



A CASE STUDY ON PUYALAS (ACUTE DACRYOCYSTITIS) THROUGH AYURVEDA

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ABSTRACT

Puyalasa, one among the *Sandhigataroga* can be correlates to dacryocystitis based on the symptomatology which includes swelling in inner canthus, which later undergoes suppuration causing thick purulent discharge. Dacryocystitis (Puyalas) is the inflammation of the lacrimal sac. Management of acute dacryocystitis differs based on the stage. In the present case report, a 50-year-old male patient suffered from this disease. He presented with the chief complaints of watering from Right eye for 6 and half months and mild swelling and pain over the lacrimal sac area in Right eye for 7 days. He was treated with *Raktamokshana* with *jalokaavcharana*, *Triphala Guggulu* and *Triphaladi Netra Parisheka*, along with *Vimlapana* in lacrimal sac area for 1 month. After 1 month of treatment, the patient got relief from all the complaints. In lacrimal syringing, there was mild obstruction or regurgitation found. On analysis of all the data, it can be concluded that *Ayurvedic* management with *Raktamokshana* with *jalokaavcharana*, *Triphaladi Netra Parisheka* and *Triphala Guggulu* along with *Vimlapana* in the lacrimal sac area offers effective result in the treatment of *Puyalasa*.

Keywords: *Puyalasa*, Acute dacryocystitis, *Raktmokshana*, lacrimal syringing, *Vimlapana*, *Netra Parisheka*, *Triphala Guggulu*

INTRODUCTION

Meaning of *puyalasa* “*Puya*” means pus, “*Alasa*” means collection, without flow^[1]. *Sandram puyasravah* is the characteristic feature of *Mansagata vrana*^[2]. The location of clinical sign of *Puyalasa* is specified by *Deepika* in commentary of *Sharangadhara* as the place between nose and the beginning of eye i.e., *Kaninika sandhi*^[3] *Puyalasa* is one among the *Sandhigata Rogas*.^[4] It is *Tridoshaja Vyadhana Sadhya Vyadhi*.^[5] *Puyalasa* According to Different *Acharyas*, *Sushruta*: A condition in which there will be *Pakwasopha* (inflammation) occurring at the *Kaninika sandhi* (inner canthus) causing *Sandra putigandha yukta puyasrava* (thick purulent discharge)^[6]. According to *Acharya Vagbhata*: *Sukshma vrana* occurring in *Kaninika sandhi* (inner canthus) producing *Sopha/samrambha* (inflammation) causing *Adhmana in Kaninika sandhi* leading to *Puyalasa*^[7].

Yogaratanakara:

Pakwasopha(inflammation) in the *kaninika Sandhi* causing *Suchibedhavat toda*(pain as if pricking by needle) along with *Putigandhayuktha puyasrava*(thick purulent discharge)^[8]. Owing to the symptoms of *Puyalasa* it can be co-related to Acute Dacryocystitis. Dacryocystitis is an inflammatory condition of lacrimal sac, which is caused secondary to obstruction and blockage of normal drainage of tears that leads to secondary infection.^[9] This

complication is connected with structural deformity, infectious disorder of the eye, and traumatic injury. The main clinical symptoms include pain, redness and swelling of lacrimal sac at medial canthus and epiphora due to inadequate drainage of tears. The line of treatment based on the stage helps to combat the pathology easily. The classical line of treatment of *Puyalasa* includes *Raktamokshana*, *Upanaha Swedana*, *Vimardana*, and *Vimlapana*.^[10]

Case report

A 50 year old Male Patient Visited in *Shalakya tantra* opd of Parul Ayurved hospital, Limda Vadodara, and is presented with chief complaints, watering from Right eye for 6 and half months and mild swelling and pain over the lacrimal sac area in Right eye for 7 days.

History of present complaints:-

Patient was asymptomatic before 6 and half months. Gradually patient found watering from Right eye Before this, Patient has not taken treatment anywhere. So, he came to OPD of *Shalakya Tantra* department, Parul Ayurved Hospital in Limda Vadodara, for the treatment of *Puyalasa* (Acute dacryocystitis).

History of past illness

No history of HTN and DM.

Family History

No any family history found

General Examination

Temperature	A febrile
Pulse rate	76/min
Respiratory rate	20/min
Blood pressure	130/90 mmhg
Height	5'4
Weight	58 kg

Systemic Examination

R.S- Clear

CVS- S1 and S2 heard

CNS- well oriented no abnormality detected

Clinical Examination:-

Ocular examination (torch and slit lamp) (both eyes)

	Right Eye	Left Eye
Eyelashes	NAD	NAD
Eyelids	MUCUS DISCHARGE	NAD
Conjunctiva	NAD	NAD
Cornea	ARCUS SENILE	ARCUS SENILE
Sclera	NAD	NAD
Pupils	RRR	RRR
Lens	NAD	NAD
Anterior chamber	NAD	NAD
Eyelashes	NAD	NAD
Canthus	Mild swelling	NAD

Syringing

Lacrimal passage irrigation was done with sterile NS (Normal saline) Obstruction with regurgitation was found in Right eye.

On lacrimal probing - track measurement was 3-4mm in Right eye.

Visual acuity

	Right Eye	Left Eye
DVA	6/6(p)	6/6
NVA	N-6	N-6

TREATMENT ADMINISTERED

- **Raktamokshana with jaloka avcharana** :- At Apanga Pradesha Done

- **Triphaladi Netra Parisheka** :-

3 sittings of *Netra Parisheka* of 7 days each with an 3 days of interval in between each sittings.

- **PURVA KARMA (PRE PROCEDURE)**^[11]

- ❖ In this stage:- Explain about the Procedure to the patient.
- ❖ Preparation of table.
- ❖ Patient made to lie in supine position.
- ❖ Patient instructed about not to sleep nor to open the eyes during the Procedure.
- ❖ The medicated decoction is filtered with the help of a

cotton so that there should not be any minute particulars in the decoction.

➤ **PRADHANA KARMA(MAIN PROCEDURE)^[11]**

- ❖ Medicated decoction is taken in the pot and medicated liquids are poured on the closed eyes from a height of 4 *Angulis* (4 Inches) in a thin and continuous stream for 20 to 25 min for Right eye at inner canthus.

➤ **PASCHAT KARMA (POST PROCEDURE)^[11]**

- ❖ After the treatment the eyes are cleaned properly and the cotton which is dipped in

the rose water is placed up on the eyes and advised the patient to take some rest

● **Vimlapana in the lacrimal sac area**

Vimlapana with *Saindhav lavana* done for 5 min. BD at lacrimal sac area done for 1 months. It is first treatment in *shastiupkrama*.

● **Shamana Chikitsa**

Triphala guggulu 1 tab (250mg) BD after food with lukewarm water for 1 month.

Pics during procedutire and after treatment:-





RESULT

Significant improvement was observed in swelling and pain over the lacrimal sac area and there was mild relief in watering after 10 days of treatment. After 1 month of treatment, complete relief was found in pain and swelling over the lacrimal sac area and watering from the eye. Lacrimal syringing was done after treatment. There was no obstruction or regurgitation found. With this management, the patient was absolutely cured. No recurrence was found in any symptoms and signs after follow up of 1 month. No adverse drug reaction was found during the study and follow-up periods.

DISCUSSION

The classical line of treatment of *Puyalasa* includes *Raktamokshana*, *Upanaha Swedana*, *Vimardana*, and *Vimlapana*.^[12] as it is a type of *Varnashotha*. where in some of them were adopted in this case study. *Raktamokshana* (Blood letting) is first line of treatment advised by *Acharya Sushruta* and *Acharya Vagbhata*. *Jalaukavacharana* (leech application) is the easiest and convenient method of *Raktamokshana* (blood letting). Leech contains Hirudin, calin, bdellins, euglins, destabilase in its saliva. These are anti-inflammatory, anti-coagulatory in nature. Hence it increases blood flow in that region, eliminates toxins and increases

nutrition to affected area. Therefore *Jalukavacharana* has the property to subside immediately the pain, swelling, burning sensation and redness. *Vimlapana* with *Saindhava Lavana* (digital massage) over the lacrimal sac area increases the hydrostatic pressure in the sac and helps to open up the occlusions. *Triphaladi Netra Parisheka* with lukewarm decoction was performed for better purification of the eye after massage. It also increases blood circulation inside the eye lids which reduce the pain and it has anti-inflammatory & antimicrobial property that reduces inflammation of the lacrimal sac area. *Triphaladi Netra Parisheka* treatment has *Chakshushya* property^[13] which is useful for the maintenance of eye health. *Triphala Guggulu*^[14] has *Tridosahra*, *Rasayana*, *Sukshma*, *Krimighna*, and *Vranaropana* properties. Thus, aggravated *Tridosha* were pacified. It also helps in eradicating infectivity and preventing further infection of the lacrimal sac.

Mode of Action:-

Mode of action of *Jaloukaavcharana*

Jalouka induces significant relief in *Shool*^[15]. It arrests the *Paka* (advance suppuration) by expelling the *Dushya Rakta & Pitta*. It prevents a secondary infection and facilitates the healing of lesions due to the antibiotic property of Hyaluronidase secreted by leech^[15]. Its

anti-inflammatory, analgesic, immunostimulation, and Immuno-modulator properties potentiate this effect [16]. It can be justified as it induces the *Srotoshodhana* by eliminating vitiated *Rakta & Pitta Dosha* & improvement in local blood circulation due to various bioactive anti-inflammatory substances released by *Jalouka* [17]. Moreover, *Jaloukavacharana* reduces the symptoms such as Pain, Swelling etc. [18,19]. Anti-inflammatory, vasodilator, superoxide invention, and badly categorized anaesthetics and analgesic compounds released by the leech penetrate the peri articular tissue and adjoining structures & induce analgesic effect through antinociceptive effects and counter-irritation. It also reduces the inflammation in relative structures by inhibiting the chemicals such as adenosine, prostaglandin (P.G.) E1 and PGF2 α ,

leukotriene B4, and (8R-15S)-dihydroxyeicosa-(5E-9,11,13,2)-tetraenoic acid (8R-15S-diHETE) which are responsible for Inflammation in such musculoskeletal disorders [18].

Netra Parishek^[20] :- In this process medicine is poured on closed eye continuously from 4 anguli (4 inches) height for specific time according to *Dosha*. The medicine is absorbed through the skin of eye lids. The active principle is aqueous extract so tissue contact time is very less as it get diluted with tears and drained to naso lacrimal duct.

Triphaladi kashya^[21] :- *Thriphalādi Netra Parisheka* contains equal quantity of powder of *Terminalia bellirica (Vibhitaka)*, *Terminalia chebula (Haritaki)*, *Phyllanthus emblica (Āmla)*, *Glycyrrhiza glabra (Yashtimadhu)* and *Symplocos racemosa (Lodhra)*.

Pharmacological properties of *Thriphaladi Parisheka* [22-30]

Name of the drug	Rasa	Guna	Virya	Vipaka	Dosha karma
<i>Terminalia chebula (Haritaki)</i>	<i>Pancha rasa</i>	<i>Laghu Ruksha</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Chakshushya, Rasayana</i>
<i>Terminalia belerica (Vibhitaka)</i>	<i>Kashaya</i>	<i>Laghu Ruksha</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Chakshushya, Kapha-pitta Nashaka</i>
<i>Phyllanthus emblica (Āmlaki)</i>	<i>Pancha rasa</i>	<i>Laghu Ruksha</i>	<i>Sita</i>	<i>Madhura</i>	<i>Chakshushya, Rasayana Thridoshajit</i>
<i>Glycyrrhiza glabra (Yashtimadhu)</i>	<i>Madhura</i>	<i>Guru Snigdha</i>	<i>Sita</i>	<i>Madhura</i>	<i>Chakshushya, Balya Vata-pittajit</i>
<i>Symplocos racemosa (Lodhra)</i>	<i>Kashaya</i>	<i>Laghu</i>	<i>Sita</i>	<i>Katu</i>	<i>Chakshushya Kapha-pitta nashaka, Grahi</i>

It is accountable for the decontamination action and pacifying of *Kapaha Dosha*. Maximum of them have *Madhura Vipaka*

which is important for pacifying *Pitta Dosha*^[31]. every single one of the

ingredients contain *Chakshushya* assets and *Kashaya rasa*.

Vimlapana in the lacrimal sac area:-

Acc. to *Acharya Susruta*^[32] *Saindhava Lavana* has properties like *chakshushya* (beneficial to the eyes Cordial), *ruchya* (relish – giving), *Agnidipaka* (light) *snigdha* (unctuous), *madhura* (slightly sweet), *vrushya* (virilific), *sheeta* (cooling), *doshaghna* (alleviates all three *dosas*)

Shamana Chikitsa:-

Triphala guggulu :-

Triphala acquire *tridosahara* property, *Cakshushya* as healthy as excellent *kostha shodhaka* hence it can be tremendously well used in all *Netra vikaras* for the reason of *shodhana*. Therefore *Triphala* is used as both *shaman* and *shodana* in day today scientific practice to avoid and manage ocular disorders. *Acharaya's* highlighted the role of *triphala prayoga* as *shamana* mainly in *netragata vikaras* (group of eye disease in which vision is mainly affected). *Triphala* is used as *rasayana dravya* in all *drishtigata rogas* only by changing the *anupana* (adjuvant) depending upon the *doshik* preponderance. For eg: *Triphala* with *madhu*, *taila* and *ghrita* in *Kaphaja*, *Vataja* and *Pittaja Netra roga* respectively^[33]. Use of *Triphala* is also quoted in drugs which prevent one from eye ailments^[34]. *Triphala churna* along with *madhu* (honey) and *ghrita* (ghee) is considered to be the

best rejuvenation therapy for eye disorders^[35]. *Guggulu* has a wide range of usefulness in indigenous medicine.^[36] like all oleo-resins, it causes an increase of leucocytes in the blood and stimulates phagocytosis.^[37] *Commiphora mukul* has antiarthritic, anti-inflammatory,^[38-40] antiseptic, antibacterial and antifungal activity,^[41-43] antidiabetic,^[44] In a recent study, C. mukul and guggulsterone were found to be effective antioxidant.^[45] *Guggulu* has been used since ancient times in the various Indian system of medicines. *Guggulu* classified as *rasayana*. *Rasayana's* are safe *Ayurvedic* compound herbal formulations or individual herbs used to rejuvenate or attain the complete potential of an entity in order to avoid diseases and degenerative changes that leads to diseases and promote longevity by providing strength and immunity.^[46]

CONCLUSION

Puyalasa should be managed properly, otherwise it will lead to *Pillaroga*. *Dacryocystitis* is a common ocular condition with high recurrence rate. *Dacryocystitis* if not treated properly leads to many complications like Acute conjunctivitis, corneal abscess, lid abscess, osteomyelitis of lacrimal bone, orbital cellulitis, facial cellulitis, acute ethmoiditis, Chronic intractable conjunctivitis, Ectropion of lower lid, Corneal ulcerations.

After analysis of all the data, it can be concluded that *Ayurvedic* management with *jalokaavcharana*, *Triphaladi Netra Parisheka* and *Triphala Guggulu* along with *Vimlapana* on lacrimal sac area offers effective result in the treatment of *Puyalasa* [Acute dacryocystitis]. Thus, it can be concluded that *Ayurvedic* approaches are helpful in managing *Puyalasa* [Acute dacryocystitis]. The current study was a single-case study. The study should be carried out on large sample size for more convincing results.

REFERENCES:-

- [1] Professor Udayshankar-Text book of Shalaky tantra, Chaukambha orientalia, Varanasi, 1st Edition-2012, pp-744, pg-600.
- [2] Sushruta Samhita, with Sri Dalhanacharya teeka, edited by Narayan Ram Acharya "Kavyathirtha", Chaukhambha orientalia, Varanasi, reprint edition-2009, Uttaratantra 17th chapter, Verse-4, 5, 6, 7, pp-824, pg-625.
- [3] Sharangadhara samhita, Pandit Sharangadhara acharya, with the commentary Adamalla deepika and Gudartha deepika, edited by Pandit Parasurama sastri, Vidyasagar, Chaukambha Sanskrit bhawan, Varanasi, Prathamakhanda-chapter 7th, pp-398, pg-118.
- [4] Acharya Sushruta, Sushruta Samhitha, Nibandha samgrahatika of Dalhana and Nyaya Chandrikatika Gayadasa, Chowkhamba Sanskrit Samsthan, Varanasi, Edition-2015; Uttaratantra, Chapter 2, Verse 3,pp: 598-824.
- [5] Acharya Sushruta, Sushruta Samhitha, Nibandha samgrahatika of Dalhana and Nyaya Chandrikatika Gayadasa, Chowkhamba Sanskrit Samsthan, Varanasi, Edition-2015; Uttaratantra, Chapter 2, Verse-4,pp598-824
- [6] Sushruta Samhita, with Sri Dalhanacharya teeka, edited by Narayan Ram Acharya "Kavyathirtha", Chaukhambha orientalia, Varanasi, reprint edition-2009, Uttaratantra 17th chapter, Verse-4, 5, 6, 7, pp-824, pg-625.
- [7] Ashtanga sangraha of vridha vagbhata with the Shashilekha Sanskrit commentary by Indu, edited by Dr.Shivprasad Sharma, chapter-, 13 verse-8, pp-964, pg-694.
- [8] Yogaratnakara with hindi commentary by Vaidya Shrilakshmiapati Shastri edited by Bhisagratna Sri Brahmasan-

- karamishra shastri, Chaukhambha Sanskrit bhawan, Varanasi, reprint edition-2012, Uttarakhanda, Netrarogadhikara, verse- 102, pp-356, pg-647.
- [9] A K Khurana & Aruj K Khurana. Comprehensive Ophthalmology. 6th edition. New Delhi. Jaypee Brothers Medical Publishers(P) Ltd.pp-623, pg-393
- [10] Vaidya Yadavji Trikamji Acharya. Uttar tantra. Sushruta Samhita with Dalhan Tika. Ch. 12/45. Varanasi: Chaukhambha Sanskrit Sansthan; 2015. p. 618.
- [11] Sharangdhar, Sharangdhar Samhita, Netra Prasadankarmani Adhyaya, Uttarakhanda 13/1, 16, 17, 38, 73, Adhamalla Dipika and Kashirama Gudhartha Dipika Commentary, Edited by Pandit Parashurama Shastri Vidyasagar, Chaukhambha Orientalia, Varanasi, Reprint Edition, 2016;p.379,381,384,389.
- [12] Vaidya Yadavji Trikamji Acharya. Uttar tantra. Sushruta Samhita with Dalhan Tika. Ch. 12/45. Varanasi: Chaukhambha Sanskrit Sansthan; 2015. p. 618.
- [13] Chuneekar KC. Haritakyadi varg. Bhavprakash Nighantu. Reprint 2010. Ch. 42-43, Chaukhambha Bharati Akadami, Varanasi; p. 45.
- [14] Vidyasagar PS, Khanda M, Samhita S. Reprint 2013. Ch. 7/82 Vataka Kalpana Adhyaya , Chaukhambha Varanasi; 2013. p. 162.
- [15] 15.Shilpa P. N., Dr. T. D.2018 Ksheerasagar. Efficacy of Jaoukavacharanain visarpa w.s.r to herpes zoster – an observational study. World Journal of Pharmaceutical Research Volume 7, Issue 14, 800-813.
- [16] Jaiswal Reena. Comparative study on the effect of and along with on foot ulcers. J. Ind. Sys.Med. 2018;6(3):122-129
- [17] Kumar Vipin et al.: Efficacy Of Jalukavacharana In The Management Of Yuvanapidaka W.S.R. To Acne Vulgaris- A Pilot Study. International Ayurvedic Medical Journal {online} 2016 {cited 2016 July}
- [18] Athreya, P., P. Grampurohit, S. Jahagirdhar, and H.D. Tosikhane. 2013. “Effectiveness of Jalaukavacaraṇa (Leech Therapy) in Acute Inflammatory Joint Disorders.” Pacific Journal of Science and Technology. 14(2):391-396

- [19] Rai P. K., Ph.D., Singh A. K., Ph.D. Scholar, Singh O. P., Rai N. P., and Dwivedi A. K. Efficacy of leech therapy in the management of osteoarthritis (Sandhivata) Ayu. 2011 Apr-Jun; 32(2): 213–217.
- [20] Dr. Ankush Bhardwaj, Associate Professor, Netra Kriya Kalpa - A Critical Review , JAAMS, Mar - Apr 2019 ;Vol. 4 (2):121
- [21] Bhaishajya Ratnavali Shotha Rogadhikara 10, Bharata Bhaishajya Ratnakara Kashaya prakarana.
- [22] Ministry of Health and Family Welfare, AYUSH, Government of India, Ayurveda Pharmacopoeia of India, Vol I, Part IV/52, 1st edition, The Controller of Publications Civil Lines, Delhi, 2004, pp-128.
- [23] Bhavaprakasha of Bhavamishra, MadhuVarga, Vidyotini Hindi Commentary, Edited by Brahmashankara Mishra, Part I, 11th edition, Chaukhambha Sanskrit Sansthan, Varanasi, 2004, pp- 788.
- [24] Ministry of Health and Family Welfare, AYUSH, Government of India, Ayurveda Pharmacopoeia of India, Vol VIII, Part I/ 29, 1st edition, The Controller of Publications Civil Lines, Delhi, 2011, pp-93.
- [25] Ministry of Health and Family Welfare, AYUSH, Government of India, Ayurveda Pharmacopoeia of India, Vol I, Part I / 17, 1st edition, The Controller of Publications Civil Lines, Delhi, 2011, pp-34.
- [26] Ministry of Health and Family Welfare, AYUSH, Government of India, Ayurveda Pharmacopoeia of India, Vol VIII, Part I/ 1, 1st edition, The Controller of Publications Civil Lines, Delhi, 2011, pp-5.
- [27] Ministry of Health and Family Welfare, AYUSH, Government of India, Ayurveda Pharmacopoeia of India, Vol VIII, Part I/57, 1st edition, The Controller of Publications Civil Lines, Delhi, 2011, pp-177.
- [28] Ministry of Health and Family Welfare, AYUSH, Government of India, Ayurveda Pharmacopoeia of India, Vol I, Part I / 53, 1st edition, The Controller of Publications Civil Lines, Delhi, 2011, pp-112.
- [29] Ministry of Health and Family Welfare, AYUSH, Government of India, Ayurveda Pharmacopoeia of India, Vol VIII, Part I/9, 1st edition, The Controller of

- Publications Civil Lines, Delhi, 2011, pp-32.
- [30] Ministry of Health and Family Welfare, AYUSH, Government of India, Ayurveda Pharmacopoeia of India, Vol VIII, Part I/45, 1st edition, The Controller of Publications Civil Lines, Delhi, 2011, pp-143.
- [31] Susruta samhitha of Susruta, Sutrasthana 45/51, English translation by P V Sharma, Vol I, Chaukhambha Vishvabharati, Varanasi, 2013, pp-426.
- [32] Susrytasamhita of Maharsi – Susruta, Edited...., with Hindi commentary.... By Kaviraja Ambidakutta Shastri....., The Kashi Sanskrit Series No. 156, Chaukhambha Sanskrit Sansthan, Varanasi – 1, 3rd Edition 1972 Sutrasthana 46: 315 - 322
- [33] Ibidem (5) Sushruta Samhita, Uttaratantra 17/31: 627.
- [34] Ibidem (1) Astanga Hridaya, Uttarasthana 13/99: 824.
- [35] Ibidem (1) Astanga Hridaya, Uttarasthana 39/43: 927.
- [36] Joshi SC, Sharma N, Sharma P. Antioxidant and lipid lowering effects of *Coriandrum sativum* in cholesterol fed rabbits. Int J Pharmacy Pharm Sci 2012; 4: 231-234
- [37] Speh B, Vogan DA. Reducibility of generalized principal series representations. Acta Math 1980;145: 227-99.
- [38] Chaturvedi GN, Singh RH. Experimental studies on the anti-arthritis effect of certain indigenous drugs. Ind J Med Res 1965; 53: 71-80.
- [39] Gujral ML, Sareen K, Tangri KK, Amma MK, Roy AK. Antiarthritic and anti-inflammatory activity of gum guggul (*Balsamodendron mukul Hook*). Ind J Physiol Pharmacol 1960; 4: 267-273.
- [40] Shanthakumari G, Gujral ML, Sareen K, Further studies on the anti-arthritis and anti-inflammatory activities of gum guggul. Ind J Physiol Pharmacol 1964; 8: 36
- [41] Pardhasaradhi SV, Sheshasayana A, Rao BS, Murthy KVR. Synthesis and antimicrobial screening of a new guggulu preparation. Ind J Pharm Sci 2001; 63: 154-5.
- [42] Dey A, Das T, Mukherjee S. In vitro antibacterial activity of n-hexane fraction of methanolic extract of *Plumeria rubralj*

- (Apocynaceae) Stem Bark. J Plant Sci 2011; 6: 135-42.
- [43] Kazemi M, Rostami H, Shafiei H. Antibacterial and antifungal activity of some medicinal plants from Iran J plant Sci 2012; 7: 55-66.
- [44] Omer SA, Adam SEI, Mohammed OB. Antimicrobial activity of Commiphora myrrha against some bacteria and Candida albicans isolated from gazelles at King Khalid wild life research centre. Res J Med Plant 2011; 5: 65-71.
- [45] Cornick CL, Strongitharm BH, Sassano G, Rawlins C, Mayes AE, Joseph AN, O'Dowd J, Stocker C, Wargent E, Cawthorne MA, Brown AL, Arch JR. Identification of a novel agonist of peroxisome proliferator-activated receptors alpha and gamma that may contribute to the anti-diabetic activity of guggulipid in Lep(ob)/Lep(ob) mice. J Nutr Biochem. 2009; 20(10): 806-15.
- [46] Wang X, Greilberger J, Ledinski G, Kager G, Paigen B, Jurgens G. The hypolipidemic natural product Commiphora mukul and its component guggulsterone inhibit oxidative modification of LDL. Atherosclerosis 2004; 172(2): 239-46.
- [47] Vayalil PK, Kuttan, G, Kuttan R. Rasayanas: evidence for the concept of prevention of diseases. Am J Clin Med 2002; 30: 155-71.