

The clinical evaluation of Ashitex and Imion on oral lesions caused by Foot and mouth disease in cattle

M. Poorkhalily¹, M. Chamani^{1*}, A. Seidavi² and A. Sadeghi¹

¹Department of Animal Science, Science and Research Branch, Islamic Azad University, Tehran, Iran,

²Department of Animal Science, Rasht Branch, Islamic Azad University, Rasht, Iran

*Corresponding author: Tel: 00989123221336. Email: m.chamani@srbiau.ac.ir

Journal of Livestock Science (ISSN online 2277-6214) 9: 16-22

Received on 05/11/2017; Accepted on 7/1/2018

Abstract

Foot and mouth disease (FMD) is an extremely infectious and contagious disease and is one of the main obstacles to the health and production of some animals. In this experiment, five treatments were used in three replicates and each replicate included five sick cows. The five treatments included vinegar (control), Ashitex, Ashitex and Imion, vinegar and Imion and vinegar and Ashitex. This project was carried out on cows in the range of the age between 3-36 months and in weight between 100-600 kg in several cattle ranches breeding fattened calves and dairy cows affected by FMD in the province of Tehran (Pakdasht and Varamin). A total, 75 sick cows were divided randomly. During the treatments, experiments were used in six stages of the first, second, fourth, sixth, eighth and tenth days and the trait characteristics including oral lesions were evaluated. The medicine of Ashitex and vinegar were sprayed on the mouth and tongue of the sick animal twice a day and in each time, about 20 ml was used. The drug of Imion was given to the sick animal 2-3 times a day at a dose of 100 ml. The reports of the treatment process were controlled and recorded by a questionnaire after the vet's examination. The way of scoring was done as bad (1), medium (2), good (3) and very good (4). The results were categorized and analyzed statistically. The results showed that the treatments of Ashitex and Imion had a significant effect ($p < 0.05$) on the improvement of oral lesions resulting from FMD compared to other treatments and vinegar treatment (control) had the least effect on the treatment of traits. According to the results, the use of Ashitex and Imion treatments to reduce the severity of the damages imposed on the livestock involved in FMD and consequently, to improve livestock productions are recommended.

Keywords: FMD; oral lesions; *Curcuma longa*; *Glycyrrhiza glabra*; *Quercus castaneifolia*, *Burseraceae commiphora*

Introduction

FMD is one of the most important diseases that can damage national economy and trade (Thompson et al., 2002). The disease agent is a virus of the family Picornaviridae and Aphthovirus genus (Jamal and Belsham., 2013). This infection is caused by very high levels of contagion in cloven-hoofed animals such as cows, sheep, goats and other cloven-hoofed animals such as deer (Alexanderson et al., 2003). The virus of FMD has a wide range of hosts that can be infected with a little amount of virus, rapid proliferation, high levels of virus propagation and multiple transmission methods that make the control and eradication of the virus difficult (Alexanderson et al., 2003). Circulating serotypes in Iran include A, O and Asia1 (Zibaei et al., 2007).

Because almost all viruses weaken the body's defense system, researchers are seeking new drug resources to improve animal immunity so that they can replace them with antibiotics and expensive drugs in livestock farms, poultry farms and other animal breeding farms. In some countries, herbal ointments have been used to treat oral lesions, but these products are not specific to the disease of FMD (Najafi et al., 2005). Herbal medicines have a variety of properties and in addition, to stimulating appetite and digestibility, they also have antimicrobial properties. (Lavinia et al., 2009) Medicinal herbs have been used to discover new drugs. They easily make materials for self-defense against insects, herbivores and microorganisms. In addition, they may produce secondary antimicrobial metabolites as part of their natural development and evolution or response to stress (Salehi Sormaghi., 2010). Phenolic compounds can be anti-nutritional as a part of the materials in medicinal herbs, but these compounds will have positive effects as anti-inflammatory properties. They also show anti-cancer and anti-oxidant effects. Phenolic compounds, including flavonoids, are important in plant defense mechanisms against invasive bacteria and other types of environmental stress. Flavonoids have been shown to be anti-inflammatory, anti-allergic, anti-virus and anti-doping agents for a long time (Muanda et al., 2009). Traditionally, farmers used medicinal herbs when they encountered a disease to treat an infected animal, but unfortunately, with the industrialization of the breeding units and the prevalence of the use of chemical drugs, the use of medicinal herbs was gradually forgotten. Over the past two decades, numerous studies have focused on the beneficial effects of essential oils on human and animal health

Due to the elimination of antibiotics through milk and the creation of antibiotic resistance in humans, the use of herbal essences as Food additives in the new nutrition of animals has increased significantly. It seems that the use of the essence of medicinal herbs can be considered an appropriate alternative to antibiotics.

Materials and methods

In this study, two herbal medicines called Ashitex and Imion produced by Sinafaravar Pharmaceutical Company (Iran) have been used in order to treat oral lesions resulting from FMD in cows. A combination of four medicinal herbs with different percentages and special formulation has been used in the manufacturing of the herbal medicine of Ashitex. The drug of Ashitex is a mixture of the powder of the pharmaceutical herbs of turmeric (*Curcuma longa*), liquorice (*Glycyrrhiza glo*), mazo (*Quercus castaneifolia*) and myrrh (*Burseraceae commiphora*). The drug of Imion is designed to enhance the immune system of body during treatment and is formulated and manufactured based on the Chicoryric acid of the medicinal herb of Friv (*Echinacea angustifolia*).

This project was carried out in several cattle breeding fattened calves and dairy cows affected by FMD in the province of Tehran (Pakdasht and Varamin), in cows aged between 3-36 months and weights of 100-600 kg in October, 2016. In order to implement this plan, the herbal medicines of Ashitex and Imion manufactured by Sinafaravar Co (Iran) as well as vinegar as a traditional way to treat lesions resulting from FMD were used and compared. The statistical design was completely randomized design with five treatments and three replications including vinegar (control), Ashitex, Ashitex and Imion, vinegar and Imion and vinegar and Ashitex. In this project, vinegar was considered as a control treatment and all cows were treated with the vaccine, but still infected with it until the end of the last day of prescribing the drug (10 days). The conditions for all cows under treatment was the same. The drug of Ashitex was sprayed on the mouth and tongue of the sick animal twice daily and 20 ml of the drug was used at each time. The immune drug was also given to the animal twice or three times a day and its consumption continued for up to 10 days. Each treatment was specifically provided in the spray and in a separate container to the animal husbandry or relevant expert. The reports of the treatment process were controlled and recorded by a questionnaire after the vet's examination. The first day of treatment, all the clinical conditions of the animal were recorded and then on the second, fourth, sixth, eighth and tenth day of the treatment, all clinical observations were made after the examination, recording and photo taking.

The studied traits in this study include:

Q1 – Oral cavity or tongue without wound with pink color (improved)

Q2 - A small vesicle or erosion in the mouth or tongue with low mucosal hyperemia (the partial improvement or the early stages of the disease).

Q3 - Severe erosion associated with severe hyperemia in the mouth or tongue

Q4 – The isolation of the whole or a large part of the epidermis on the surface of the tongue or mouth with very severe hyperemia.

The way of scoring is considered respectively: bad (1), medium (2), good (3) and very good (4).

Statistical analysis

The statistical model used in this study was a completely randomized design with a total number of 75 sick cows in 5 treatments including:

1. Vinegar (control), 2 - Ashitex, 3 - Ashitex and Imion, 4 vinegar and Imion, and 5 vinegar and Ashitex in three replicates and in each replicate included 5 cows.

$$Y_{ijk} = \mu + R_i + T_j + e_{ijk} \text{ Eq. (1)}$$

Y = vector containing information related to extraction information (clinical status report) from cows under treatment

μ = total mean

R_i = Vector containing information related to the effect of treatment at levels 1 to 5

T = Vector containing information about the repetition effect at levels 1 to 5

The variables studied in this design included the appearance of oral and cutaneous ulcers.

The sampling method was field experiment and information was collected in two stages. In the first stage, a questionnaire was completed by the veterinarian in three stages of the onset of the treatment, the second and fourth days of treatment with the drug of Ashitex and in the sixth, eighth and tenth days with the drug of Imion, and in the next stage, the examination of oral lesions resulting from FMD on the sick cattle. The results of the experiment were analyzed by SPSS software for the variables under study based on statistics related to scoring which shows the effect of the use of two herbal medicines, Ashitex and Imion for the treatment of lesions resulting from FMD in cows.

Results and Discussion

The one-way analysis of variance (ANOVA) analyzes the differences between variables based on the weeks under study in these treatments. In this test, the following hypothesis is analyzed:

$$\begin{cases} H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 \\ H_1: \mu_i \neq \mu_j: i \neq j \text{ at least for one} \end{cases} \text{ Eq. (2)}$$

The first treatment

For first treatment, there is a significant difference in the first treatment for items 1, 2, 3, 4. The vinegar has an antiseptic effect and eliminates the virus of FMD of the virus by reducing the pH of the virus.

The second treatment

For second treatment, there is a significant difference in the second treatment for items 1, 2, 3, 4.

The third treatment

For third treatment, there is a significant difference in the third treatment for items 1, 2, 3, 4.

The fourth treatment

For fourth treatment, there is a significant difference in the fourth treatment for items 1, 2 and 3.

The fifth treatment

For fifth treatment, there is a significant difference in the fifth treatment for items 1, 2 and 3.

According to the information obtained from the questionnaire and the effects of the treatments on the improvement of the studied traits, the average of each treatment in each trait was measured during the treatment days and is shown in Table 1.

The results showed that experimental treatments in all studied traits had therapeutic effect and improvement of lesions. The treatment of Ashitex and Imion treatment had a significant effect ($P < 0.05$) on the improvement of lesions resulting from FMD which can be due to the properties of their compounds: anti-inflammatory properties, wound healing, general strengthening of the body, treatment of oral ulcers, antiviral and bacterial agents, strengthening the immune system of the body and stimulating it are considered as pain relievers. On the other hand, vinegar treatment has the least effect compared to other treatments since vinegar has only antiseptic properties and eliminates the virus of FMD through the reduction of pH.

The graph of the mean of the experimental treatments during the course of treatment for each lesion is shown in the following figures

The first question is related to the oral cavity or the tongue without a wound with pink color. The second question is related to a small vesicular or erosion in the mouth or tongue with hyperemia with low mucus. The third question is related to severe erosion associated with severe hyperemia in the mouth or tongue. The fourth question is related to the severity of the whole or a large portion of the epidermis on the surface of the tongue or mouth with very severe hyperemia.

Table 1- The analysis of the average of experimental treatments during the treatment period in the studied traits of FMD

Trait ↓	Days after treatment↓	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5
Q1	1 day	1.5000	1.7857	1.5333	1.4667	1.8571
	2 days	1.7143	2.5714	2.4000	1.8000	2.0000
	4 days	1.9286	3.3571	2.8667	2.0000	2.1429
	6 days	2.1429	3.5000	3.2000	2.0667	2.2857
	8 days	2.2143	3.5000	3.3333	2.2000	2.4286
	10 days	2.3571	3.5000	3.5333	2.5333	2.7143
	Total	1.9762	3.0357	2.8111	2.0111	2.2381
Q2	1 day	2.0000	2.3571	2.0000	1.9333	2.2143
	2 days	2.0000	3.0714	2.7333	2.2667	2.2857
	4 days	2.0714	3.7143	3.3333	2.4000	2.2857
	6 days	2.2143	3.6429	3.6000	2.4667	2.4286
	8 days	2.2857	3.7143	3.7333	2.7333	2.7857
	10 days	2.5000	3.7143	3.7333	2.9333	3.1429
	Total	2.1786	3.3690	3.1889	2.4556	2.5238
Q3	1 day	2.4286	3.0000	2.7333	2.3333	2.5000
	2 days	2.5000	3.6429	3.1333	2.7333	2.6429
	4 days	2.5714	3.7143	3.4000	2.9333	2.9286
	6 days	2.7143	3.7857	3.6667	2.9333	3.0000
	8 days	2.7857	3.7143	3.9333	3.0000	3.2857
	10 days	3.0714	3.7143	3.9333	3.0000	3.2143
	Total	2.6786	3.5952	3.4667	2.8222	2.9286
Q4	1 day	2.7143	3.1429	3.1333	3.4000	2.8571
	2 days	2.7857	3.6429	3.4000	3.4000	2.8571
	4 days	2.7857	3.7857	3.6000	3.3333	3.0000
	6 days	3.0000	3.7857	3.8667	3.3333	3.1429
	8 days	3.1429	3.8571	3.9333	3.4000	3.1429
	10 days	3.4286	3.8571	3.9333	3.4667	3.3571
	Total	2.9762	3.6786	3.6444	3.3889	3.0595

Q1: Oral cavity or tongue without wound with pink color (improved), Q2: A small vesicle or erosion in the mouth or tongue with low mucosal hyperemia (the partial improvement or the early stages of the disease), Q3: Severe erosion associated with severe hyperemia in the mouth or tongue, Q4: The isolation of the whole or a large part of the epidermis on the surface of the tongue or mouth with very severe hyperemia.

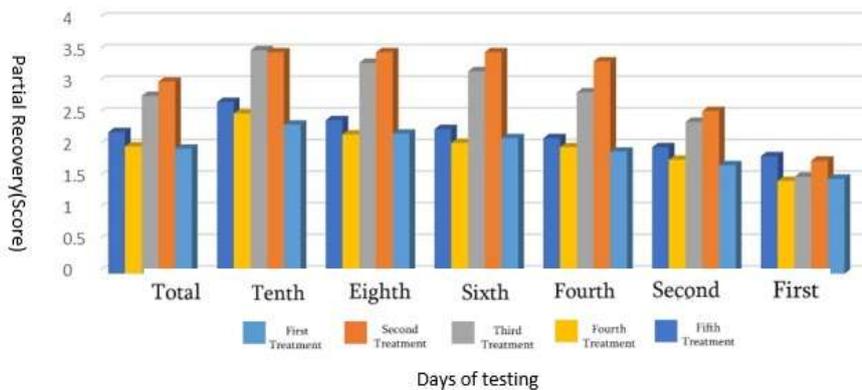


Figure 1- The comparison of experimental treatments during the treatment period for the first question (Oral cavity or tongue without wound with pink color).

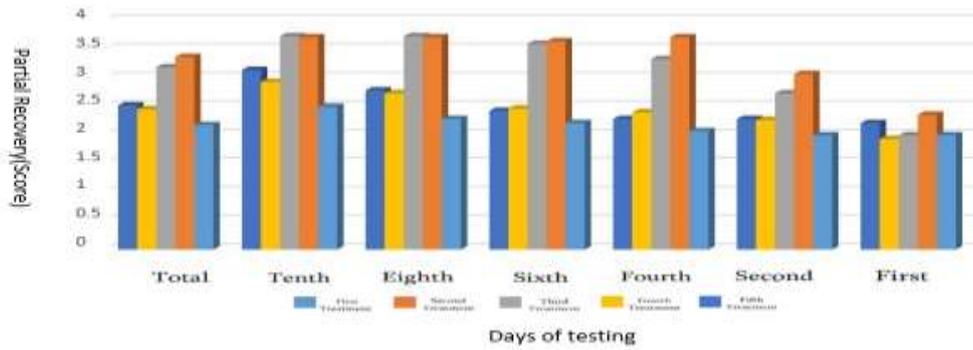


Figure 2- The comparison of experimental treatments during the treatment period for the second question (A small vesicle or erosion in the mouth or tongue with low mucosal hyperemia).

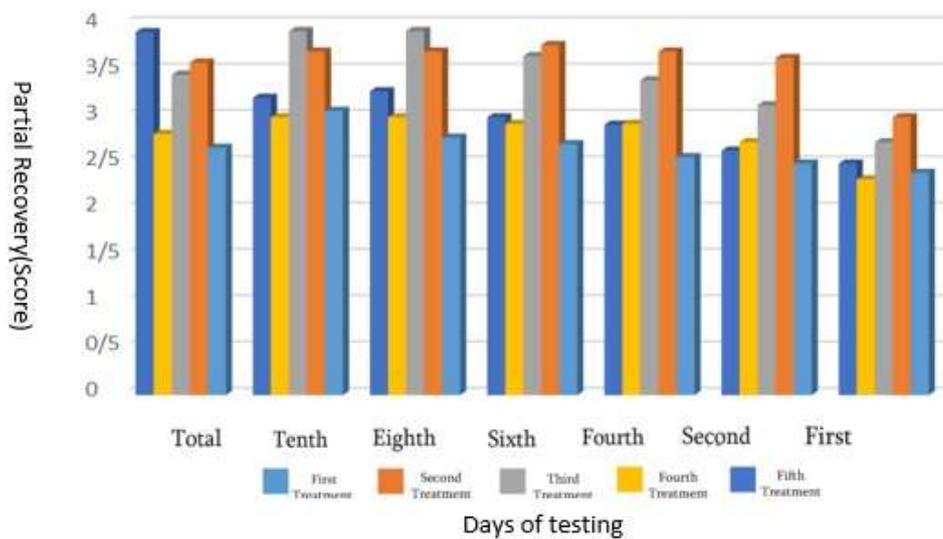


Figure 3- The comparison of experimental treatments during the treatment period for the third question (Severe erosion associated with severe hyperemia in the mouth or tongue).

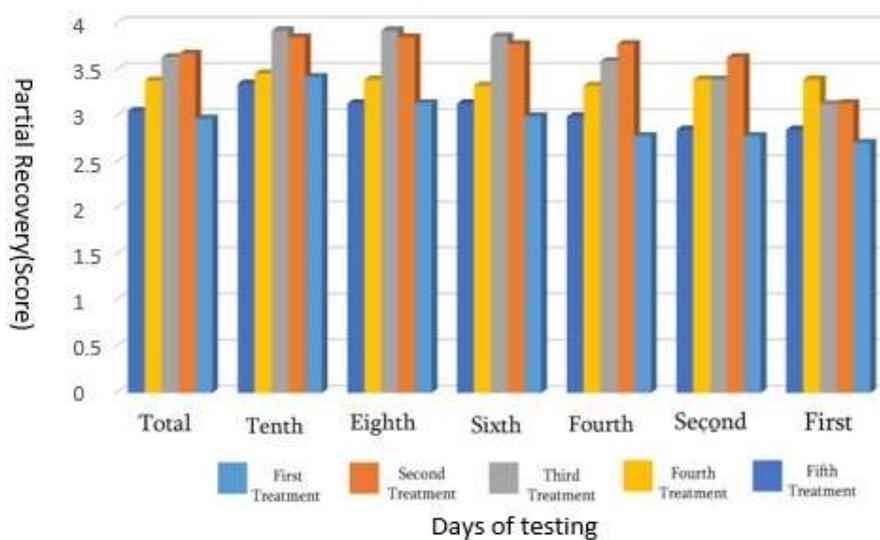


Figure 4- The comparison of experimental treatments during the treatment period for the fourth question (The isolation of the whole or a large part of the epidermis on the surface of the tongue or mouth with very severe hyperemia).

Moreover, the effects of treatment days in experimental treatments on the traits under study showed that the treatment of Ashitex and Imion in the final days of the treatment had a better effect on the treatment of lesions than other treatments which is likely to be associated with strengthening the immune system of animals and having a double effect on the properties of the drug of Ashitex. On the other hand, the treatment of vinegar was less effective than other treatments for improving oral lesions during treatment days. Turmeric whose scientific name is *Curcuma longa* has anti-inflammatory properties and has been used in infectious and autoimmune diseases and wound healing. Liquorice whose scientific name is *Glycyrrhiza glabra* is useful for the general strengthening of the body and the healing of wounds. The essence of Liquorice is useful for the treatment of oral wounds and digestive system. It can also be used as topical anti-viral agent for ulcers and inflammation of shingles, eyes, mouth and genital tract (Nikkhah and Hojjati., 2012).

Mazo is a kind of oak whose scientific name is *Quercus castaneifolia* and it has two kinds of bitter and sweet fruits, the sweet kind is intended and has a pharmaceutical and industrial use. Moreover, it contains tannin (tannic acid) and a few other pharmaceutical substances. Mazo Plant is very antibacterial and it is very useful in the treatment and control of oral ulcers and inflammations caused by it (Rezaghali and Paknezhad., 2013).

Myrrh is the scientific name of *Burseraceae commiphora* and myrrh essential oil is a strong and natural antimicrobial agent and plays an important role in the prevention and control of diseases. The oil of Myrrh has anti-inflammatory and anti-microbial properties and is a suitable compound for preventing and controlling infection. The prevention of complications such as fever, Foot poisoning, cough, colds, and infections that progress from the growth of germs is one of the most important properties of Myrrh oil (Abbasizadeh et al., 2015).

But the main reason for the use of Curcumin-Based Ashitex drug is due to the specific properties of this organic compound which includes anti-oxidant, anti-inflammatory, anti-cancer and anti-proliferation properties.

The medicinal herb of Friv whose scientific name is *Echinacea angustifolia* and contains valuable compounds such as alkyl amide, icon butylamide, Chicoryuric acid, etc. It also contains essential oils and the most important compounds of the essential oil of Friv include Humbled, Caryophyllene and oxidation of Caryophyllene. The compounds of this plant have many therapeutic benefits such as analgesics, anti-inflammatory, antibacterial, antiseptic, antispasmodic, anti-tumor, anti-candida, immune stimulant, vasodilator, antiviral and anti-trichomoniasis (Taghizadeh et al., 2002).

According to the rich plant sources used in the pharmaceutical combinations of Ashitex and Imion to control oral lesions caused by FMD, it can be helpful to reduce the oral complications of this dangerous disease and using the drug of Imion can help to increase the general immune of body of the animal during the course of the treatment to a large extent to compensate for the weakness of the immune system with the disease of the virus of FMD and the analysis of the animal's physical capacity due to severe oral lesions and wounds after they are infected by FMD.

Conclusion

According to the results, the use of two herbal drugs of Ashitex and Imion in reducing the severity of the damage to the traps involved in FMD has been effective and ineffective vaccine has an auxiliary effect on the healing of oral ulcers. In the case of commercial production of this product, it is recommended as vinegar substitute.

Acknowledgement

This manuscript is prepared based on PhD thesis of first author at Science and Research Branch, Islamic Azad University, Tehran, Iran. We are grateful to the Science and Research Branch, Islamic Azad University, Tehran, Iran for support.

References

- 1) Abbasizadeh Z, Comstyle M, Galehdari H, Rezaei A, Seyed Nezhad M, 2015. Local effect of a herbal mixture on wound healing in male diabetic rats. *Journal of Diabetes and Metabolism of Iran*. 6: 406-417
- 2) Alexanderson S, Zhang Z, Donaldson AI, Garland AJM, 2003. The pathogenesis and diagnosis of foot and mouth disease. *Journal of Comparative Pathology*. 129:1-36.
- 3) Jamal SM, Belsham GJ, 2013. Foot and mouth disease: Past, present and future. *Veterinary Research* 44:116-29.
- 4) Lavinia S, Gabi D, Drinceanu D, Stef D, DanielaM, Julean C, Ramona T, Corcionivoschi N, 2009. Application of Herbal Feed Additives in Animal Nutrition - A Review. *Romanian Biotechnol.* 14(4): 4606-4614.
- 5) Muanda F, Kone D, Dicko A, Soulimani R, Younos C, 2009. Phytochemical composition and Antioxidant capacity of Three Malian Medicinal Plant Parts. *Complementary and Alternative Medicine*. 2: 211-214.

- 6) Najafi M, Bahonar A, Barani M, Marjan Mehr H, Ghazian F, Haghi GH, Akbari M, Darabi H, 2005. Evaluation of Mirtoet Herbal Medicine in improving oral lesions of FMD (Foot and mouth disease) in cattle. The fourteenth veterinary congress. Research and Development Center of Barajeh Essence Pharmaceutical Company.
- 7) Nikkhah A, Hojjati Z, 2012. Antioxidant and antibacterial properties of *Thymus vulgar* methanolic extracts, *Cassia angustifolia* and *Glycyrrhiza glabra*. *Daneshvar Journal*. 19(100): 35-44
- 8) Rezaghali M, Paknezhad M, 2013. The first national conference on Medicinal Plants and Sustainable Agriculture. Hegmatane Environment Evaluators Association. Hamedan, Bu'ali University.
- 9) Salehi Sormaghi MH, 2010. Medicinal herbs and herbal therapy. *The World of Nutrition*. The first Edition. 3:377-375.
- 10) Taghizadeh M, Jarvandi p, YASA N, 2002. An overview of the Echinacea plant. *Quarterly Journal of Medicinal Plants*. The first year. 4: 2-8
- 11) Thompson D, Muriel P, Russel D, Osborne P, Bromley A, Rowland M, 2002. Economic costs of the foot and mouth disease outbreak in the United Kingdom in 2001. *Revue scientifique ET Technique-Office international des epizooties*. 21:675-85.
- 12) Zibaei M, Kianizadeh M, Keivanfar H, Rabani M, Hematzadeh F, Bokaei S, 2007. Identification of the Foot and Mouth Disease foci form susceptible foci in Khorasan Razavi province. *Journal of Veterinary Research*. 62:151-55.