

# Colocynth: A potential oilseed crop for bio-fuel production

Coal, petroleum and natural gas are the main sources of energy in the world today. All three sources are fossil-derived, non renewable and cause global warming by emitting greenhouse gases. Various crops like maize, rapeseed/canola, soybean, sugarcane, palm oil, jatropha and sunflower are being cultivated to produce bio-fuel. But crop bio-fuel has high cost of production; needs large amounts of fresh water for irrigation, which eventually will lead to global food shortage. There is need to find non-agricultural crops that grow in the wild, for bio-fuel production. Colocynth is one of the best candidates for this purpose as it has the potential to yield high oil seed production, while growing on marginal lands. The plant grows well in sandy soils, hot climate with little moisture and does not need much care. Since the colocynth seed has high oil contents of 22-53 %, it may produce more than 3,000 kg/ha of oil, which is comparable to major oilseed crops. Consequently, this hardy vine can be used to generate large scale vegetable oil for a viable bio-fuel industry.

Keeping in view the importance of colocynth as a potential oilseed crop for the



In the UAE colocynth flowers from November to April

Table 1: Different traits of *Citrullus colocynthis* germplasm of the UAE

S.N.	Traits	Mean	Minimum	Maximum
1	Fruit length (mm)	57.9	48.7	70.1
2	Fruit diameter (mm)	59.7	52.3	74.6
3	No. of seeds per fruit	315	169	561
4	Seed weight per fruit (g)	7.7	3.2	20.0
5	Seed length (mm)	6.1	5.4	7.7
6	Seed width (mm)	3.6	3.2	4.3
7	Seed thickness (mm)	1.7	1.8	4.2
8	100 seeds weight (g)	2.4	1.8	4.2

marginal lands, ICBA carried out various botanical explorations between 2013 and 2014 to collect its fruits from different parts of the United Arab Emirates for a comprehensive study of the plant and its seeds for conservation, distribution and further research (Shahid and Rao, 2014). During the expeditions, fruits of about 25 accessions of the species were collected

from all around the country (Figure 1). The majority of the *Citrullus colocynthis* accessions were found in the desert. Different characters of fruits and seeds of the collected colocynth germplasm were studied to ascertain its yield potential as oilseed crop.

ICBA's study shows that colocynth plants grow well in sandy soils with little available water, as little as 70 mm of water. The colocynth fruit, which is smooth and round is about 48-70 mm long and has diameter of 52-75 mm. One fruit contains roughly 170-560 seeds and total seed weight per fruit is 3.2-20 g. Seeds are egg shaped brown to dark brown, 5.4-7.7 mm long, 3.2-4.3 mm wide and 1.8-4.2 mm thick, while 100 seed weight is 1.8-4.2 g (Table 1). Results showed a large variation among the collected colocynth germplasm regarding its fruit and seed traits. The accessions with the best characteristics, as identified in (Table 1), could be exploited for the production of bio-fuel in the arid lands.

In 2014, the collected colocynth germplasm along with accessions from other countries were planted, at ICBA field experiment facilities, to study and explore its potential as an oilseed crop in the region.



Figure 1: Collection locations of *Citrullus colocynthis* germplasm in the UAE





One colocynthis seed has 22-53% oil content

### Colocynthis (*Citrullus colocynthis* L.)

is a perennial, herbaceous vine that grows naturally in North Africa, southern Europe, the Middle East and South Asia. Mostly it is found in deserts with high temperatures and low rainfall. In the United Arab Emirates, where it is called handhal (الحنظل), it is common and widespread in its eastern, northern and central regions.

It belongs to the gourd (Cucurbitaceae) family that also includes, squash, pumpkin, cucumber, zucchini, melon, watermelon etc.; however, its pulp is very bitter and not edible. The flowers are yellow and solitary, which are monoecious having male and female reproductive parts in different flowers on the same plant.

Colocynthis has many medicinal benefits against different ailments including diabetes, toothache, rheumatism and cancer. It is also an antioxidant and can be used as laxative.

Although the plant can be propagated by seed and vegetative propagation, the later is more common and successful as seed germination yields poor results due to its dormancy which is hard to break. This prompted ICBA and Birla Institute of Technology and Science (BITS), Dubai Campus, to work together on colocynthis seed dormancy problem. The mutual research resulted into finding an efficient way of breaking the seed dormancy with different treatments (Menon et al., 2014).

### References

- Menon K., A.P. Jayakumar, M. Shahid, Neeru Sood, and N. K. Rao. 2014. Seed dormancy and effect of salinity on germination of *Citrullus colocynthis*. *International J. of Environmental Science and Development* 5(6):566-569
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