

Importance of Standardization of Seed Testing Procedure in Medicinal Plants

Hiteksha I. Damor^{1*}, Minal S. Baria², Kalyanrao Patil³ and Ankeshkumar Sharma¹

¹Ph.D. Scholar, Department of Genetics and Plant Breeding, Anand Agricultural University, Anand

²Department of Entomology, Anand Agricultural University, Anand

³Department of Seed Science and Technology, Anand Agricultural University, Anand



*Corresponding Author

Hiteksha I. Damor^{1*}

E-mail: damorhiteksha@gmail.com

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INTRODUCTION

Traditional Indian medicine is becoming increasingly popular, they possess secondary metabolites having medicinal values and are commonly used to treat and prevent many diseases without any ill effects on the human body. Medicinal plants possess many beneficial active compounds like anti-oxidants, anti-inflammatory, anti-insecticidal, anti-parasitic, antibiotics, anti-hemolytic properties, *etc*, also used widely by tribal people all over the world. Detailed knowledge of the action of medicinal plants is required to understand their potential and efficient influence. Nowadays, herbal medicinal preparations are more in demand than mainstream pharmaceutical/ allopathic products. Herbal medicines are considered as safer, better physiological compatibility, and cost-effective. India is a gold mine of medicinal plants and a rich repository of traditional medicinal knowledge. Demand for medicinal plants is increasing with expansion in human needs, numbers and trade purposes (Bhattacharya et al., 2019). Herbal medicine has been considered as a sole role in coping with many deadly diseases including cancer and disease associated with viral onslaught *viz.*, Hepatitis, AIDS, *etc*. Unlike synthetic pharmaceutical drugs, medicinal herbs are easily absorbed in the body and bloodstream leaving minimal residual and side effects. Even in many modern medicines, the basic composition is derived from medicinal plants and these have become acceptable medicines for many reasons that include Easy availability, least side effects, low prices, environmental friendliness, and lasting curative property.

The importance of any medicinal plant relies on the active principal present in it, so the uniformity in quality, as well as the quantity of planting material, is of paramount importance (Singla & Jaitak, 2014).

In our country, about 4.5 million plant species and among them estimated only 250,000-500,000 plant species, have been investigated phytochemically for biological or pharmacological activity. In India, medicinal and aromatic plants covered 628 thousand ha area with production of 798 thousand MT during the year 2019-20 (Anonymous, 2019-20). However, the large-scale production and expansion of medicinal plants are restricted due to the non-availability of good-quality seeds. For quality seed production, an attempt has been made to formulate seed standard and seed testing procedures at the national and international levels.

Seed standards are seed quality parameters and consist of physical purity, genetic purity, germination capacity, moisture content and seed health status. Seed testing protocols are methodologies standardized for determining different seed quality parameters for getting higher quality seeds of different medicinal plants with the best planting value.

Seed testing refers to an evaluation of seed quality parameters and compared with 'minimum seed standard'. It helps to evaluate the planting value of seeds and to minimize the risk of planting low-quality seeds and getting the highest planting value. "Seed quality" is mainly centered around the reflection of the overall value of seeds for planting; Viability is the most widely accepted aspect of seed quality. Other aspects of seed quality include physical purity, vigor, freedom from disease-insect and pest, moisture content and varietal identity and purity of seed lot.

With the alarming rate of loss of biodiversity due to other well-known factors alongside the indiscriminate collection of wild medicinal plants, there is a real danger of extinction of many of our medicinal plant species.

The non-availability of authentic planting material and proper production techniques are the main constraints in the cultivation and commercial production of medicinal plants and it also has a negative impact on the raw material of superior quality for medicine

preparation. The importance of any medicinal plant relies on the active principal present in it, so the uniformity in quality, as well as the quantity of planting material is of paramount importance. Therefore, a good source of quality seed is essential for raising healthy medicinal plants and the quality seeds can be made available through standard seed procedures. However, information regarding seed testing procedures in medicinal plants is very rare. Successful testing requires adequate facilities, trained staff, uniform methods or procedures and a research program for improvement.

Seed testing protocols, Seed standard and Seed quality parameters are necessary for the following major aspects:

- Seed quality assurance
- National and International Seed trade
- Planting value of seed
- Labeling requirement under Seed act.
- Implementation of seed act- for seed certification.
- Notification of variety
- Protection of a variety under PPV & FRA
- Seed banking
- To determine if seed meets established labeling specifications
- To help and to ensure better quality, governments usually utilize seed testing, certification and legislation

Need for seed testing standardization in medicinal crops

- Low germination percentage
- Presence of dormancy
- Low seedling survival
- Immature seeds
- Non-judicious exploitation by drug industries
- Lack of reliable information

Demand and supply of Indian medicinal plants

- Commercial demand of herbal raw drugs for the year 2015-16 was 5,12,000 MT
- Total exports of herbal raw drugs, including extracts was 1,34,500 MT
- The consumption demand of medicinal plants by the domestic herbal industry was

estimated at 1,95,000 MT. of which 1,67 500 MT was used by rural households every year

- About 1178 medicinal plant species recorded in the practices of trade
- There is a growing demand today for plant-based medicines in the international market
- The international market of medicinal plants is over 60 billion US dollar per

year, which is growing at the rate of 7 per cent per annum

- The present export of herbal raw materials and medicines from India is about US dollar 100-114 million approximately per year mainly to six developed countries viz. USA, Germany, France, Switzerland, U.K. and Japan, who share between them 75-80 per cent of the total export market

Important medicinal plants and their mode of propagation:

Sr. No.	Name	B. Name	Family	Bio-active compound	Propagation method	Plant part used
1	Dioscorea (Medicinal Yam)	<i>Dioscorea floribunda</i>	Dioscoreaceae	Diosgenin	Seed, Tuber pieces	Rhizomes (tubers)
2	Rauvolfia	<i>Rauvolfia serpentina</i>	Apocynaceae	Alkaloids, Serpentine, Reserpine	Seeds, Stem cuttings, Root cuttings, Stumps	Roots
3	Opium	<i>Papaver somniferum L.</i>	Papaveraceae	Opium, morphine, codeine.	Seeds	Milky white latex unripe capsules
4	Stevia	<i>Stevia rebaudiana</i>	Asteraceae	Steviol glycosides (Stevioside and Rebaudioside)	Seed-poor, Stem cutting and tissue culture	Leaves
5	Ocimum	<i>Ocimum sanctum</i>	Labiatae	Tannins, Phenolic acids, Anthocyanins, Phytosterols and Policosanols, Linalool	Seeds	Leaves, seeds, roots
6	Periwinkle	<i>Catharanthus roseus</i>	Apocynaceae	Alkaloids (Vincristine and Vinblastine)	Seeds	Leaves, seeds, roots
7	Aloe	<i>Aloe barbadensis</i>	Liliaceae	Aloin	Root suckers or rhizome cuttings	Leaves, seeds, roots
8	Solanum	<i>Solanum khasianum</i>	Solanaceae	Glyco-alkaloid, Solasodine	Seeds	Berrie
9	Nuxvomica	<i>Strychnus nuxvomica</i>	Loganiaceae	Glucoside loganin	Seeds	Seeds
10	Guggal	<i>Commiphora mukul</i>	Burseraceae	Quinic acid and Myo-inositol	Seeds (poor), Stem cutting	Bark - Oleogum resins
11	Aonla	<i>Emblica officinalis</i> <i>Phyllanthus emblica</i>	Euphorbiaceae	Ascorbic acid, Ellagitannins, Emblicanin A and B	Budding, grafting and seeds	Fruits
12	Senna	<i>Cassia angustifolia</i>	Leguminosae	Glycosides, Sennosides	Seeds	Leaves and pods
13	Opium	<i>Papaver somniferum</i>	Papaveraceae	Morphine, Thebain and Codeine	Seeds	Tuberous roots
14	Isabgol	<i>Plantago ovata</i>	Plantaginaceae	Polyphenols	Seeds	Seeds and husks
15	Aswagandha	<i>Withania somnifera</i>	Solanaceae	Steroidal alkaloids and Lactones (Withanolides, Withaferins)	Seeds	Leaves and roots
16	Safed Musli	<i>Cholophytum borivilianum</i>	Liliaceae	Saponins	Seed and tuber cuttings	Roots
17	Shatavar	<i>Asparagus racemosus</i>	Lilicaceae	Saponins, Sapogenin, Shatavarin	Seeds	Roots, leaves

CONCLUSION

Every part of the medicinal herb is serving as magic for all living ones all over the universe, without no/least side effects. Traditional plant

medicines found a significant position in the modern-day drug industries due to the minor side effects as well as the synergistic action of the combination of a beneficial compound.

Medicinal and aromatic plants still have many unknown and uncountable potential role fluctuating from cure of the disease to prevention of disease. The gathered massive knowledge, information and useful technology should be used appropriately in the whole world and go ahead from generation to generation to enhance the production of medicinal plants.

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