

Critical Study of Aloe ferox in view of Ayurveda

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Abstract

South Africa & India have rich heritage of ancient wisdom and their Traditional Medicinal Systems are part of it.

Aloe ferox is compared with Aloe vera on the basis of Ayurvedic principles & other theories. This is theoretical research & can lead to many interesting researches.

On the basis of this study, dried exudate of Kumari (Aloe vera) can be used which is not commonly seen in practice.

As Kumari (Aloe vera) shows similarity to Aloe ferox used in Traditional South African Medicine, we can use them as substitute to each other.

This study throws light on many new uses of Kumari & also leads to researches in many fields like Ayurveda, Pharmacology, Ethnobotany, Ethnomedicine etc.

This study proves that we can compare plants of same family & genus occurring in different countries with the help of Ayurvedic principles explained in texts of DravyaGunaVidnyan.

INTRODUCTION

South Africa & India have rich heritage of ancient wisdom and their Traditional Medicinal Systems are part of it. That of India is called as Ayurveda.

This article is part of a study which shows comparison between ancient medicinal knowledge of these two countries & shows Ayurvedic Interpretation of 33 medicinal plants used in Traditional medicinal systems of South africa.

This article shows different medicinal uses of Aloe ferox, an indigenous South African Medicinal Plant, in the view of Ayurveda.

This is theoretical research & can lead to many interesting researches in field of Ayurveda.

BASIS OF STUDY

Ayurveda is Eternal & can be applied anywhere in this world. (Ayurvedam Nityam) [1]

Everything in this Universe is made of Basic Five Universal Elements; Earth, Water, Fire, Air & Space (Panchbhautic Siddhanta)[2]

Man is microcosm of Universe & has all Universal Elements in his body. (Pind-Brahmand Nyaya)[3]

Ayurvedic Pharmacology- All plants work due to qualities of

plant namely Taste-Active energy etc. (Dravya-Guna-Vidnyan)[4]

Everything in this universe is medicine including each & every plant. (Aushadhitva of all Dravyas)[5]

Different theories to decide Taste of plant & other qualities.(Rasoplabdhi Hetu)[6]

Continental Drift Theory - Drifting of Indian plate from Southern African plate may have some effect on plants of these two countries. They may have similar qualities shown by Universal elements. (Panchbhautic qualities) [7]

Botanical Principles- Plants of same family & same Genus show similar active principles.

Pharmacognotic Study- Certain active principles show certain tastes in plants which Ayurveda explains as Rasa.

Basic Five Universal Elements in a Seed remain same everywhere. (Panchbhautikatva of Beeja)[8]

Taste etc qualities of plant change with environmental & geological changes. (Effect of Desh & Bhumi on Rasadi GunaKarmas)[9]

Strength of qualities (like taste) changes with change in environment of plant. (TarTam Bhav)[10]

Application of Ayurvedic principles explained in DravyaGunaVidnyan to South African Plants

1. Ayurveda is eternal. That means Ayurvedic Principles are applicable for in any age & anywhere. That means, we can use Theories mentioned by Ayurvedic Pharmacology cum Pharmacy called 'Dravya-Guna-Vidnyan', for any plant at any place in this world[11].

2. When I started my study about medicinal plants of Southern Africa, I was thinking about qualities of plants i.e. Rasadi Gunakarmas of these plants. I thought that if Ayurveda says that all plants in the whole world are medicines i.e. 'Aushadhi'[12] then there must be some principles about how to decide about qualities of plants i.e. Rasadi Gunakarmas of these plants, which will prove medicinal properties of these plants. That is the way how Ayurvedic texts called Nighantus are born.

3. First thing I started thinking about status of Panchmahabhootas or Five Universal Elements (Panchbhautikatva) of these plants.

4. According to Panchbhautic Theory & Pindibrahmandi nyaya, everything in this world is made of Five Universal elements (Panchbhautic) & whatever there is in universe is in our body. That is why these medicinal plants work on our body[13].

5. I also found reference about Continental Drift Theory, which means India was once connected to Southern Africa. There are some similar & resembling Flora & Fauna found in these two countries. I even found some plants used in exactly similar way as we use them or plants of that Genus in India. That means these two countries share same evolution history before they departed[14].

6. That means at least some of the species which were evolved before 'Continental Drift', must have something similar in Panchbhautic Makeup of their seeds(Beeja) [15].

7. Qualities of plants i.e. Rasadi Gunakarmas of any plant depend upon Geographical occurrence (Desh) & Geological occurrence (Bhumi). That means even though Continental drift Theory says about similar Geological Birth History of these two countries, after departure these two lands have been constantly affected with geological changes. But if a plant faces drastic changes in environment, it dies. If it survives, it makes some changes in morphology & chemical composition, but not a 'Total Makeover'. That means, when Geographical occurrence (Desh) & Geological occurrence

(Bhumi) of a plant is changed, it can show some difference in qualities of plant (Rasadi Gunakarmas) but not the total Change in status of Five Universal elements (Panchbhautikatva) or their qualities residing in seeds (Beeja) of that plant. E.g. Even though chilies have number of species allover the world, it remains 'Chilli', which show Pungent Taste (Katu Rasapradhanya)[16].

8. On the same note, I can say that even though seeds of 'Croton species' of Southern Africa, are not used for drastic purgation (Teevra Virechan), they must show this action at some extent.

9. The same can be said vice-versa about Ayurvedic plants. If medicinal plants of Southern Africa are showing some medicinal uses unknown to us, then may be plants have these karmas to some extent. This is just hypothesis, not a solid statement. I want to extend this study further. I want to prove these statements practically.

10. This is all about why I thought that I think about resemblance in qualities of plants (Rasadi GunaKarmas) of medicinal plants of these countries.

11. Sometimes I got clear indications about Taste (Rasa) of some medicinal plants of Southern Africa. E.g. Bitter, pungent, sweet & sour etc.

12. Sometimes I had to decide about Taste (Rasa) from active ingredients. e.g. Saponins usually show bitter taste & they show exactly similar pharmacological actions like Pungent medicinal plants (Katu Rasapradhan Dravyas). In case of medicinal plants containing Saponins as main active ingredient, I made statements that this plant must have mainly Bitter Taste (Tikta Rasapradhanya).

13. Medicinal plants having Tannins as main active ingredients or majority concentration of Tannins show mainly Astringent taste (Kashay Rasapradhanya) & Astringent action (Stambhan Karma). In case of such plants, I have decided that these plants mainly have Astringent Taste i.e. Kashay Rasapradhanya according to Ayurveda.

14. For some plants, I concluded about Taste (Rasa) from there pharmacological actions.

15. E.g. Plants having action of 'Blood purification' & Purgation (Virechan Karma) must have mainly Bitter Taste (Tikta Rasa).

16. Usually while doing statements about qualities of plant (Rasadi GunaKarmas), I have collected majority points

endorsing that statement. But sometimes only one relevant reference is enough to prove that statement.

This is all about how I made statements or suggestions about qualities of plants i.e. Rasadi Gunakarmas of medicinal plants of Southern Africa.

Figure 1

Figure 1: *Aloe ferox* – In Ayurvedic perspective



Botanical Name: *Aloe ferox*

Family: Asphodelaceae (Previous name- Liliaceae)

Local Names: Zulu, Xhosa, Sotho- Umhlaba

Afrikaans- Bitteraalwijn, Tapaalwyn

English- Bitter Aloe, Red aloe [17]

Occurrence or Geographical pattern according to Ayurveda (Desh):

Aloe ferox occurs in land with moderate or less rains & dry, less fertile soil [18] (Sadharan Or Jangal).

Botanical Description of *Aloe ferox*:

A robust plant with persistent dry leaves on a single stem.

Broad, fleshy leaves are dull green or reddish green, with dark brown spines along the edges and sometimes on the lower surface.

Bright red or Orange flowers appear from May to August and are arranged in erect, candle-shaped clusters [19].

Plant Part Used:

1. Cape aloes- It is a dark brown resinous solid, which is dried form of the bitter yellow juice exudates from bottom of the leaf.

2. Aloe gel- Watery, slimy inner fleshy part of leaf [20].

Active Ingredient & Pharmacological Effect:

Aloin- purgative principle

Glycoprotein- Hydrating, insulating, protective principle [21].

Method of Extraction:

1. For extraction of exudates, a traditional harvesting method is used. Leaves

removed from main stem are arranged in circular manner and exudates are collected in the centre. After drying and purification, commercial laxative is obtained.

2. For extraction of leaf sap, the leaf skin is removed and fresh gel is used immediately [22].

Medicinal Uses:

1. As a laxative - crude cape – aloe is taken orally, about twice the size of a match head.

2. For arthritis, half of the laxative dose is used orally.

3. For Conjunctivitis and Sinusitis, the fresh leaf sap is instilled directly [23].

Caution: should not be used in pregnancy as laxative.

Research on *Aloe ferox* in view of Ayurveda:

I compared *Aloe ferox* with Kumari (*Aloe vera*) [24].

Occurrence & morphology of these two species are exactly similar & even Qualities- Actions (Guna-Karmas) seems to be similar [25].

I have suggested about Panchbhautic description (status of Panchmahabhootas or Five Universal Elements in

South African plant) & Rasadi Gunakarmas of Aloe ferox in my study.

Explanation of status of Panchmahabhootas or Five Universal Elements in South African plant (Panchbhautic description):

Bigger size indicates dominant qualities of Earth & Space element (Prithvi &

Aakash mahabhoot Gunadhikya)[26].

Ascribing to strong purgative action of extract, it may have dominant qualities of

Fire & Air element (Tej & Vayu mahabhoot Gunadhikya)[27].

According to similarities, we can say that Taste (Rasa), Postdigestive Effect of

plant (Vipak), Active energy (Veerya) should be the same like Kumari.

I have mentioned actions seen according to medicinal uses. It may have some

more actions unseen.

Prediction of Taste, Active energy, Post digestive effect, miscellaneous action, Qualities of leaf Juice, Exudate & Boiled /& dried forms of exudate or leaf juice of Aloe ferox (Rasadi Gunakarmas of Patraswaras, Niryaas & Saar of Aloe ferox)

Plant Part used - Leaf juice

Taste (Rasa) - Bitter (Tikta), Sweet (Madhur)

Post digestive effect (Vipak) - Sweet (Madhur)

Active energy (Veerya) - Cold (Sheeta)

Qualities (Gunas) - Heavy (Guru), Oily (Snigdha), Slimy (Picchila)

Action on Three Basic biological Humors i.e. Tridosha - Reduces imbalance of Tridosha (Tridoshaghna)

Local Action (Sthanin Karma) - Tonic for eyes (Netrya), Treats nasal diseases (Nasavikarnashak), Anti-inflammatory (Shothhar), Painkiller (Vedanasthapana), Removes pus from site & inhibits suppuration (Pooyanashak)

Internal action (Abhyantar Karma) -

Eliminates faeces by breaking hard stools (Bhedan), Removes excessive or vitiated PittaDosha by purgation (Pittasarak), Laxative (Anulomak)

Plant Part used- Dried form of exudate or leaf juice (Saar) or exudate (Niryas)

Taste (Rasa) - Bitter (Tikta)

Post digestive effect (Vipak) - Pungent (Katu)

Active energy (Veerya) - Hot (Ushna)

Qualities (Gunas)- Hot (Ushna), Strong (Teekshna), Light (Laghu), Dry (Ruksha)

Action on Three Basic biological Humors i.e. Tridosha - Corrects imbalance of Tridosha by removing excessive amount from body (Tridoshaghna)

Local Action (Sthanin Karma)- Cleansing of wounds (Vranashodhan), Healing of wounds (Vranaropan)

Internal action (Abhyantar Karma) - Laxative (Anulomak), Eliminates faeces by breaking hard stools (Bhedan)

New medicinal uses of Aloe ferox on the basis of Thesis:

1. Rejuvenating Herb-

We can use Aloe ferox as Rejuvenating Herb i.e. Rasayan.

Pharmacological actions of Aloe Ferox according to Ayurveda:

According to Ayurvedic interpretation of qualities & actions of Aloe ferox, we can say that Aloe ferox can also help as cleanser of body (Shodhan), as an " Digestive Fire Stimulator " (Jatharagnideepan), as a metabolism - booster (Dhatvagnideepan) & also for nourishment of all tissues of body (Dhatuposhan). This altogether can help to improve nutrition of all the seven basic body material respectively which provides a healthy Shukradhatu. This can provide a strong body with healthy sexual power. This can also strengthen mind with good tolerance & resistance to bad desires which help to protect good Life Force or Energy called Oja in our body.

That means, Aloe ferox can also help as a complete 'Rasayan' i.e. Rejuvenating herb.

Methods of Treatment:

We can use Cape aloe or yellowish leaf juice of Aloe ferox

as cleansing treatment in less doses as first for few days. After a good cleansing regime when a person will feel lightness & cleanness in his body & when his digestive fire gets a good stimulation, we can start giving him pulp of leaf along with a very balanced diet as per Ayurvedic Texts.

Caution:

Aloe ferox should be avoided in Pregnant women as its use can cause abortions.

2. Aphrodisiac action-

We can use *Aloe ferox* as an aphrodisiac.

Pharmacological actions of *Aloe ferox* according Ayurveda:

According to similarities, we can say that *Aloe ferox* can also help for proper cleansing of body & improve appetite, digestion & assimilation. It can help to reduce toxins & impurities in body due to its properties. This allover can help to improve nutrition of all the seven basic body material respectively, including Shukradhatu, which is nothing but Rasayan karma. As we know Rasayan leads to Vajikaran which means improving sexual function.

It can also directly help to improve quality & quantity of sperms (Shukravardhak) as mentioned about Kumari.

It can also help in women to correct functions of Reproductive system.

Methods of Treatment:

We can use Cape aloe or yellowish juice of Leaf of *Aloe ferox* in very few doses for cleansing & as a Rasayan or to assist Rasayan.

With proper recommendation of diet, we can use leaf juice of *Aloe ferox* as Vajikaran.

It can be used a long term treatment or even can be used as a short term treatment.

3. Liver tonic

We can use *Aloe ferox* as a liver tonic.

Pharmacological actions of *Aloe ferox* according Ayurveda:

According to Ayurveda, Pittadosha is one of the Three Biological humors which perform the digestive functions. When this humor increases in excess due to improper diet & behaviour then digestive functions are

disturbed.

According to similarities, we can say that *Aloe ferox* can also help to remove excessive Pittadosha from body by laxative action & also to improve appetite, to improve digestion & assimilation & to maintain liver functions or to stimulate liver to produce normal quantity of bile. This can help to cure jaundice & many other digestive problems originated due to improper functions of liver. We can use it in Impaired liver functions due to infections, indulgence in excessive alcohol, bad food habits, smoking & consumption of other toxic substances which can be explained as slow poisoning. We can use it in hepatomegaly, jaundice, liver abscesses, tumors & other chronic symptoms & diseases due to liver dysfunction like constipation, loss of appetite, indigestion, flatulence, lusterless-dry-flaky skin & in some skin diseases.

Methods of Treatment:

We can try Leaf juice of *Aloe ferox* to stimulate Liver & to improve metabolism. This can also help as a Bitter Tonic.

4. Abscess

We can use *Aloe ferox* for internal & topical treatment of abscess.

Pharmacological actions of *Aloe ferox* according Ayurveda:

According to similarities, we can say that *Aloe ferox* can also help as a drawing agent having analgesic & anti-inflammatory effect. It can also help to draw local toxins & vitiated Doshas in the area of abscess & then helps it to get drained by itself by softening the skin. We can use leaf juice of *Aloe ferox* as dressing on the wound.

Methods of Treatment:

We can use Cape Aloe or boiled & dried leaf juice of *Aloe ferox* in very less dose. We can make a paste of those in water & can apply it on abscesses on limbs, Back, Neck & abdomen. When the abscess drains we can use leaf juice of *Aloe ferox* as dressing on those wounds. This will act as antiseptic, anti-inflammatory, soothing & also as prophylactic treatment.

A person who has tendency to get abscesses frequently due to disturbed metabolism, stress, toxicity or due to chronic debilitating diseases like diabetes & even in AIDS patients we can use leaf Juice of *Aloe ferox* to improve their immunity to infections & to avoid tendency to get abscesses.

5. Emmenagogue & uterine stimulant

We can use Aloe ferox as an emmenagogue & uterine stimulant.

Pharmacological actions of Aloe ferox according to Ayurveda:

According to similarities, we can say that Aloe ferox must also have cleansing effect on uterus by improving circulation of uterine endometrium & by improving contractions of uterus which allover works for inducing menses & for improving tone of uterus.

Aloe ferox can also help in irregular menses by correcting hormonal axis of body. It can even help in Anemia & general weakness. All over it can help as an emmenagogue & uterine stimulant.

Methods of Treatment:

We can boil & dry leaf juice of Aloe ferox & use it in very less dose like 100-300mg depending upon general strength & severity of ailment. We can try Cape Aloe in this way.

We can use Leaf juice of Aloe ferox in menstrual problems due to general weakness, anemia & other debilitating diseases. After correcting general health we can start the treatment mentioned above to cure menstrual problems like menstrual irregularities, oligomenorrhea, Amenorrhea, Dysmenorrhea & Infertility.

It can be used after delivery in very less dose as cleansing treatment or to ensure complete expulsion of placenta in patients having impaired uterine tone.

It can be used in secondary amenorrhea which means lack of menses after delivery for more than 3-4 months & even for longer period.

Caution:

Aloe ferox should be avoided in Pregnant women as its use can cause abortions.

6. Skin diseases

We can use Aloe ferox for skin diseases as an internal & external treatment.

Pharmacological actions of Aloe ferox according to Ayurveda:

According to similarities, we can say that Aloe ferox must

also have cleansing effect & blood purifying action like Kumari when used internally. It can also be used as external treatment for various skin diseases as antiseptic & treating wounds.

We can use leaf juice of Aloe ferox internally & also for local treatment in skin diseases like eczema, scabies, erysepalus, leprosy & skin rashes due to various other infections.

It can be used in Diabetic sores & also in venereal sores.

Methods of Treatment:

We can use leaf juice in small doses internally for few days along with local treatment by using the same.

7. HIV infected & AIDS patients

We can use Aloe ferox as a supportive herb for HIV infected & AIDS patients.

Pharmacological actions of Aloe ferox according to Ayurveda:

According to similarities, we can say that Aloe ferox must also have cleansing effect & metabolism enhancement (Dhatvagnivardhan) like Kumari when used internally. It can also be used as external treatment for various skin diseases as antiseptic & treating wounds.

We can use leaf juice of Aloe ferox internally in HIV infected people to keep them healthy & to increase their resistance power. We can use it in AIDS patients as supplementary treatment.

Methods of Treatment:

We can use leaf juice in small doses internally throughout as a supplementary treatment in AIDS patients & HIV infected people.

8. Tonic for Digestive system

We can use Aloe ferox as a tonic for digestive system.

Pharmacological actions of Aloe ferox according to Ayurveda:

Aloe ferox also has Bitter Taste & also helps in same ways as explained above.

It may help in Digestion in three ways:

It can work as laxative & purgative which allover will help

for cleansing of Digestive system.

It can be good activator for Digestive system (liver, gall bladder & intestines) to secrete more digestive juices.

It can help to improve 'Dhatuposhan' i.e. nourishment of seven basic tissues by improving basic metabolism at cellular level.

Methods of Treatment:

We can use leaf sap of *Aloe ferox* as tonic in very low doses to improve quality of digestion & absorption in people having chronic digestive disturbances due to improper & irregular diet, addictions, improper functions of Liver & also due to chronic constipation.

It can be a help for people having diabetes & also for people having low appetite & digestion due to chronic medications.

Caution:

Should not be used by pregnant ladies.

9. Treatment for Gout

We can use *Aloe ferox* for treatment of Gout.

Pharmacological actions of *Aloe ferox* according to Ayurveda:

Aloe ferox can work as cleansing in body & also can be used as local treatment for swollen & painful joints in Gout.

Methods of Treatment:

We can give Leaf sap of *Aloe ferox* for patients of gout in low doses to clean their systems & even can apply poultices of Leaves for painful & swollen joints.

In addition to proper treatment, Ayurveda recommends avoiding too much protein food, alcohol, salty-pungent & food having hot property e.g. spices, daytime sleep, too much exercise, working near fire or in too hot areas e.g. working near furnaces.

10. Treatment for Anemia

We can use *Aloe ferox* for anaemia.

Pharmacological actions of *Aloe ferox* according to Ayurveda:

Aloe ferox can help us as laxative & purgative. It can clean systems & due to Bitter Taste it also can improve

metabolism which will help for better absorption of Iron & other nutrients which are essential for maintaining normal blood production in our body.

Methods of Treatment:

We can initially give edible oils to patients to oleate their body from inside & then leaf juice of *Aloe ferox* as cleanser & then we can keep giving leaf juice as 'General Health Tonic' which will help to improve metabolism.

11. Treatment for Spleen disorders like Splenomegaly

We can use *Aloe ferox* for spleen disorders.

Pharmacological actions of *Aloe ferox* according to Ayurveda:

Aloe ferox also shows laxative & purgative effect which can help in cleansing systems & also can help as metabolism booster for creating good quality blood in the same way like Kumari. It will also help as tonic to improve basic metabolisms in patients suffering from chronic debilitating diseases.

Methods of Treatment:

We can give Leaf Juice of *Aloe ferox* to patients who show Splenomegaly due to some chronic diseases.

12. Treatment for Ascitis

We can use *Aloe ferox* for Ascitis.

Pharmacological actions of *Aloe ferox* according to Ayurveda:

Aloe ferox can help in same way as Liver Tonic & also as booster for Metabolism.

It can help as cleanser of systems & can remove obstructions in excretory system all over body.

It can help as anti-parasitic & also as anti-inflammatory in all organs involved in system which regulates water excretion. This will help for removal of excessive water from body.

Methods of Treatment:

We can use Leaf Sap of *Aloe ferox* internally.

13. Treatment for Ophthalmological complaints

We can use *Aloe ferox* for ophthalmological complaints.

Pharmacological actions of *Aloe ferox* according to Ayurveda:

Aloe ferox can work as anti-inflammatory & soothing in symptoms like redness of eyes, secretions, burning sensation & pain of eyes.

Methods of Treatment:

We can use *Aloe ferox* in same way.

We can use leaf sap as eye drops or can be applied on eye as poultice to relieve pain, secretions & inflammation of eyelids & eyes.

14. Treatment for Headaches due to Sinusitis, Migraine etc.

We can use *Aloe ferox* for headaches.

Pharmacological actions of *Aloe ferox* according to Ayurveda:

Aloe ferox leaf sap can also help in same way as local soothing & cooling medicine for headaches due to excessive heat in body.

Methods of Treatment:

We can use leaf sap as local application on forehead & scalp to reduce headache & even can use it internally to balance Doshas in body to remove main cause.

We can even instill drops of leaf sap in nose to cure headaches due to sinusitis & migraine.

CONCLUSIONS

We can use *Aloe ferox* as substitute for *Aloe vera*.

This study shows some new uses of *Aloe ferox* in diseases like different types of Rhinitis mentioned in Ayurvedic texts, Rheumatoid Arthritis, Rheumatic fever.

This study can help researchers in the fields of Ayurveda, Ethnomedicine, Ethnobotany, Phytomedicine, Pharmacology & Pharmacognosy & will provide a different view for researches on herbs.

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References

- r-0. Prof. Kulkarni: Ayurvedic Philosophy [Edition-1998] ;3
- r-1. Prof. Kulkarni: Ayurvedic Philosophy [Edition-1998] ;3
- r-2. Prof. Kulkarni: Ayurvedic Philosophy [Edition-1998] ;4
- r-3. Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;5 (In Marathi Language)
- r-4. Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;10,11 (In Marathi Language)
- r-5. Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;86 (In Marathi Language)
- r-6. http://www.studyworld.com/newsite/ReportEssay/Science/Earth%5CThe_Continental_Drift_Theory-361148.htm)
- r-7. Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;6,7,8,18,19 (In Marathi Language)
- r-8. Keith Coates Palgrave : Trees of Southern Africa [2nd Revised edition]
- r-9. Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;6,7,8,18,19 (In Marathi Language)
- r-10. Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;10 (In Marathi Language)
- r-11. Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;10 (In Marathi Language)
- r-12. Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;10 (In Marathi Language)
- r-13. http://www.studyworld.com/newsite/ReportEssay/Science/Earth%5CThe_Continental_Drift_Theory-361148.htm)
- r-14. Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;13 (In Marathi Language)
- r-15. Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;13 (In Marathi Language)
- r-16. Wyk, Outshoorn & Gericke: Medicinal Plants of South Africa [Second edition 2000- reprinted 2002] 40
- r-17. Wyk, Outshoorn & Gericke: Medicinal Plants of South Africa [Second edition 2000- reprinted 2002] 40
- r-18. Wyk, Outshoorn & Gericke: Medicinal Plants of South Africa [Second edition 2000- reprinted 2002] 40
- r-19. Wyk, Outshoorn & Gericke: Medicinal Plants of South Africa [Second edition 2000- reprinted 2002] 40
- r-20. Wyk, Outshoorn & Gericke: Medicinal Plants of South Africa [Second edition 2000- reprinted 2002] 40
- r-21. Wyk, Outshoorn & Gericke: Medicinal Plants of South Africa [Second edition 2000- reprinted 2002] 40
- r-22. Wyk, Outshoorn & Gericke: Medicinal Plants of South Africa [Second edition 2000- reprinted 2002] 40
- r-23. Wyk, Outshoorn & Gericke: Medicinal Plants of South Africa [Second edition 2000- reprinted 2002] 40; Deshpande-Javalekar : Dravya-Guna-Vidnyan [5th Revised Edition-Reprinted in Oct.2002] ;13 ,689 (In Marathi Language); Dr.Kulkarni, Dr.Ansari Ayurvedic Plant Encyclopedia [First edition-2002] , 3.
- r-24. Wyk, Outshoorn & Gericke: Medicinal Plants of South

Africa [Second edition 2000- reprinted 2002] 40;
Deshpande-Javalgekar : Dravya-Guna-Vidnyan [5th Revised
Edition-Reprinted in Oct.2002] ; (In Marathi Language)
r-25. Deshpande- Javalgekar : Dravya-Guna-Vidnyan [5th

Revised Edition-Reprinted in Oct.2002] 18, 19 (In Marathi
Language)
r-26. Deshpande- Javalgekar : Dravya-Guna-Vidnyan [5th
Revised Edition-Reprinted in Oct.2002] 18, 19 (In Marathi
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