

Ethnoveterinary Therapies for Management of Foot & Mouth Disease

Santwana Palai^{1*} and Arpita Priyadarshini²

^{1*} Assistant Professor, Department of Veterinary Pharmacology & Toxicology, College of Veterinary Science & Animal Husbandry, OUAT, Bhubaneswar, Odisha

²UG Scholar, BVSc & AH, College of Veterinary Science & Animal Husbandry, OUAT, Bhubaneswar, Odisha

ARTICLE ID: 19

Introduction

This viral illness affects farm animals and is very contagious. Lesions in the mouth, foot, and mammary glands are the most common manifestations of this disease. When an animal is milking, its milk yield drastically decreases; nursing calves typically die; pregnant animals may abort; and after an abortion, sterility may result (Amir et al., 2023).

Causes

Apthous, a virus belonging to the Picornaviridae family, is responsible for this disease. It contains seven serotypes that are immunologically distinct: O, A, C, Asia1, SAT1, SAT2, and SAT3. The virus is rapidly rendered inactive when exposed to temperatures over 56°C and outside of the pH range of 6.0 to 9.0. However, it can persist for a substantial amount of time when linked to animal protein, such as in infected milk, where it can withstand 15 seconds of pasteurization at 72° C. The virus is immune to chloroform, ether, and alcohol (Li *et al.*, 2023).

Mode of Transmission

Most often through direct or indirect contact between animals that are susceptible and those that are afflicted. primarily by transferring animals that are clinically afflicted. Via use of inanimate vectors like cars, food, utensils, equipment, etc., via aerosol route. Animals that are infected emit a lot of aerosol virus, which can spread to other animals through their mouths or respiratory systems. The virus may travel 300 km by sea and up to 60 km by land. all excretions and secretions, including urine, feces, and saliva, from the afflicted animal. Up to four days before any clinical symptoms manifest, the virus can be found in milk and semen. Calves have contracted the illness from contaminated milk. This virus can live for fourteen days in dry feces during the summer, six months in slurry during the winter, ninety-nine days in urine, and three months in the summer and twenty-eight days in the soil during the winter.

primarily by consuming raw or undercooked milk, as well as contaminated meat and meat byproducts. via medical professionals, tourists, and animal handlers. When an animal recovers from an infection, the majority of them continue to be carriers. The virus may spread from one animal to another through the carrier. For six to twenty-four months, carrier cattle may carry the virus in their esophageal-pharyngeal fluid.

Clinical symptoms

- Anorexia and a high temperature up to 104–106°F (41°C).
- excessive salivation, with lengthy, ropy strings of saliva dangling to the ground.
- The animal stamps its feet and injures its legs' interdigital spaces before becoming lame.
- oral lesions and ulcers.
- Lip-smacking.
- Mammary gland's vesicles (Yi *et al.*, 2022).

Preventive measures

- Farm animals receive routine vaccinations; the first dosage is given at three months of age, and the second dose is given thirty days later. then carried out once every six months, ideally in April or May.
- All the animals in a region or community must receive vaccinations at once.
- To limit the FMD outbreak, ring vaccinations and border immunizations can safeguard areas free from the disease.
- It is recommended that only vaccinated animals, and only those obtained after 15–21 days of vaccination, are to be introduced into the village from outside sources.
- No buying of animals from regions where disease is prevalent.
- Purchases of new animals should be done six months after the epidemic.
- Cattle fairs shouldn't permit the entry of unvaccinated animals.
- Severe quarantine guidelines for animals should be followed.
- A foot bath can be made at the farm's or village's entrance.
- It is always preferable to buy or obtain fodder from a location where FMD hasn't been reported in the last six months or so (Dabasa and Abunna, 2021).

Suggested first aid and Treatment

- The FMD affected animals should be put apart from the others.

- The FMD affected animals' mouths and feet should be cleaned three to four times a day with an antiseptic mouth wash containing 1% potassium permanganate (KMnO₄).
- Glycerine can be applied on top of the lesions.
- Soft food and clean water must be provided to the affected animal.

Treatment

Consultation and treatment with antibiotics should be done by a licensed veterinarian. Antipyretics, painkillers, ectoparasiticides can be given as per advice of veterinarian

Ethnoveterinary approaches to FMD

- The mixture of neem leaves, turmeric, sesame oil or coconut oil are mixed to be applied on FMD wounds on foot of affected cattle.
- A paste of marigold or orange jasmine leaves can be applied on the maggoted FMD wound on feet of animal.
- The FMD lesions can be rinsed with soda ash solution to eliminate the necrotic tissue, after which finger millet flour and raw honey can be applied to the cleaned lesions (Gakuya *et al.*, 2011).
- Also, herbal preparations suggested by National Dairy Development Board can be used as below [internet source]

For FMD mouth lesions,

- Cumin seeds, Black pepper, Fenugreek seeds, Powdered Turmeric – each 10 gm, Garlic - 4 cloves; Coconut – one; Jaggery- 120 gm.
- The fenugreek, cumin, and black pepper seeds soaked in water for 20-30 mts are blended with turmeric and garlic cloves to a fine paste. 1 full grated coconut and jaggery are added to the paste and mixed by hand. The preparation is applied gently inside the mouth, tongue and palate thrice a day for 3 to 5 days.
- The dose is to be prepared freshly for each application.

For FMD foot lesions/wound

- *Acalypha indica* leaves, Tulsi leaves, Neem leaves, Mehndi leaves – each 1 handful; Garlic-10 cloves; Sesame or Coconut oil - 500 ml; Turmeric powder - 20 g
- All the ingredients are to be blended thoroughly. 500 ml coconut or sesame oil is to be mixed with it and then boiled and cooled.

- After cleaning the FMD wound and the preparation is to be applied directly or bandaged with a medicated cloth. Annona leaf paste or camphorated coconut oil can be applied on the first day (only in presence of maggots).
- All these herbal remedies like leaves of *Acalypha indica* leaves, Tulsi leaves, Neem leaves, and Annona leaves (Figure 1) have phytochemicals in them responsible for FMD lesions healing (Palai *et al.*, 2023).



Figure 1: Ingredients of ethnoveterinary formulation for FMD

Control measures

- As soon as clinical symptoms are identified, infected animals must be immediately isolated, confined, and their movements must be restricted.
- Common grazing pastures should not be used for the grazing of infected animals.
- It is not appropriate to let affected animals drink water from ponds, streams, rivers, etc.
- It is not advisable to let sick animals roam the village with the other animals.
- Movements of sick animal attendants ought to be limited to another farm animal. People should use soap and caustic soda to clean themselves and their possessions if it is not practical.
- When there is an outbreak, the healthy animals should receive care before the sick ones. Individuals should wash themselves and their clothing with a 4% sodium

carbonate solution after ministering to the sick animals. Use a 4% sodium carbonate solution to clean the utensils used to gather milk.

- It is not recommended for calves to be fed milk from infected animals or to be allowed to nurse from their affected mothers.
- Animals that are afflicted can have their mouths cleaned using an antiseptic mouth wash. You can use 1% potassium permanganate solution three to four times a day.
- Animals that are afflicted may have their feet cleaned with a 2% copper sulphate solution. To prevent infection and the growth of maggots on the wound, apply antiseptic lotion and insect repellents.
- It is advised to use sodium carbonate (4%), citric acid, and (0.2%) sodium hydroxide (2%) to disinfect floors, buildings, and any contaminated materials.
- The animal housing should be surrounded by a layer of lime powder.
- At the farm's entrance, a foot bath should be created (Chanchaidechachai *et al.*, 2023).

Reference

- Amir, A., Qadeer, I., Munir, S., Ayoub, K., & Kalsoom, H. (2023). Diagnosis and Vaccination of Animals that are Affected by Foot and Mouth Disease. *Journal of Zoology and Systematics*, 1(2), 58-68.
- Chanchaidechachai, T., Saatkamp, H. W., Hogeveen, H., de Jong, M. C., & Fischer, E. A. (2023). Evaluation of foot and mouth disease control measures: Simulating two endemic areas of Thailand. *Preventive Veterinary Medicine*, 220, 106045.
- Dabasa, G., & Abunna, F. (2021). Review on Epidemiology of Foot and Mouth Disease (FMD) in Ethiopia. *J Trop Dis*, 9, 269.
- Gakuya, D. W., Mulei, C. M., & Wekesa, S. B. (2011). Use of ethnoveterinary remedies in the management of foot and mouth disease lesions in a dairy herd. *African Journal of traditional, complementary and alternative medicines*, 8(2).
- Li, Q., Wubshet, A. K., Wang, Y., Heath, L., & Zhang, J. (2023). B and T Cell Epitopes of the Incursionary Foot-and-Mouth Disease Virus Serotype SAT2 for Vaccine Development. *Viruses*, 15(3), 797.
- Palai, S., Patra, R., Jena, S., Nikunj, M., Sardar, K. K., & Parija, S. C. (2023). A comprehensive review on potential benefits of *Annona squamosa* L. leaves for the treatment of diabetic wounds. *Annals of Phytomedicine*, 12(2), 149-160.

Yi, Z., Pei, S., Suo, W., Wang, X., Huang, Z., Yi, A., ... & Huang, X. (2022). Epidemiological characteristics, routine laboratory diagnosis, clinical signs and risk factors for hand, -foot-and-mouth disease: A systematic review and meta-analysis. *Plos one*, 17(4), e0267716.

