due to physical interactions, which may have resulted in some inaccuracy of individuals in the results. The ad-libitum continuous sampling for event behaviours, though does not necessarily produce data valid for complete analysis, does help to in terms of backing up the other data (Lehner, 1992). Each group of weaners were observed for three days, starting on the day of first mixing to ensure that data was collected when aggression and stress due to mixing was at its peak, however, by having a 2 day gap after the initial

observation, it could be said that the weaners may have already established their hierarchy and aggression would be naturally reduced. This could be improved by observing the pigs over a shorter period of time.

As a result of the findings, observed aggression in weaners does seem to be an issue. Future research could be carried out looking into a variety of different calming agents to see which one produces positive effects. Recommendations such as observing pigs in a variety of environments, and over different time-scales could be made to ensure external influences effecting the data can be minimised.

## 5. Conclusion

The aim of this project has been to see whether the addition of Pet Remedy would have an effect on the behaviour of pigs, concentrating on aggressive behaviours seen. Pet remedy is said to contain agents which calm animals, and the results from this study and previous studies in companion animals have shown that the addition of this product in this instance has shown a decrease in aggressive behaviour, and an increase in resting behaviours. Pigs are often exposed to poor welfare standards resulting from the aggression they show in their groups. By reducing the amount of aggressive behaviour in these groups, welfare can be greatly improved. This paper shows that decreasing aggression is a feasible option, as there are products on the market that can aid in doing so. Framework has been set for further research to be carried out, allowing the chance for welfare of farmed animals to be improved.

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## 7. Appendix A

### Project management plan

Meeting type	Topic	Outcome	Date
Project Group	Project proposal	Project decided - The effectiveness of pet remedy in pigs	21/10/2016
Email – Farm manager	Access to pigs	Access permitted – as and when required – no notice needed	10/11/2016
Farm manager	Shown to weaner pig area	Layout of area examined	14/11/2016
Ethical Review	Ethical review	Accepted	18/11/2016
Data collection begins	First data collection	First data collection retrieved	08/12/2016
Data collection ended		Final data collection retrieved	13/02/2017
Data analysis meeting with supervisor	Forms of data analysis appropriate	Data analysis corrected	17/02/2017
Final copy handed in	Report finished	Report ready for marking	10/03/2017

Observation date	Completed
Thursday 08/12/2016	✓
Friday 09/12/2016	✓
Monday 12/12/2016	✓
Thursday 19/01/2017	✓
Friday 20/01/2017	✓
Monday 23/01/2017	✓
Thursday 09/02/2017	✓
Friday 10/02/2017	✓
Monday 13/02/2017	✓