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Review Article

A REVIEW ON ILLUSTRATED MANUAL OF HERBAL DRUGS USED IN AYURVEDA BY Y. K. SARIN: AN AID IN PREVENTING ADULTERATION AND SUBSTITUTION

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ABSTRACT

The authenticity of crude herbal drugs is fundamental to the safety, efficacy, and credibility of Ayurveda. However, adulteration and substitution remain persistent challenge due to rising demand, overexploitation of plants, and scarcity of genuine sources. This trend also existed in ancient times, as apparent from the concept of *Pratinidhi Dravya* (substitute drugs) as mentioned in our classical text books. Nowadays the concept of substitution is entirely converted into intentional and unintentional malpractices of adulteration. The book 'Illustrated Manual of Herbal Drugs Used in Ayurveda' by Dr. Y. K. Sarin (1996) serves as an authoritative reference for the identification and authentication of commonly used Ayurvedic drugs. In addition to that this book has emphasized how to identify the adulteration and substitution in herbal drugs. This review covers 216 herbal drugs which is arranged in a table according to their part being adulterated make them more understandable and easier to access. Result shows that adulteration is most frequent in underground parts such as roots, rhizomes, and tubers (approximately 40%). Stem bark about 15%, while fruits and seeds together is nearly 20%. There is a pressing need to address adulteration and substitution in crude herbal drugs, which compromise safety and efficacy of herbal drugs. The present review aims to evaluate the book, with a focus on its contribution to the authentication of crude herbal drugs, identification of adulteration and substitution practices, and its significance in ensuring standardization and safety in Ayurvedic medicine.

INTRODUCTION

Ayurveda, the ancient system of Indian medicine, relies profoundly on herbal drugs for preventive and therapeutic purposes. The quality, efficacy, and safety of Ayurvedic formulations are directly dependent on the authentic identification of crude drugs. In practice, however, challenges such as adulteration the deliberate or accidental addition of inferior or spurious material and substitution the use of an alternate plant in place of the genuine drug due to non-availability or commercial interests are common. Adulteration and substitution are not new concepts, as they are also described in our classical literature under the name of "*Pratinidhi Dravya* or *Abhava Dravya".* Its etymology is given in *Shabdakalpadrum* which states that it is a substitute, representative or proxy of real form[1]. In *Dharamshastra* it is mentioned that "if what is prescribed is absent a *Pratinidhi* (substitute) is to be taken according to similarity[2]. In *Charak Samhita,* an indirect reference of *Pratinidhi* has been found in *Sharira Sthana*[3]. In *Ashtangahridya Pratinidhi* has been mentioned in *Sutra Sthana* which says that in case of non-availability of a particular drug, another similar drug can be used [4]. In *Bhavaprakasha Samhita* it is mentioned in *Mishra prakarana* which says that a drug can be substituted in place of non-available drugs. They should be evaluated according to their properties like *Rasa, Guna, Virya, Vipaka* and similar plants can be searched for. It should be considered only for unimportant drugs in a formulation the main drug should not be substituted [5]. In *Yogratnakar* it is mentioned that in case of non-availability of any particular drug, one should try to get another similarly potent drug having same *Rasa, Guna, Virya, Vipaka* [6].

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Bhaishajyaratnavali gives a very vast description about concept of *Pratinidhi* in *Paribhasha Prakaran* [7]*.* These practices not only compromise the therapeutic value of medicines but also raise serious concerns patient safety and the credibility of Ayurveda in modern healthcare. It can lead to adverse health effects, reduced efficacy of products and loss of public trust. In this context, reference manuals that provide clear guidelines for the identification and authentication of raw drugs along with their potential adulterants & substitutes are of immense significance. One among them is:-

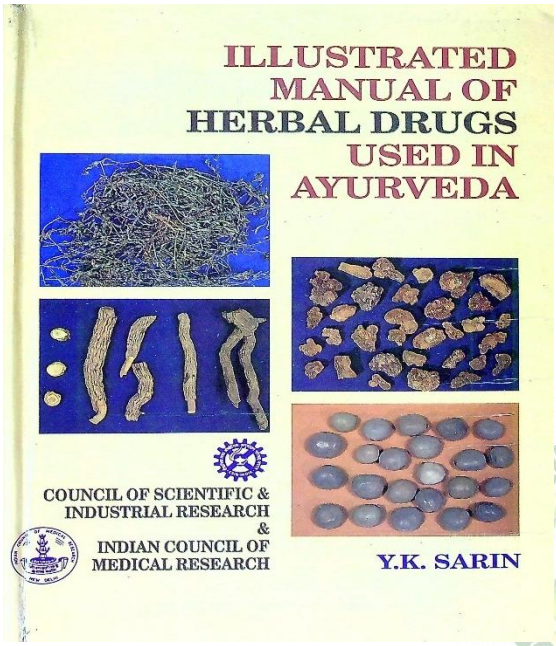

Image 1: Front page of Illustrated Manual of Herbal Drugs Used in Ayurveda by Dr. Y. K. Sarin

Book - Illustrated Manual of Herbal Drugs Used in Ayurveda

Author - Dr. Y. K. Sarin

Publisher-Council of Scientific & Industrial Research and Indian Council of Medical Research, New Delhi, 1996.

It is a revolutionary contribution in this field. Dr.Y.K.Sarin, has contributed allot in the field of *Ayurveda* and botany. He has given many books such as *Principal crude herbal drugs of India, flora of Trikuta hills, Dioscorea Deltoidea.* This manual aids in the recognition of crude herbal drugs commonly employed in Ayurvedic practice. The book includes colour photographs along with detailed descriptions of morphological and organoleptic characters. By systematically documenting the genuine sources of herbal drugs, the manual plays a vital role in addressing the long-standing issues of adulteration and substitution. The review of this book is needed because identification of herbal drugs is the cornerstone of safe and effective Ayurvedic practice and in present time, problems of adulteration and substitution are increasing due to overexploitation of plants, market demand, and scarcity of genuine sources. This book by Y. K. Sarin provides a reliable, illustrated reference that helps students, researchers, and Ayurvedic practitioners recognize genuine crude drugs and prevent spurious material from entering formulations. In this review the main aim is to critically evaluate the plants mentioned in the book and to organize them in a table format according to part being adulterated and substituted to make it more accessible and easier to understand. And highlighting its strengths and limitations through a review will ensure its continued academic and practical relevance in Ayurvedic drug standardization.

MATERIAL AND METHODS

The book "*Illustrated Manual of Herbal Drugs Used in Ayurveda* by Y. K. Sarin" was thoroughly studied to evaluate its coverage of crude herbal drugs, descriptive methodology, and photographic illustrations.

Special emphasis was given to the following aspects:

- Adulterant and substitutes of herbal drugs mentioned in book.

The term adulteration is defined as substituting original crude drug partially or wholly with other similar-looking substances. The substance, which is mixed, is free from or inferior in chemical and therapeutic property.[8] Drugs are said to be adulterated if it does not fulfill the standard parameters of genuine drug or it does not meet the prescribed standards. It can be intentional or unintentional. There are so many conditions due to which a drug is considered as adulterated.

1) **Spoilage** - Due to the attack of microorganisms.
2) **Deterioration** - Impairment in the quality of drug
3) **Admixture** - Addition of one article to another due to ignorance or carelessness or by accident. E.g., *Bala* root is mixed with *Bala* stem, *Pippali* root mixed with *Pippali* root stalk, *Piper nigrum* seed with *Carica papaya* seed (intentional), *Manjistha* root with *Manjistha* stem.
4) **Sophistication** - The intentional or deliberate type of adulteration. E.g., Starch powder with Ginger powder.
5) **Inferiority** - Refers to any substandard drug. E.g. *B. Aristata* and *B. Lycium*, *E. Ribes* and *E.Robusta.*
6) **Substitution** - A totally different substance is added in place of original drug. E.g Different species of *Vidari, Vaarahi*, different species of *Bhumyamlaki*, different species of *Mustak* etc.

Generally, the drugs are adulterated by substitution with:

- Substandard commercial varieties
- Inferior drugs
- Artificially manufactured commodities [9].

Substandard commercial varieties

Adulterants are used in place of actual drug. E.g. Presence of *Strychnos nux-vomica* or *S. potatorum* in place of *Strychnos nux-vomica*.

Inferior drugs

These inferior drugs used, May or may not be having any chemical or therapeutic value as that of original nature drug. Due to their morphological similarity to authentic drug, they are marketed. Belladonna leaves are substituted with Ailanthus leaves; saffron is admixed with dried flowers of *Carthamus tinctorius*.

Artificially manufactured commodities

The substances artificially prepared to resemble original drug are used as substitutes.

Drugs with their names, botanical source and part adulterated or substituted are then listed under table 1.

Table 1: Drugs with their names, botanical source and part adulterated or substitution [10]

S.No.	Name	Latin name	Part	Adulterant
Root, rhizome & underground parts				
1.	*Agnimanth*	*Clerodendrum multiflorum* (Burm.f.) and certain species of *Premna*.	Root, root bark	*Kshudra agnimanth - Clerodendrum multiflorum* (Burm.f.) *Brihad agnimanth- Premna obtusifolia* R.Br. *P.latifolia* Roxb. *P. serratifolia* Linn.
2.	*Ativisha*	*Aconitum heterophyllum* Wall.	Root	*Chaerophyllum villosum* Wall. [Meetha palisa] – Root
3.	*Bala*	*Sida cordifolia* Linn.	Root	*S. Rhombifolia* Linn. [Mahabala]
4.	*Amlaparni*	*Rheum webbianum* Royle.	Rhizome	*R.Webbianum* Royle. *R. Emodi* Wall. - Unpeeled roots [In material from Nepal, U.P. and H.P.] *R. Palmatum* Linn. - Peeled rhizome [from China].
5.	*Amragandhi haridra*	*Curcuma amada* Roxb.	Rhizome	*Curcuma aromatica* Salisb. [Amba haldi]
6.	*Bharangi*	*Clerodendrum serratum* Linn.	Root bark	Root with stems. Root of *Clerdendrum indicum* (L.) Kuntze. Bark of *Picrasma quasiodes* (D. Don) Benn. [In eastern India]
7.	*Bilva*	*Aegle marmelos* Linn.	Root bark	Basal portion of stout lateral root – Available in market Thinner roots – to increase weight of drug.
8.	*Brahati*	*Solanum indicum* Linn.	Root	Root of *Solanum melongena* Linn. Root of *S. torvum* Swartz.
9.	*Chitrak*	*Plumbago zeylanica* L.	Root & bark	Root and Root bark of *Plumbago rosea* Linn. [Rakta chitraka] – more potent
10.	*Daruharidra*	*Berberis aristata* Hook. F. & Thomson.	Root & root bark	Bark from stem of *Coscinium fenestraium* Colebr. [In Kerala & Tamil Nadu known as – Mirmanjal/ Maramannal] Root and root bark of *B. lycium* Royle.
11.	*Danti*	*Baliospermum montanum* Muell-Arg.	Root	*Croton oblongifolius* Roxb. [Nagdanti]- South India Roots of *Ricinus communis* Linn.
12.	*Gambhari*	*Gmelina arborea* Roxb.	Root bark	Stem bark of *G.Arborea* Roxb. Root bark of *G. Asiatica* Linn. [south India] Root bark of *Premna flavescens* Ham. [Burhi kasmaar]
13.	*Gokshur mool*	*Tribulus terrestris* Linn.	Root	Root of *T. alatus* Delile. And *Pedalium murex* Linn. [western India]
14.	*Haridra*	*Curcuma longa* Linn.	Rhizome	Coloured earthy material in powder form.

15.	*Indravaruni*	*Citrullus colocynthis* (L.) Schrad.	Roots	Root of *C.Vulgaris* Schrad.
16.	*Ishwari*	*Aristolochia indica* Linn.	Roots	Dried stem of same species. Roots of *A. tagala* Linn. *A. Bracteata* Linn. And other species of same genus
17.	*Jatamansi*	*Nardostachys jatamansi* D.C	Rhizome	Rhizome of *Selinum vaginatum* C.B.Cl. *S. Lenuifolium* Wall. [Bhootkeshi]
18.	*Jeevanti*	*Leptadenia reticulata* (Retz.) Wt.	Root	Whole herb of *Ephemerantha macraei* (Lindl.) Hunt & Summerh. Roots of *holostemma ada-kodien* J.A.Schutes.
19.	*Karveer*	*Nerium indicum* Mill.	Root bark	Whole root or stem bark of *Nerium indicum* Mill. & *Thevetia peruviana* (Pers.) Schum.
20.	*Karchoor*	*Curcuma zedoaria* (Berg.) Rosc.	Rhizome	Rhizome of *Curcuma caesia* Roxb. [kali haldi] Madakachoora & Narkachoora [primary & secondary Rhizome]
21.	*Katuki*	*Picrorhiza kurroa* Royle ex. Benth.	Rhizome	Roots of *Lagotis glauca* Gaertn. [Kashmir and kulu]
22.	*Kulinjan*	*Alpinia galanga* Willd.	Rhizome	Rhizome of *Alpinia officinarum* [China - k/as lesser galangal, kulanjana khatai or chota kulanjana in trade & Rasna in south India. {Substitute}] Rhizomes of *Acorus calamus* Linn. *Amomum subulatum* Linn. & dried gingers are common adulterants.
23.	*Kushth*	*Saussurea lappa* Clarke	Roots	Roots of *Inula royleana* DC. *I. racemosa* Hook.f. & *Carduus nutans* Linn.
24.	*Laangali*	*Gloriosa superba* Linn.	Tubers	Sliced rhizome of *Costus speciosus* (Koen.) Sims.
25.	*Lashun*	*Allium sativum* Linn.	Compound bulb	Bulbs of *Allium ampeloprasm* Linn.
26.	*Manjistha*	*Rubia cordifolia* Linn.	Roots	Pieces of stems. Root of *R. sikkimensis* Kurz. [Sikkim & north eastern hills]
27.	*Nirgundi*	*Vitex negundo* Linn.	Roots	Roots with pieces of stems.
28.	*Pashanbhed*	*Bergenia ligulata* (Wall). Engl.	Rhizome	Roots of *Didymocarpus pedicellatus* R.Br. & *Coleus amboinicus* Benth. [eastern India] Whole herb of *Aerva lanata* Juss. [south India]
29.	*Patala*	*Stereospermum suaveolens* DC.	Roots	Roots with stem. *Stereospermum tetragonum* DC. [officinal drug in south India]
30.	*Patha*	*Cissampelos pareira* Linn.	Root	Roots od *Stephania glabra* Hk. F. Roots of *Cyclea peltata* Diels. [considered as true source in south India]
31.	*Pippali*	*Piper longum* Linn.	Rhizome and root	Pieces of stem With other species of piper [Bihar & Meghalaya]
32.	*Prishniparni*	*Uraria picta* Desv. Ex DC.	Root	Roots of *Desmodium gangeticum* (Linn.) DC. [south India] Roots of *Uraria hamosa* Wall. [eastern and south India] In north India drug is either available as whole or only dried leaf. Roots of *Desmodium & Flemingia* sps.

33.	*Punarnava*	*Boerhavia diffusa* Linn.	Root	Roots of *B. repanda* Willd.
34.	*Pushkar mool*	*Inula racemosa* Hook.f.	Roots	Roots of *Saussurea lappa* C.B.Cl. Roots of *Iris germanica* Linn. [in Kashmir - sometime considered as true source]
35.	*Rasna*	*Pluchea lanceolata* (DC.)Clarke.	Roots	Roots of *Vanda tessellata* (Roxb.) Hook.ex.D. Don. [Bangiya Rasna] Root of *Tylophora indica* (Burm.f.) Merill. [Khar ki Rasna] Rhizome of *Alpinia galanga* Willd. [Kulinjana] – used in South India as substitute.
36.	*Sarpagandha*	*Rauwolfia serpentina* Benth. Ex. Kurz.	Roots	Roots of *R. tetraphylla* Linn. Thin roots of *Tabernaemontana divaricata* (Linn.) R.Br. *R. densiflora* Benth. & *R. micrantha* Hook.f.
37.	*Shalparni*	*Desmodium gangeticum (*Linn.) DC.	Roots	Roots of *Desmodium pulchellum* Benth. Ex. Barker. Roots of *Flemingia chappar* Ham. & *F. semialata* Roxb. [Bara salpan] Roots of *Uraria hamosa* Wall. & *Pseudarthria viscida* W.A. [in South India – considered as proper source]
38.	*Shatavari*	*Asparagus racemosus* Willd.	Roots	Roots of *A. sarmentosus* Linn. [south India] Peeled roots of *A. adscendens* Roxb.
39.	*Shati*	*Hedychium spicatum* Ham.ex.Smith.	Rhizome	Rhizome of *H. coronarium* Koening. Rhizome of *Kaempferia galangal* Linn. [south]
40.	*Shunthi*	*Zingiber officinale* Rosc.	Dry rhizome	Powdered material is mixed with exhausted and unscraped material. Powdered capsicum.
41.	*Shweta sariva*	*Hemidesmus indicus* R. Br.	Roots	Roots of *Cryptolepis buchananii* R. & S. & *Ichnocarpus frutescens* R.Br. Roots of *Decalepis hamiltonii* Wt. & Arn.[South India]
42.	*Shyonaka*	*Oroxylum indicum* Vent.	Root bark	Stem bark Root & Root bark of *Ailanthes excelsa* Roxb. [Arluka or Arlu]
43.	*Talmuli*	*Curculigo orchioides* Gaertn.	Roots	Unpeeled rhizome of *Acorus calamus* Linn.
44.	*Tagara*	*Valeriana wallichi* DC.	Rhizome & roots	Roots of other west Himalayan species of *Valeriana.* Roots of *Coleus vettiveroides* K.C.Jacob.
45.	*Trivrit*	*Operculina turpethum* (Linn.)	Roots	Pieces of stem Stem pieces of *Marsdenia tenacissima* W & A. [Safed nisoth]
46.	*Vacha*	*Acorus calamus* Linn.	Rhizome	Roots of *Alpinia galangal* Willd.[sugandha vacha] & Aconitum sps. [akot vacha] Rhizome of *Costus speciosus* (Koen.) Sims.
47.	*Vatsanabh*	*Aconitum ferox* Wall.ex Seringe.	Roots	Roots of *A. falconeri* Stapf. *A.Laciniatum* Stapf. *A.Spicatum* Stapf. Or *A.Violaceum* Jacob.
48.	*Vriddhadaruk*	*Argyreia nervosa* (Burm.f) Boj.	Roots	Roots of *Ipomoea pes-caprae* (Linn.) Sw. & *I. Petaloidea* Chois.

49.	*Yashtimadhu*	*Glycyrrhiza glabra* Linn.	Roots & stolons	Root of *G. uralensis* Fisch. [china] Roots of *Abrus precatorious* Linn.
Stem, stem bark & stem tubers				
50.	*Arjun*	*Terminalia arjuna* Wight. & Arn.	Stem bark	Bark of other species of *Terminalia.* *T. alata* Heyne ex Roth. *T. tomentosa* W. & A.
51.	*Ashok*	*Saraca asoca* Roxb.	Stem bark	Stem bark of *Polyalthia longifolia* Benth. & Hook. [Ashok tree]
52.	*Babul*	*Vachellia nilotica* (L.)P.J.H. Hurter & Mabb.	Stem bark	Flat & hard pieces of bark obtained from main trunk or older branches.
53.	*Beejak*	*Pterocarpus marsupium* Roxb.	Heartwood	Heartwood of *Terminalia tomentosa* W. & A. & *Bridelia Montana* Wild.
54.	*Chandan*	*Santalum album* Linn.	Heartwood	Pieces of sapwood. Exhausted wood shavings and saw dust after distillation of oil are also mixed with the commercial material.
55.	*Guduchi*	*Tinospora cordifolia* (Willd.) Hook. f. & Thoms.	Stem	Pieces of thick areal root of same plant. Stems of *Tinospora malabarica* (Lam.)Miers. & *T. crispa* Hook. F. & Thoms.
56.	*Kanchanar*	*Bauhinia variegata* Linn.	Stem bark	Stem bark of *Bauhinia variegata* Linn. [Kovidar or Kanchanar bhed. Stem bark of some other species of *Bauhinia,* especially *B.malabarica* Roxb. & *B. racemosa* Lamk.
57.	*Katphal*	*Myrica esculenta* Buch-Ham.	Stem bark	Not common. Sometimes stem bark of *Myristica malabarica* Lam. [Rampatri] & *Careya arborea* Roxb.
58.	*Kutaj*	*Holarrhena antidysentrica* (Roth.) DC.	Stem bark	Stem bark of *Wrightia tomentosa* R. & S. *W. tinctoria* R.Br.
59.	*Lodhr*	*Symplocos racemosa* Roxb.	Stem bark	Stem bark of *Symplocos crataegoides* Buch.-Ham. & *S. spicata* Roxb. [Kerala and Tamil Nadu.]
60.	*Paribhadr*	*Erythrina variegata* Linn.	Stem bark	Bark of *Erythrina tuberosa* Roxb. [Coral tree]
61.	*Padmak*	*Prunus cerasoides* D.Don.	Stem bark	Pieces of heartwood with bark attached are generally sold in place of pure bark by name of *Padma kashth*.
62.	*Raktachandan*	*Pterocarpus santalinus* Linn.	Heartwood	Heartwood of *Adenanthera pavonia* Wild. [Ranjan & Raktakambal in Bengal, Bari gumchi in north India.] Heartwood of *Caesalpinia sappan* Linn. Wood shavings & saw dust of some other trees.
63.	*Rohitak*	*Tecomella undulata* (G. Don.) Seem.	Stem bark	Stem bark of *Aphanamixis polystachya* (Wall.) Parker.
64.	*Saptaparn*	*Alstonia scholaris* (Linn.) R.Br.	Stem bark	Bark obtained from the main trunk or thick branches.
65.	*Shirish*	*Albizia lebbeck* Benth.	Stem bark	Stem bark of *Albizia marginata* Merr. [*Nenmenivak* in Malayalam & *Pulivak* in Tamil Nadu. *A. odoratissima* (Linn.f.) Benth. [Northern & Western India.]
66.	*Somavalli*	*Ephedra gerardiana* Wall. Ex. Stapf.	Stem & Aerial	*E. sinica* Stapf. & *E. equisetina* Bunge. – [imported from china, named as *Maa huang.*]

			parts	*E. intermedia* Schrenk & Mey. [In India] Dried herb of *Equisetum arvense* Linn. [Sometimes]
67.	*Tvak*	*Cinnamomum zeylanicum* Blume.	Inner bark obtained from the shoots	Stem bark of *Cinnamomum tamala* Nees. & Eberm. [Indian Cassia Lignea*/ Tajchaal*]
68.	*Varun*	*Crataeva nurvala* Buch.Ham.	Stem bark	Stem bark of *Aegle marmelos* Corr.
69.	*Vidari*	*Pueraria tuberosa* DC.	Tuber	Stem tubers of *Ipomoea paniculata* Linn. R.Br.[*Bhumi kumhr*] Stem tubers of *Trichosanthes cordata* Roxb.
Leaf & leaflets				
70.	*Dhatura*	*Datura metel* Linn.	Leaves & Flowering or fruiting tops	*Datura innoxia* Mill.
71.	*Swarna patri*	*Cassia angustifolia* Vahl.	Leaves	Leaves of *Cassia acutifolia* Delile. [*Alexanderian senna*].
72.	*Talish*	*Abies webbiana* Lindl. Or *Taxus baccata* Linn.	Dry leaves	Leaves of *Rhododendron anthopogon* D.Don. Leaves of *Abies pindrow* Spach.
73.	*Tulsi*	*Ocimum sanctum* Linn.	Leaves	*Ocimum sanctum* var. nigrum is considered more effective in south India.
74.	*Vasa*	*Adhatoda vasica* Nees.	Leaves and terminal leafy branches	Leaves of *Adhatoda beddomi* C.B.Clarke. [South India]
Flowers & parts				
75.	*Kumkum*	*Crocus sativus* Linn.	Dried stigmas along with upper parts of styles	Anthers & longitudinally split petals of saffron flower, Ligulate corolla of marigold. Tubular florets of calendula and stigma of maize. The material is sometimes artificially coloured and treated with honey, fat or oil to change the texture and increase the weight.
76.	*Lavang*	*Syzygium aromaticum* Merr. & L.M.Perry.	Flower buds	Cloves from which volatile oil has been partially or entirely removed. Cloves stored for long time. Commercial samples contain blown cloves, mother cloves & clove stalks.
77.	*Mundi*	*Sphaeranthus indicus* Linn.	Floral heads	Floral heads of *Sphaeranthus amaranthoides* Linn. Sometimes loose or balding floral heads.
78.	*Nagkesar*	*Mesua ferrea* Linn.	Anthers	Flower buds of *Mammea suriga* (Ham.) Kesterm. [*Raktanagkesar*] *Krishn nagkesar* – immature fruits of *Cinnamommum tamala* Nees. & Eberm. And other species of *Cinnamommum.* *Malabarnagkesar* - immature fruit of *Dillenia pentagyna* Roxb.
79.	*Priyangu*	*Callicarpa macrophylla* Vahl.	Flower	Fruits of *Agalia roxburghiana* Miq. [*Phak priyangu*]

			buds and flower	Fruit kernels of *Prunus mahaleb* Linn. [*Dhaunla*]
80.	*Utpal*	*Nymphaea stellata* Willd.	Flowers	Other species of *Nymphaea.* *Raktotpal – N. nouchali* Burm.f. *Kumud – N. stellata.*
81.	*Vanapsa*	*Viola odorata* Linn.	Flowers	Mixture of more than one species. *Phool banafsha or Gul banafsha* should contain only flowers and peduncles, flowers with leaves are sold separately under name *Berg banafsha.*
Seeds & fruits				
82.	*Ajamoda*	*Trachyspermum roxburghianum* (DC.) Wolf.	Fruits	Fruit of *Apium graveolense* Linn. Fruits of *Carum stictocarpum* Benth.
83.	*Ashwagol*	*Plantago ovata* Forsk.	Seeds & Seed husk	Seeds of *P. major* Linn. & *P. lanceolata* Linn.
84.	*Atmagupt*	*Mucuna pruriens* (L.) DC.	Seeds	Seeds of *Mucuna utilis* Wall. & *M. cochinchinensis* Cheval. [*Safed kaunch*]
85.	*Bilva phal*	*Aegle marmelos* (Linn.) Corr.	Unripe fruits	Peeled pieces of fruits of *Feronia limonia* (L) Swingle.
86.	*Dhatura*	*Datura metel* Linn.	Mature seeds	*Kaladhatura* seeds with *Datura stramonium* Linn. *D.innoxia* Mill.
87.	*Ela*	*Elettaria cardamomum* (Linn.) Maton.	Near ripe capsules	Fruits of *Amomum kepulaga* Sprague. & Burkill. Exhausted cardamoms obtained after distillation of oils. Immature fruits & partially opened fruits.
88.	*Gokshur*	*Tribulus terrestris* Linn.	Fruits	Fruits of *Tribulus alatus* Delile. Fruits of *Pedalium murex* Linn. [Brihad Gokshur]
89.	*Hijjal*	*Barringtonia acutangula* (Linn.) Gaertn.	Fruits	Seeds of *Barringtonia racemosa* Blume.
90.	*Indrayava*	*Holarrhena antidysentrica* (Roth.) DC.	Seeds	Seeds of *Wrightia tomentosa* Roem. & Schult. And *W. tinctoria* R.Br. [*Meetha indrajau.*]
91.	*Jatipatri*	*Myristica fragrans* Houtt.	Fibrous aril	Mace of *M. malabarica* Linn. [*Rampattri*]
92.	*Jaatiphal*	*Myristica fragrans* Houtt.	Kernels of the seed	Kernels of *Myristica malabarica* Lam. Some commercial material consists of limed nutmegs
93.	*Jayaphal*	*Croton tiglium* Linn.	Seeds	Seeds of *Jatropha curcas* Linn. [*Vyaghr erand*]
94.	*Jyotishmati*	*Celastrus paniculatus* Wild.	Seeds	Seeds of *Cardiospermum helicacabum* Linn. Market sample- Seeds of *Durant* sps.
95.	*Krishn jirak*	*Carum carvi* Linn.	Ripe fruits	Fruit of *Bunium persicum* (Boiss) Fedt. [*Kala zira* or *Shimai shirgam*] Coloured fruits of *Cuminum cyminum* Linn.
96.	*Kupeelu*	*Strychnos nux-vomica* Linn.	Seeds	Seeds of *Strychnos nux blanda* Hill.
97.	*Latakasturi*	*Abelmoschus moschatus* Medic.	Seeds	Seeds of *Abelmoschus ficulneus* Wight & Arn. [*Deola or ranbhindi*]
98.	*Madanaphal*	*Randia dumetorum* (Lam)	Fruits	Fruits of *Gardenia turgida* Roxb. Dried fruits of *Artabotrys odoratissimus* R.Br.
99.	*Parisika yavani*	*Hyoscyamus niger* Linn.	Seeds	Seeds of *Hyoscyamus muticus* Linn. Seeds of *Gynandropsis gynandra* (L.)Briq.

100.	*Pippali*	*Piper longum* Linn.	Mature but unripe fruiting spikes	*Bara pipal* – Material originating from West Bengal. Similar to material imported from Southeast Asia. *Gole pipal* or *Chota pipal* – Material of hill regions of Sikkim & north Bengal as well as Murshidabad dist. Of West Bengal. Fruiting spikes of *Piper peepuloides* Roxb. [*Savali pipal*] – Common adulterants of *Bara pipal.*
101.	*Sthul ela*	*Amomum subulatum* Roxb.	Ripe or nearly ripe seeds	Fruits of *Amomum aromaticum* Roxb. [*Moraang ilayechi*] – Calcutta. *Elettaria cardamomum* under trade name *Hyderbadee elayechi*
102.	*Tumbru*	*Znathoxylum armatum* DC.	Fruits	Fruits of other species of *Zanthoxylum*. Like fruits of *Z. rhetza* (Roxb.) DC. [Known in trade as *Tirphala or Rhetsamarram*] Fruits of *Z. acanthopodium* DC. [Eastern India]
103.	*Tuvarak*	*Hydnocarpus laurifolia* (Dennst.) Sleummer.	Seeds	Seeds of *H. kurzii* (King.) Warb. [Source of *Chalmoogra oil.*]
104.	*Unnab*	*Ziziphus sativa* Gaertn.	Fruits	Fruits of *Z.jujuba* Lam. Are sometimes mixed with the material.
105.	*Vidang*	*Embelia ribes* Burm.f	Fruits	*Embelia Robusta* C.B.Cl. [*Vidang bhed*]
Whole herb				
106.	*Bhringaraj*	*Eclipta alba* (Linn.) Hassk.	Fresh or dry whole herb	*Wedelia calendulacea* Less. [Known as *Pitabharangi* in north India & *Manjal krisalai* in Tamil Nadu].
107.	*Bhumyamalki*	*Phyllanthus fraternus* Webster.	Whole herb	Other species of *Phyllanthus.* *Phyllanthus urinaria* Linn. Is used more commonly. *P.amarus* Schum. & Thonn. *P.maderaspatensis* Linn.
108.	*Brahmi*	*Bacopa monnieri* (Linn.) Pennell.	Fresh or dried herb	*Centella asiatica* Linn. Is sold as Brahmi. [Northeast India]- Jalnim. Prevalent name of Brahmi is given to *Bacopa monnieri* in south India. [*Nir Brahmi*]
109.	*Dhanvayas*	*Fagonia cretica* Linn.	Dry whole herb	Whole herb of *Alhagi pseudalhagi* (Bieb.) Desv. [Source of *Yavaasa* sometimes sold as *Dhamaasa*]
110.	*Hamsapadi*	*Adiantum lunulatum* Burm.	Whole plant	*Adiantum venustum* Don. and *A. capillus-veneris* Linn sold by the name of *Parshoshaan.*
111.	*Kiratatikt*	*Swertia chirayita* Roxb.	Whole herb	*S. angustifolia* Buch-ham. *S. alata* Royle. *Andrographis paniculata* Nees. [*Kalmegh*]
112.	*Mandooka parni*	*Centella asiatica* Linn.	Leaves or whole herb	Commercially sold by name *Brahmi,* which is *Bacopa monnieri* in Ayurvedic material medica.
113.	*Punarnava*	*Boerhavia diffusa* Linn.	Dry whole herb	*Trianthema portulacastrum* Linn. [Sometimes] *B. repanda* Willd.
114.	*Sahachar*	*Barleria prionitis* Linn	Whole herb	*B.cristata* Linn. *B.strigosa* Linn.
115.	*Shaileya*	*Parmelia perlata* (Huds.) Ach.	Fruiting	*P.perforata* Ach.

			thallus	*P.nepalensis* D.D. Awasthi.
116.	*Shankhpushpi*	*Convolvulus pluricaulis* Choicy	Whole herb	*Evolvulus alsinoides* Linn. *Canscora decussate* Schult.
Gums, juices & extracts				
117.	*Babul*	*Vachellia nilotica* (L.)P.J. H.H urter & Mabb.	Gum from stem bark	Gum obtained from other species of *Acacia & Albizzia.* *Anogeissus latifolia* Wall. [Ghatti gum]
118.	*Gugglu*	*Commiphora mukul* (Hook ex. Stocks.) Engl.	Oleo-gum resin obtained from the stem	Oleo-gum resin obtained from *Boswellia serrata* Roxb. [Salai guggul] *Commiphora myrrha* Nees. [Hirabole or bole] – Sometimes. *Commiphora roxburghii* (Arn.) Engl. – Sold by the name *guggul.*
119.	*Hingu*	*Ferula assa-foetida* Linn.	Oleo-gum resin of rootstock	Mixed with small stones, sand and rootlets of plant. *Heenga rasa* is further mixed with wheat & corn flour, potato and Acacia gum.
120.	*Kumari*	*Aloe barbadensis* Miller.	Fresh or dried juice obtained from the leaves	Drug from Kathiawar region of Gujarat is adulterated with those obtained from other parts of country. Market sample – with black catechu, sand and iron dust.
121.	*Mochras*	*Salmalia malabarica* Schott & Endl.	Exudate from the stem bark	Two varieties of *Mochras.*
122.	*Rasanjan*	*Berberis lycium* Royle or *B.asiatica* Roxb.	Dried aqueous extract of the roots	Pieces of wood, leaves, stones etc. *Rasaunt* obtained from *Berberis lycium* Royle is considered best.
123.	*Saral niryaas*	*Pinus roxburghii* Sargent.	Oleo-resin from trunk	Unprocessed oleo-resin known as *Leesa or Gandaabiroza*]
124.	*Sal niryaas*	*Shorea robusta* Gaertn.f.	Resinous exudates of stem bark	Resinous exudates from stem bark of *Vateria indiaca* Linn. [Known as *Chandras & Vella kunirikam*.]
125.	*Shallaki niryaas*	*Boswellia serrata* Roxb. Ex. Coleb.	Oleo-Gum resin	*B. carteri* *B. frereana* sold in Indian market by name *Kundur.* *Garuga pennata* Roxb. Known as *Moina gum*
Insect galls				
126.	*Karkatshringi*	*Pistacia integerrima* Stew. Ex. Brandis.	Insect galls formed on the leaves & petioles	Insect galls obtained from other trees, especially of *Terminalia* sps.

RESULT

The *Illustrated Manual of Herbal Drugs Used in Ayurveda* by Y. K. Sarin documents many herbal drugs along with their botanical sources, macroscopic and organoleptic features, and common adulterants and substitutions. Among them a total of 126 crude herbal drugs with their adulterants and substituent are given in this article. The review of this manual revealed that adulteration and substitution is most prevalent in underground parts of plants-roots, rhizomes, and tubers-which accounted for nearly 40% of reported cases. Stem and bark adulteration represented around 15%, while fruits and seeds together comprised about 20%. Leaves, flowers, and whole herbs contributed the remaining share.

A notable observation is that drugs of high therapeutic and commercial value, such as *Rauwolfia serpentina* (*Sarpagandha*), *Crocus sativus* (*Kumkuma*), *Commiphora mukul* (*Guggulu*), and *Santalum album* (Chandana), were frequently targeted for adulteration & substitution. To decrease the cost of the drug- e.g., *Papaya* seed is added in *Marich*, *Polyalthia longifolia* bark is added in *Saraca ashoka* bark, *Kusumbh* flowers are in practice at the place of *Kesar*. In several cases, adulteration arose due to functional similarity (e.g., *Bacopa monnieri* and *Centella asiatica* both sold as *Brahmi*), scarcity of genuine species, or deliberate sophistication with inferior material. In some cases, adulteration arose due to morphological similarity e.g. *Tribulas terrestris (Laghu gokshura)* with *Pedalium murex (Brihat gokshura*), *Embelia ribes* with *E. robusta*, *Kutha* and *Pushkarmool*, *Berberis aristata* and *B.Lycium.* The manual also highlights regional variations in adulteration practices, such as substitution of *Kutaja* (*Holarrhena antidysenterica*) with *Wrightia* species in southern India.

By organizing information systematically according to plant parts, and supplementing descriptions with photographic plates, the manual provides a practical tool for identifying unadulterated crude drugs and understanding the patterns of adulteration & substitution across different categories for U.G. and P.G. students of Ayurveda, Research scholar's, Ayurvedic practitioners and mainly facility of department of Dravyaguna vigyana.

DISCUSSION

The findings from the book highlight its relevance in addressing the challenges of adulteration and substitution, which continue to be a serious issue in the field of Ayurvedic pharmacognosy. Correct identification of crude drugs ensures therapeutic efficacy and patient safety, and this manual provides practical tools for the same. Therefore, knowledge about adulterated plant parts and potential adulterants in market is much necessary so, by knowing about them will enable us identify the authentic drug mentioned. For example, *Shatavari* (*Asparagus racemosus*) is being adulterated with *Ipomoea digitata*, and *Musta* (*Cyperus rotundus*) with *Cyperus scariosus*, we can see for their proper identification through macro and microscopic characters. In this book, herbal drugs are basically mentioned in different groups based on which part of plant is adulterated, e.g.:-

1. Plants having adulteration in Root, Rhizome & Underground Parts are mentioned starting from *Agnimanth* [page no. 2] to *Yashti* [page no. 116] adulterants of 49 plants are mentioned. Which are particularly prone to substitution because of morphological similarities between species.
2. Plants having adulteration in Stem, Stem Bark & Stem Tubers are mentioned starting from *Arjun* [page no. 118] to *Vidaari* [page no. 163] adulterants of 19 plants are mentioned.
3. Plants having adulteration in Leaf & Leaflets are mentioned starting from *Dhatura part* [page no. 164] to *Vasa* [page no. 178] adulterants of 5 plants are mentioned.
4. Plants having adulteration in Flowers & Their Parts are mentioned stating from Kumkum [page no. 180] to Vanapsa [page no. 196] adulterants of 7 plants are mentioned.
5. Plants having adulteration in Seeds & Fruits are mentioned starting from *Amalki* [page no. 198] to *Yavani* [page no. 292] adulterants of 24 plants are mentioned.
6. Plants having adulteration in Whole Herb are mentioned stating from *Apamarga* [page no. 294.] to *Shankhapushpi* [page 326] adulterants of 11 plants are mentioned.
7. Plants having adulteration in Gums, Juices & Extracts are mentioned stating from *Babul* [page no. 328] to *Shallaki* [page no. 346] adulterants of 9 plants are mentioned.
8. Plants having Insect Galls as useful part and there adulteration is mentioned from page 348 to 350 with adulteration of *Karkatashringi.*

Some plants are mentioned repeatedly as per there useful parts like *Babul* is mentioned under stem, stem bark and resin also, *Bilva* under root and fruit, *Bala* under root and seed, *Nimb* under leaf, seed and bark, *Indravaruni* under fruit and root.

A total of 126 plants are mentioned with its substitutes and adulterants, part used and botanical name are mentioned in this review. For academic scholars, it will provide a strong foundation in the practical aspects of drug authentication, identification. And that is the reason and need of this review article. In conclusion, the review highlights the enduring relevance of Y. K. Sarin's manual in addressing adulteration and substitution, while also pointing

towards the need for continuous updating and integration with modern pharmacognostical tools to ensure safety, efficacy, and sustainability in Ayurveda.

CONCLUSION

The Illustrated Manual of Herbal Drugs Used in Ayurveda by Y.K. Sarin remains a vital reference for authenticating crude drugs and combating adulteration. By systematically documenting genuine sources and adulterants, it enhances safety, efficacy, and reliability in Ayurvedic practice while supporting education, research, and standardization in contemporary herbal medicine.

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