

Arsenicals in Ayurveda – A Review through *Brihatrayi*

Review Article

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Abstract

Metals and minerals including heavy metals like mercury, lead and arsenic are most frequently utilized in Ayurvedic system of medicine. Use of arsenicals is an integral component in Ayurvedic therapeutics. In Ayurveda, arsenicals comprise *Haratala* (Arsenic trisulphide), *Manahshila* (Arsenic disulphide) and *Somala* (Arsenic trioxide). They were widely practiced for various therapeutic and non-therapeutic purposes by the seers in different pathological manifestations with great conviction. Classics of *Brihatrayi*, one of the scheduled books of Ayurveda also hold ample references of arsenicals in diseases like *Hicca* (hiccup), *Shwasa* (respiratory distress), *Shotha* (oedema), *Visha* (Poison) and *Kushta* (skin diseases) etc. In the current review, an attempt has been made to compile all such references of arsenicals referred in *Brihatrayi*.

Key Words: Arsenic, Ayurveda, Brihatrayi, Haratala, Manahshila, Somala

Introduction:

India is having glorious history of rich traditional medical practices. Ayurveda is one among widely practiced ancient medical system in Indian subcontinent dates back to about 5000 years BC. It comprises utilization of drugs originated from natural resources including metals and minerals to maintain or cure or prevent different diseases. These formulations are being used successfully without any noticeable side effects. Seers have experienced the usefulness of metals and minerals and documented them in their respective classics. Being used for

over a long period, these medicines are acknowledged to be safe, which is the ultimate proof for their non - toxic beneficial effects. But there is big hue and cry about presence of heavy metals in Ayurvedic drugs about their safety aspects. Few toxicity reports were published due to administration of Ayurvedic drugs.(1,2,3) Toxicity may be noticed due to non-compliance of code of conduct of the treatment procedures. Seers were also aware about such toxic effects. They brilliantly provided certain precautions and contraindications while manufacturing and using metals and minerals. Great care has been imposed while using all such metallic preparations in therapeutics.(4)

Arsenicals, a group of minerals known to human since antiquity comprising *Haratala* (Arsenic trisulphide), *Manahshila* (Arsenic disulphide) and *Somala* (Arsenic trioxide) mentioned with wide range of therapeutics. Though

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therapeutic utility of arsenicals was increased with advent of *Rasashastra*, references pertaining to arsenicals can be traced back in major treatises too. But, this information is scattered in the classics. Though, one attempt has been reported on compiling references of metals and minerals; it was limited only to *Charaka Samhita*.(5,6) Considering this, references of arsenicals available in *Brihatrayi* are compiled and grouped into categories with an intension to provide emphasis on therapeutic and non-therapeutic usage of them. The categories are as under:

- Utilization in therapeutics
 - Internal administration
 - External application
- Other purposes etc.

Materials and Methods:

Brihatrayi (*Charaka Samhita*, *Sushruta Samhita* and *Astanga Hridaya*) with their commentaries are screened to compile references of arsenicals.

Results and Observations:

Arsenicals in *Brihatrayi*:

Haratala, *Manahshila* and *Somala* are the three elements that contain Arsenic as an element in their composition mentioned in *Brihatrayi*.

Classification:

Both *Charaka* and *Sushruta* have grouped *Haratala* and *Manahshila* under *Parthiva Dravyas*, while, *Sushruta* categorized *Haratala* and *Somala* under *Dhatu Visha*.

Synonyms:

Charaka used two terms i.e. *Alam*, *Haratala* to refer *Haratala*. *Chakrapani* clarified that both these terms are synonymously used. *Sushruta* used terms *Ala*, *Tala* and *Harita* to refer this mineral.

Charaka used only one term i.e. *Manahshila* throughout the classic, while

Sushruta mentioned *Nepali*, *Manohva* and *Shila* to refer *Manahshila*. *Vagbhata* used one more term *Manohva* for *Manahshila*.

Sushruta used the term *Phenashma* for *Somala*.

Haratala:

Chemically *Haratala* is identified as Orpiment (As_2S_3). Being an arsenical mineral; it should be administered with great caution.(7) It is advocated externally as well as internally since the period of *Charaka Samhita*. It is used as a component in formulations of topical application like *Lepa*, *Taila*, *Anjana* etc. *Charaka* recommended its formulations for internal administration to treat diseases like *Hikka* (hiccup), *Shvasa* (respiratory distress), *Kasa* (cough) and *Visha* (poisoning). The therapeutic dose mentioned for *Haritala Bhasma* is 30 -60 mg.(8) The formulations mentioned in *Brihatrayi*, which hold *Haratala* as one of the components are depicted at Table 1, 2 and 3.

Manahshila:

Chemically, *Manahshila* is identified as Realgar - Red Orpiment (As_2S_2). (9) It is extensively used in formulating compounds for internal administration and topical application by ancient seers. It is advocated for internal administration in various dosage forms to treat diseases like *Kasa*, *Hikka*, *Swasa*, *Chhardi*, *Visha* and *Pinasa*. Ample of formulations containing *Manahshila* as an integral component were prescribed for external applications to treat different skin diseases, eye diseases etc. *Charaka* and *Vagbhata* used *Manahshila* in anti-dotal formulations for snake bite and scorpion sting. This mineral is frequently preferred by the seer for administration through different routes of drug administration. The therapeutic dose mentioned for *Manahshila* is 4-8 mg.(10) The formulations mentioned in *Brihatrayi*, which hold *Manahshila* as one of the

components, are summarized at Table 4, 5, 6.

Formulations containing both *Haratala* and *Manahshila* as components in *Sushruta Samhita* and *Astanga Hridaya* are depicted at Table 7, 8.

Somala:

No reference pertaining to *Somala* is available in *Charaka Samhita* and *Astanga Hridaya*. *Sushruta* used the term *Phenashma* to refer this mineral and grouped it under *Dhatu Visha*.

Discussion:

Screening of classics of *Brihatrayi* revealed that arsenicals were used to treat many pathological manifestations since ages. Though, the use of metals and minerals in therapeutics was increased after the development of *Rasashastra* but roots of this science can be traced back to *Brihatrayi*. They categorized *Haratala* and *Manahshila* under the group of *Parthiva Dravya*. *Sushruta* classified *Haratala* and *Phenashma* under *Sthavara (Dhatu) Visha*. *Charaka* advocated formulations of *Haratala* and *Manahshila* in certain pathological lesions involving skin.

Arsenicals are used in different pharmaceutical dosage forms like *Lepa*, *Dhooma*, *Anjana*, *Churna* and *Taila* etc. Formulations of arsenicals are recommended in various diseases of skin, eye, oral cavity and respiratory tract etc. This information available in classics makes clear that such metals have special role in different clinical conditions. They have made their unique place in Ayurvedic pharmacopoeia and became integral part of Ayurvedic therapeutics. Formulations of arsenicals are safely used in Ayurvedic therapeutics. Various published reports revealed that when these minerals are converted into medicines strictly adhering to the classical guidelines specified in ancient texts, they are devoid of any toxicity.(11,12) *Sameer Pannaga Rasa*, one among arsenical formulation has a significant action in cases bronchial

asthma and it could suppress eosinophil count, Erythrocyte Sedimentation Rate and can improve Peak Expiratory Flow Rate (PEFR) along with providing symptomatic relief.(13)

Current research work clearly reflects that arsenicals are safely used in Ayurveda in different dosage form to treat various disease conditions. These classical evidences are ultimate proof for their safety as they are clinically tested since ages without any noticeable side effects. So that mere presence of heavy metals in Ayurvedic formulations is not sufficient to say that Ayurvedic drugs are toxic.

Conclusion:

Screening of *Brihatrayi* reveals that arsenicals have significant therapeutic values. Fine powders of these processed minerals are used in therapeutics through both internal and external routes. Majority of the formulations are for external application. Certain *Dhuma Yogas* also contain *Haratala* that have been advocated in diseases of respiratory tract. Being used for over a long period, these medicines are acknowledged as safe, which is the ultimate proof for their non-toxic beneficial effects. But taking consideration about potential toxicity of arsenicals; precautions should be taken to avoid any harmful effects resulting from their use in therapeutics. Well designed pre-clinical and clinical studies also can be planned to evaluate actual safety and therapeutic efficacies in respective conditions. This work is anticipated to be convenient for referring the utilization of arsenicals emphasized in *Brihatrayi* and reduces the strenuous efforts of researchers to gather information. This also emphasizes the frequency of arsenicals used in different conditions since ancient days of civilization.

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Table 1: Therapeutic utilization of *Haratala* in *Charaka Samhita*

	Reference	Formulation	Therapeutic Uses
Utilization in therapeutics : Internal Administration			
1	Sutra 5/26	<i>Dhooma Yoga</i>	<i>Shiro Virechana</i>
2	Chikitsa 17/78	<i>Dhooma Yoga</i>	<i>Hikka, Swasa</i>
3	Chikitsa 18/69	<i>Dhooma Yoga</i>	<i>Vataja Kasa</i>
4	Chikitsa 18/74	<i>Dhooma Yoga</i>	<i>Vataja Kasa</i>
5	Chikitsa 23/54	<i>Mrit Sanjivani Agada</i>	<i>Sarva Visha</i>
Utilization in therapeutics : External Application			
6	Sutra 3/5	<i>Pradeha Yoga</i>	<i>Kushtha</i>
7	Sutra 3/10	<i>Avacurna Yoga</i>	<i>Kushtha</i>
8	Sutra 3/12	<i>Pradeha Yoga</i>	<i>Kushtha</i>
9	Chikitsa 7/114	<i>Kanaka Kshiri Taila</i>	<i>Krimi, Kandu, Kushtha</i>
10	Chikitsa 9/66	<i>Varti Yoga</i>	<i>Apasmara, Unmada</i>
11	Chikitsa 14/56	<i>Lepa Yoga</i>	<i>Arsha</i>
12	Chikitsa 25/114	<i>Lepa Yoga</i>	<i>Twak Janana</i>
13	Chikitsa 26/196	<i>Peetaka Churna</i>	<i>Mukha Roga</i>
Other References			
14	Sutra 1/70	Referred as ' <i>Alam</i> '	Classification of <i>Parthiva Dravya</i>

Table 2: Therapeutic utilization of *Haratala* in *Sushruta Samhita*

Sr No	Reference	Formulation	Therapeutic Uses
Utilization in therapeutics : External Application			
1	Sushruta Chikitsa 1/105	<i>Romashatana karma</i>	<i>Vrana</i>
2	Sushruta Chikitsa 1/107	<i>Romashatana karma</i>	<i>Vrana</i>
3	Sushruta Chikitsa 1/108	<i>Romashatana karma</i>	<i>Vrana</i>
4	Sushruta Chikitsa 6/12	<i>Taila Lepa</i>	<i>Arsha</i>
5	Sushruta Chikitsa 9/27	<i>Lepa</i>	<i>Shwitra</i>
6	Sushruta Chikitsa 18/19	<i>Taila</i>	<i>Granthi, Arbuda</i>
7	Sushruta Chikitsa 20/28	<i>Lepa</i>	<i>Arunshika</i>
8	Sushruta Chikitsa 20/59	<i>Lepa</i>	<i>Ahiputana, Mushka Kacchu</i>
9	Sushruta Uttara 21/52	Ear drops with cow urine	<i>Krumikarna</i>
10	Sushruta kalpa 6/3-7	Ksharagada	<i>Visha</i>
Other References			
11	Kalpa 2/5	<i>Haratala</i> and <i>Somala</i> listed as <i>Sthavara Visha</i>	<i>Dhatu visha</i>

Table 3: Therapeutic utilization of *Haratala* in *Ashtanga Hridaya*

Sr. No	Reference	Formulation	Therapeutic uses
Utilization in therapeutics : External Application			
1	Chikitsa 20/13	<i>Lepa</i>	<i>Shwitra</i>
2	Uttara 13/31	<i>Bhaskaranjana II</i>	<i>Timira</i>
3	Uttara 14/30	<i>Varti</i>	Based on <i>Upadrava</i>
4	Uttara 16/56	To grow eyelashes	<i>Pilla Roga</i> for <i>Romotpatti</i>
5	Uttara 37/35	<i>Lepa & Anjana</i>	Scorpion bite
6	Uttara 37/40	<i>Lepa & Anjana</i>	Scorpion bite

Table 4: Therapeutic utilization of Manahshila in Charaka

	Reference	Formulation	Therapeutic Uses
Utilization in therapeutics : Internal Administration			
1	Sutra 5/26	<i>Dhooma Yoga</i>	<i>Shiro Virechana</i>
2	Chikitsa 17/77	<i>Dhooma Yoga</i>	<i>Hikka, Swasa</i>
3	Chikitsa 17/145	<i>Manahshiladi Ghrita</i>	<i>Hikka, Swasa</i>
4	Chikitsa 18/52	<i>Leha Yoga</i>	<i>Kasa, Hikka, Swasa</i>
5	Chikitsa 18/69	<i>Dhooma Yoga</i>	<i>Vataja Kasa</i>
6	Chikitsa 18/71	<i>Dhooma Yoga</i>	<i>Vataja Kasa</i>
7	Chikitsa 18/73	<i>Dhooma Yoga</i>	<i>Vataja Kasa</i>
8	Chikitsa 18/74	<i>Dhooma Yoga</i>	<i>Vataja Kasa</i>
9	Chikitsa 18/75	<i>Dhooma Yoga</i>	<i>Vataja Kasa</i>
10	Chikitsa 18/130	<i>Dhooma Yoga</i>	<i>Vataja Kasa</i>
11	Chikitsa 18/146	<i>Dhooma Yoga</i>	<i>Ksataja Kasa</i>
12	Chikitsa 18/147	<i>Dhooma Yoga</i>	<i>Ksataja Kasa</i>
13	Chikitsa 18/169	<i>Haritaki Leha</i>	<i>Swasa, Kasa</i>
14	Chikitsa 20/39	<i>Leha Yoga</i>	<i>Chardi</i>
15	Chikitsa 23/55	<i>Mrita Sanjivani Agada</i>	<i>Visha</i>
16	Chikitsa 26/152	<i>Pradhamana Nasya Yoga</i>	<i>Pinasa</i>
Utilization in therapeutics : External Application			
17	Sutra 3/5	<i>Pradeha Yoga</i>	<i>Kushtha</i>
18	Sutra 3/10	<i>Avacurna Yoga</i>	<i>Kushtha</i>
19	Sutra 3/12	<i>Pradeha Yoga</i>	<i>Kushtha</i>
20	Sutra 3/12	<i>Pradeha Yoga</i>	<i>Kushtha</i>
21	Sutra 3/15	<i>Lepa Yoga</i>	<i>Kushtha</i>
22	Chikitsa 3/306	<i>Anjana Yoga</i>	<i>Vishama Jwara</i>
23	Chikitsa 7/117	<i>Lepa Yoga</i>	<i>Sidhma</i>
24	Chikitsa 7/167	<i>Shamana Lepa</i>	<i>Switra</i>
25	Chikitsa 7/170	<i>Lepa Yoga</i>	<i>Kilasa</i>
26	Chikitsa 23/78	<i>Agadahara Lepa Yoga</i>	<i>Visha, Timira etc.</i>
27	Chikitsa 23/190	<i>Lepa Yoga</i>	<i>Sarva Shotha, Visha</i>
28	Chikitsa 23/192	<i>Lepa Yoga</i>	<i>Sarva Visha</i>
29	Chikitsa 23/213	<i>Pancha Shirisha Agada</i>	<i>Vishahara</i>
30	Chikitsa 25/114	<i>Lepa Yoga</i>	<i>Twak Janana</i>
31	Chikitsa 26/196	<i>Peetaka Churna</i>	<i>Mukha Roga</i>
32	Chikitsa 26/235	<i>Varti Yoga</i>	<i>Netra Roga</i>
33	Chikitsa 26/250	<i>Anjana Yoga</i>	<i>Netra Roga</i>
34	Chikitsa 26/252	<i>Sukhavati Varti</i>	<i>Netra Roga</i>
Other References			
35	Sutra 1/70	Classified under <i>Parthiva Dravya</i>	

Table 5: Therapeutic utilization of Manahshila in Sushruta Samhita

Sr.No	Reference	Formulation	Therapeutic uses
Utilization in therapeutics : Internal Administration			
1.	Chikitsa 40/4	<i>Dhooma varti</i>	<i>Kasa</i>
2.	Uttara 51/50	<i>Dhooma varti</i>	<i>Hikka, Shwasa</i>

Utilization in therapeutics : External Application			
3.	Chikitsa 2/69	<i>Ropana Taila</i>	<i>Vrana Chikitsa</i>
4.	Chikitsa 20/24	<i>Lepa</i>	<i>Indralupta</i>
5.	Chikitsa 20/54	<i>Ropana Taila</i>	<i>Valmika</i>
6.	Uttara 11/16	<i>Anjana</i>	<i>Kandu</i>
7.	Uttara 12/16	<i>Anjana</i>	<i>Sirotpata</i>
8.	Uttara 12/29	<i>Anjana</i>	<i>Shukra nashaka</i>
9.	Uttara 13/7	Application	<i>Lekhyaroga</i>
10.	Uttara 14/4	Application	<i>Bhedhyaroga (Bisgranthi)</i>
11.	Uttara 14/7	Application	<i>Bhedhyaroga (Anjananamika)</i>
12.	Uttara 17/7	<i>Anjana</i>	<i>Drushtigata roga</i>
13.	Uttara 17/18	<i>Varti</i>	<i>Ratryandha</i>
14.	Uttara 17/39	<i>Rasakriya</i>	<i>Pittaja Timira</i>
15.	Uttara 17/43	<i>Rasakriya</i>	<i>Kaphaja Timira</i>
16.	Uttara 18/98	<i>Anjana</i>	<i>Netraroga</i>
17.	Uttara 18/100	<i>Anjana</i>	<i>Timira</i>
18.	Uttara 19/14	<i>Anjana</i>	<i>Nayana Abhigata</i>
19.	Uttara 21/48	<i>Taila</i>	<i>Karna Roga</i>
20.	Uttara 26/34	<i>Nasya</i>	<i>Shiroroga</i>
21.	Uttara 35/7	<i>Bali in Goshala</i>	<i>Mukhamandika</i>
22.	Uttara 39/263	<i>Nasya</i>	<i>Jwara Pratishedha</i>
23.	Uttara 50/18	<i>Swedana</i>	<i>Hikka</i>
Other References			
24.	Sutra 1/32	<i>Parthiva Drug</i>	Classification

Table 6: Therapeutic utilization of Manahshila in Ashtanga Hridaya

Sr. No.	Reference	Formulation	Therapeutic uses
Utilization in therapeutics : Internal Application			
1	Chikitsa 3/168	<i>Haritaki Avaleha</i>	<i>Swasa, Kasa</i>
2	Chikitsa 6/20	Licking with honey	<i>Chardi, Trishna, Hridroga</i>
Utilization in therapeutics : External Application			
3	Chikitsa 1/162	<i>Anjana</i>	<i>Vishama jwara</i>
4	Chikitsa 13/38	<i>Taila nirmana</i>	<i>Medoja Vriddhi</i>
5	Chikitsa 19/73	<i>Lepa</i>	<i>Sidhma and Switra</i>
6	Uttara 9/23	<i>Pratisarana</i>	<i>Kaphotklishtha roga</i>
7	Uttara 11/24	<i>Anjana</i>	<i>Timira, Arma</i>
8	Uttara 13/25	<i>Anjana</i>	<i>Timira</i>
9	Uttara 13/29	<i>Bhaskaranjana</i>	<i>Timira</i>
10	Uttara 13/70	<i>Vimala Varti</i>	<i>Timira</i>
11	Uttara 16/5	<i>Lepa</i>	<i>Kaphaja Abhishyanda</i>
12	Uttara 16/5	<i>Pottali</i>	<i>Netraroga</i>
13	Uttara 16/52	<i>Anjana</i>	<i>Kandu</i>
14	Uttara 24/28	<i>Lepa</i>	<i>Indralupta</i>
15	Uttara 36/82	<i>Vajragada</i>	<i>Snake poison</i>
16	Uttara 37/44	Antidote	<i>Scorpion poison</i>

Table 7: Therapeutic utilization of Haratala and Manahshila in Sushruta Samhita

Sr.No.	Reference	Formulation	Therapeutic uses
Utilization in therapeutics : Internal Application			
1.	Uttara 52/22	<i>Dhooma varti</i>	<i>Kasa</i>
Utilization in therapeutics : External Application			
2.	Sutra 37/14	<i>Varti</i>	<i>Samshodhana in Nadivrana</i>
3.	Sutra 37/18	<i>Taila</i>	<i>Samshodhana</i>
4.	Chikitsa 1/60	<i>Lepa</i>	<i>Vrana</i>
5.	Chikitsa 1/97	<i>Shwetakarma</i>	<i>Vrana</i>
6.	Chikitsa 2/91	<i>Taila</i>	<i>Dushta Vrana</i>
7.	Chikitsa 9/10	<i>Lepa</i>	<i>Kushtha</i>
8.	Chikitsa 9/55	<i>Vajraka Taila</i>	<i>Kushtha, Vrana</i>
9.	Chikitsa 18/41	Rubbing	<i>Vrana</i>
10.	Chikitsa 19/18	<i>Taila LA</i>	<i>Medoja Vriddhi</i>
11.	Chikitsa 19/40	<i>Churna for LA</i>	<i>Upadansha</i>
12.	Chikitsa 19/46	<i>Churna</i>	<i>Upadansha, Visarpa</i>
13.	Chikitsa 20/6	<i>Kalka lepa</i>	<i>Kshudra roga</i>
14.	Chikitsa 20/21-23	<i>Lepa</i>	<i>Alasa roga</i>
15.	Chikitsa 25/38	<i>Ghrita Abhyanga</i>	<i>Vyanga</i>
16.	Kalpa 8/112	With honey	<i>Mutra Visha Dansha Chi.</i>
17.	Uttara 11/9	<i>Anjana, Varti</i>	<i>Kaphaja Netrabhishyanda</i>
18.	Uttara 30/7	with <i>Karanja</i>	<i>Shakuni Pratishedha</i>
19.	Uttara 32/4	<i>Taila</i>	<i>Putana Pratishedha</i>
20.	Uttara 33/3	<i>Taila</i>	<i>Andhaputana</i>
21.	Uttara 60/49	<i>Taila, ghrita</i>	<i>Upasarga</i>

Table 8: Therapeutic utilization of Haratala & Manahshila in Ashtanga Hridaya

Sr.No.	Reference	Formulation	Therapeutic uses
Utilization in therapeutics : Internal Application			
1.	Chikitsa 3/68	<i>Dhoomapana</i>	<i>Kapha-Vataja Kasa</i>
2.	Sutra 30/18	<i>Ksharakarma</i>	<i>Kshara</i>
3.	Chikitsa 4/11	<i>Dhoomapana</i>	<i>Swasa</i>
4.	Chikitsa 3/149	<i>Dhoomapana</i>	<i>Kasa</i>
5.	Chikitsa 3/150	<i>Dhoomapana</i>	<i>Kasa</i>
6.	Uttara 21/18	<i>Dhooma</i>	<i>Shirovirechana</i>
Utilization in therapeutics : External Application			
7.	Chikitsa.19/67,70,71	<i>Churna (LA)</i>	<i>Dadru</i>
8.	Chikitsa 19/81	<i>Maha Vajraka Taila</i>	<i>Switra, Arsha LA</i>
9.	Uttara 1/23	<i>Lepa</i>	<i>Balaka Namakaran Samskara</i>
10.	Uttara 2/73	<i>Lepa</i>	<i>Ahiputana Chikitsa</i>
11.	Uttara 5/2	Internal & external	<i>Graha Unmada, Apasmara</i>
12.	Uttara 13/87	<i>Varti</i>	<i>Ratryandha</i>
13.	Uttara 20/24	<i>Varti</i>	<i>Putinasa</i>
14.	Uttara 22/100	<i>Peetaka Churna</i>	<i>Mukha Roga (hold in mouth)</i>
15.	Uttara 25/49	<i>Lepa</i>	<i>Vrana</i>



16.	Uttara 25/60	<i>Lepa</i>	<i>Twak Shuddhi</i>
17.	Uttara 30/20	<i>Taila pana</i>	<i>Nadivrana Chi.</i>
18.	Uttara 32/2	<i>Lepa</i>	<i>Yavaprakhya</i>
19.	Uttara 32/31	<i>Manjishthadi taila</i>	<i>Vyanga, Nilika</i>
20.	Uttara 34/4	<i>Lepa</i>	<i>Guhya roga</i>
21.	Uttara 35/24	<i>Chandrodaya Agada</i>	Poison
22.	Uttara 37/73	<i>Mandara Agada</i>	Poison
