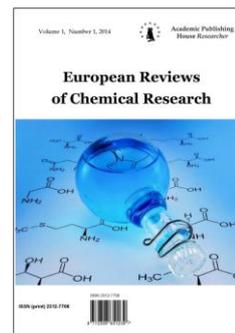


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## Repellency and Antifeedant of Ticks Through Ethno Plant Extracts and Ivermectin on Buffalo Calves

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### Abstract

The study was performed to determine the performance of ginger, garlic, neem and ivermectin on the ticks. For that purpose, 12 male buffalo calves were selected, which were divided in four groups in A, B, C and D, each group contained 3 animals. The data was collected on 3<sup>rd</sup>, 8<sup>th</sup>, 15<sup>th</sup> and 21<sup>st</sup> day, respectively. The effectiveness of ivermectin on 3<sup>rd</sup> day found (25.92%), 8<sup>th</sup> (37.03%), 15<sup>th</sup> (92.6%) and 21<sup>st</sup> day found (100%) whereas, neem seed extract was observed on 3<sup>rd</sup> day found (55.81%), 8<sup>th</sup> (48.83%), 15<sup>th</sup> (41.86%) and on 21<sup>st</sup> day (46.51%) thus, ginger extract 3<sup>rd</sup> day found (63.46%), 8<sup>th</sup> (51.92%), 15<sup>th</sup> (51.92) and 21<sup>st</sup> day (61.54%), and garlic extract on 3<sup>rd</sup> day found (32.61%), 8<sup>th</sup> (39.13%), 15<sup>th</sup> (36.96%) and 21<sup>st</sup> day (30.43%), respectively. It was concluded from the comparative effect of the ethno plant extracts and ivermectin on ticks' interaction that in total extract the ginger found more potent followed by neemseed extract and garlic but their effect was prolonged effect and 100% result was achieved through the ivermectin hence, it is recommended for the tick infestation and treatment.

**Keywords:** Medicinal plants; Ivermectin; Repellents; Animals; Ticks.

### Introduction

The naturally occurring plants as ethno-veterinary medicine those refer to people's beliefs, knowledge, skills and practices relating to care of their animals (Choudhury, 2003). The use of these plants are limited by the seasonal availability of certain plants, the scarcity of treatment against infectious disease, the ineffectiveness of some treatments, the existing harmful practices and the often inadequate ethno-diagnosis (Choudhury, 2001;FAO, 1985). The five plants such as; *Dryopterisinaequalis*, *Albiziaanthelmintica*, *A. gummifera*, *Olea Africana* and *Myrsineaficana* were reportedly used in Kenya (Golob and Webley, 1980). The Kikuyu of Central Kenya allegedly use *Cissampelospaireira* roots, *Vernonialasiopus* roots and leaves, *Myrsine Africana* fruits, *Rapaneamelanophloeos* fruits, *Ficusthonningi* sap, *Albiziaanthelmintica* roots and *Ficussycomorus* sap for treatment, they also some time use the bark of *Acacia mellifera* against

parasites of animals (Grainge and Ahmed, 1988; Saxena, 1993). Schmutterer, (1990) reported eleven plants used for the same purpose. From Nigeria, 92 species of plants were identified to be used in traditional veterinary practice, with 15 reported to be used against general worm infestation in cattle (Anonymous, (1992). In the Somalia, six plants were reported to be used for treatment in livestock (Schmutterer and Ascher, 1984). Schmutterer and Ascher, (1987) listed 39 plants used against cestodes, 16 against trematodes and 45 against nematodes in humans worldwide. The ethno-veterinary made medicine in which most livestock keepers treat animal health problems due to easily available, inexpensive and effective, mostly in rural areas where, veterinary services are irregular or costly and used for emergency purpose (John *et al.*, 2005). Many countries have already come to realize the medicinal plants as a potential means of therapeutic agent and also their availability and cost effectiveness ardently throughout the world wide, various kinds of herbal extract showed the Larvicidal and Acaricidal effects as reported by (Chungsamarnyart and Jansawan, 1991).

Neem, *Azadirachta indica* A. Juss., (Meliaceae) widely distributed throughout tropical in both dry and humid areas (FAO, 1988). The most promising example of plants currently used for pest control (NRC, 1992), grown in many countries of worldwide with an immense work over the neem tree as the pesticidal properties which is used as a powder from crushed seeds, mixed with the grain at various concentrations levels, provided the protection of many insect pests included weevils, *Sitophilus* spp., khapra beetles, *Trogoderma granarium* and lesser grain borer, *Rhizoperthadominica* (Golob and Webley, 1980; Saxena *et al.*, 1989) due to bitter smell, can reduce its attractiveness as a protecting in food grains mostly in stored grains with its *azadirachtin* content in seed kernels (Ermel *et al.*, 1987). *Azadirachtin* content has also been analysed due to as important tree (Gruber, 1991) because, the extracts from different ecotypes effloresces variation in the antifeedant activity (Singh, 1987). Further, Pathaket *et al.*, (2004) studied plant extracts of neem, *Azadirachta indica* leaves and bark; nochi, *Vitexnugundo* leaves; vashambu, *Acorus calamus* rhizome and pungu, *Pongamiapinnata* leaves against ixodid ticks of small ruminants. Garlic, *Allium sativum*, L. (Amaryllidaceae) is also grown at worldwide, but the country China is the most producer yearly, near about 10.5 million tons (23 billion pounds) as 77% of worldwide output and the second is India about (4.1%) followed by South Korea (2%), Egypt and Russia (1.6%) and America (1.4%) Aeschlimann and Freyvogel, (1995). Ginger, *Zingiber officinale* L. (Roscoe) (Zingiberaceae) is also an indigenous to Southern China and other parts of Asia to West Africa and to the Caribbean. The herbal preparation consisting of garlic, onion, lemon extract, turmeric powder and camphor in karanj oil when applied once daily for consecutive days eliminated *sarcoptes scabiei* infestation in piglets within 5 days application (Dewivedi and Sharma, 1986). Shannon *et al.*, (1995) described that the ivermectin was safest and more effective for the treatment of endo and ectoparasites.

The ticks are small arachnids in the order Parasitiformes, Family, Ixodidae more than 700 species which are totally distinguished to others due to hard shell. An engorged tick, filled with blood, can easily be killed by stepping. In ixodidae nymphs and adults, a prominent head /*capitulum* forwarded from the body. Ixodid tick undergoes to three primary stages: egg, nymph, and adult Dennis *et al.*, (2005). This kind of specie requires three hosts, and their life cycle, takes at least one year to complete, which produce upto 3,000 eggs on the ground by the adult female. After emerging the second stage the larvae, which feed on small mammals and birds than molt on the ground, then feed on larger hosts and molt in an adult stage which attach to the larger hosts, feed, and lay eggs, while males feed very little and occupy larger hosts primarily for mating Aeschlimann and Freyvogel, (1995). Infestation rates of important genera of ticks infesting cattle in Pakistan were as follows: *Boophilus*, 43.40, *Hyalomma*, 36.65, *Rhipicephalus*, 16.88 and *Amblyomma*, (3.05%. Infestation rates by ticks of these genera in buffaloes were 53.12, 31.25, 15.62 and 3.05%, respectively (Mannan *et al.*, 1997; Hannan *et al.*, 2001).

A preliminary study was conducted by the Abdullah *et al.*, (2009a) established ginger as a higher tick repellent and they rubbed garlic, onion, ginger and neem leaves on five pieces of cotton cloth put ten ticks collected from cattle and buffalo in the centre of the cloth. Abdullah *et al.*, (2009b) proved ginger to be highly tick repellent as all ticks left the cloth in 25.3 seconds whereas, they took 30.6 seconds, 37.3 seconds and 40 seconds to leave the pieces of cloth rubbed with garlic, onion and neem leaves. Lal *et al.*, (2009) confound that the SAU students found ginger as best tick repellent and ticks spent 76.6 seconds on the piece of cloth that was rubbed with animal body.

Further, this study revealed that ticks were permanent eco-parasites that caused direct damage to cattle by sucking huge quantity of blood and bringing down milk and meat production besides acting as vector for viral, bacteria, protozoan and helminth pathogens and parasites that caused ailment and high mortality in cattle, buffalo, sheep and goat. As we know, the chemicals used against ectoparasites are harmful for man and animals, and the poor growers are illiterate they don't have knowledge how to apply insecticides on the animal body so far. The patent drug ivermectin and locally available medicinal plants are selected with the aim for comparative investigation. Therefore, the few objects were carried out under study to compare the effect of ivermectin and ethno plant extracts on ticks to increase the value of herbal products as compare to other acaricides or organophosphate pesticides.

### Materials and Methods

The experiment was carried-out for a period of 6 months from June to November, 2013 in the Faculty of Animal Husbandry and Veterinary Sciences, Sindh Agriculture University Tandojam – Sindh, Pakistan. Twelve buffalo calves of male at aged between 9 to 12 months at weight of approximately 45-52kg per calf were also kept under experimental conditions. All under kept observed calves were examined for the presence of ticks attacked which known as ectoparasites and then the effectiveness of ivermectin and different ethno plant extracts. These were known as locally indigenous medicinal plant such as; Neem, *Azadirachta indica* A. Juss., (Meliaceae), Garlic, *Allium sativum*, L. (Amaryllidaceae), and Ginger, *Zingiber officinale* L. (Zingiberaceae). The dose of ivermectin was kept under observation for the attacked ticks on the body of buffalo calves. These calves were divided into four groups as, A, B, C and D, respectively. In which, all the groups kept under observed for the knowing about the less expensive, highly economic and high effective against this pest. All four groups were treated equally with the different doses of ethno plant extracts expect ivermectin which was used sub cut route (SC) injection method. Finally, the dose and recommendations were suggested to the growers of animal farms.

The ticks were observed by visually on the effected buffalo calves with their numbers and the numbers of tick were also recorded as pre-treatment and the post-treatment at 3<sup>rd</sup>, 8<sup>th</sup>, 15<sup>th</sup> and 21<sup>st</sup> day of the treatment period. The severity of infestation of ectoparasites (ticks) was observed by counting the numbers in a selected area of the individual calf. The ticks within this area were counted at pre-treatment of day 0 and post treatment as; 3<sup>rd</sup>, 8<sup>th</sup>, 15<sup>st</sup>, 21<sup>th</sup> days, respectively. Thus, if there was any adverse effect found on the treated animal was also kept under observation before and after the treatment on respective days as mentioned above given schedule. It was also focused on the hairs fall, rough condition skin of the animal, feeding efficacy and weakness of the treated animals with their physically appearance and by the visually examination at pre and post treatment on respective days. The under given doses of the ethno plants and Ivermectin on different groups were applied as per prescribed schedule.

1. Group – A was treated with Ivermectin (G-Tek) subcutaneously at dose rate of 1cc/ 50kg body weight.
2. Group- B was treated with neem seed extract (applied on skin) at the rate of 75gm/ 50kg body weight.
3. Group-C was treated with ginger extract (applied on skin) at the rate of 75gm/ 50kg body weight.
4. Group-D was treated with garlic extract (applied on skin) at the rate of 75gm/ 50kg body weight.

#### Effect of ivermectin (G-Tek) on male buffalo calf

Ivermectin is known as a parasite control drug which resulted in paralysis and the death of the tick parasites. The injection of ivermectin was injected on three male buffalo calves with the dose of 1cc/ 50kg body weight. The animal then observed on 3<sup>rd</sup>, 8<sup>th</sup>, 15<sup>th</sup> and 21<sup>st</sup> days of post injection of ivermectin. The effectiveness of ivermectin was kept under observation as respective of the extracts. Therefore, the repellency effect of different ethno plants extract was kept under observation.

#### Neem seed kernals, *Azadirachta indica* A. Juss. (Meliaceae) extract

Neem, *A.indica* is known with the many names throughout the world wide such as; *Antelaeazadirachta* (L.) Adelb., *Azedarachfraxinifolia* (Moench), *Meliaazadirachta* (L.), *M.*

*fraxinifolia* (Salisb.), *M. indica* (A. Juss.) Brandis, *M. pinnata* (Stokes) and here in Sindh-Pakistan as a Nim tree with its local name. In our neighbor country (India) this plant is also commonly referred as neem-tree, Indian lilac, or white cedar. This tree is with a hardy tree growing to an approximately with the height of 15-20 m long, with a dense leafy, oval-shaped in canopy with the bark is rough, pale grey-brown in colour. The seed kernals were collected from the branches dried for a week before grinding. The grinding process was done through the electric grinder or juicer machine kept at laboratory of AHVS, SAU- Tandojam. Finally, the paste was made and rubbed on the affected animals to check the efficacy, repellency and the antifeedant of ticks.

#### **Garlic, *Allium sativum* L. (Amaryllidaceae) extract**

Garlic, *A. sativum* commonly known as garlic globally, this is a kind of onion species with genus, *Allium* which is used throughout the world wide since 7,000 years and known with its native from central Asia, and has long been a staple as a frequent seasoning in Asia, Africa, and Europe. This was also known to and ancient Egyptians which was been used for both cooking and medicinal purposes so far. Keeping in view, the importance of this seed, the garlic seed was purchased locally from near city market Hyderabad – Sindh about one kilo gram and cleaned with the help of hand and knife finally minced purely, made a paste and was rubbed on the affected parts of animals kept at experimental field situated at SAU, Tandojam.

#### **Ginger, *Zingiber officinale* L. (Roscoe) (Zingiberaceae) extract**

Ginger, *Z. officinale* roots of the plant are consumed as a delicacy, medicinal and for the purpose of species in food stuffs throughout the world wide with the mixtures of this plant other families are; turmeric, cardamom, and the galangal, have them common names to enhance the taste of the food stuffs. The ginger is an indigenous plant of southern China, from whence it was spread to the other countries of Asia, West Africa and the Caribbean, respectively. But in Pakistan and India, it is known as adrak, used in different commonly and particularly dining table dishes of homes and hotels in all seasons as well. But here we used it as an ethno extract, purchased from same market of Hyderabad. The fresh garlic was also minced in same pattern as neem and garlic, applied on the vicinity of severely affected animals and thus data was taken on respective days. An integrated control strategy based on the following results was taken and the recommended for the control of ticks in buffalo calves and all kind of animals, respectively.

#### **Income from different IPM modules**

In the tick management, it was determined the economical difference between ethno-veterinary plants and ivermectin. The prices were compared through these pest management modules which were also tested about expenses and income of the experiment. Behalf of expense and income, the final suggestions would be appreciated for animal farmers. The modules were: tick control through ethno plants module and tick control through chemical (Ivermectin) module. The input and output record was kept. Finally, the economic analysis was made to determine cost: benefit analysis of different IPM modules.

#### **Data Analysis**

The data were collected on the 3<sup>rd</sup> day, 8<sup>th</sup> day, 15<sup>th</sup> day and 21<sup>st</sup> day from each group of animal and thus calculated in simple percentage an under given formula; whereas, analysis of variance was done though Statistix (8.1) students software USA.

$$\text{Effectiveness (\%)} = \frac{\text{No. of ticks after treatment}}{\text{Total number of ticks before treatment}} \times 100$$

#### **Results**

The study was performed to accesses the performance of ginger, garlic, neem and ivermectin on the ticks. The purpose of research was to find out the effectiveness of some ethno-veterinary plants extracts and very popular drug ivermectin. The collected information from these agents was interpreted under the following headings.

#### **Effect of ivermectin (G-Tek) on male buffalo calf**

The injection of ivermectin was injected on three male buffalo calves with the dose of 1cc/ 50kg body weight. The animal then observed on 3<sup>rd</sup>, 8<sup>th</sup>, 15<sup>th</sup> and 21<sup>st</sup> days of post injection of ivermectin. The effectiveness of ivermectin on 3<sup>rd</sup> day found 25.92%, 8<sup>th</sup> day 37.03%, 15<sup>th</sup> day 92.6% and on 21<sup>st</sup> day 100%, respectively. The data regarding result of the effect of ivermectin on ticks is shown in Table 1.

**Table 1:** Effect of ivermectin (G-Tek) on tick on male buffalo calf

Animals	No. of ticks before treatment	No. of ticks after treatment			
		3 <sup>rd</sup> day	8 <sup>th</sup> day	15 <sup>th</sup> day	21 <sup>st</sup> day
1	08	06	04	00	00
2	10	08	08	01	00
3	09	06	05	01	00
Total	27	20	17	02	00
Results (%)		25.92%	37.03%	92.6%	100%

**Effect of neem seed extract on tick on male buffalo calf**

The extracts of neem seed was applied on the skin of three male buffalo calves, 75gm/50kg body weight each animal. The animal then observed on 3<sup>rd</sup> day found 55.81%, 8<sup>th</sup> day 48.83%, 15<sup>th</sup> day 41.86% and on 21<sup>st</sup> day 46.51%, respectively. The data regarding result of effect of neem seed extract on ticks is shown in Table 2.

**Table 2:** Effect of neem seed extract on tick on male buffalo calf

Animals	No. of ticks before treatment	No. of ticks after treatment			
		3 <sup>rd</sup> day	8 <sup>th</sup> day	15 <sup>th</sup> day	21 <sup>st</sup> day
1	15	06	07	08	08
2	16	07	08	10	10
3	12	06	07	07	05
Total	43	19	22	25	23
Results (%)		55.81%	48.83%	41.86%	46.51%

**Effect of ginger extract on tick on male buffalo calf**

The extracts of ginger extract was applied on the skin of three male buffalo calves, 75gm/50kg body weight each animal. The animals then observed on 3<sup>rd</sup>, 8<sup>th</sup>, 15<sup>th</sup> and 21<sup>st</sup> days of post application of ginger extract. The effectiveness of ginger extract was observed on 3<sup>rd</sup> day 63.46%, 8<sup>th</sup> day 51.92%, 15<sup>th</sup> day 51.92% and on 21<sup>st</sup> day 61.54%, respectively. The data was regarding results of the effect of ginger on ticks are shown in Table 3.

**Table 3:** Effect of ginger extract on tick on male buffalo calf

Animals	No. of ticks before treatment	No. of ticks after treatment			
		3 <sup>rd</sup> day	8 <sup>th</sup> day	15 <sup>th</sup> day	21 <sup>st</sup> day
1	12	05	07	07	06
2	15	06	07	07	04
3	25	08	11	11	10
Total	52	19	25	25	20
Results (%)		63.46%	51.92%	51.92%	61.54%

**Effect of garlic extract on tick on male buffalo calf**

The garlic extract was applied on the skin of three male buffalo calves at 75gm/ 50kg body weight each animal then observed on 3<sup>rd</sup>, 8<sup>th</sup>, 15<sup>th</sup> and 21<sup>st</sup> days of post application of garlic extract. The effectiveness of garlic extract was observed on 3<sup>rd</sup> day 32.61%, 8<sup>th</sup> day 39.13%, 15<sup>th</sup> day 36.96% and on 21<sup>st</sup> day 30.43%, respectively. The data was regarding results of the effect of the garlic on ticks are shown in Table 4.

**Table 4:** Effect of garlic extract on tick on male buffalo calf

Animals	No. of ticks before treatment	No. of ticks after treatment			
		3 <sup>rd</sup> day	8 <sup>th</sup> day	15 <sup>th</sup> day	21 <sup>st</sup> day
1	24	19	15	15	17
2	7	05	04	05	06
3	15	07	09	09	09
Total	46	31	28	29	32
Results (%)		32.61%	39.13%	36.96%	30.43%

**Effect of different agents on ticks on male buffalo calf**

The extracts of different ethno-veterinary plants (neem, ginger, garlic), and the ivermectin was applied on the male buffalo calves, 75gm/ 50kg body weight of each plant and 1cc/ 50kg body weight on each animal. The animal then observed on 3<sup>rd</sup>, 8<sup>th</sup>, 15<sup>th</sup> and 21<sup>st</sup> days of post application. On 3<sup>rd</sup> day the effectiveness of Ivermectin found 25.92%, Neem seed extract 55.81%, Ginger extract 63.43% and Garlic extract 32.61%. On day 8<sup>th</sup> it was observed, Ivermectin 37.03%, Neem seed extract 48.83%, Ginger extract 51.92% and Garlic 39.13%. On 15<sup>th</sup> day the results were as, Ivermectin 92.60%, Neem seed extract 41.86%, Ginger extract 51.92% and Garlic 36.96%. Whereas, on 21<sup>st</sup> day the Ivermectin 100%, Neem seed extract 46.51%, Ginger extracts 61.54% and Garlic 30.43%, respectively. The analysis of variance (ANOVA) showed that there was non-significant difference in the effect of drugs and in the period of attacked tick repellency ( $P > 0.05$ ) further, the data regarding results Ivermectin and the extracts of Neem seed, Ginger and Garlic are shown in Table- 5.

**Table 5:** Effect of different agents on ticks on male buffalo calf

S. No.	Agents	Effect on Ticks in Percent			
		3 <sup>rd</sup> day	8 <sup>th</sup> day	15 <sup>th</sup> day	21 <sup>st</sup> day
1	Ivermectin	25.92	37.03	92.60	100
2	Neem seed Extract	55.81	48.83	41.86	46.51
3	Ginger Extract	63.46	51.92	51.92	61.54
4	Garlic extract	32.61	39.13	36.96	30.43

**Economical difference between ethno-veterinary plants and Ivermectin**

In order to determine the economical difference between ethno plants and ivermectin, the prices were compared in the Table 6. The economical agent was found neem seed extract which is free of cost in our circumstances and have highest tick repellent activity. Ginger was also an economical ethno plant, which provided satisfactory results on low prices followed garlic. The ivermectin is the drug of choice for the treatment of ecto-parasites, it is somewhat costly than the ethno-veterinary plants but provided more satisfactory results than those plants.

**Table 6:** Economical difference between ethno-veterinary plants and Ivermectin

S. No.	Agents	Quantity/ Animal	Price/Animal	Results
1	Ivermectin	1cc/ 50kg bw	15	100%
2	Ginger extract	75gm/ 50kg bw	10	61.54%
3	Garlic extract	75gm/ 50kg bw	07	30.43%
4	Neem seed extract	75gm/ 50kg bw	05	46.51%

## Discussion

Ethno-veterinary medicine is the given name to the way in which most livestock keepers in most of the countries treat animal health problems. Ethno plant extracts are integral part of traditional medical practices in many countries of the developing world. A large proportion of the population uses this form of ailments in their livestock because of their easily available, inexpensive and effective, especially in rural areas where veterinary services are absent or irregular and expensive. Khan *et al.*, (1993) investigated the prevalence of ticks on different livestock species also in Pakistan and the infestation rates in cattle and buffaloes were 28.2 and 14.7%, respectively. Soulsby, (1982) reported that the ticks may transmit the disease *Babesiabigemina* that rise in temperature, red urine, anaemia, inappetence, jaundice, emaciation to the death. This study is an agreement with the (Schmuttereret *al.*, 1981; Choudhury, 2009) who reported that the neem tree is an evergreen except in the driest areas found throughout the tropics and subtropics of the world that flourishes in arid and semi-arid areas. *Azadirachtaindica* is used against various ailments including helminth parasites. Ginger, *Z. officinale* (L.) Rosc) has been used as spice for over 2000 years (Bartley and Jacobs, 2000).

Ivermectin is a drug which is the tick parasites control that effects to a neurologic damage to the parasite which resulted in paralysis and the death of the parasites. Ticks are economically the most important pest of cattle, buffalo and other domestic animals in tropical and subtropical countries. They act as vectors of a number of pathogenic micro organisms and protozoans. The ivermectin is more potent drug against tick infestation and gives 100% results. Helen and Chesterman, (2005) described that the tick (adult male and female) and nymphs were markedly susceptible on ivermectin. The results of present study was also similar to the findings of Helen and Chesterman (2005), that the effect of ivermectin is found more potent drug against tick infestation and provide 100% results within limited time against parasites. John, (2002) reported in natural history of ticks with the investigation ethno-veterinary method practiced by the owners for the treatment of common disorders of digestive tract (indigestion, colic and diarrhea), respiratory tract (cold/rhinitis, pneumonia) as well as against ectoparasites (mange, ticks, lice and flies). The present findings supports the earlier observation of Ninkov and Savin, (1986), Nettleton and Beckett, (1976) and Shannon *et al.*, (1995) who reported 90% to 100% efficacy of ivermectin against tick infestation in calves. It was seen that no ectoparasites were present on body of animal after 7<sup>th</sup> day to the end the experiment.

The neem seed extract found with both activities like repellent and killing behavior further, results are in agreement with (Ndumu *et al.*, 1999) who reported the undiluted neem extract with 100% concentration established 100% mortality and the larvae stages, after 48h of application and their smell repelled the adult stages of ticks. Similarly, reported by (Zuber *et al.*, (2003) in tick removal; densities on animal treated with neem seed extract were lower than on untreated animals, they also further, suggested the neem seed extract is effective in controlling ecto-parasites of live stock. *In vitro* toxicity of neem seed oil was tested against the larvae of tick, *Boophilus decoloratus* (*Ixodidae* or hard tick) parasitic mainly to cattle. The 20, 40, 60, 80 and 100% concentrations of neem seed oil were found to kill all 100% mortality (Chaudhery, 2009). The garlic also acts as good repellent (USDA, 1975) with its insecticidal plants. During research, it was found that garlic repelled the ticks, which was also reported by (USDA, 1975) further they suggested that garlic may be considered as tick repellent for individuals and populations at high risk for tick bites, rather than other agents that might have more adverse effects. The ginger was found good repellent in present study. Similar, findings found by (Watt and Breyer-Brandwijk, 1962) who reported some medicinal and poisonous plants and some of the ginger used to control external parasites as ticks. Similar findings were also reported by (Kapushi, 1992; Moyol and Mastika, 2009) who naturally made products controlled the ticks through integrated tick management in Africa, the farmers use plants (6.8%) mainly the neem, ginger and garlic against ecto-parasites of livestock with good results. In conclusion, as we observed that the tick infestation was played a significant cause of economic losses to the livestock and dairy industry throughout the world so, the use of vaccines for tick control is on the possibility basis with the different many side effects. If we manage it with IPM tool as biological control rather be better.

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