

Title of the technology

Post harvest treatment and enhancement of germination of seed of *Commiphora wightii* Arn. Bhandari (guggal)

A: Nature of technology

Process technology

B: Process in brief

The dry climate of western Rajasthan supports a number of plant species, which are endemic to this arid ecosystem and are not found elsewhere in India. One such plant species is *Commiphora wightii* (Arn.) Bhandari (Synonyms: *Commiphora mukul*), commonly known as guggal. This is one of the endangered plant species of this region and is included in the Red Data Book of IUCN. It is a small tree of the Burseraceae family and is a multi-branched hard shrub like tree has an ash-coloured bark that comes off in large flakes exposing the under bark that also peels away. Leaves are small, trifoliate, shining green on top and greyish below and sessile. Flowers are small and brownish. Fruits are ovoid drupes of 6-8mm in diameter and turn reddish on ripening. The fruit setting in guggal plants commenced from August to October and fruits start maturing in the month of November to December in almost entire guggal growing areas in Rajasthan. The fruit starts turning red from green is the indication of maturity indices in guggal and full mature and ripe fruit is red in colour. This is the right time for seed collection. However, due to red colour, birds eat fruits, when it is ripe and ready for harvest. Generally, half mature fruits were collected for seeds, this result into low germination. Seed germination is very poor and most of the time it failed to germinate. Even with different pre-treatments the germination percentage and seedling growth were not satisfactory. Very little information is available on its seed germination. Therefore, the present technology/process was developed to enhance seed germination of this species.

Regeneration through seeds in nature is very poor, few seedlings develop from seeds. The percentage of germination varied from 1 to 4% under natural conditions. *Commiphora wightii* is a slow growing species. State forest department is unable to grow nursery of this species as germination percentage is very low. Seed germination in guggal is very poor and requires intervention to improve the germination. The cause of poor germination ability was due to collection of half ripen fruits from the plants. These fruits were difficult to depulp them. A simple method was developed to overcome this problem.

We have developed a process for fastening the ripening of fruits in guggal. Half ripe-fruits of guggal were collected in the month of November, 2006 from naturally growing trees. Fruits were brought to the laboratory and sealed in 200-micron thick polythene bag and kept in the lab for 18-24h. All fruits were turned red. Then fruits were depulped and almost 80% seeds were of black colour and showed viability. Seeds of guggal showed two type of colour viz; 50-70% white colour and remaining seeds appeared blackish in colour. Black coloured seeds showed 50-90 percent germination and they are viable. However, removal from seedlot, by picking, is time and labour intensive process. For this used a technique known as floater method and seedlot containing white and black seeds were kept in water for 5-6 hours. Black coloured seeds sank in the water and white ones were floating. Remove the floater and collect black viable seeds from the lower portion of the container and black colour showed 80% germination. This simple process can help SFD & Farmers for large scale production of seedlings. The process has been depicted below.



Immature Fruits



Fruits were kept in 200 micron polybag for 48h



After 48h in polybag



Macerated seeds



Black, brown and off-white seeds of *C. wightii*



One-month old seedlings developed from black mature fruits

C: Beneficiaries of the technology

1. Prominent beneficiaries/ user groups

State Forest Department and Farmers and Ayurvedic sector

2. No. of clients to whom technology has been transferred/ sold

This technology is a process technology to enhance seed germination tremendously. Seed germination by way of applying this technology has increased from 1 percent to 74.5 percent. This report has been sent to State Forest Department.

3. Potential for further dissemination (As the case may be)

Not applicable as the results were presented in the training programmes, workshops and through hands-on trainings and publication. *C. decidua* has been found to be one of the best species for shade and shelter belts to check the movement of sand in the Thar desert. As it is drought resistant and withstands neglect, this species could be particularly useful in arid areas as a live hedge providing edible fruits.

Publication

1. Mishra D.K., N.K. Bohra, Tripathi, Atul, R.L. Suara, J.K. Shukla and Arjun Ram (2011). Performance of *Commiphora wightii* (Arn.) Bhandari under Arid Environment. Proceedings IV National Forestry Conference held at FRI, Dehradun 9-11 December 2009, 73-81.

D: Economic significance

1. Potential to address Livelihood issues and generate additional income

It is an ancient medicinal plant and source of gum, which is pale brown or dull green in colour. The gum exudes from the major branches in cold season, and has many medicinal uses such as astringent, antiseptic on old wounds, as a urine stimulant, lotion for ulcers and gargle material for weak and spongy gums. The oleogum of this plant is an indigenous drug that is known to be highly effective in the treatment of obesity, arthritis and several other diseases in Indian System of Medicine (Ayurveda). The gum is also used for incense making. This plant is under threat due to its lack of natural regeneration by seeds and overexploitation for gum. The plant dies after gum collection/tapping. This plant can either be propagated through seed and through stem-cuttings. Due to low germination of seeds, clonal propagation was the only method for its propagation. Seeds are viable and can germinate if collected at right time of maturity. White seeds are immature can not germinate. Only black seeds are viable and give 70-90% germination. As stated above, plant is very useful and farmers can plant this on their field bunds to generate additional income and protect their farmlands.

2. Productivity enhancement and economic benefits over replaced technology

This process technology can give boost to the plantation programmes of State Forest Departments.

3. Impact of the technology

Results were presented in the training programmes, workshops and through hands-on trainings.

E. Developed by

D. K. Mishra, Silviculture Division, Arid Forest Research Institute, Krishi Upaj Mandi, Basni, New Pali Road, Jodhpur – 342 005, Rajasthan, India
Website: www.afri.res.in; Email: dkmishra@icfre.org