Effect of 25% Aqueous Extract of *Azadirachta indica* on Haematological Alteration in Mange Infested Goats

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Abstract: Sarcoptes scabies causes one of the most contagious and zoonotic disease in goats known as mange. Total 6 goats of Surti and Marwari breeds, infested with mange were selected from surrounding village of Anand district of Gujarat state in India. The diagnosis was carried out by skin scrapping examination. All the goats were treated with 25% aqueous extract of Azadirachta indica for more than 35 days. The levels of haematological parameters, viz., Haemoglobin (Hb), Total Erythrocyte Count (TEC), Total Platelet Count (TPC), Pack Cell Volume (PCV), Neutrophils, and Monocytes were decreased significantly, whereas those of Total Leukocyte Count (TLC), Lymphocytes and Eosinophils were increased significantly (p<0.05) in all six mange affected goats as compared to healthy control group goats (n=6).

Keywords: Goats, mange, haematological alteration, Azadirachta indica

1. Introduction

Goat farming, being one of the most important component of livestock industry is suitable for landless and marginal farmers as goats are having adaptability to harsh climates. Milk, meat (chevon), variety of cashmere/mohairfibers and wool/hair/leather are few of the many uses, for which goat are reared, making them multi - purpose animals in the different parts of the world (Smith and Sherman, 2009). Diseases act as major barrier against successful goat keeping. Goats are affected by various infectious and non infectious diseases including parasitic and metabolic disorders. Prolonged contact of mange mites with the skin of the host, cause the condition known as mange. Infestation in goats can be by many species of burrowing and non burrowing mites (Fentanew et al., 2015), however the species more normally found are scabies mite (Sarcoptes scabiei), goat follicle mite (Demodex caprae), psoroptic ear mite (Psoroptes cuniculi), and chorioptic scab mite (Chorioptes bovis) (Talley, 2007). Azadirachta indica (neem tree) is an extremely helpful plant used to treat many of skin disorders (Eid et al., 2017). This investigation was planned to study effect of 25% aqueous extract of Azadirachta indica on haematological alteration in mange infested goats under middle Gujarat climate.

2. Material Method

In present study 6 goats suffering from mange infestation were presented from nearby villages of Anand district. The skin scrapping of all these animals was done.4 ml blood was collected from these goats in a sterile vial containing anticoagulant potassium salt of ethylene diamine tetra acetic acid (K₃EDTA). The blood was collected at 0 day, 15^{th} day, 30^{th} day and 45^{th} day, from the commencement of treatment, to study the haematological parameters. All goats were treated by topical application of 25% aqueous extract of

Azadirachta indica once in a day for 45 days. Preparation of 25% aqueous extract of Azadirachta indica was done by powdering the air dried leaves of Azadirachta indica by mechanical grinder and then was stored in air tight containers. Exactly 250 grams of course powdered leaves of the plant were mixed with 750 ml of distilled water in 1 litre of beaker and was stirred at every 2 hours interval of 48 hours. The mixture was then filtered in another beaker. The filtrate was then evaporated at room temperature till semi solid residue was formed, which was then preserved in refrigerator at - 18°C for subsequent experiment. The haematological parameters studied included, Haemoglobin (Hb) (g/dl), Total erythrocyte count (TEC) ($\times 10^{6}/\mu$ l), Total leukocyte count (TLC) ($\times 10^{6}/\mu l$), Total platelets count (TPC) ($\times 10^{3}/\mu$ l), Packed cell volume (PCV) (%), Neutrophils (N) (%), Eosinophils (E) (%), Lymphocyte (L) (%), Basophils (B) (%) and Monocytes (M) (%) by using Automatic Whole Blood Analyzer (Abacus Junior Vet - 5). The data was analysed by using completely randomized design as per Snedecor and Cochran (1994).

3. Result and Discussion

The results of haematological parameters presented in Table 1.

The mean values of haemoglobin (g/dL) increased gradually and significantly (p<0.05) with increasing the duration of treatment till 45th day (11.13 \pm 0.63) in comparison to the values of previous week. However, the improvement in haemoglobin values was non - significant from 0 day (8.40 \pm 0.50) to 15th day (9.30 \pm 0.56). Sinha et al. (2004) stated that the mean value of Hb was significantly reduced in goats suffering from sarcoptes mange infestation. Similar finding was reported by Akomas et al. (2011), Pawar et al. (2012), Gupta et al. (2013), Habeeb (2015), Kumar et al. (2016), and Iqbal et al. (2018).

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The mean values of total erythrocyte count (×10⁶ / μ l) increased gradually and significantly (p<0.05) with increasing the duration of treatment till 15th (9.42± 0.29) and 45th day (15.24± 0.42) in comparison to the values of previous weeks respectively. However, there was non -significant (p>0.05) increase in the values of total erythrocyte count from 15th day till 30th day. Sinha et al. (2004) revealed significant increase in TEC value in mange affected goats. Similar finding was reported by Akomas et al. (2011), Pawar et al. (2012), Gupta et al. (2013), Habeeb (2015), Kumar et al. (2016), and Iqbal et al. (2018).

The mean values of total leucocyte count (×10⁶ /µl) decreased gradually and significantly (p<0.05) on 30thday (10.69± 0.72) in comparison to 15th day (13.46± 0.87). The improved in total leucocyte count values was non -significant from 0 day (15.11± 1.04) to 15th day (13.46± 0.87) and 30th day (10.69± 0.72) to 45th day (8.29± 0.71). Pawar et al. (2012) recorded significantly increased mean value of TLC in goats suffering from sarcoptes mange infestation. Similar finding was reported by Akomas *et al.* (2011), Ogundiyi et al. (2012), Gupta et al. (2013), Habeeb (2015) and Kumar et al. (2016).

The mean values of total platelets count $(\times 10^3/\mu l)$ increased gradually and significantly (p<0.05) on, 30^{th} (256.17± 13.88) and 45th day (305.17± 13.51) in comparison to 15^{th} (184.00± 11.88) and 30th day, respectively. However, the increase was non - significant on 15^{th} day (184.00± 11.88) in comparison to value on 0 day (160.67± 12.12). Sinha et al. (2004) revealed significant increase in TEC value in mange affected goats. Similar finding was reported by Akomas *et al.* (2011), Pawar et al. (2012) and Gupta et al. (2012).

The mean values of packed cell volume (%) increased gradually and significantly (p<0.05) on, 15^{th} (20.98± 0.80), 30^{th} day (23.89± 0.70) and 45^{th} day (27.18± 0.86) in comparison to day 0 (17.94± 0.70), 15^{th} (20.98± 0.80) and 30^{th} day (23.89± 0.70), respectively. Sinha et al. (2004) revealed significant decrease in PCV value in mange affected goats. Similar finding was reported by Gupta et al. (2013), Habeeb (2015), Kumar et al. (2016), and Iqbal et al. (2018).

The mean values of lymphocytes (%) decreased gradually and significantly (p<0.05) on, 15^{th} (45.13± 0.76), 30^{th} day (41.79± 0.69) and 45^{th} day (38.98± 0.85) in comparison to day 0 (47.85± 0.85), 15^{th} (45.13± 0.76) and 30^{th} day (41.79±

0.69), respectively. Gupta et al. (2013) recorded significant decrease in lymphocytes value in mange affected goats. Similar finding was also reported by Pawar et al. (2012).

The mean values of neutrophils (%) increased gradually and significantly (p<0.05) on, 15^{th} (56.25± 1.39), 30^{th} day (58.15± 1.41) and 45^{th} day (60.22± 1.35) in comparison to day 0 (54.27± 1.32), (56.25± 1.39) and 30^{th} day (58.15± 1.41), respectively. However the increase in values of neutrophils on 15^{th} and 30^{th} day were non - significant. Gupta et al. (2013) recorded significant increase in neutrophils value in mange affected goats. Similar finding was also reported by Pawar et al. (2012).

The mean values of eosinophils (%) decreased gradually and significantly (p<0.05) on, $15^{\text{th}}(11.70\pm1.13)$, 30^{th} day (9.20 \pm 0.85) and 45^{th} day (7.30 \pm 0.72) in comparison to day 0 (15.00_z \pm 1.19), $15^{\text{th}}(11.70\pm1.13)$ and 30^{th} day (9.20 \pm 0.85), respectively. Gupta et al. (2013) recorded higher value of eosinophils in goats suffering from sarcoptes mange. Similarly, Pawar et al. (2012) observed a significant increase in number of eosinophils in mange affected goats.

The mean values of basophils (%) did not increased or decreased significantly (p<0.05) during the course of treatment. Similarly, Ogundiyi et al. (2012) also observed a non - significant difference in number of basophils in healthy and mange affected goats.

The mean values of monocytes (%) increased gradually and significantly (p<0.05) on, 15^{th} (0.92± 0.06), 30^{th} day (1.36± 0.06) and 45^{th} day (1.82± 0.06) in comparison to day 0 (0.47± 0.06), 15^{th} (0.92± 0.06) and 30^{th} day (1.36± 0.06), respectively.

4. Conclusion

From the above research it can be concluded that 25% aqueous extract of *Azadirachta indica* is useful in treatment of mange infested goats and it also showed significant improvement in the haematological values of affected goats.

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Haematological	Days of treatment			
Parameters	0 day	15 th day	30 th day	45 th day
Hb (g/dL)	8.40 _x ±0.50	9.30 _x ±0.56	$10.20_{xy} \pm 0.50$	11.13 _x ±0.63
TEC (× $10^6/\mu l$)	7.07 _x ±0.46	$9.42_{y}\pm0.29$	15.14 _y ±0.44	15.24 _z ±0.42
TLC (× $10^6/\mu l$)	15.11 _v ±1.04	13.46 _v ±0.87	10.69 _x ±0.72	8.29 _x ±0.71
TPC (× $10^3/\mu l$)	160.67 _x ±12.12	$184.00_{x} \pm 11.88$	256.17 _y ±13.88	305.17 _z ±13.51
PCV (%)	17.94 _x ±0.70	20.98 _v ±0.80	23.89 _z ±0.70	27.18 _w ±0.86
L (%)	47.85 _w ±0.85	45.13 _z ±0.76	41.79 _y ±0.69	38.98 _x ±0.85
N (%)	54.27 _x ±1.32	56.25 _{xy} ±1.39	58.15 _{xy} ±1.41	60.22 _v ±1.35
E (%)	15.00 _z ±1.19	$11.70_{y} \pm 1.13$	9.20 _{xy} ±0.85	7.30 _x ±0.72
B (%)	0.53±0.12	0.52±0.09	0.25±0.04	0.58±0.13
M (%)	$0.47_{x} \pm 0.06$	$0.92_{v} \pm 0.06$	$1.36_{z}\pm0.06$	$1.82_{w}\pm0.06$

Table 1: Haematological findings in mange infested goats on different treatment day Mean (±SE)

Means with uncommon subscripts within the column (x, y, z, w) differ significantly (p<0.05).

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