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Study the antimicrobial effect of “Palash beej and Palash pushp” on urinary tract infection through culture and sensitivity test

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ABSTRACT

Despite decades of dramatic progress in their treatment and prevention, infectious diseases remain a major cause of death and debility and by observing increasing prevalence of urinary tract infection and changing epidemiology of infectious disease with the advent of antimicrobial agents, so it's time to reopen and evaluate the ancient literature of medicine and search for the appropriate medicine. In Ayurvedic texts Krimi is of various types, some of which can be correlated with microbes e.g. - Abhayantar Krimi. As Palash (Butea monosperma) also has an action of krimighana and frequently used in mutrakrichra, so it is imperative for us to prove the antimicrobial properties of the mentioned drugs using scientific parameters. Total 50 number of urinary tract infected patients selected randomly and studied from B.V. Medical foundation's Ayurved Hospital, Rognidan department. Extract of Palash beeja and Pushpa was prepared. A separate sensitivity disc was prepared. Sensitivity was tested on different organism detected during the study. Antimicrobial susceptibility found more toward uropathogen E-coli on both groups. Higher concentration of Palash Pushpa (Butea-monosperma) & Beeja extract was found more susceptible compare to lower concentration. On comparing both groups antimicrobial susceptibility of Palash Pushpa (Buteamonosperma) extract was found more than Palash beeja (Butea-monosperma) extract to all uropathogen.

Keywords: Antimicrobial agent, Palash Beeja and Pushpa, Urinary tract infection.

INTRODUCTION

Despite decades of dramatic progress in their treatment and prevention, infectious diseases remain a major cause of death and debility and are responsible for worsening the living conditions of many millions of people around the world. Infections frequently challenge the physician's diagnostic skill and must be considered in the differential diagnoses of syndromes affecting every organ system.

Changing epidemiology of infectious disease with the advent of antimicrobial agents, now it is being realized that as we developed antimicrobial agents, microbes developed the ability to elude our best weapons and to counterattack with new survival strategies. Antibiotic resistance occurs at an alarming rate among all classes of mammalian pathogens. So, a question arises, how much of a next generation of antibiotics has to be produce? And what is assurance of these antibiotics on health?

Hence, it is time to reopen and evaluate the ancient literature of medicine and search for the appropriate medicine, already mentioned in it. If we observe and evaluate the quotations mentioned in Ayurveda, we will come to know that the origins of modern microbiology are deeply situated within the ancient literature.

A urinary tract infection, or UTI, is an infection that can happen anywhere along the urinary tract. It is the second most common type of infection in the body. Urinary tract infections (UTIs) account for about 8.3 million doctor visits each year.

In general, 3 main mechanisms are responsible for UTIs, including

1. Colonization with ascending spread.
2. Hematogenous spread.
3. Peri uro-genital spread of infection.

As we search the similar kind of disease in Ayurvedic literature and previous research done on the same topics we can correlate the symptom of mutrakrichra with urinary tract infection those are:

- Muhurmuhur mutrapravrutti can be compared with frequency
- Sakastha mutrapravrutti can be compared with dysuria
- Raktavarna mutrapravrutti can be compared with haematuria

- Sadaha mutrapravrutti can be compared with burning micturation
- Adhoga- Udarashula can be compared with pain in abdomen and flanks

As we see the increasing prevalence and the severity of the disease also developing resistance to antimicrobial agents lead us to find antimicrobial activity of Ayurvedic drugs. There are so many drugs described in Ayurveda, which are highly effective against microbes and described as jantughana, krimighna, bhutaghna, rakshoghna etc. According to Bhavaprakash "Palash" (*Butea monosperma*) is one of the drug which are krimighana and also used in mutrakrichra^[1]. Palash is a drug which is found easily all over India and its beej and pushp are used internally in various diseases.

Palash is katu, tikta, kashaya and katu vipaki, deepan, vrushya, snigdha, and used in Gulma, vataja grahani, arsha, krimi, varna doshanashak, Vatajanak-Kapha-Pitta Raktavikar, mutrakruchhranashak, grahi, shital, trushna, dahashamak and kusthaghna.

In Ayurvedic texts krimi is of various types, some of which can be correlated with microbes. As palash (*Butea monosperma*) also has an action of krimighna and frequently used in mutrakrichra, to see its krimighana (antimicrobial) activity. It is necessary to evaluate this knowledge with the help of present day techniques such as urine culture and sensitivity method.

AIM & OBJECTIVE

1. Standardization and extraction of Palash (*Butea monosperma*) beej and pushp.
2. To determine the antimicrobial activity of Palash (*Butea monosperma*) beej and pushp on urinary tract infection through culture and sensitivity method.

MATERIALS & METHODS

Materials

1. Palash (*Butea monosperma*) beej and pushp was purchased from Pune market. Raw material was authenticated at Department of Botany, Pune University. Ethyl alcohol extraction was done by sox-let apparatus method at Indian Drug Research Institute, Pune.

2. Different type of media for the culture and sensitivity^[2].
3. Glass slide for identification of bacteria^[3].
4. An incubator for incubation of culture plated disc.
5. The mid stream urine sample will be collected in a sterile culture bottle from the patients who are suffering from Urinary tract infection.

Experimental design

1. Total 50 number of urinary tract infected patients selected randomly for experimental study.
2. Ethyl alcohol extraction of Palash (Butea monosperma) beej and pushp done at Indian Drug Research Institute, Pune.
3. A sensitivity disc with lower concentration -10%, 20% and higher concentration - 90%,100% extract of palash (Butea monosperma) beej and pushp was prepare at Indian Drug Research Institute, Pune.
4. Different type of culture media disc, plated with collected urine sample by platinum loop under all aseptic precaution for cultivation of organisms.^[4]
5. Incubated for next 24 hrs.
6. Bacteria will be isolated and identified.

7. Sensitivity of an extract of palash (Butea monosperma) beej and pushp in different fix concentrations was observed.

Inclusion criteria

- Irrespective of age and sex.
- Clinically diagnosed UTI patients^[5,6].
- Having albumin and pyuria in urine routine and microscopic examination.

Exclusion criteria

- Patient clinically not diagnosed as suffering from UTI.
- Don't show albumin and pyuria in urine sample by routine and microscopic examination.
- No growth sample rejected from the study.

Observation and results

Observations were done according to

- Gender
- Age
- Education
- Socio economic status
- Marital status

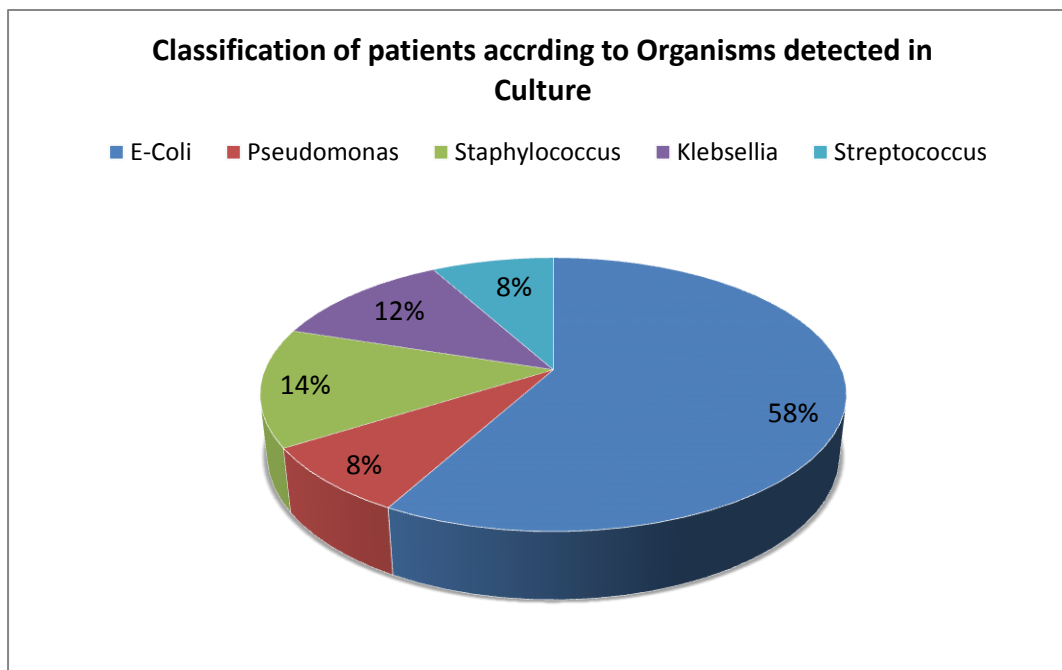
Acc. to symptom

Symptom	No. of Patients
Frequency (muhurmuhur-mutrapravrutti)	34
Burning Micturation (Sadaha-mutrapravrutti)	31
Dysuria (Sakastha-mutrapravrutti)	48
Hematuria (Raktavarni-mutrapravrutti)	12
Pain in abdomen & flanks (Basti pradshi udar shula)	14

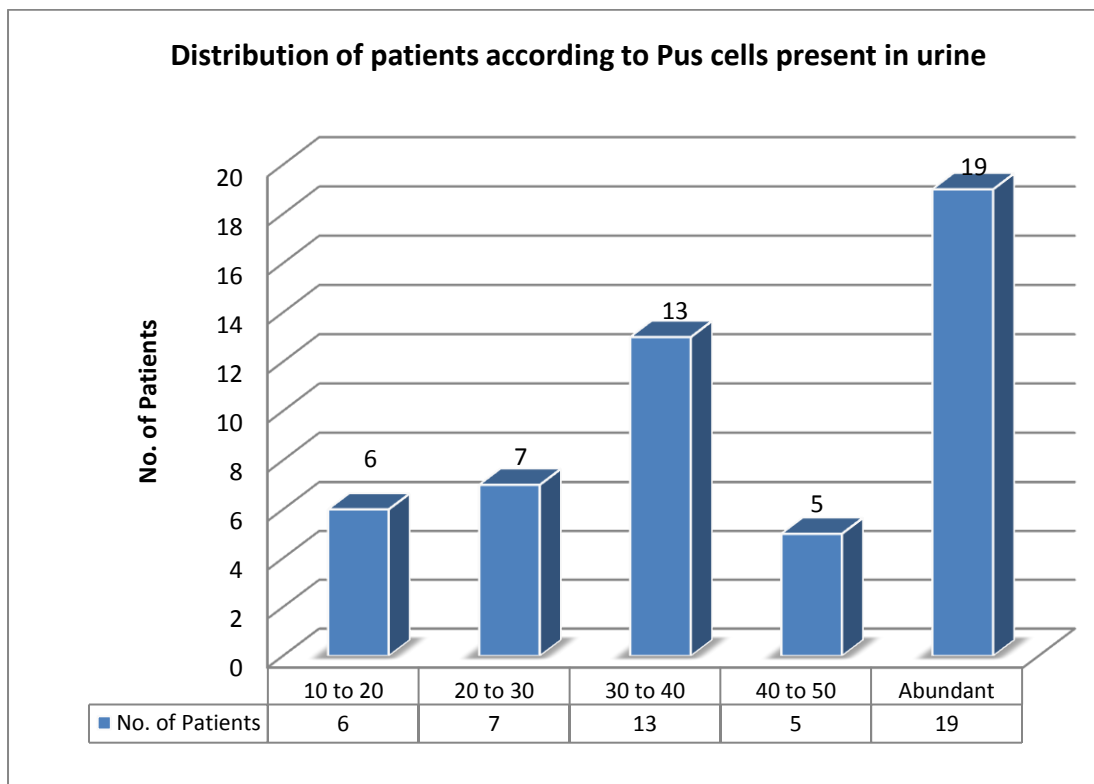
Acc. to Disease type.

Disease Type	No. of Patients
Acute Pyleonephritis	21
Cystitis	14
Urethritis	8
Complicated UTI	7

Acc. to organism



Acc. to Pus cell



Zone of inhibition for E coli antibiogram on 29 samples.

Antimicrobial Agent Palash Beej	Lower Concentration		Higher Concentration	
	No. of Patients	Percent	No. of Patients	Percent
No Sensitivity	18	62%	11	38%
0 – 3 mm	10	35%	8	27.5%
3 – 6 mm	1	3%	8	27.5%
6 – 9 mm	0	0%	2	7%
9 – 12 mm	0	0%	0	0%
Antimicrobial Agent Palash Pushp	Lower Concentration		Higher Concentration	
	No. of Patients	Percent	No. of Patients	Percent
No Sensitivity	6	21%	1	4%
0 – 3 mm	18	62%	5	17%
3 – 6 mm	5	17%	12	41%
6 – 9 mm	0	0%	6	21%
9 – 12 mm	0	0%	5	17%

Zone of inhibition for Klebsella antibiogram on 6 samples.

Antimicrobial Agent Palash Beej	Lower Concentration		Higher Concentration	
	No. of Patients	Percent	No. of Patients	Percent
No Sensitivity	6	100%	5	75%
0 – 3 mm	0	0%	1	25%
3 – 6 mm	0	0%	0	0%
6 – 9 mm	0	0%	0	0%
9 – 12 mm	0	0%	0	0%
Antimicrobial Agent Palash Pushp	Lower Concentration		Higher Concentration	
	No. of Patients	Percent	No. of Patients	Percent
No Sensitivity	04	60%	2	33.33%
0 – 3 mm	02	40%	2	33.33%
3 – 6 mm	0	0%	2	33.33%
6 – 9 mm	0	0%	0	0%
9 – 12 mm	0	0%	0	0%

Zone of inhibition for Staphylococcus antibiogram on 7 samples.

Antimicrobial Agent Palash Beej	Lower Concentration		Higher Concentration	
	No. of Patients	Percent	No. of Patients	Percent
No Sensitivity	06	86%	04	53%
0 – 3 mm	01	14%	03	47%
3 – 6 mm	0	0%	0	0%
6 – 9 mm	0	0%	0	0%
9 – 12 mm	0	0%	0	0%
Antimicrobial Agent Palash Pushp	Lower Concentration		Higher Concentration	
	No. of Patients	Percent	No. of Patients	Percent
No Sensitivity	03	47%	01	14%
0 – 3 mm	04	53%	02	29%
3 – 6 mm	0	0%	04	57%
6 – 9 mm	0	0%	0	0%
9 – 12 mm	0	0%	0	0%

Zone of inhibition for Streptococcus antibiogram on 4 samples.

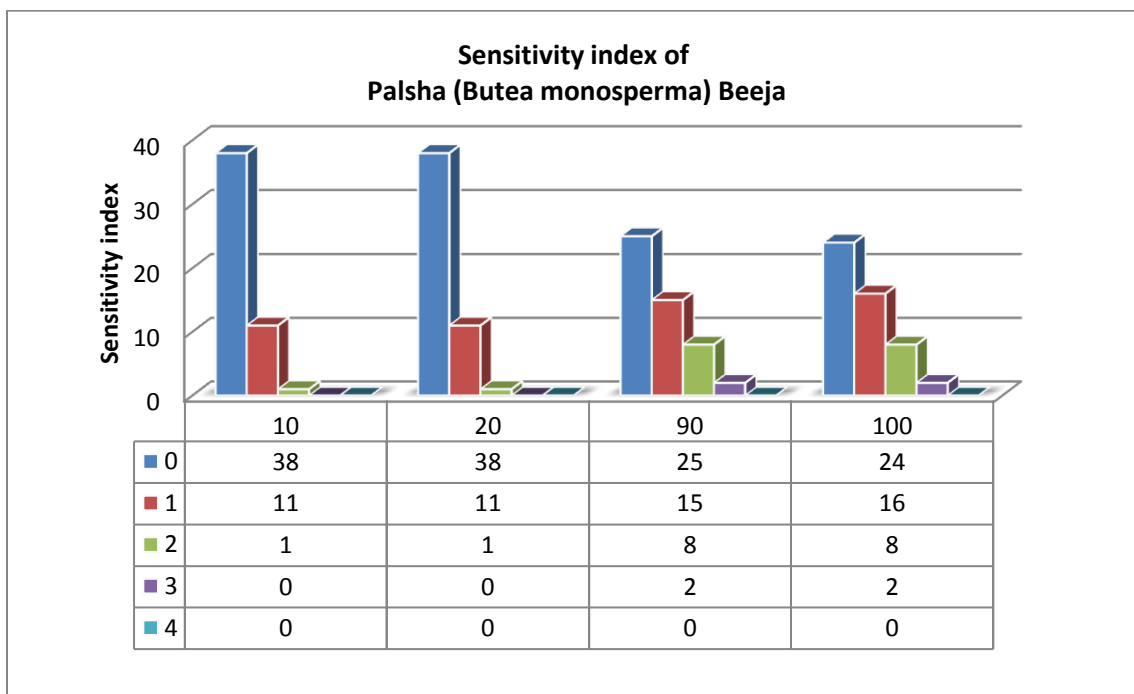
Antimicrobial Agent Palash Beej	Lower Concentration		Higher Concentration	
	No. of Patients	Percent	No. of Patients	Percent
No Sensitivity	04	100%	02	50%
0 – 3 mm	0	0%	02	50%
3 – 6 mm	0	0%	0	0%
6 – 9 mm	0	0%	0	0%
9 – 12 mm	0	0%	0	0%
Antimicrobial Agent Palash Pushp	Lower Concentration		Higher Concentration	
	No. of Patients	Percent	No. of Patients	Percent
No Sensitivity	04	100%	01	25%
0 – 3 mm	0	0%	03	75%
3 – 6 mm	0	0%	0	0%
6 – 9 mm	0	0%	0	0%
9 – 12 mm	0	0%	0	0%

Zone of inhibition for *Pseudomonas* antibiogram on 4 samples.

Antimicrobial Agent Palash Beej	Lower Concentration		Higher Concentration	
	No. of Patients	Percent	No. of Patients	Percent
No Sensitivity	04	100%	02	50%
0 – 3 mm	0	0%	02	50%
3 – 6 mm	0	0%	0	0%
6 – 9 mm	0	0%	0	0%
9 – 12 mm	0	0%	0	0%

Antimicrobial Agent Palash Pushp	Lower Concentration		Higher Concentration	
	No. of Patients	Percent	No. of Patients	Percent
No Sensitivity	04	100%	01	25%
0 – 3 mm	0	0%	03	75%
3 – 6 mm	0	0%	0	0%
6 – 9 mm	0	0%	0	0%
9 – 12 mm	0	0%	0	0%

Sensitivity index of Palash (*Butea-monosperma*) Beej



Anova: Single Factor**SUMMARY**

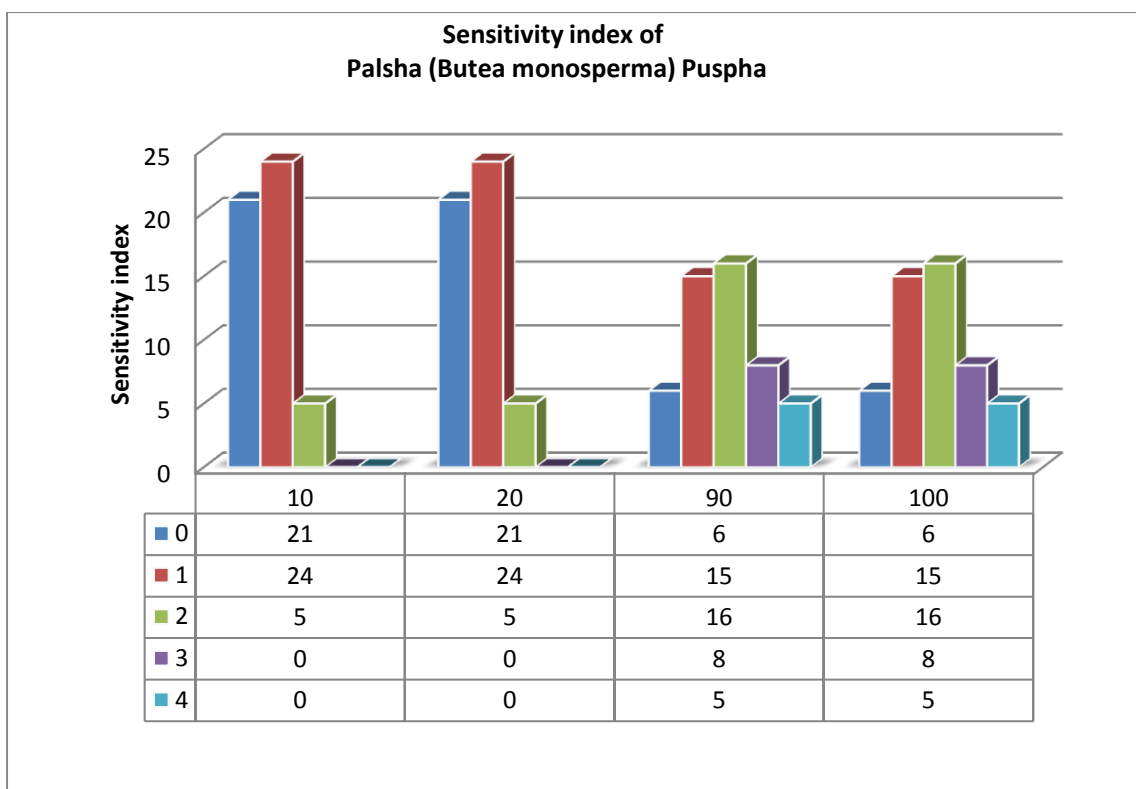
Groups	Count	Sum	Average	Variance
10	50	13	0.26	0.237143
20	50	13	0.26	0.237143
90	50	37	0.74	0.767755
100	50	38	0.76	0.757551

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	12.015	3	4.005	8.011635	4.6E-05	2.650677
Within Groups	97.98	196	0.499898			
Total	109.995	199				

Since P value is less than 0.05 we reject Ho.

As the concentration of extract increases the sensitivity index also increases.

Sensitivity index of Palash (Butea-monosperma) Pushpa**Anova: Single Factor**

Groups	Count	Sum	Average	Variance
10	50	34	0.68	0.426122
20	50	34	0.68	0.426122
90	50	91	1.82	1.334286
100	50	91	1.82	1.334286

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	64.98	3	21.66	24.60793	1.48E-13	2.650677
Within Groups	172.52	196	0.880204			
Total	237.5	199				

Since P value is less than 0.05 we reject Ho.

As the concentration of extract increases the sensitivity index also increases.

Comparison between two group

Anova: Single Factor						
Groups	Count	Sum	Average	Variance		
B10	5	50	10	266.5		
B100	5	50	10	100		
P10	5	50	10	135.5		
P100	5	50	10	26.5		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1486	3	495.3333	3.748975	0.0067	3.238872
Within Groups	2114	16	132.125			
Total	2114	19				

Since P value is less than 0.05. We reject Ho. On comparison between the results of the two groups the second group that is the one with extract of Palash pushp shows more efficacies.

DISCUSSION

- In Present study 50 cases of Urinary tract infection were selected for experimental study.
- The most common pathogen associated with present study was E coli 58% [7], with another organism like staphylococcus 14%, klebsellia 12%, streptococcus 8%, and 8% Pseudomonas.
- A zone of inhibition for **Palash (Butea-monosperma) pushp** extract show 79% effective in lower concentration and 96% effective in higher concentration and for **beej** extract 38% effective in lower concentration and 62% effective in higher concentration against uropathogen **E-coli**.
- Zone of inhibition for **Palash (Butea-monosperma) pushp** extract show 40% mild effective in lower concentration and 67% mild to moderate effective in higher concentration and for **beej** extract no effect in lower concentration and 25% mild effective in higher concentration against uropathogen **Klebsiella**.
- Zone of inhibition for **Palash (Butea-monosperma) pushp** extract show 53% mild effective in lower concentration and 86% mild to moderate effective in higher concentration and for **beej** extract 14% mild effective in lower concentration and 47% mild to moderate

effective in higher concentration against uropathogen **Staphylococcus**.

- Zone of inhibition for **Palash (Butea-monosperma) pushp** extract show no effect in lower concentration and 75% mild effective in higher concentration and for **beej** extract no effect in lower concentration and 50% mild effective in higher concentration against uropathogen **Streptococcus**.
- Zone of inhibition for **Palash (Butea-monosperma) pushp** extract show no effect in lower concentration and 75% mild effective in higher concentration and for **beej** extract no effect in lower concentration and 50% mild effective in higher concentration against uropathogen **Pseudomonas**.
- Antimicrobial susceptibility of Palash (Butea-monosperma) Pushp extract was found more than Palash (Butea-monosperma) beej extract to all uropathogen.
- Higher concentration of Palash (Butea-monosperma) Pushp & Beej extract was found more susceptible compare to lower concentration.

SUMMARY

- Ethyl alcohol extraction & preparation of sensitivity disc of Palash (Butea-monosperma)

Beej & Pushp was done from Indian Drug Research Institute, Pune.

- Palash (Butea-monosperma) Beej & Pushp was studied and proved significant antimicrobial activity against E-coli & mild to moderate antimicrobial activity against all other uropathogen found.

CONCLUSION

- The present study demonstrates Palash (Butea-monosperma) Pushp & Beej extract having

significant antimicrobial activity against E-coli & mild to moderate antimicrobial activity against all other uropathogen found.

- Higher concentration of Palash (Butea-monosperma) Pushp & Beej extract was found more susceptible compare to lower concentration
- Antimicrobial susceptibility of Palash (Butea-monosperma) Pushp extract was found more than Palash (Butea-monosperma) beej extract to all uropathogen.

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