

**VALUE ADDITION OF DIETARY RAW INGREDIENTS THROUGH
PREPROCESSING –AN AYURVEDIC AND TRADITIONAL VIEW****Prashant B. Bedarkar^{1*}**

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ABSTRACT

Pathya kalpana; dietary adjuvant formulations are peculiarity of Ayurvedic therapeutics. Principle of *Samskara* meant to alter the qualities of a drug is widely used in Ayurvedic pharmaceutico therapeutics. Raw food ingredients frequently used in Ayurvedic therapeutics are also mentioned to undergo certain pharmaceutical preprocessing operations, *Shodhana* but collective information is not documented yet, hence an attempt has been done with this review. Available textbooks on Ayurveda (Laghutrayee, Bruhadtrayee, Nighantu) were screened for pharmaceutical preprocessing of dietary ingredients used in general and not for any particular formulation. Preprocessing of different food ingredients are mentioned in Ayurvedic texts with their mottos, which is peculiarity of Ayurvedic pharmaceutics which are different from preprocessing practiced by contemporary food industry globally and hence their pharmacological evaluation is potent area of research.

KEYWORDS: *Pathya kalpana*; dietary potent area of research.

INTRODUCTION

Diet is major part in disease treatment as per Ayurvedic therapeutics. It is turned in to medicines with preparation of *Pathya Kalpana*^[1] (supplementary dietary formulations for treatment). Principle of *samskara*^[2], which is meant to alter the qualities of a drug is widely used in Ayurvedic pharmaceutico therapeutics. Raw food ingredients frequently used in Ayurvedic therapeutics are also mentioned to undergo certain pharmaceutical preprocessing operations in Ayurvedic texts, among which few are considered as *Shodhana* measures. *Shodhana* although has generally regarded and translated frequently as measure of

purification, still it isn't merely a purification and is done for various purpose, principally to change the qualities of a substance.^[3] Such preprocessing is a part of value addition of a drug. It may be necessary when same dietary ingredient is meant to use in medicinal formulation as medicine. As collective information on such preprocessing of dietary raw ingredients is not compiled at one place, hence an attempt to compile it has been done through present work.

MATERIAL AND METHODS

Available textbooks on Ayurveda (Laghutrayee, Bruhadtrayee, Nighantu) were screened for use of dietary ingredients and any pharmaceutical preprocessing, which is meant to conduct in general and not for certain formulation or indication. The references of such pre procedures on each ingredient were collected, repetition of pre procedures were counted as one hence avoided for further consideration unless any process modification is noted.

OBSERVATIONS AND DISCUSSION

These pre processing can be classified as good post harvest management like good storage practices and *Shodhana* procedures, *Samanya samskara* (pre procedures or practices to be followed in general) and *Vishesha samskara* (specific pre procedures or practices). Brief information on preprocessing of common dietary ingredients mentioned in Ayurvedic texts is given below.

A) *Shodhana* of food ingredients

1) **Turmeric** (Haridra)- Botanical name-*Curcuma longa* linn. **Part used**-Rhizomes ***Shodhana of Haridra***-Boiling in cows urine, followed by in decoction of *Sphaeranthus indicus* and then in combined medicated water (*Gandhodaka*) derived from- tender leaves of Lemon (*Bijapura*), *Mango (Mangifera Indica)*, *Jamun (Eugenia jumbolana)*, *Bel (Aegle marmelos)* and *Kapittha (Feronia elephantum* Correa (Faro. Rutaceae). Then steaming (fumigation) is done with fumes of boiling cow urine in a closed vessel. Then it is dried in shade.^[4]

Probable effects of processing

Colouring substances of turmeric gets changed with treatment by alkaline liquids, gases thus boiling with *Gomutra* and it's fumes (Ammonia) may alter chemical composition of colouring substances of turmeric (curcuminoids; principle pharmacologically active ingredients). Chemical ingredients of plants used for *shodhana* may form complexes with chemical ingredients of turmeric.

Motto-1) To facilitate process of drying 2) To reduce drying time 3) To reduce loss of volatile oil 4) To improve appearance i) To minimize wrinkling ii) To improve colour to dark with slight brownish tinch, else if unprocessed, it will be light yellow. 5) To improve medicinal value i) *Pramehaghna* property.

2) Garlic (*Rasona*)- Botanical name-*Allium sativum*, **Part used**-Bulb

Shodhana of *Rasona*-Inner shoot (embryo) of garlic clove should be removed. For removal of irritant, pungent smell, it should be immersed over night in Buttermilk.^[5]

Motto-1) To reduce pungent smell 2) To reduce chances of Itching (Allergy) 3) To improve *Deepan, pachana* property.

Probable effects of processing

Immersion in aqueous acidic liquid may cause hydrolysis of certain chemical ingredients. Immersion may initiate process of germination, in contact with proteins of butter milk, acidic media, dilute lactic acid. Process of germination initiates formation of Vitamin E etc and initiates series of multiple chemical reactions necessary for utilization of energy for germination. Lactobacilli may uptake ingredients of Garlic and produce their metabolites, which may remain in processed garlic.

3) Asfoetida (*Hingu*)

Asfoetida is fried in cow's ghee. It is soaked in leaf juice of lotus.

Motto-To reduce pungency, irritancy and strong smell.

4) Ginger (*Ardra*)- Botanical name-*Zinziber officinalis*, **Part used**-Rhizome.

Shoots are cut with knife and it is immersed in water overnight then washed frequently with water till getting clear drained and washed out liquid and then they are dried in sunlight.

It is then immersed in lime water for period of 3-9hrs.

Outer peel of Ginger is removed first.

Rhizomes are parboiled with lime water (bleaching) for 3-9hrs and then dried in shade.^[6]

Paste of lime or chalk is applied over rhizomes and dried.

Motto-1) To extinguish viability of rhizome for germination, thus help in preservation/storage 2) To facilitate drying process 3) Reduction of time to get dry 4) To minimize infestation by insects 5) Overnight immersion followed by drying facilitates peeling of outer skin 6) To improve appearance e.g. to reduce wrinkling etc.

Probable effects of processing- Overnight immersion may initiate process of germination and its effect on chemical composition of Ginger. Boiling gelatinizes starch and thus may alter qualities of drug, formation of new chemical moieties with carbohydrates is also possible.

5) Surana kanda - Botanical name- *Amorphophallus campanulatus* (Roxb.) Blume.
(Fam. Araceae) **Part used-**Corm.

Surana is Properly washed with water and cut in to thin slices and kept immersed in a water. It is steamed traditionally. It is heated with method of *putapaka* (roasted in fire after wrapping with leaves and smeared for covering with wheat or black gram flour dough).^[7]

Motto-1) To reduce irritancy (concentration of irritant substances).

Probable effects of processing-Drug gets treated with it's own vapours at raised temperature and pressure.

6) Black Pepper (Maricha)- Botanical name- *Piper nigrum*, **Part used-**Seed.

Shodhana-Black pepper should be immersed in buttermilk for 3 hrs.^[8] Effects as mentioned above.

7) Cumin/ caraway (Jeeraka)- Botanical name- *Cuminum cyaminum*, **Part used-**Seed.

Shodhana-It is made wet with sour gruel (kanji; a liquid derived by fermentation of cooked rice some times added with few other ingredients before fermentation) and dried.^[9] Effects as mentioned above.

8) Ajowan (Ajamoda)- Botanical name-*Apium leptophyllum* (Pers.) F. V. M. ex Benth.
(Fam. Umbelliferae), **Part used-** Seed.

Shodhana-Seeds should be immersed in buttermilk for 3 hrs. Effects as mentioned above.

9) Bishop's Weed (Yavani)- Botanical name- *Trachyspermum ammi* (Linn.) Sprague ex Turril (Fam. Umbelliferae), **Part used-** Seed.

Shodhana-Seeds should be immersed in buttermilk for 3 hrs.^[10] Effects as mentioned above.

10) Gingili oil /Sesame oil (*Tila taila*)

Shodhana-Should be mixed with water and separated after 12 hrs.^[11]

Motto-1) Improvement of medicinal value (*Toya sannikarsha*).

Probable effects of processing-Partial rancification, oxidation, formation of few micelles favourable for retaining aqueous soluble /more polar chemical moieties in the form of micelle during further food processing/treatment of oil with other food stuff.

11) **Beatle leaves**-Mid rib is removed.

Motto-Mid rib reduces intellect (*Buddhi*).

B) Specific food processing

Food ingredients meant to use after some period (ageing).^[12]

Cereals [Rice, Jowar, Bajra (millet) etc], **Jaggery, Honey, Ghee, Coriander** (*Dhanyaka*).

If old jaggery is not available then fresh jaggery is kept in sunlight for 12hrs.^[13]

Motto-1) Cereals becomes *laghu* in property 2) Therapeutic efficacy of honey increases 3) Ghee becomes more suitable for use as medicine. Old ghee recommended for preparation of medicinal formulations for Mental disorders like *Unmada* (Mania/Schizophrenia) and *Apasmara* (Seizure disorders).

Probable effects of processing

Bhallataka is said to keep in Heap of whole barley fruits (*Dhanya rashi*) for specified time before use and pharmacognostically, experimentally and clinically the effect of procedure on its extracted oil by method of *patana* was significantly better in terms of management of Diabetes.^[14]

Common processing of certain food ingredients^[15]

Cooking (Heating, boiling), frying in case of Vegetables and Meat.

Milk-It is generally boiled before use until and unless indicated without boiling.

Vegetables- Vegetables should undergo steaming (*swedana*) i.e. either steamed over vapour or boiled (cooked) and crushed or pounded turned to specified food processing to make in to curry generally fried with fats.

Meat- Meat should be either roasted over direct fire, or indirectly through *putapaka* (after making bolus wrapped with some wheat or black gram flour) or fried with fats or prolonged cooking should be done with sour gruel (*kanji*), buttermilk, fats etc.

Motto-1) To facilitate digestion 2) To make them near sterile (to reduce viable pathological microbial count). 3) To reduce chances of infestation by parasites like helminthes etc. 4) In case of Meat and vegetable-i) To make them soft and facilitate digestion, ii) To extract soluble ingredients to facilitate absorption 5) To make them palatable (increase acceptability (taste, flavor, appearance, form of presentation etc).

Probable effects of processing

Proteins get denatured (changed) with heating, hence heat treatment of meat along with other food stuff may form multiple protein complexes with chemical ingredients of other food stuffs. Protein phenol/ tannin, protein calcium complexation are well known and sensitive phenomenon.

Dietary ingredients are frequently used in medicinal formulations or their formulations are also often used as main line of treatment in Ayurvedic therapeutics. Although food ingredients are said to *Rasa pradhana* i.e. they exhibit their action principally by virtue of their Rasa and possess *madhyam veerya* or *veerya* is less affecting factor in exhibition of their properties, still when those are processed in to a formulation along with other potent medicines, their properties become important and may show very potent actions due to synergistic effect of effect of formulation composition (*Samyoga*). Different sub types of combinations are explained in Ayurvedic classics like *Dravya* (physical combination of substances), *Guna* (combination of properties of substances) and *Karma* (combination of actions of substances) *Samyoga*.^[16]

Various *Samskara* like *Toya sannikarsha* (immersion in liquids), *Agnisannikarsha* (Roasting, *Putapaka*, Frying, boiling, steaming etc), *Kala prabhava* (*sthapana*, ageing) are mentioned in classics which are found used in above processes. They are said to change the qualities of the drug.

Preprocessing of food ingredient changes their properties and hence must be calibrated and defined. Their standardization (Pharmacognostic, physicochemical, phytochemical) is need of time to know whether some food ingredient has been underwent preprocessing and in desired manner or not. There are many preprocessing of food ingredients like i) Pre processing practiced by primary producers, farmers like-Traditional curing of turmeric, Ginger^[17] iii) Pre processing practiced by food industry on commercial basis and for export in global market like Industrial Curing of turmeric.^[18], Ginger, refining of oil^[19], polishing of rice, Pulses, Pausterization of milk^[20], fortification of rice, fats, clarification of milk fats, regulation of milk fat content etc. ii) Preprocessing carried out traditionally by local residents or ethnic groups like smearing of milled pulses (dal) with oil by local residents of Saurashtra region, India, *Putapaka* of ripened fruit of *Bel (bilva)* etc. Coating of grains by oils is way of natural protection against insects and infestations.^[21] These practices if evaluated have firm scientific basis and major role as potent procedures to render protective effect, value addition, capable to make desirable change in activity etc.

Preprocessing of food ingredients mentioned in Ayurvedic classics or one used traditionally are different from preprocessing practiced by contemporary food industry globally and hence they are source of research and way of value addition, hence their pharmacological evaluation is core area of research.

CONCLUSION

Pathya kalpana; dietary adjuvant formulations are peculiarity of Ayurvedic therapeutics. Preprocessing of different food ingredients are mentioned in Ayurvedic texts with their mottos, which is peculiarity of Ayurvedic pharmaceutics which are different from preprocessing practiced by contemporary food industry globally and hence their pharmacological evaluation is potent area of research.

REFERENCES

1. RH Singh. Charak Samhita. 1st ed., reprint 2011, Chaukhambha Surabharati prakashana. 1: 278-9.
2. RH Singh. Charak Samhita. 1st ed., reprint 2011, Chaukhambha Surabharati prakashana. 2: 495-6.
3. Kashinath shastry. Rasatarangini. Motilal banarasi das publication, Delhi, 11th ed. 1979; pp.22.

4. Indradeva tripathy. Chakraduatta. Chaukhambha samskrit samsthana, Varanasi. 1st ed., 1991; 225.
5. Radhakrishna Parashara. Sharangdhara Samhita. Baidyanath Ayurved bhavana limited, Nagpur, India. 4th ed., 1994; 238-9.
6. PV Dhamankar. Ayurvediya Aushadhi dravya Shodhana Vidhi. Dhutpapeshwar limited, Mumbai, India, Pp.160-1.
7. Radhakrishna Parashara. Sharangdhara Samhita. Baidyanath Ayurved bhavana limited, Nagpur, India. 4th ed., 1994; 183.
8. Pammi narayana sastry. Rasayoga ratnakara. Dr Achanta Lakshmiapati Ayurved Trust. Vijayvada. 1st ed., 2005; 225.
9. Pammi narayana sastry. Rasayoga ratnakara. Dr Achanta Lakshmiapati Ayurved Trust. Vijayvada. 1st ed., 2005; 225.
10. Pammi narayana sastry. Rasayoga ratnakara. Dr Achanta Lakshmiapati Ayurved Trust. Vijayvada. 1st ed., 2005; 225.
11. Pammi narayana sastry. Rasayoga ratnakara. Dr Achanta Lakshmiapati Ayurved Trust. Vijayvada. 1st ed., 2005; 225.
12. Radhakrishna Parashara. Sharangdhara Samhita. Baidyanath Ayurved bhavana limited, Nagpur, India. 4th ed., 1994; 11.
13. Brahma shankara. Bhaishajya ratnavali. Chaukhambha samskrit samsthana, 13th ed. 1997; 39.
14. Mohan Krishna Dwivedi *et al.* Effect Of *Kala Prakarsha* On Pharmaceutical Processing W.S.R. *Bhallataka* And Its Efficacy On Type Ii Diabetes Mellitus. Thesis submitted for the degree of M.D. (Ayu.) to Gujarat Ayurved University, Jamnagar. 2014.
15. Yadavji trikamji Acharya, Narayana ram Acharya. Chaukhambha Surabharati Prakashana, Varanasi. 1st ed. 2014; 239.
16. RH Singh. Charak Samhita. 1st ed., reprint 2011, Chaukhambha Surabharati prakashana. 1: 496.
17. K.P. Prabhakaran Nair. The Agronomy and Economy of Turmeric and Ginger.e book cited on 3.12.2017 at 7.51pm. available at. <https://books.google.co.in/books>.
18. Director, Agriculture technology information centre, Indian Institute of Spices research, calicut, Kerala, "Turmeric",. 2015., downloaded from <http://www.spices.res.in/pdf/package/turmeric.pdf> on 07/10/2016.
19. P.A.T. SWOBODA. Chemistry of refining. JAOCS: 1985; 62(2): 287-8.

20. Modi. A., Prajapat R. Pasteurization process energy optimization for a milk dairy plant by energy audit approach. International Journal of Scientific & Technology Research, 2014; 3(6): 181-8.
21. Inge de Groot. Protection of stored grains and pulses. Monograph by Agromisa Foundation, Wageningen, 2004.pp.29. cited on 4.12.2017 at 9pm. Available at. http://journeytoforever.org/farm_library/AD18.pdf.