

Quality of ingredients used in Ayurvedic herbal preparations

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Those who understand Ayurveda deeply state that every material, whether animate or inanimate is potentially medicinal.^[1]

To say this with scientific rigor requires both deep understanding of human biology and intimate knowledge of external environments. Ayurveda is based on the Pancha Mahabhuta Siddhanta, the understanding of objects of sense perception in terms of five qualities of objectivity, each one arising from a particular sense. This approach is inclusive of anything with a form occupying space. The perspective can be extrapolated to all things that can be measured, either qualitatively or quantitatively. This is a unique feature of Ayurveda.

The concepts of Rasa (taste), Guna (qualitative attributes), Veerya (therapeutic effect) and Vipaka (overall post-digestive effect of a medicine) are qualitative. When the approach to drug action based on the above principles does not work, Ayurveda proposes the principle of Prabhava, meaning unpredictable action of a drug i.e. not based on a plant or substance's morphology or internal attributes.

Such materials were meticulously studied by the ancient sages, based on the Prakriti Sama Samavayarabdha principle. Those not falling into this category are classified under Vikriti Vishama Samavayarabdha, meaning unpredictable action, not consistent with Guna or Rasa.^[2] As a result, Ayurvedic science of drug action on the human body has become sacrosanct, allowing only additions, but no deletions. In this way its science dealing with medicinal properties of materials has remained unchanged. Though a limitation on Ayurveda, it gives a clear boundary to

physicians on the use of materials as medicine. Going beyond such limitations can only be achieved based on sound understanding of underlying principles of Ayurveda.

Even though flora, fauna and minerals/metals are all used in Ayurveda, this article only considers quality aspects of herbal ingredients used in Ayurveda industry. More than 1500 plants were identified and their possible multiple uses are specified in the codified works of Ayurveda dating from 2500 BC (Charaka Samhita) up to 1900 AD (Saligrama Nighantu).

These can be categorized into trees, shrubs, herbs (including grass) climbers, creepers and some ferns, lichens and orchids. Many were rare, endangered, threatened or extinct even at the time of Bhava Mishra (16th century). Today, nearly 200 such medicinal plants are under different levels of threat. Industry obtains them not only from forests, but also from locations including unprotected-wasted lands, roadsides, traditionally used landscapes etc. For purposes of quality, considerations about such plants are of two kinds.

MORPHOLOGY-ROOTED PLANT SPECIFICATIONS

There need not necessarily be a one-to-one relationship between Dravyaguna and western identifications of a given 'plant' i.e. Sanskrit and botanical names are not necessarily in one-to-one correspondence. As a result, there can be more than one botanical source for a given plant component of an Ayurvedic formulation e.g. Bala can mean either *Sida retusa* or *Sida cordifolia*, *Centella asiatica* and *Bacopa monnari* are both accepted as Brahmi. Similarly, Vishnukranti also has more than two botanical sources. Correspondingly, morphological properties determining botanical identification of a plant may seem a reasonable starting point for quality control, but quality control cannot end there, for specific Ayurvedic dravyaguna properties do not necessarily depend on particulars of plant morphology.

SECONDARY ASPECTS OF PLANT QUALITY CONTROL

There are further considerations of great importance

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in determining quality of plant ingredients in herbal formulations, including place of origin, method of cultivation (mono-culture or multi-culture crop etc.), time, season, methods of collection and storage. All these parameters play important roles in final plant quality and should therefore be listed among a given plant's attributes and applied to all herbal ingredients.

Each of these should be studied for individual plants and objective standards evolved. For example, for many plants, particularly when roots and stems are used, secondary metabolites determine therapeutic activity, so availability of these is important. This is an area requiring careful explanation. Many plants, though grown with great care and nourishment, are not found to be effective, because they lack the necessary Veerya. Veerya may even be derived from secondary metabolites formed in a plant out of stress and starvation. For example, relatively smaller specimens of Haridra (Haldi, Turmeric), grown under demanding, dry conditions in Tamil Nadu are far more potent, with greater concentration of curcumin, than the same variety grown in damp conditions.

Ayurveda recommends not collecting plants during the rainy season or immediately after it. This is to prevent the Veerya being diluted. Certain plants, especially root tubers, have to remain underground for a specified period before they are collected. This ensures better therapeutic activity. Certain plant material loses its activity merely from exposure to sunlight e.g. Haridra. Some plants need to be processed in particular materials to obtain their full efficacy e.g. *Piper longum* in milk. Some are synergistic and become more effective when used together e.g. Sali parni and Prushni parni.

Such nuances in Ayurveda have to be studied more deeply in order to achieve appropriate 'gold standards' of quality assurance for herbal ingredients. HPLC and HPTLC may at best be a starting point, but they will never suffice, as adequate quality standards for truly Ayurvedic herbal ingredients.

For example, four basic attributes are given to an ideal

ushadham (medicine) pertaining to both an ingredient of a whole preparation, as well as a poly constituent formulation. These are 1. Bahu kalpam, which can be used in varieties of dosage forms like decoction and oils. 2. Bahu gunam means having more than one attribute like *Tinospora cordifolia*, which has many uses. 3. Sampannam, which refers to natural attributes and is critical for quality control. To ensure that the sampannatha is present in herbal ingredients, many attributes must be assessed. 4. Yogyata means suitability of a medicine in a given context.^[3]

Present day scientific instrument-based standardization cannot measure sampannatha. This opens up the need for developing Ayurveda-based methodologies of quality control. Formulating ways for these variables to be measured is a non-trivial scientific challenge. Only when these have been developed, can herbal ingredients for Ayurvedic preparations with truly consistent quality be made available.

Even in today's world the following words of Charaka are relevant to its being fulfilled.

“*Thadeva yuktam bhaishajyam yadarogyaya kalpathē*” broadly meaning medicine is that which restores health and brings longevity.^[4] “*Suddhastu Shamayet nacha kopayet*” meaning, a pure medicine is, one which when eliminating a disease, should not give rise to even the slightest cause for another disease.^[5]

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