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# Efficacy of Different Ethno-Veterinary Products Against Cattle Ticks in Nepal

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**Abstract:** Ticks cause serious economic losses in cattle and an experiment was conducted to test efficacy of different products against ticks in Lamjung, Nepal during 2017-2018. The experiment was designed in completely randomized designs with seven treatments and four replications. Cattle ticks (*Rhipicephalus (Boophilus) microplus*) were collected reared and produce next generation. Newly hatched larvae were used to test the efficacy of different products against these ticks. After 1 hour of treatment application, least number of ticks were found live in Cypermetrhrin application (2.5%) followed by Neem (10%), saltwater (25%), chinaberry and Mug-wort (27.5%). This study clearly shows that different ethno-veterinary products also manage the cattle ticks in the context of developing resistance to acaricides.
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**Keywords:** Ticks, Efficacy, Ethno-Veterinary Products

## 1. Introduction

Ticks cause serious economic losses in livestock industry. It has been studied that about 80% of the world cattle population is infested with ticks (Bowman et al., 1996). Ticks transmitted viral, bacterial and protozoan pathogens causing diseases like hemorrhagic fever, ehrlichiosis, anaplasmosis, theileriosis, and babesiosis in meat and dairy animals (Rajput et al., 2006).

The efficacy of some acaricides against some ectoparasites became questionable (Hogsette, 1999). It is reported that ticks developed resistancy to different acaricides in different parts of world (George et al., 2004; Kunz and Kemp, 1994). Tick had the excellent capacity to develop resistance to the acaricides (Solomon, 1983). It is reported that ticks developed resistance to amitraz in different parts of Kenya (Kamidi and Kamidi, 2005). Similarly, resistance is normally seen with more than one class of acaricide in Mexico (Foil et al., 2004) and multiclass resistance is general in Brazil (Graf et al., 2004). Foil et al. (2004) gave an average of 12 years for evolution of resistance to amitraz. Similar condition of developing resistancy to different acaricides also reported from Nepal. Traditionally farmers were using different plant and other products to manage ticks and other ectoparasites in Nepal. However, there is no any scientific study on these products. Hence, it seems necessary to evaluate the efficacy of different ethno-veterinary products against ticks.

## 2. Material and Methods

An experiment was conducted to test efficacy of different products against ticks in Lamjung, Nepal during 2017-2018. The experiment was designed in completely randomized designs with seven treatments and four replications namely; Neem (*Azadirachta indica*) leaf extracts solution, Chinaberry (*Melia azedarach*) leaf extract solution, Mug-wort (*Artemisia vulgaris*) leaf extract solution, Salt-water solution, Cypermetrhrin and control (no products application).

### 2.1 Collection of Ticks

Randomly 20 cattle ticks (*Rhipicephalus* (*Boophilus*) *microplus)* were collected from Bageshwori Gaushala, Bharatpur, Chitwan, Nepal in March, 2018. Ticks were collected manually using a forcep and gloves. The collected ticks were stored in a sterile container.

### 2.2 Rearing of ticks

Collected ticks were reared in Entomology lab at Institute of Agriculture and Animal Science, Lamjung Campus. After about 3-4 days ticks were found laid eggs and after one month eggs were hatched out into larvae. Then after fifth days of hatching, ticks were allocated for the testing the efficacy of different botanical product. Ten immature ticks were allocated

in each petridis and applications of treatments were done accordingly.

**2.3 Preparation of different products**

Neem (*Azadirachta indica*) leaf extracts solution, Chinaberry (*Melia azedarach*) leaf extract solution, Mug-wort (*Artemisia vulgaris*) leaf extract solution, Salt-water solution, Cypermetrhrin. Leaves of Neem, China berry, Mug-wort, Tobacco were grinded and produced its extract. Similarly, mixture of 100 gram common salt (NaCl) and 200 ml water were used for the another treatments. Tik-out (Cypermethrin 100 EC) was used as chemical pesticides against the ticks.

**2.4 Statistical Analysis**

All the information collected during study including qualitative information were coded and tabulated in Excel sheet. Statistical tools R 4.2.2 were used for the analysis. The recorded data were subjected to analysis of variance (ANOVA) and significant mean differences were separated by Duncan's Multiple Range Test (DMRT) at 0.05 percent level of significance (Gomez and Gomez, 1984).

**3. Results**

As presented in Table 1 and Figure 1 highest number of dead ticks were found in Cypermethrin treatment followed by Neem whereas least in Chinaberry treatment after 10 min and 1 hour of treatment application. After 1 hour of treatment application, least number of ticks were found live in Cypermetrhrin application (2.5%) followed by Neem (10%), saltwater (25%), chinaberry and Mug-wort (27.5%). All ticks were found live in control treatment.

Table 1. Efficacy of botanical product after 10 mins and 1 hrs of treatment application, 2017/018

| S. N. | Treatment | Average live ticks number after 10 min of treatment application | Average live ticks number after 1 hr of treatment application |
|---|---|---|---|
| 1 | Neem | 8.25cd | 0.75d |
| 2 | Chinaberry | 9.25ab | 3.75b |
| 3 | Mug-wort | 8.75bc | 2.75c |
| 4 | Tobacco | 8.5bc | 2.75c |
| 5 | Saltwater | 8.75bc | 2.50c |
| 6 | Cypermethrin | 7.5d | 0.50d |
| 7 | Control | 10.00a | 10.00a |
| Test of Sign. | | *** | *** |
| Grand Mean | | 8.71 | 3.28 |
| LSD | | 0.85 | 0.85 |
| CV | | 6.62 | 17.57 |
| EMS | | 0.33 | 0.33 |

* Means followed by the same letter in each column are not significantly different by DMRT at < 0.05 percent level

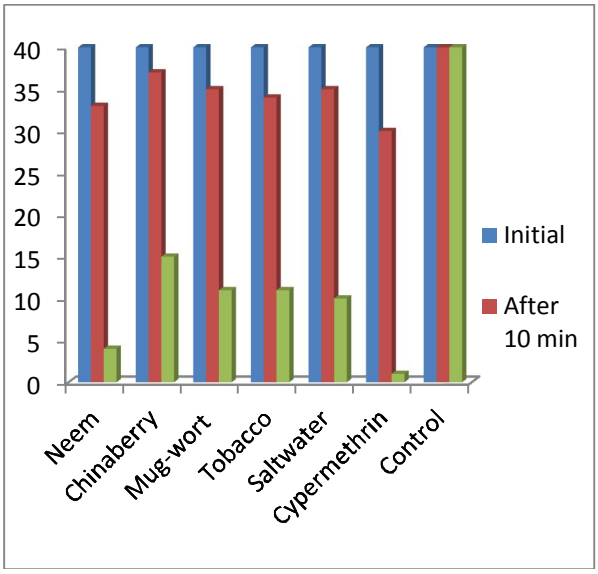


Figure 1. Live ticks after different times of treatment application in Lamjung, Nepal, 2017/018

**4. Discussions**

Different botanical and other products were found effective for the control of tick which is supported by different other reports. Among the tested products Neem was found most effective followed by salt water, Mug-wort (*Artemisia vulgaris)*, tobacco (*Nicotina tobaccum*) and chinaberry (*Mellia azadiract*). It is reported by Ghosh et al. (2007) Neem (*Azadirachta indica*) against different life stages of ticks were highly encouraging. Neem contain Azadirachtin which possesses insecticidal property (Nawrot, and Harmatha, 1994; Vietmeyer, 1992). Tobacco (*Nicotiana tabacum*) is used in eradication of external pest of cattle infestation and mange (Davidovic et al., 2011). It is reported that tobacco leaves (*Nicotiana tabacum* Linn., Solanaceae) have been used as insecticide and pesticide for long time (Abdul-ghany et al., 2011). Carlile (2006) remarked that nicotine will rapidly penetrate the cuticle of the target organism, and can be used effectively as a

contact insecticide. Mug-wort *(Artemisia vulgaris)* was using in the treatment of animals infected by blood parasites by rubbing the ground fresh leaves (Davidovic et al., 2011). Essential oils from *Artemisia vulgaris* work against insect (Bouzenna and Krichen, 2013; Negahban et al., 2007; Negahban et al., 2006). The mechanism behind the insect mortality in the contact toxicity test is that the volatiles penetrate in the insect body via the respiratory system and result in abnormal breathing, which leads to asphyxiation and finally the death of insects (Pare and Tumlinson, 1999). Zewdie (2010) reported salt water as the effective control measure for the control of ticks. According to the Tvedten (2016) salt desiccated and killed the ticks.

## 5. Conclusion

Ethno-veterinary management practices are also effective as compared to chemical pesticides for the tick control. Therefore, there is a need for further studies on the efficacy of such products which have lower side-effects and reduces the problem of resistance which is prevalent in the use of chemical acaricides.

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