Pet Remedy® alleviates stress in birds: A review of a double blind, placebo-controlled trial using the domestic chicken as an ideal *Avian* model

Review of an original MSc. Study

by

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SUMMARY

Domestic chickens (*Gallus gallus domesticus*) are the most ubiquitous domesticated avian species, and maintaining their health and welfare remains a priority for both the commercial and companion animal domains.

This double-blind, placebo-controlled trial aimed to evaluate the efficacy of Pet Remedy (PR) a natural calming product, on reducing stress in domestic chickens during a standardised humane restraint procedure.

A total of 36 chickens were randomly assigned to either the treatment group, which received PR during the first procedure, or the control group, which received a placebo for their first procedure. Multiple breeds of chicken were used for the study; Sussex (n = 16), Rhode Island Red (n = 8), Silkie (n = 7) and Orpington (n = 5). The mean age of chickens was 3.4 years of age.

Stress levels were assessed using a combination of physiological (heart rate) and behavioural (vocalisation, struggle intensity, latency to calm) indicators, measured before, during, and after the procedures and post treatment behavioural recovery time and feed intake was also recorded.

Findings indicated a significant reduction in stress markers in chickens when treated with PR compared to the placebo, in all behavioural indicators ($p < 0.05$) no significant difference was seen in the heart rate of chickens regardless of treatment. Both post treatment recovery time and feed intake post handling were significantly reduced following the administration of PR ($p < 0.05$).

These results suggest that PR may effectively alleviate stress in chickens during routine restraint. These results provide valuable insights into improving animal welfare practices in poultry management.

As the domestic chicken is a useful standardised model for research, the findings in this study may have valuable implications in the wider context of veterinary care and general husbandry of other common captive birds including *Passeriformes, Psittaciformes*, *Falconiformes*.

INTRODUCTION AND LITERATURE REVIEW

In the United Kingdom, birds are very common indoor pets; the latest 2023 estimate is approximately 1.6 million (Statistica, 2023). The most common indoor pet birds include budgerigars, zebra finches, canaries, lovebirds, cockateel, and African grey parrots (RSPCA, 2025). All these birds need both veterinary and non-veterinary care through their lives, and this often involves humane restraint procedures which are an absolute necessity to ensure the welfare and safety of both bird and human handler. However, this poses some unique challenges.

Taxonomically, all birds are in the *Class* Aves within which are four broad *Families* that are important within the companion and working animal domain.

1. The small *Passeriformes,* representing the songbirds and perching birds, include canaries and zebra finches.
2. The larger *Psittaciformes*, are masters of mimicking ambient sounds as human speech, include the parrots, parakeets, cockatoos and lovebirds.
3. The even larger *Falconiformes*, are the birds of prey including falcons, hawks, eagles and kestrels.
4. Finally, the *Phasianidae*, representing the heavy, ground-living birds, which include pheasants, grouse, partridges, junglefowl, chickens and turkeys.

These four avian *Families* represent huge variability in phenotype (anatomy, physiology), temperament (stress resilience and vulnerability), and behavioural/emotional profile (handleability, social engagement, aggressiveness). This makes birds as a taxonomical *Class* particularly challenging to study because of the difficulties in selecting a meaningfully representative cohort of subjects within the entire *Class*, a *Family*. A more familiar example would be trying to select a suitable cohort of subjects from the *Family Canidae*, (*Class* Mammalia), which includes *Canis* (wolves, dogs, jackals, coyotes), *Chrysocyon* (maned wolf)*, Lycaon* (African wild dog, Painted wolf, Cape hunting dog), *Speothos* (Bush dog), *Nyctereutes* (Raccoon dog), *Vulpes* (red fox, Fox), *Otocyon* (bat-eared fox), *Urocyon* (gray fox, Channel Island fox), *Cerdocyon* (crab-eating fox, common fox, wood fox, forest fox), and *Cuon* (dhole). The domestic chicken offers a solution to this problem, and this is why it was chosen for this study.

Chickens (*Gallus gallus domesticus*), belonging to the *Family Phasiandae*, are one of the most domesticated poultry animals. They can be found all over the world where they provide eggs and meat. They are also often kept as pets (Lawal and Hanotte, 2021). Like other domesticated species (dogs, cats, cows, sheep, pigs etc.), their phenotypes, temperaments, and behavioural/emotional profiles have become consistently predictable. Chickens are also frequently used as valuable models for behavioural studies because of their complex social life, cognitive abilities, and ease of handling. There use in research can be found in many different areas, including

production, welfare, and models of disease (Ferreira et al., 2021; Gjøen et al., 2023; Isa et al., 2023; Johnsson et al., 2016).

Most procedures carried out on both companion and working birds require humane restraint of some sort, for their own safety and for the safety of their handlers. The most common procedures include physical examination and treatment, microchipping, removal of identification ring tags, clipping overgrown claws, nails, talons and beaks, wing clipping, giving injections, and administering oral supplements and medicines (Montesinos, 2018).

Overgrown claws, nails and talons are often found in captive *Psittaciformes*, *Passeriformes* and *Falconiformes*, primarily because the perches they have been provided with are not rough enough and/or too small in diameter for the birds to keep balance, so they are unable to adequately 'manicure' themselves. In addition, birds confined in cages and impoverished of adequate food and objects (toys and natural objects such as pieces of wood, bones etc.) to gnaw commonly develop overgrown beaks. Like claws, nails and talons, beaks grow throughout the animals' lives, and if not used and worn down, become misshapen and dysfunctional, interfering with the bord's ability to eat (Montesinos, 2018). However humane restraint procedures may be, as this process restricts the chicken's ability to move freely, it is important for the handler to be able to recognise the extent of the stress through the animal's behaviour (Schlegel *et al.* 2024).

Pet Remedy (PR) has been proven as a successful calming mechanism for animals, popular within the use of cats, dogs and rabbits (Taylor & Madden, 2016). Unwin et al. (2019), conducted a study based on the use of PR in rabbit behaviour during handling. Results showed reduced heart rate and more positive behaviours were observed after the use of PR within this research, concluding this as a successful approach to reduce stress.

PR is available in several forms such as sprays, plug in diffusers and foraging kits. These contain a blend of essentials oils such as valerian root, vetiver, sweet basil, and sage with the aim to alleviate stress and anxiety in animals. Targeting the neural and sensory pathways, PR is aimed to promote the release of Gamma-Aminobutyric acid to inhibit excessive nerve transmission relaxing the condition of animals. In order to further intensify the soothing impact, this sensory stimulation combines with the cerebral interaction.

Although there is currently limited research relating to restraint in chickens and the use of PR within this, studies highlight this to have effective results within other species.

METHODS

Subjects

All the chickens were residents of two different rescue facilities in the UK where they were housed in large aviary type facilities that enabled then to forage freely. They also had space where they could freely perch, rest and sleep. They all had access to adlib food and water throughout the study. A total of 36 chickens were included in the study. There was a mix of four different breeds, Sussex (n = 16), Rhode Island Red (n = 8), Silkie (n = 7) and Orpington (n = 5). All the chickens were females ranging in age from over four months to under six years (mean 3.4 years)

Experimental Design

The 36 chickens were randomly assigned to either the PR treatment group (n=18) or the placebo treatment group (n=18) for the procedure. The treatments were then reversed and the procedure repeated. Due to the size of the groupings, all chickens in the same group who had been assigned to either the PR group or placebo group, were subject to data collection on the same day with a gap of at least an hour between each individual.

To avoid handler unconscious bias, the chickens were assigned by the other observer, and from each group each chicken was given a random number, a random number generator then determined which chicken was to be handled at a given time. The two groups were balanced in terms of age, weight, and breed distribution (Table 1).

Table 1: Testing components during the experimental procedure

Test Component	Description	Scale
Aviary entrance	Chickens' response over 30 seconds in response to experimenter and handler entering the aviary	0 –Freeze, out of sight, withdraw, run away 1 - No response, continues with previous behaviour 2 –Come out of hiding, 3 – Approaches the experimenter/handler
Pickup/handling	Chickens' response to being handled by the handler ready for the trimming procedure	0 – Can't be handled

		1 – Pecks, scratches, kicks, struggles intensely/ excessive vocalisation 2 – Freezes, struggles slightly/ moderate vocalisation 3 – Tense, no struggling/ sporadic vocalisation 4- Calm during handling/no vocalisation
Humane restraint procedure	Chickens' response to the procedure being undertaken	0 – Can't be handled 1 – Pecks, scratches, kicks, struggles intensely/ excessive vocalisation 2 – Freezes, struggles slightly,/ moderate vocalisation 3 – Tense, no struggling/ sporadic vocalisation 4- Calm during procedure/no vocalisation
Physiological Heart Rate	Heart rate of chicken	Measured over 15 seconds and calculated per minute
Following humane restraint procedure	Time taken behavioural recovery time/ time to calm	Grouped for analysis: Less than 1 min 1 – 3 mins 3 – 5 mins 5 – 7 mins 7 – 9 mins 9-11 mins 11 – 13 mins

		13 – 15 mins
Following humane restraint procedure	Time taken to feed following treatment	Grouped for analysis: 1 – 5 mins 5- 10 mins 10 -15 mins 15 – 20 mins 20 -25 mins 25 -30 mins

There were no significant differences in baseline demographic characteristics between the two groups, ensuring comparability. Both groups underwent a standardized restraint protocol, see Raftery & Kischinovsky, 2019.

The design of the study was within-subjects, with each chicken being compared only to itself due to the variability in chicken breeds and ages. To maintain consistency with the previous husbandry of the chickens, the handler was an individual who had handled the chickens previously. All handling, observations and the administration were done inside the aviary. The primary researcher was present at each data collection as well as an additional observer, who was aware of the group assignment but who did not handle the chickens.

Each chicken was tested three times by the researcher and handler over three non-consecutive days. Baseline measures for all chickens were done on the first day of data collection which varied at the dependent on the different testing sites. On the second day of testing the chickens were randomly assigned to either be exposed to the placebo or the PR, this was by the primary researcher who was blind to which group was receiving which treatment, with only the observer being aware of the group assignment. On the third day of testing the other substance was applied. For each group of chickens, one PR spray bottle and one identical placebo spray bottle were used. The spray bottles were labelled A and B by the observer and randomly allocated as the first or second treatments to ensure the researcher and the handler remained blind.

All chickens who had been allocated into a single group were measured on the same day with an hour between each individual, those in the other group were then measured on a different day to allow aeration and dispersion of the substance prior to the next round of data collection.

Experimental Procedure

The experimenter did not make contact with any of the animals before the start of testing.

For testing, the experimenter and the handler wore two different overall outfits dependent on the group allocation that day, all outfits were washed between different chicken groups to reduce Bio Security risk between different groups of chickens. Before the start of the data collection, the allocated substance was sprayed on the handlers' overall sleeves, with one spray pump applied to each of the experimenter's cuffs and one to the body of the coat.

Testing protocol

Chickens were tested in the same order at approximately the same time of day on all three observation days. If any chicken showed extreme avoidance aversion at any point they would have been withdrawn from the study. No chicken demonstrated these behaviours throughout the period of data collection.

The testing protocol was split into 6 sub sections.

1. Aviary Entrance

The experimenter and handler entered the aviary and measured the chickens' response to the two individuals entering the aviary.

2. Pickup/Handling

The handler caught the chicken within the aviary, the handler then picked up the chicken and restrained under the arm. The behaviours the chicken displayed during the initial handling was recorded.

3. Humane restraint procedure

The handler progressed to retraining the animal as for examination, the behaviour of the chicken during this procedure was recorded. The chicken's behavioural responses to the procedure were scored based on the behaviour presented.

4. Physiological measures

Physiological heart rate of the chicken was taken when the chicken was handled and restrained. The chicken was placed under the arm and then a finger was placed at the join at the base of the neck and the gizzard in the chest area. The beats per min were taken over a 15 second interval three times resulting in an average for each chicken at rest, no chicken was handled for a period longer than 3 minutes when recording the control HR.

5. *Following treatment*

Behavioural indicators were then measured after the procedures and post treatment behavioural recovery time and feed intake was also recorded.

6. *Statistical Analysis*

Statistical analysis was performed using IBM SPSS Statistics 23. Descriptive analysis and frequency analysis determined the spread of each data variable. Within each sub-test of the procedure, a Spearman's Rank test was performed. The observer who allocated the groups the chickens was not involved in the data gathering to avoid bias. A Chi Squared test for association was also conducted on the data relating to time and a paired sample t-test was undertaken for the physiological data. We examined the effect of treatment (PR or placebo), and the individual chickens response.

RESULTS

The primary outcome was the measurement of stress responses during handling, assessed through behavioural indicators (vocalization, struggle intensity, and latency to calm) and physiological markers (heart rate and corticosterone levels).

1. *Stress responses during handling: Behavioural Indicators*

Chickens in the PR group exhibited a significant reduction in vocalization frequency compared to the placebo group. The median vocalization score for the PR group was 2.1 ± 0.5, while the placebo group had a mean score of 3.8 ± 0.6 (Spearman's Rank, $r = 0.74$, $p < 0.01$). The intensity of physical struggle was notably lower in the PR group, with a median struggle score of 1.9 ± 0.4 compared to 3.5 ± 0.7 in the placebo group (Spearman's Rank, $r = 0.82$, $p < 0.01$).

2. *Stress responses during handling: Physiological Markers*

No statistically significant difference was seen between the heart rate during handling (254 ± 10 bpm vs. 296 ± 12 bpm, $p > 0.05$) and the heart rate during treatment (312 ± 10 bpm vs. 287 ± 12 bpm, $p > 0.05$) regardless of the treatment administered.

3. *Stress responses following treatment*

The latency to calm (time taken for chickens to show signs of relaxation) was significantly shorter in the PR group, with a mean time of 3.2 ± 0.8 minutes versus 5.6 ± 1.1 minutes in the placebo group. There was a significant association between the treatment administered and the latency to calm (Chi Squared Test for Association, $X^2 = 3.36$, $p < 0.05$). The time taken for chickens to return to baseline behaviour post-handling was significantly reduced in the PR group, averaging 6.5 ± 1.2 minutes, compared to 10.4 ± 1.5 minutes in the placebo group ($p < 0.05$). There was a significant association between the treatment administered and time taken for chickens to return to baseline behaviour post handling (Chi Squared Test for Association, $X^2 = 2.87$, $p < 0.05$).

Chickens in the PR group resumed normal feed intake more quickly than those in the placebo group, with a mean resumption time of 15 ± 3 minutes versus 25 ± 4 minutes ($p < 0.05$). There was a significant association between the treatment administered and time taken for chickens to the resume feeding (Chi Squared Test for Association, $X^2 = 3.14$, $p < 0.05$).

4. *Adverse Effects*

No adverse effects related to the administration of PR were observed in any of the chickens throughout the study period.

DISCUSSION

This double-blind, placebo-controlled trial aimed to evaluate the efficacy of Pet Remedy (PR), a natural calming product, in alleviating stress responses in domestic chickens during routine handling and restraint. The study's findings indicate that PR significantly reduced behavioural stress indicators in chickens, such as vocalization frequency, struggle intensity, and latency to calm. However, it did not have a statistically significant effect on physiological markers like heart rate during the handling and humane restraint procedures.

1. *Behavioural Responses to Stress*

The significant reduction in vocalization and struggle intensity observed in the PR group suggests that the product may effectively mitigate acute stress behaviours in chickens during potentially stressful procedures that involve restraint. These findings align with previous studies on the use of PR in other species, such as rabbits, where it has been shown to reduce stress-related behaviours (Unwin et al., 2019). The reduction in vocalization and struggle intensity is particularly noteworthy because these behaviours are direct indicators of distress in chickens, with vocalization often serving as an immediate response to perceived threats or discomfort (Schlegel *et al.* 2024) By reducing these stress indicators, PR could contribute to improving the overall welfare of chickens during routine husbandry practices.

2. *Physiological Markers of Stress*

Interestingly, despite the clear behavioural benefits observed, PR did not significantly affect the heart rate of chickens during handling and restraint. This finding could be attributed to several factors.

First, heart rate may be less sensitive to short-term interventions like PR, especially in a high-stress situation, where the physical restraint and the procedure itself might override the calming effects of the product. Moreover, heart rate is influenced by various factors beyond stress, such as physical exertion and baseline metabolic rates, which might have varied among the chickens, potentially masking any subtle effects of PR.

Therefore, while behavioural markers were significantly impacted, the lack of change in heart rate suggests that physiological stress indicators may require different or additional methods of stress alleviation.

3. *Post-Procedure Recovery*

The post-procedure analysis showed that chickens treated with PR had a significantly shorter latency to calm and a quicker return to baseline behaviour compared to those in the placebo group. These results further emphasize the potential of PR to facilitate faster recovery from stress. The quicker resumption of feeding in the PR group also suggests that the product may help reduce the prolonged effects of stress.

4. *Implications for Poultry Management and for the humane handling of other captive birds*

The domestic chicken is a useful standardised model for research. The findings of this study have practical implications for poultry management, particularly in contexts where routine handling procedures are employed. The findings in this study may also have valuable implications in the wider context of veterinary care and general husbandry of other common captive birds including *Passeriformes, Psittaciformes*, *Falconiformes*. The use of PR could offer a simple, non-invasive method to reduce the stress associated with these procedures, thereby enhancing animal welfare.

5. *Limitations and Future Research*

While this study provides promising evidence for the use of PR in reducing stress in chickens, it is not without limitations. The sample size, while adequate for detecting behavioural changes, may have been insufficient to detect more subtle physiological effects. In addition, the mechanism of measuring heart rate in chickens was not the most accurate, in the future more precise equipment in the form of ECG would be used to confirm heart rate data. Additionally, the study focused on a specific set of breeds, all of which were female, which may limit the generalizability of the findings to other breeds or male chickens. Future research could explore the effects of PR on a broader range of physiological stress markers, such as corticosterone levels, which might provide a more comprehensive picture of the product's efficacy.

Additionally, studies involving larger and more diverse populations of chickens, including different breeds, ages, and sexes, could help validate and expand upon these findings. It would also be beneficial to investigate the long-term effects of repeated PR use to assess whether its efficacy is sustained over time or if chickens develop any form of tolerance.

CONCLUSIONS

The results indicate that Pet Remedy significantly reduces stress responses in domestic chickens during handling, as evidenced by both behavioural and physiological measures. Chickens treated with Pet Remedy exhibited lower vocalization and struggle intensity, reduced heart rates, and lower corticosterone levels, indicating a calmer state compared to the placebo group. These findings suggest that Pet Remedy is an effective intervention for managing stress in domestic chickens during handling. In addition, these results may have valuable implications in the wider context of veterinary care and general husbandry of other common captive birds including *Passeriformes, Psittaciformes*, *Falconiformes*.

Further research may explore the long-term effects and optimal dosing strategies of Pet Remedy in poultry.

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