



A case of adult cannibalism in BALB/c mice and the effect of Eucalyptus oil as a treatment

Yogita Shete^{1*} Sandip Basu²

¹Shete, Animal House Facility, RMC Parel, Mumbai-12

²Head, RMC, BARC, C/O Tata Memorial Hospital, Parel, Mumbai-12

ABSTRACT

Eight-week-old male and female BALB/c mice that were procured and kept for quarantine experienced 10% mortality in males and 3.3% in females from the second day onwards with partially mutilated carcasses in both cages. Considering the stress due to travel Vitamin C was provided in the drinking water from day 4. The percentage of mortality was reduced as compared to the first day however mortality continued to 5th day. Furthermore, the application of eucalyptus oil in the cage and animal body surface of the animals for one week repeatedly results in a substantial decrease in % mortality in male and female mice.

Keywords: Adult BALB/cmice, cannibalism, Eucalyptus oil, vitamin-C

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CASE HISTORY

8 to 9 weeks old, male and female BALB/c mice(no.170) were procured with a mean body weight of 18 - 20 g and a traveling duration of 1hr. They were housed for quarantine in the institutional animal house facility (106/GO/RBi/S/99/CPCSEA) in the Polycarbonated cage system. The mice were maintained under a controlled environment of $23 \pm 1^{\circ}$ C., and humidity of $65 \pm 5\%$ in a 14 h light/10 h dark cycle. The animals were provided standard gamma irradiated pelleted feed and filtered drinking water ad- libitum. Animals were housed in sufficient corncob bedding material in a cage of 4 to 5 animals with a cage

change frequency of 3 times a week. We observed 3.3% and 10% mortality in the female and male animals from the second day of the quarantine. These animals were handled by an experienced personnel hence, handling stress and husbandry issues were nullified here. Further, the pelleted feed was provided directly inside the cage in a small stainless-steel bowl to meet the nutrient requirement so cannibalism can be controlled. However, cannibalism was persistent in the colony even on 4th day of quarantine. We assumed that environmental change could influence aggression and stress in the animals and vitamin C was provided in the drinking water to all the animals and observed if mortality could diminish. However, the

*Corresponding author.

E-mail address: yogeshwarivet@gmail.com

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percentage of mortality remains same in males and there was partial reduction in females till the 5th day of quarantine. Finally considering overall history of death patterns in males and females, a strong-smelling eucalyptus oil was applied in these animals to see if it could prevent cannibalism. For this purpose, eucalyptus oil swabs were applied inside and outside the cage and on the body surface of the animals once daily for 7 days to see its effect in cannibalism.

RESULT AND DISCUSSION

The current case study elaborated about the rare case of cannibalistic activity seen in the caged adult Balb/C mice. **Figure 1** represents the percentage of mortality from day one in both male and female mice and **Figure 2** represents the effect of eucalyptus oil in reducing mortality patterns in both the sex. **Figure 3** represents the partially eaten carcasses observed in the male and female cages with one or two live animals remained in the cages during the second day of quarantine. Cannibalism is multifactorial problems in laboratory animal house. The altered behaviour in rodents (cannibalism) may occur due to overcrowding, malnourishment, olfactory, physical and auditory stress, cage change frequency, handling, etc (Mayntz & Toft, 2006). All animal husbandry-associated activities were ruled out in the current case of cannibalism. A change in the environment or housing might result in extra stress on the animals (Burn & Mason, 2008), and could be one of the reasons. However, the standard routine protocol is followed in our facility like housing, cleaning and feeding the colony animals. The percentage of cannibalism and mortality was higher in male mice as compared to the female mice. This could be the more aggressive and competitive behaviour of male animals than female mice (Lacey et al., 2007). The other reason may be due to altered pheromones that disturbs the social status within the group in inbred male mice (Zalaquett & Thiessen, 1991). Besides the effect of Vitamin C supplements through drinking water on mortality pattern was not remarkable but the mortality pattern was reduced in female as compared to male animals. This could be attributed to neuromodulator effect of vitamin C on acetylcholine, dopamine and glutamate function to reduce oxidative stress (Rice, 2000). The reason for animal mortality and cannibalism reason could not be confirmed. However, a possible attempt was made to reduce it by application of eucalyptus oil. On application of eucalyptus oil, the mortality pattern was significantly reduced as compared to day one of quarantine. The possible mechanism could be the strong odour or smell introduced in the animal colony. Animal responds to different odours or pheromones via olfactory bulbs which play a piv-

otal role in the response. Eucalyptus oil may have altered or diluted the effect of other pheromones within the colony. The olfactory bulb plays a key role in emotion, memory, smell and learning ability in rodents. It controls and contributes to behaviour responses due to altered olfactory discrimination in rodents (Polis, 1981). Gandelman, in 1972, reported the role of bulbectomized animals showing altered behaviour in cannibalism in both male and female animals. This was further supported by other rodent studies (Rymer, 2020).

Our attempt to use eucalyptus oil may have diluted or diverted the response due to the introduction of a new strong scent in the colony. The properties of volatiles, dilution in the presence of oxygen and open air, and the antibacterial properties of eucalyptus oil are used as pheromonal changes in the colony. This resulted in lower aggressive behaviour and mortality in both groups. However, substantial research is required to determine the reaction of different pheromones utilizing different age groups and different strains in the animal colonies to comprehend their function in behaviour patterns and brain signaling changes.

This approach of eucalyptus oil application can be explored in breeding colonies to prevent pup loss or similar types of problems. The altered behaviour due to odors is one of the key factors that may transform the experimental results. Similar trials may be conducted to a large extent in breeding, experimental, or combined facilities for further use of eucalyptus oil concerning the welfare of animals

Limitation of the study: Case report observations recorded as incidental findings in animals brought for the experiments. Treatment by introduction of artificial pheromones could be able to achieve desired goal successfully. However, to establish the eucalyptus oil as a remedy in cannibalism in animal colonies extensive study is recommended in different aggressive strains and age groups of mice and rats especially in the breeding colony. It is necessary to determine the further impact on body weight gain, feed consumption, behavioural pattern and reproductive performance.

Authors Contribution : Dr. Yogita Shete: study conception and design, data collection, analysis and interpretation of results. Dr. Sandip Basu: Preparation and scientific inputs in manuscript drafting.

Animal Ethics approval: The project sanction No. BAEC/29/2021.

Conflicts of interest

Authors declare no conflicting interest

REFERENCE:

Burn CC, Mason, GJ (2008). Effects of cage-cleaning frequency on laboratory rat reproduction, cannibalism, and welfare. *Appl. Anim. Behav. Sci.* 114(1-2): 235-247.

Lacey JC, Beynon RJ, Hurst JL (2007). The importance of exposure to other male scents in determining competitive behaviour among inbred male mice. *Appl. Anim. Behav. Sci.* 104 (1-2):130-142.

Gandelman R (1972). Induction of pup killing in female mice by androgenization. *Physiol. Behav.* 9(1): 101-102.

Mayntz D, Toft S (2006). Nutritional value of cannibalism and the role of starvation and nutrient imbalance for cannibalistic tendencies in a generalist predator. *J. Anim. Ecol.* 75(1): 288-297.

Polis GA (1981). The evolution and dynamics of intraspecific predation. *Ann. Revi. Ecol. Systems.* 12(1): 225-251.

Rice ME (2000). Ascorbate regulation and its neuroprotective role in the brain. *Tre. Neurosci.* 23(5):209-216.

Rymer TL (2020). The Role of olfactory genes in the expression of rodent paternal care behaviour. *Genes.* 11(3):292.

Zalaquett C, Thiessen D (1991). The effects of odors from stressed mice on conspecific behaviour. *Physiol. Behav.* 50(1):221-227

Figure 1. Percent mortality of the mice during the quarantine period

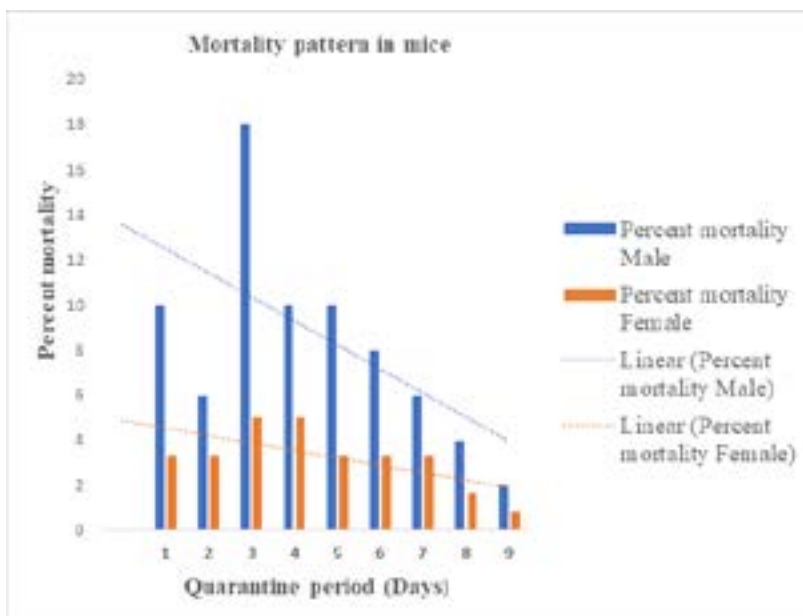
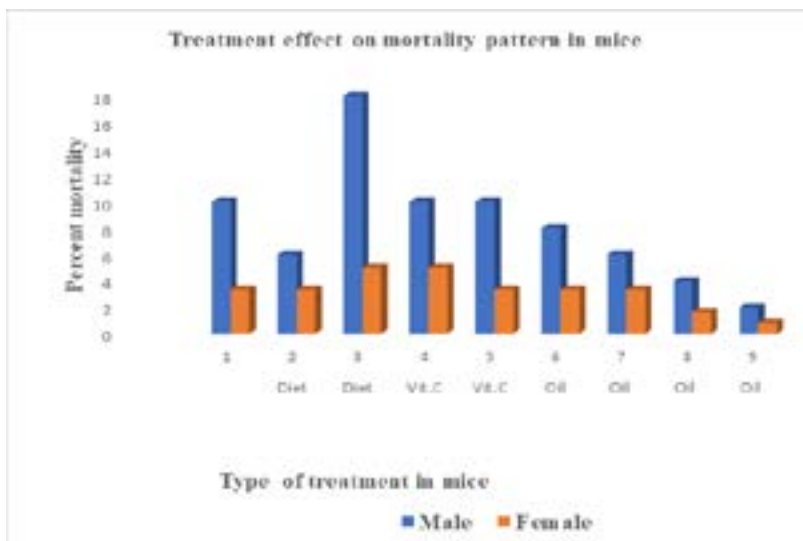


Figure 2. Effect of treatment and reduced mortality of the mice.



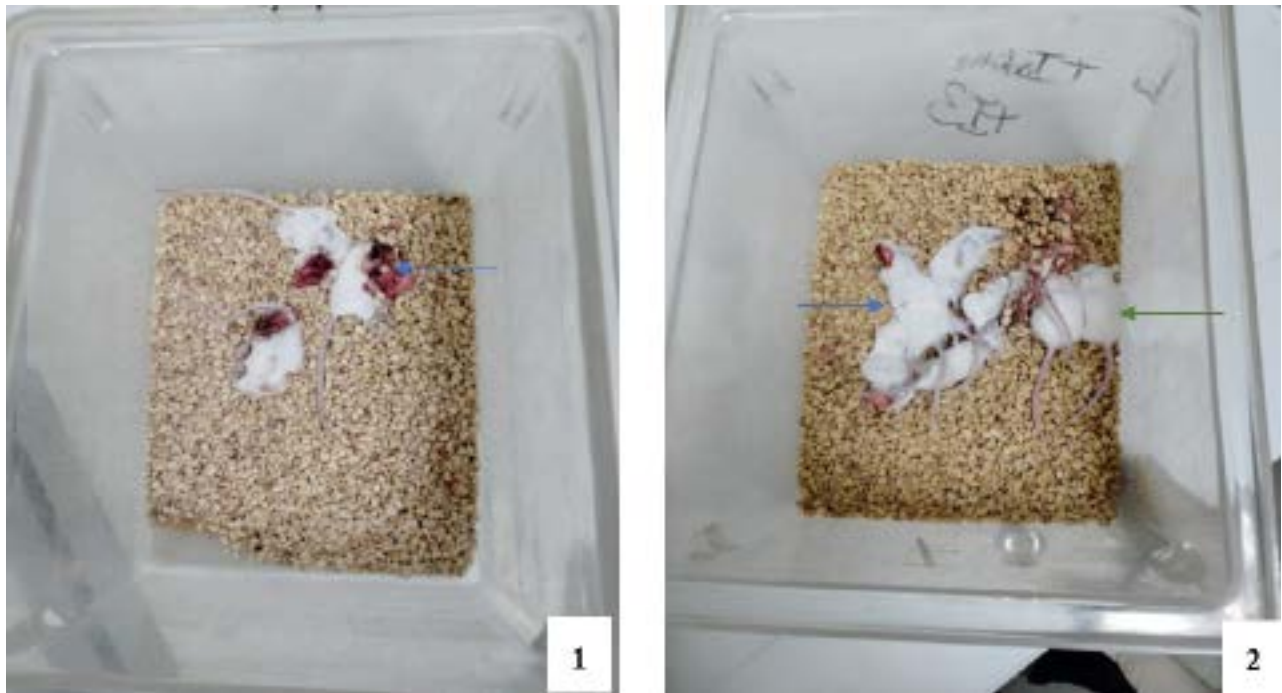


Figure 3. Cannibalism in Mice: Cage No.1: Cage with dead partially eaten carcasses (blue arrow), Cage No.2: Partially eaten carcasses (blue arrow), Live animal seating near to them (green arrow).