

## Effect of spacing on seed production and oil percentage of *Jatropha curcas* L.

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### SUMMARY

*Jatropha curcas* can help to increase rural incomes, from plantations and agro-industries. *Jatropha curcas* is a valuable multi-purpose crop to alleviate soil degradation and afforestation, which can be used for bio-energy to replace petro-diesel, for soap production and climatic protection, and hence deserves specific attention. In the present study, different spacing treatments were applied to see the effects on the yield and oil contents of seeds. The spacing treatment of 170cm x 150cm gave maximum seed yield per acre with maximum oil content while spacing treatment of 100cm x 100cm gave minimum seed yield and oil contents.

**Key Words :** *Jatropha curcas* L., Oil percentage, Seed production, Spacing treatment

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Abundance and availability of energy resources largely determine the economic wellbeing of a country. Energy independence has to be our first and foremost priority (A.P.J. Abdul Kalam, 2005). One of the main crops currently being promoted for biodiesel production in several countries, globally, is *Jatropha curcas*. There have been substantial political and social pressures to promote the growing of such crops (in particular *Jatropha curcas*) in India, as a means of economic empowerment, social upliftment and poverty alleviation within marginalized communities.

*Jatropha curcas* L is a multi purpose plant belonging to the family Euphorbiaceae with several attributes and considerable potential and has evoked interest all over the topics as a potential biofuel crop (Beet *et al.*, 2002). It is an all purpose, zero waste drought resistant photo insensitive perennial plant. The species grows in areas with extreme climates and soil conditions that could not be inhabited by most of the agriculturally important plant species (Chandhari *et al.*, 1999).

*Jatropha curcas* is a valuable multi-purpose crop to

alleviate soil degradation and afforestation, which can be used for bio-energy to replace petro-diesel, for soap production and climatic protection, and hence deserves specific attention. *Jatropha curcas* can help to increase rural incomes, self-sustainability and poverty for women, elderly children and men, tribal communities, small farmers. It can as well help to increase income from plantations and agro-industries.

All parts of *Jatropha curcas* used in traditional medicine (Dilara and Nath, 2000). Leaves and tender stems are used as a folk dye by tribal people (Srivastava *et al.*, 2008). In the present study, different spacing treatments were applied to see the effects on the yield and oil contents of seeds. *Jatropha curcas* L. is one of the prospective biodiesel yielding crops (Datta and Pandey, 1993) which belongs to family Euphorbiaceae. It is a multipurpose tree of significant economic importance.

### MATERIALS AND METHODS

The field experiments was conducted during 2005-06 and 2006-07 at research field of Biotech lab training and demonstration centre and various locations of Surguja (Chhattisgarh) districts viz., Pratappur, Kalyanpur and Sitapur site. Different spacing treatments were laid out in randomized

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block designs with three replications.

Nursery was prepared in polybags of 26 cm x 15 cm size. A mixture of sandy loam soil and vermicompost were mixed in 1:1 ratio and filled into polybags. Seeds sowing were done in the first week of June (60% seed germination rate) 2-3 healthy seeds were sown in each polybags at the depth of 2.5-3.5 cm and watered daily with rosecane to keep the soil moist (Srivastava *et al.*, 2009). Nursery plants were thoroughly watered to loosen the soil.

Plant transplantation in the field was done during the 15 July to 15 August in different block design viz., 100cm x 100cm, 110cm x 110cm, 120cm x 120cm, 150cm x 150cm and 170cm x 150 cm, respectively situated at different selected localities. All necessary fertilizers viz., *Trichoderma* as a seed dresser, vermicompost were applied in different ratio after the establishment of seedling in field. All other cultural operations such as weekly irrigation, training and pruning, weeding were done time to time, whenever required.

## RESULTS AND DISCUSSION

The flowering and fruiting occurred after 3<sup>rd</sup> year of plantation under Surguja district condition. The data obtained in two year are given in Table 1 and Fig.1. which indicates that plant height was significantly influenced by spacing treatment.

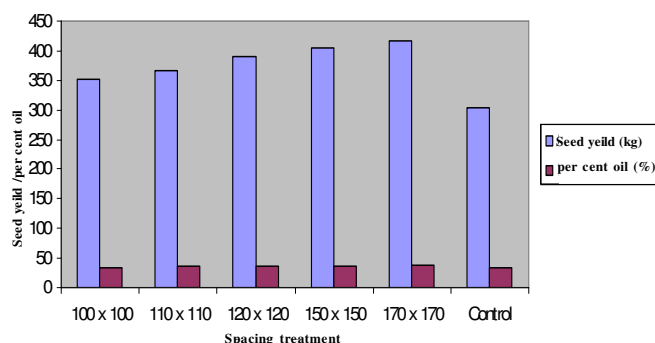


Fig. 1 : Effect of spacing on seed yield and oil per cent of *Jatropha curcas* L.

Table 1 : Effect of spacing on seed yield and oil content of *Jatropha curcas* L.

Spacing treatment (cm)	Plant height (cm)	Branching per plant	Weight of 100 seeds (g)	Seed yield (kg)	Per cent oil (%)
100 x 100	264	06	61.2	351	33.74
110 x 110	256	08	62.7	367	34.89
120 x 120	247	10	63.4	389	35.02
150 x 150	244	13	64.1	404	36.19
170 x 150	239	15	66.0	417	38.33
Control	268	09	39.4	304	32.98

The maximum plant height (264 cm) was recorded with closest spacing (100cm x 100cm). Unlike plant height, branches per plant were significantly improved with increase in spacing as compared to closest spacing. The wider planting at 170cm x 150cm was found to be the most suitable for production of seed (66g / 100 seeds), seed yield per acre (417 kg/acre) in comparison to other treatments. The per cent oil content was also recorded and was found maximum (38.33 %) in the spacing treatment of 170cm x 150cm.

Similar observations were also made by Srivastava *et al.* (2009) in *Jatropha curcas* L. and Sarkar and Banik (2002) in *Sesamum indicum* and Kumar *et al.* (2005) in *Cassia angustifolia*. Jones and Miller (1992) recommended 2m x 1.5m to 3m x 3m spacing for *Jatropha* plantation. The present study has been made to improve the cultivation practices adopted by growers. The most suitable cultivation practice in these areas is being documented.

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