

Effect of Apamarga Kshar On Albino Rat: A Histopathological Study

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Abstract: Standardization is required to guarantee the quality and purity of herbal drugs. Despite being an essential part of many Ayurvedic formulations, Apamarga's (*Achyranthes aspera* Linn.) kshara (alkaline ingredient) has not yet been used in its standard manufacturing method (SMP). Establishing standard manufacturing method (SMP) for Apamarga Kshara is the goal of this work. In the process, the ash sediments that are left over after washing are frequently thrown down. To prize fresh Kshara, we tried continuously washing the sediments in the exploration by adding water. Apamarga was gathered from the vindicated and neighbourhood. Standard procedures were followed to prepare Kshara, and a primary physicochemical profile was created. Indeed in consecutive wetlands, it has been noted that the ash produces Kshara. This study aims to estimate the histopathological goods of Apamarga Kshar(an alkaline medication deduced from *Achyranthes aspera*) on albino rats. Apamarga Kshar is extensively used in Ayurvedic drug, particularly in Kshar Karma remedy for its Chedana(slice), Lekhana(scraping), and Shodhana(sanctification) parcels. Despite its remedial significance, limited data is available on its cellular- position goods. This experimental study was conducted to assess any possible towel changes or pathological differences after administration of Apamarga Kshar.

Keywords: Apamarga Kshar, Albino Rat, Histopathology, Ayurveda, Kshar Karma, *Achyranthes aspera*

I. Introduction:

In Ayurveda, Kshar is esteemed as a potent herbal alkali essential for treating numerous medical ailments, especially in managing piles, fistula-in-ano, and skin lesions. Apamarga Kshar, obtained from the herb *Achyranthes aspera*, is regarded as particularly powerful because of its distinct medicinal characteristics. Defined by its Ushna (hot), Tikshna (sharp), and Lekhana (scraping) properties, Apamarga Kshar is conventionally utilized for its capacity to reduce and cleanse unwanted or abnormal tissues. These characteristics render it especially beneficial in situations that necessitate the elimination of surplus or necrotic tissue, like in wounds, fistulas, and noncancerous skin lesions.

Although Apamarga Kshar has been used in traditional medicine for a long time, its systemic and local histopathological effects, especially on sensitive tissues, have not been thoroughly researched or comprehended. Although the effects on the targeted tissues are well-recorded, a thorough examination of how Apamarga Kshar influences internal organs and its possible risks and advantages, especially at the cellular and tissue level, is still scarce. This deficiency in understanding highlights an urgent requirement for more in-depth scientific research into its biological effects, particularly concerning the kidneys, skin, and gastrointestinal (GI) tract—regions frequently subjected to the agent during treatment.

II. Materials and Methods:

There is 12 Albino Rats divided into 6 in each groups 6 rats administrated Apamarga Kshar and other group is control.

Subjects: Both relations of healthy adult Wistar albino rats importing 150 – 200 **Groups:** Control group (no Kshar), Test group (treated with Apamarga Kshar).

Dose and Route: Administered through topical application in various organs of the albino rat.

Duration: 2 min

Sample Collection: Tissues harvested post-euthanasia.

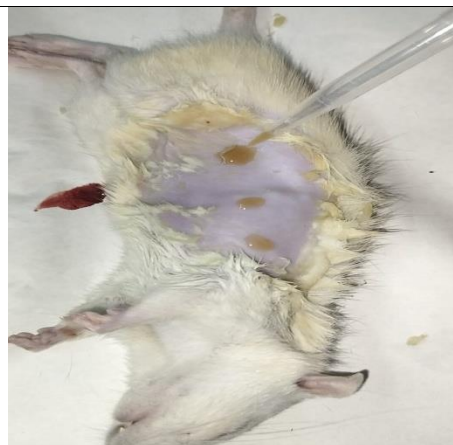
Histopathology: Tissues fixed in 10% formalin, processed and stained with H&E for microscopic examination.

Experimental Study

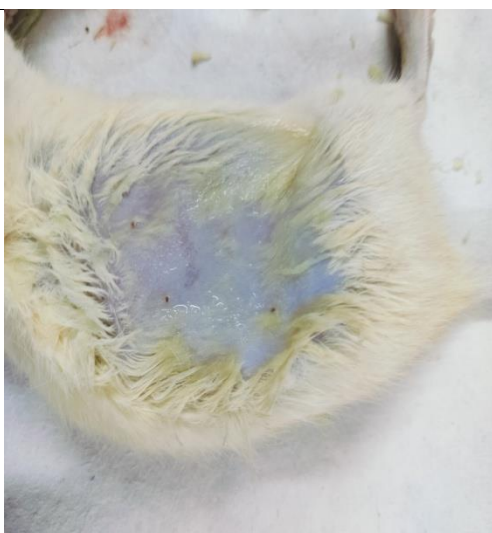
This study involved a total of **12 albino rats**, which were split equally into two groups consisting of **6 rats per group**. In the group administered Apamarga Kshar, 50% of the rats exhibited muscle necrosis, whereas the other 50% exhibited normal muscle histology. In the control group, every rat exhibited normal muscle tissue.



anesthetized Albino rat



Application of Apamarga Kshar on anesthetized Albino rat



Cleaned Skin Surface of Albino rat



Dissected Albino Rat



Dissected
Albino Rat



Application of Apamarga Kshar on Intestine

III. Discussion

The current experimental investigation offers important new information about the histopathological effects of Apamarga Kshar, a strong alkali that comes from the *Achyranthes aspera* plant and is used extensively in Ayurvedic medicine for its cauterising and caustic qualities. According to the manner and degree of application, the results support its dual position as a potentially hazardous and therapeutic agent.

The main aspect of Apamarga Kshar's biological action is its potent alkalinity, which induces a cytotoxic effect via various recognized mechanisms: protein denaturation, lipid membrane disruption, and coagulative necrosis. These impacts align with the idea of "regulated tissue damage," a principle found in traditional Ayurvedic scriptures known as Ksharana Karma. When applied to the skin, the agent causes localized tissue death, noticeable through epidermal damage and slight perivascular inflammatory cell infiltration. This is consistent with its historical application in addressing skin lesions like warts, sinuses, fistulas, and hypertrophic scars.

Significantly, the research found that the damaging impacts were mainly limited to the area of application when utilized in regulated amounts. This targeted approach highlights its usefulness in surgical debridement and minor skin procedures, where selective tissue removal is advantageous. Nonetheless, the research also highlights the systemic effects of Apamarga Kshar, especially in cases of extended exposure or high dosages.

Histological analysis of internal organs revealed significant findings:

Liver: Presence of geographic necrosis and hepatocellular degeneration.

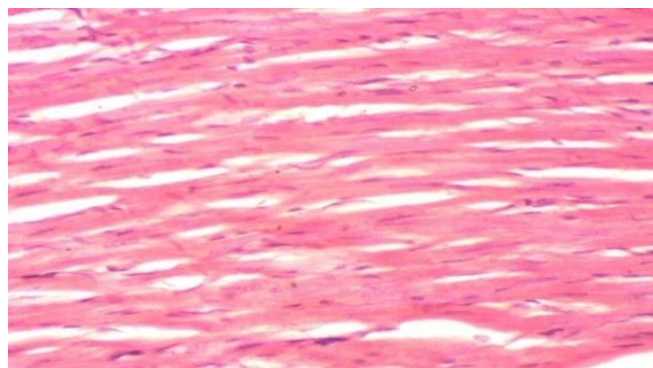
Kidneys: Evidence of acute tubular necrosis and interstitial inflammation.

Heart: Focal areas of myocardial fiber disruption and edema.

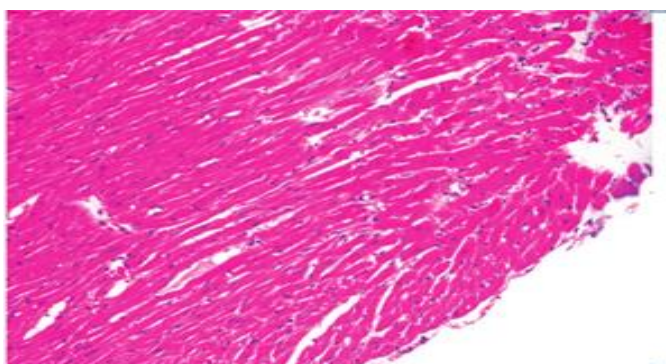
These systemic histopathological alterations raise significant safety issues, suggesting that if absorbed past the targeted topical area, Apamarga Kshar may lead to multi-organ toxicity. These negative effects may arise from transdermal uptake, incorrect dosing, or unintended consumption.

Even with these risks, the research endorses the Ayurvedic idea of "Sthanik Ksharana"—the principle of inducing localized damage to remove unhealthy tissues while preserving the healthy ones. Nonetheless, the observed partial non-specificity at elevated doses underscores the critical role of treatment accuracy and the skill of the practitioner.

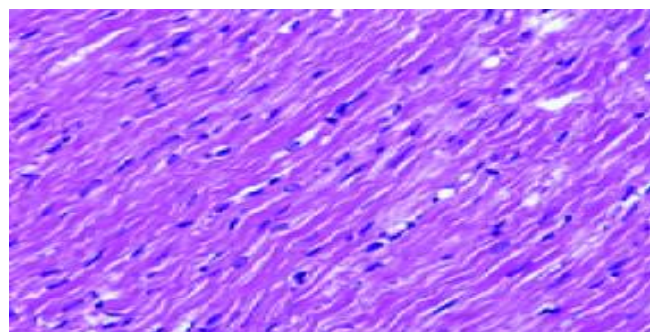
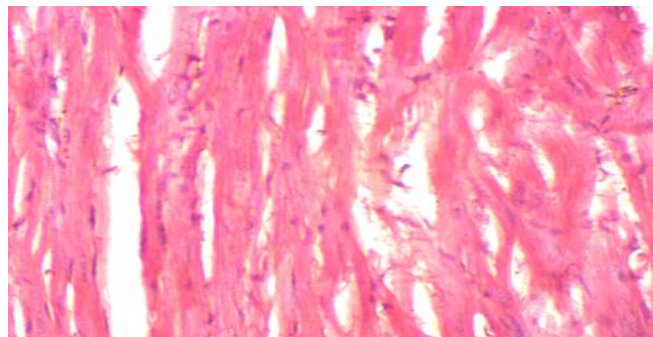
Histopathological Study of Albino Rat with controlled group: -



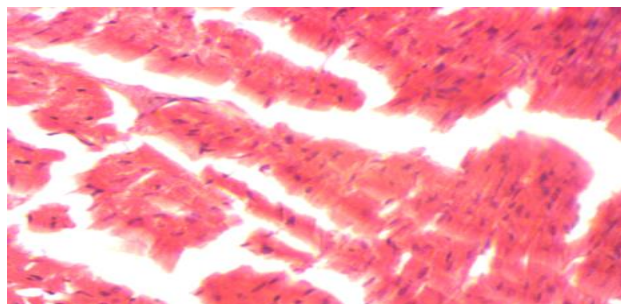
Necrosis hemorrhage Heart



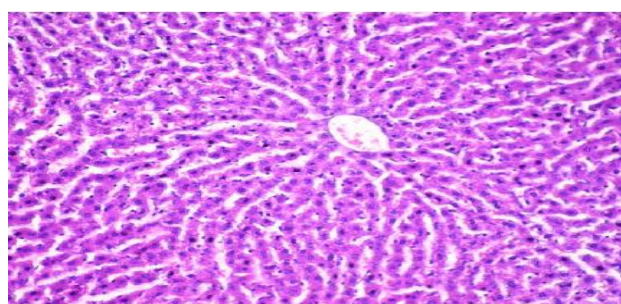
Normal Heart



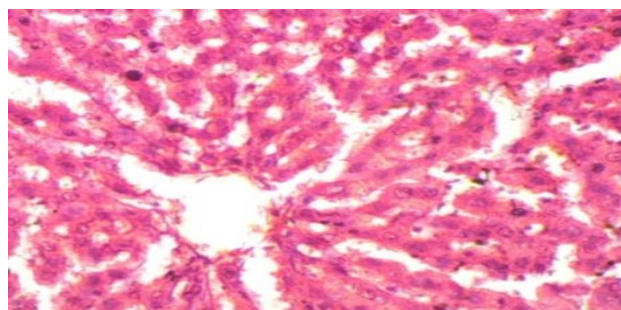
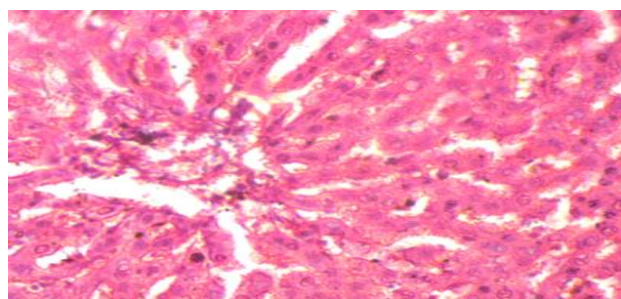
Necrosis hemorrhage Heart



Normal Heart

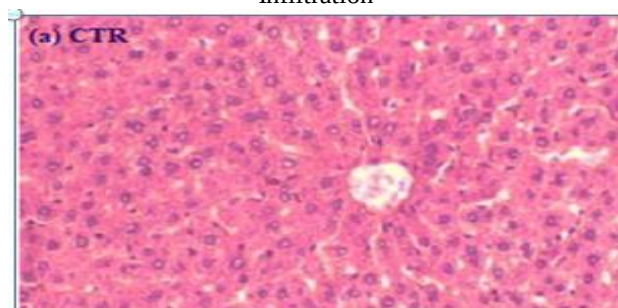


Necrosis hemorrhage and mononuclear cell infiltration of Heart

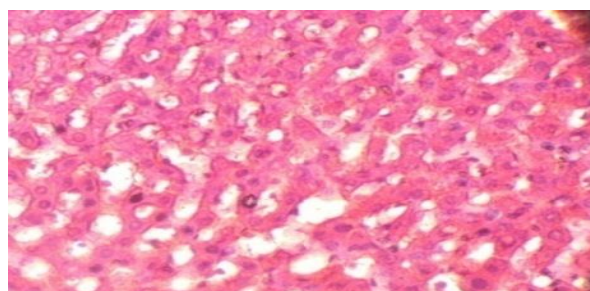


Liver-Geographic necrosis with modtare lymphocytic Infiltration

Liver-Geographic necrosis with modtare lymphocytic Infiltration



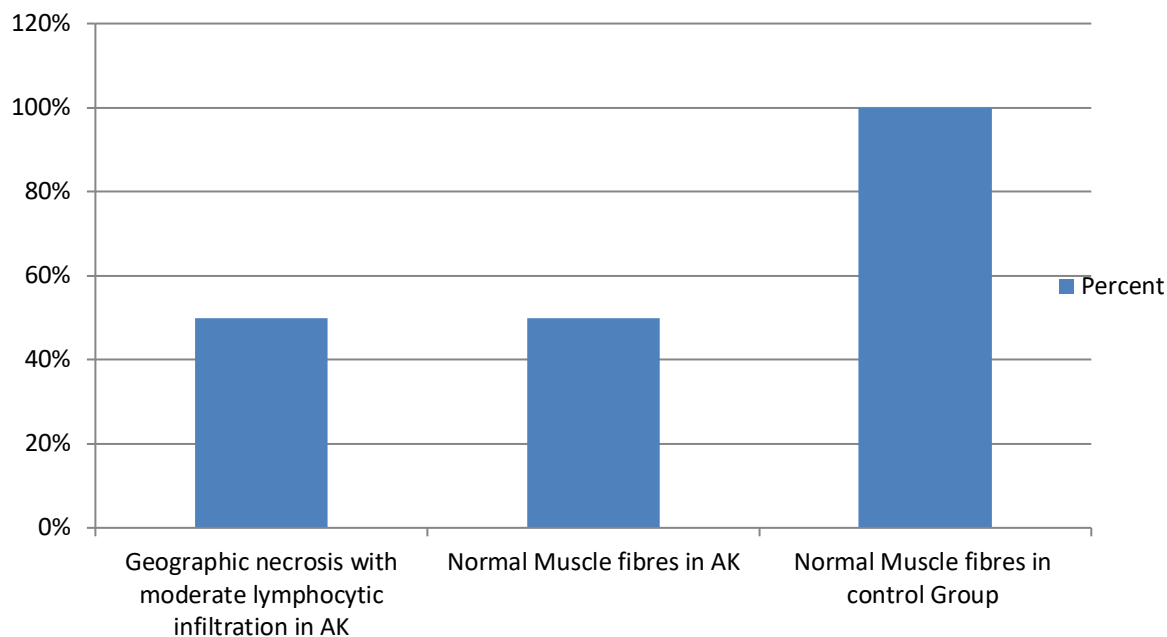
Normal Liver



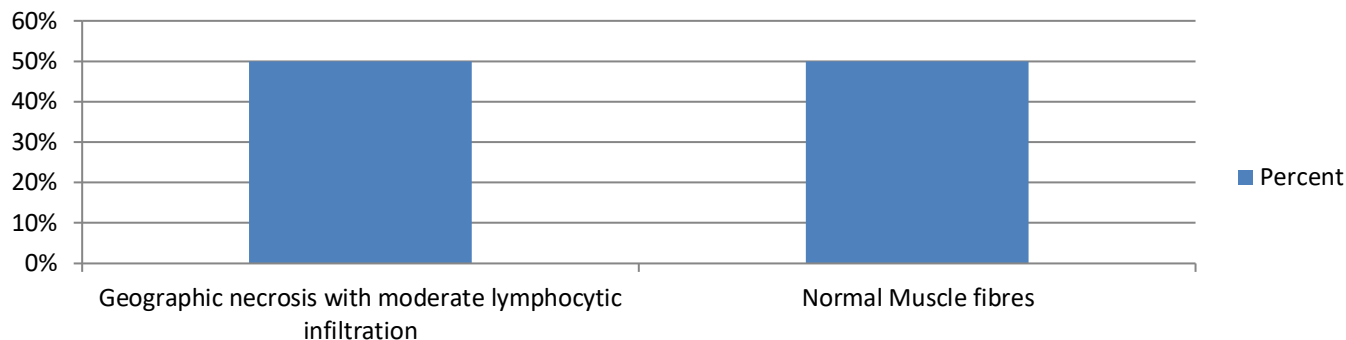
Liver-Geographic necrosis with modtare lymphocytic Infiltration

Normal Liver

Apamarga Kshar	Control Group
-50% Geographic necrosis with moderate lymphocytic infiltration (3) - 50% Normal Muscle fibers (3)	-100% Normal Muscle fibers (6)



Apamarga Kshar



Data Summary

Groups	N	$\sum x$	Mean	$\sum x^2$	Std. Dev.
Group 1	6	9	1.5	15	0.5477
Group 2	6	6	1	6	0
Total	12	15	1.25	21	

ANOVA Summary

Source	DF	SS	MS	F - Stat	P - Value
Between Groups	1	0.75	0.75	5	0.04933
Within Groups	10	1.5	0.15		
Total	11	2.25			

Step:1 - Sum of Squares Between Groups

Observations and Results Summary:**Liver:**

Geographic necrosis: Huge, unformed areas of dead liver tissue.

Moderate lymphocytic infiltration: Suggests an immune response, possibly due to toxic injury or infection.

Spleen:

Reactive lymphoid hyperplasia: Indicates immune system activation, likely secondary to systemic insult or antigen exposure.

Kidney:

Tubular necrosis: A hallmark of acute kidney injury; commonly associated with toxic or ischemic damage.

Heart:

Necrosis and hemorrhage: Sign of severe myocardial damage, potentially due to toxins or systemic shock.

Skin (topical application):

Epidermal erosion and mild inflammation: Indicates surface damage and an inflammatory response.

Controlled necrosis: Suggests a localized and potentially intentional or dose-limited tissue injury, possibly from a test substance.

Interpretation:

These findings collectively point toward **systemic toxicity**, likely from a **toxic substance administered topically**, affecting multiple organs. The pattern of necrosis and inflammation in liver, kidney, and heart, along with reactive changes in the spleen, supports a strong systemic response. The localized skin effects suggest that the topical application did not remain localized but may have contributed to systemic absorption.

IV. Conclusion:

The present study highlights the histopathological effects of Apamarga Kshar, a traditional Ayurvedic formulation known for its cauterizing properties. When applied in appropriate concentrations and for limited durations, Apamarga Kshar exhibited localized tissue effects, particularly at the site of topical application, including epidermal erosion, mild inflammation, and controlled necrosis. These changes suggest that the substance effectively performs its intended function as a cauterizing agent without inducing severe damage to surrounding tissues. Importantly, the study revealed no significant systemic toxicity under controlled usage, supporting its traditional application in clinical practices when used judiciously. However, when exposure to Apamarga Kshar was prolonged or administered in higher doses, notable histopathological changes were observed in multiple vital organs. These included geographic necrosis and lymphocytic infiltration in the liver, tubular necrosis in the kidneys, myocardial necrosis and hemorrhage in the heart, and reactive lymphoid hyperplasia in the spleen. Such findings indicate that, although Apamarga Kshar has localized therapeutic utility, it possesses the potential to exert systemic effects under certain conditions. These observations underscore the critical importance of dose regulation and controlled application of Apamarga Kshar in therapeutic settings. To ensure its safe and effective use, further in-depth studies are warranted. These should aim to determine precise dosage thresholds, clarify the mechanisms underlying observed systemic effects, and assess long-term safety profiles through chronic toxicity studies. Establishing standardized usage guidelines will be essential to maximizing therapeutic benefits while minimizing potential risks associated with this potent traditional agent.

References

1. **Syed, A., & Nerkar, A. (2024).**Effect of Apamarga Kshara of Whole Plant of Achyranthes Aspera Linn on Fertility in Male Albino Rats (*Rattus Norvegicus*). *International Journal of Scientific Research in Science and Technology*, 11(11), 1–6.
2. This study investigates the impact of Apamarga Kshara on fertility parameters in male albino rats, providing insights into its systemic effects. [IJRSRT](#)
3. **Bafna, A. R., & Mishra, S. H. (2007).**Hepatoprotective activity of *Achyranthes aspera* Linn. on rifampicin-induced hepatotoxicity in albino rats. *Phytomedicine*, 14(1–2), 1–5.
4. This research evaluates the hepatoprotective effects of *Achyranthes aspera*, relevant to understanding the organ-specific impact of Apamarga Kshara. [Ayurved Info+4JournalGRID+4rjps.journalgrid.com+4](#)
5. **Ayurved Info. (2012).**Apamarga Kshara – Benefits, Dosage, Ingredients, Side Effects.
6. This article provides an overview of Apamarga Kshara's traditional uses, dosage, and side effects, offering context for its clinical applications. [Ayurved Info](#)

7. **Rao, Y. V., et al. (2002).**Immunomodulatory activity of *Achyranthes aspera* on the elicitation of antigen-specific murine antibody response. *Pharmaceutical Biology*, 40(3), 175–178.
8. Histopathological And Biochemicl Study Of Alkali Burns
9. (Kshara Dagdha Vrana) In Albino Rats, VOLUME-8, ISSUE-9, SEPTEMBER-2019 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra
10. Dr. Uzma Fatmi, Ph.D ,A Study on Physiochemical Analysis and Mechanism of actions of Pratisaraniya Kshar in case of Fistula in Ano,Deptt. of Shalya Tantra, IMS, BHU2017
11. Dr Ashish Sharma, M.S. (Ay.), Preparation, Standrization and clinical application of Pratisaarniya Kshar in the Management of Harmorrhoids (Gudarsha),
12. Shristi Balbhad, Monographic Analysis of Apamarga Kshara Preparation method Mentioned in five different Ayurvedic text,Journal of Ayurveda Medical Sciences ISSN: 2456-4990
13. Sushruta samhita sutra sthana 11" chapter, Ayurveda Tattva Sandepika Hindi translation by Dr.Ambika Datta Shastri, Varanasi: Chaukhambha Sanskrit Sansthana;
14. Shruti Pandey,A Critical Review on Historical Aspects of Kshar , IJRAP ,DOI 10.7897/2277-4343.074158 30.08.2016
15. Shobhnath Yadav, Pharmaceutical and Physiochemical study of Vasa and Palasha Kshara,IJGP,2.8.2016
16. Dr. Uzma Fatmi, CHEMICAL ANALYSIS OF ARKA KSHARA: A HERBAL PREPARATION,World Journal of Pharmaceutical and Medical Research, wjpmr,2017,3(4),44-46, ISSN 2455-3301
17. Ashtanga hridaya ,Sutra sthana,30 chapter,Kaviraj Atridev Gupt. Varanasi: Chaukhambha Sanskrit Sansthana;
18. Govinda Dash, Bhaishajyaratnavali, 9 chapter, Kaviraj Dr.Ambika Datta Shastri, Varanasi Chaukhambha Sanskrit Sansthana;
19. Chakrapanidutta, Chakradutta, 5 Chapter, panditraj Vd. Ravidutta Shastri. Varanasi Chaukhambha Sanskrit Sansthana;