

ADULTERATION: A THREAT TO AYURVEDIC MEDICINE – A REVIEW ARTICLE

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ABSTRACT

The demand of *Ayurvedic* drugs is growing day by day to attain wellness and get rid of life style disorders. About 60 % of the world's population use alternative medicines. As the demand is high and production of raw material is comparatively low. This gap between demand and supply has been increased and continuously increasing. To fulfill the gap between demand and supply, adulteration comes into practice. Adulteration is a malpractice which affects the faith in *Ayurveda* and *Ayurvedic* drugs. Because of this *Ayurveda* is getting affected. If someone uses adulterants in the *Ayurvedic* preparations or in single drug, it will not give the desired result or it may harm the patients. This may become the reason of reduced faith in *Ayurvedic* system of medicine. This problem can be resolved by promoting cultivation and conservation of natural resources. Instead of using adulterants, substitutes of the drugs should be used.

Keywords: Adulteration, demand and supply gap, Ideal drug

INTRODUCTION

Ayurvedic medicines contain products derived from plants, animals, metals and minerals. Approximately 90% of *Ayurvedic* preparations are plant based¹. The demand of *Ayurvedic* drugs is growing day by day to attain wellness and get rid of life style disorders. It seems that in past few decades people moved away from the nature due to increased urbanization. However, there is again a revival of drugs being obtained from vegetable sources than at any time in history. Medicinal plants are now in a “come back” phase with the last two decades seeing people shifting their focus back to the forgotten traditional natural medicines.

About 60 % of the world's population use alternative medicines.² these medicines are used by both developing and developed countries for their primary health care needs. In India, about 70 % of rural population depends on the traditional system of medicine. In the Western countries, approximately 40 % of people are using the herbal medicine for the treatment of various diseases.² According to a report the usage of *Ayurvedic* products by Indian households in year 2017 was 77 % which was up from the 69% in year 2015. Global market for *Ayurvedic* is also growing. The size of global market is expected to almost treble from \$3.4 billion in 2015 to \$9.7 billion by 2022.³

According to an estimation of The World Health Organization (WHO) the present demand for medicinal plants is approximately US \$14 billion per year which is growing at the rate of 15 to 25% annually and likely to increase more than US \$5 trillion in 2050 (Rs. 245 lakh crores). In India, the medicinal plant-related trade is estimated to be approximately US \$1 billion per year. The annual demand of botanical raw drugs in the country has been estimated at 3,19,500 MT for the year 2005-06. The annual trade value corresponding to the trade of 3,19,500 MT of botanical raw drugs in the country works out to Rs.1,069 crores for the year 2005-2006.⁴

In India, more than 1.5 million practitioners are using the traditional medicinal system for health care. About 7800 manufacturing units are involved in the production of natural health products and traditional plant-based formulations in India, which requires more than 2000 tons of medicinal plant raw materials annually. More than 1500 herbals are sold as dietary supplements or ethnic traditional medicines.²

The gap between demand and supply of MAPs (Medicinal and Aromatic plants) was estimated to be about 50,000 to 2, 50,000 tons in 2015 and this gap was expected to increase from 2,50,000 to 5,00,000 tons by 2020 (Planning Commission, 2010 & CRPA, 2011).⁵ Increased demand of medicinal plants causes the adulteration. To fill the gap between demand and supply, adulteration comes into practice. Adulteration is a malpractice which affects the faith in *Ayurvedic* and *Ayurvedic* drugs. On the other hand we also don't get the desired results or benefits from these adulterated drugs.⁶ So present paper aims towards highlighting the effect of adulteration on practice of Indian traditional medicine.

Adulteration⁷

It is the substitution of the original crude drug partially or fully with other substances which is either free from or inferior in therapeutic and chemical properties.

According to scholars there are Five types of adulteration can be seen:-

Adulteration with inferior commercial varieties e.g. *Maricha* (*Piper nigrum* Linn.) adulterated with papaya seeds.

Adulteration by artificially manufactured substances e. g. artificial invert sugar for honey

Adulteration by exhausted drugs e.g. Clove, Fennel are adulterated after extracting volatile oil

Adulteration by addition of heavy metals e.g. Pieces of limestone in asafoetida, lead in pieces of opium

Adulteration by Synthetic Principles e.g. adding Citral to oil Lime.

Adulterated drugs⁸

According to GMP Rules & Act under Schedules - T, Section 33EE for ASU Drugs, the drugs are deemed to be adulterated poisonous or deleterious substance:-

- If it consists filthy or decomposed material.
- If prepared, packed or stored under insanitary conditions.
- If its container contains any poisonous or deleterious substance.
- Colour other than one which is prescribed
- Harmful or toxic substance
- If any substance mixed to reduce its quality or strength

Types of adulterants presence in ASU Herbal drugs^{7,9,10}

1. Using substandard commercial varieties:- The adulterant resembles the original crude drug morphologically, chemically, therapeutically but are substandard in nature and cheaper in cost. Example: Medicinal ginger replaced by African ginger, Japanese ginger and cochineal ginger, *Strychnos nux-vomica* L. is adulterated by *Strychnos potatorum* L. etc.
2. 2. Using superficial similar inferior drugs:- Inferior drug may or may not have any chemical or therapeutic value. They resemble only morphologically due to morphological similarity adulteration is being done. Example – *Crocus sativus* L.(Saffron) is admixed with dried flowers of *Carthamus tinctorius* L.(*kusumbha*), belladonna leaves are substituted with Ailanthus leaves etc.

3. Using artificially manufactured substances:- The natural drug is adulterated with artificial substances. This type of adulteration is carried out for the drugs which are costly E.g. Artificial invert sugar for honey & *Vanshalochana*, compressed chicory in place of coffee, paraffin in place of bee wax etc.
4. Using exhausted drugs:- In this type of adulteration, same drug is admixed but active ingredient of the drug already extracted. This type of adulteration is practiced in aromatic substances which contain volatile oil e.g. Clove, fennel, caraway.
5. Adulteration by addition of heavy metal:- Pieces of limestone in asafoetida, Lead in pieces of Opium.
6. Using of synthetic chemicals to enhance natural characters
7. Presence of vegetative matter of same plant:- In this type of adulteration, the other vegetative parts of the plants along with part used is admixed. Examples: stem portion are adulterated along with roots drug like *Clerodendrum serratum* Spreng. (*Bharangi*), *Rauwolfia serpentina* Benth. ex Kurz (*Sarpagandha*).
8. Harmful adulterants:- Sometimes wastes from the market are collected and mixed with authentic drugs. This is particularly from liquids or unorganized drugs. E.g. Rodent faecal matter in cardamom seed, white oil in coconut oil.
9. Adulteration of powders:- The drugs which are in powder form are frequently adulterated because it is difficult to detect the adulterant in powder form e.g. red and white capsicum powder is admixed in red and white sandal wood powder, exhausted ginger powder in ginger, bark powder with brick powder

Reason of adulteration of ASU Herbal drugs

Confusion in vernacular names

Similarity in morphology

Lack of authentic source

Lack of knowledge about authentic source

Similarity in color

Careless collections

Unknown reasons

Confusion in vernacular names:- ^{4, 9, 11,12}

Parmelia perlata Ach.(*Shaileya*) a lichen species is being traded in different markets under entirely different names e.g. Chhadila (Amritsar & Delhi), Mehndi (Himachal Pradesh), Jhula(Uttarakhand) Dagarphool (Mumbai), Kalpaasi (Chennai). *Aerva lanata* Juss (*Pashanbheda*) for *Berginia ciliate* are some other examples for adulterations due to confusion in names.

Geographical variation:- *Berberis aristata* DC.(*Daruharidra*) found in Western Himalyan regions and it is abundant in number in these regions so easily available in North India. In South, *Coscinium fenestratum* Gaertn. is sold as *Daruharidra* due to less availability. (BP)

Lack of knowledge about authentic source: Though authentic plant is available in plenty in Western Ghats & Himalayas, suppliers are unaware of it. *Nagakesara* (*Mesua ferrea* L.), market samples are adulterated with flowers of *Punnaga* (*Calophyllum inophyllum* L.). Adulterated flowers are identified by presence of two celled ovary, but the original flowers are with single celled ovary.

Similarity in morphology: *Mucuna pruriens* Bek. (*Kevanch*) adulterated with, other similar papilionaceae seeds like *Mucuna utilis* (White variety) & *Mucuna deeringiana* (Bigger variety). Apart from this, *Canavalia virosa* & *Canavalia ensiformis* are sold in Indian market for *Mucuna pruriens*.

Lack of knowledge about authentic plant: Botanically *Kiratikta/ Chiraita* is *Swertia chirata* (Roxb. Ex Flem.) Karst. but adulterated with *Kalmegha* i.e. *Andrographis paniculata* Nees. Ancient Vedic literature reveals the description of Soma plant, i.e. Somalatha (*Ephedra gerardiana* (Wall.) Stapf), but identification of the plant and its morphology, habitat and distribution are still not clearly established. So different botanical sources like *Sarcostemma brevistigma* W.& A., *Ceropegia species* are used.

Unscientific collection: Careless collection of herbs by suppliers. For e.g.: Saileyam or Shilapushpam. (*Parmelia perlata* Ach.), a lichen usually admixed with *Parmelia perforata* & *Parmelia cirrhata*.

DISCUSSION

Classical texts of *Ayurveda* describes properties of an ideal drugs as follows:- *Bahuta*- The Drug or *Dravya* should be available in abundant quantity. If there is low availability of drug, it is considered as one of the lacunas of the drug. *Yogyatvam* -*Dravya* should be enough capable or effective to cure the diseases. *Anekvidhakalpna* – The *Dravya* should be like that, it can be prepared in multiple forms e.g. *Swaras* (fresh juice), *Kwath* (decoction) etc. according to the interest of the patient and condition of the diseases. *Sampat*-The *Dravya* should possess with all its properties like *rasa, guna, virya* etc. and actions like *deepna, pachna*. This property of the *dravya* depends upon the proper collection time which has been mentioned according to the different parts of the plant in respective seasons.¹³

According to above said the drugs other than that of ideal one should be considered as the inferior drugs. It seems that *Ayurved Acharyas* also condemn use of inferior quality medicine in treating illness. This concept can be correlated to adulteration in present era so it is high time to stop this malpractice of adulteration. Because of this *Ayurveda* is getting affected. If someone uses adulterants in the *Ayurvedic* preparations or in single drug, it will not give the desired result or it may harm the patients, which may become the reason of reduced faith in *Ayurvedic* system of medicine.

CONCLUSION

Crude drug adulteration has to be developed as a major area of study because it is high time to have a control over this malpractice. World Health Organization (WHO) in its publication on quality standards for medicinal plant material, recommends rejecting any batch of raw material which has more than 5% of any other plant part of the same plant (stem in leaf drugs), never the less if they are derived from the authentic plant. All the possible measures like pharmacognostical study, phytochemical analysis etc. to check out the adulteration in crude drugs should be encouraged. The collectors and traders have to be educated about the dangers and unethical nature of adulteration. Also, they should be educated about the

authentic sources. The increased gap between demand and supply should be reduced. As the demand is high and production of raw material is comparatively low. This problem can be resolved by promoting cultivation and conservation of natural resources. Instead of using adulterants, substitutes of the drugs should be used.

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Source of Support: Nil

Conflict Of Interest: None Declared

How to cite this URL: Ramakant Marde & Shalini Rathour: Adulteration: A Threat To Ayurvedic Medicine – A Review Article. International Ayurvedic Medical Journal {online} 2019 {cited October, 2019} Available from: http://www.iamj.in/posts/images/upload/1889_1893.pdf