SUMMARY AND CONCLUSIONS

The present experiment was conducted on 48 surgically created wounds in twelve apparently healthy goats of either sex of one and half years to two years of age and weighing between 10 to 15 kg body weight. The selected goats were dewormed one week prior to commencement of experiment. All goats were maintained under iso-managemental condition and similar feeding schedule.

The wounds of group I were treated with cow urine topically, while wounds of group II and III treated with cow urine topically as well as orally and pyrogen free distilled water respectively. Gross morphological parameters such as general appearance of wound, appearance of granulation tissue, degree of inflammation, filling of wound gap by granulation tissue, extent of percentage wound contraction, appearance of scab and its shedding, complete healing, extent of cicatrisation and ease of application and removal of dressing agents were studied.

Histomorphological parameters like inflammatory cell infiltration, neo-vascularization, fibroplasia, collagen fibres and epithelialization were studied. Histochemical parameters for wound healing measure viz. onset and extent of collagen fibres, elastic fibres and reticular fibres were observed. These parameters were
visually quantified on the scales viz. 0,1,2,3 and in some parameters up to 4. The following criteria were adopted while visually quantifying the histomorphological and histochemical parameters.

(i) **LEUCOCYTIC INFILTRATION**

0 : Absent.
1 : 0-5 cells/HPF*
2 : 6-30 cells/HPF*
3 : More than 30 cells/HPF*

(ii) **NEOVASCULARIZATION**

0 : Absent.
1 : 1-5 new blood vessels/HPF*
2 : 6-10 new blood vessels /HPF*
3 : 11-15 or more blood vessels /HPF*

(iii) **FIBROPLASIA**

0 : Absent.
1 : Small number of fibroblasts towards surface.
2 : Diffuse fibroblastic proliferation towards surface extending down to deeper areas.
3 : Dense fibroblastic proliferation over the whole area.
4 : Dense fibroblastic proliferation over the whole area and the fibroblasts laying down collagen fibres.

(iv) **EPITHELIALIZATION:**

0 : Absent.
1 : Upto 20% epithelialization.
2 : 20% epithelialization.
3 : 80% or more epithelialization

(v) **COLLAGEN FORMATION**

0 : Absent.
1 : Small amount of thin collagen.
2 : In between 1 and 3.
3 : Diffuse thick collagen.
4 : Wavy collagen.

(vi) **Elastin Formation**

0 : Absent.
1 : Small amount.
2 : In between 1 and 3.
3 : Diffuse.
(vii) RETICULIN FORMATION

Same as elastin.

The studies of histomorphological and histochemical parameters were done of the tissues collected on day-7, 14 and 21. The percentage wound contraction was also observed on the same period.

There was clotting of blood in all groups on 1st day. The wound surface appeared pinkish and moist with absence of any exudation during initial phase of healing process in group I and II. Scabbing appeared in all groups but completed earlier in group II, followed by group I and group III. In contrast to group I and II, group III exhibited wounds having pinkish appearance and wet surface with exudation and some offensive smell.

Granulation tissue appeared on day-3 in group II and on day-4 to -5 in group I. While it could be observed on an average by day-7 in group III.

Moderate degree of inflammation persisted for day-5 to -6 in group I and II, while it persisted longer for a period of 15 to 16 days in group III.

The cavity of wound was filled to two third of its depth by day-7 to -9 in group I and II. The complete filling of the wound cavity was observed by day-11 to -12 in group I and by 10 to 11
days in group II. While in group III, one half gap was filled by day-14 to -15.

Wounds were completely healed by epithelialization on an average by day-18 to -21 in group I, while in group II it was found to be healed completely by 17 to 20 days. Group III healed completely by epithelialization by day-30 to -35, leaving a marked scar.

Dressing gauze got adhered to the healing tissues and required moistening before its removal without any offensive smell in group I and II. There was offensive smell with adhered dressing gauze in group III.

Wound contraction exhibited increasing trend with the increase in periods of observation. Extensive wound contraction was found in group II (94.47±0.53%) followed by group I (89.90±0.50%) and group III (77.81±0.37%) on day-21.

Infiltration of inflammatory cells was more pronounced on 7th day of wound healing in all the groups. These cells in later phase of healing were reduced to minimum. Group II exhibited maximum infiltration followed by group I and group III.

Neo-vascularization was visible from day-7 in all the three groups and reached to its maximum level on day-14 and thereafter,
vscularity started decreasing. Extent of neo-vascularization was maximum in group II on day-14 followed by group I and group III.

Group I and II exhibited maximum fibroblastic proliferation on day-7 as compared to group III. Thereafter, fibroblastic proliferation showed an increasing trend till day-21. Histomorphologically fibroplasia was more extensive in group II followed by group I and III.

All the groups exhibited a gradual increasing trend to the formation of collagen fibres as observed histomorphologically and histochemically. Intensity of collagen fibres was more in group II followed by group I and III.

Elastic fibres exhibited significant variation during the periods of observation. It followed an increasing trend with increase in time in all the groups with maximum intensity observed on day- 21.

Quantum of reticular fibre formation increased with increase in observation time and maximum fibres could be recorded on 21st day of observation. Group II excelled in reticular fibre formation followed by group I and least was recorded in group III on 21st day of observation.
On the basis of the findings observed in the present study following conclusions may be drawn:

1. Cow urine has an attenuating effect on inflammation.

2. Granulation tissue appeared earlier and its growth was more conspicuous in wounds treated with cow urine topically and orally than only topical one.

3. Extensive wound contraction as well as epithelialization was a prominent feature of cow urine treatment and synergistic effect was added by oral administration of cow urine.

4. Fibroplasia and neovascularization appeared more in cow urine treated wound than control.

5. Early scabbing occurs in wounds treated with combined uropathy as compared to wounds treated topically with cow urine.

6. Wounds receiving combined uropathy excel in collagenation as compared to wounds treated with cow urine topically.

7. With respect to quantum of elastic and reticular fibres, cow urine seems to be superior when compared with control.

8. Cow urine treated wounds showed early signs of maturity by a decrease in vascularity and increase in reticular and collagen fibres.
9. Diminution in size of scar following wound healing is a feature of combined uropathy followed by topical application alone.

10. Cow urine plays an excellent role in healing process of surgical wounds when used orally and topically concomitantly.

11. Cow urine possesses potential of antiseptic and antimicrobial property.

12. In terms of early healing of wound, easy availability and cost effective, cow urine can be recommended for use orally as well as topically as wound healing agent.