

Walailuck Saikaew 2014: Effect of Chemical Fertilizers and Compost on Jatropha Yield. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Assistant Professor Somchai Anusontpormperm, Ph.D. 125 pages.

An experiment was carried out on an Ultic Paleustalf at Kanchanaburi Research Station, Kasetsart University from July 2009 till June 2010 objectively to compare the effect of chemical and organic fertilizers on yield of Jatropha. Randomized Complete Block design with eight treatments and four replications was employed. The treatments consisted of no fertilization (F1), applications per rai of 1,000 kg compost (F2), 50 kg of 15-15-15 fertilizer (F3), 100 kg of 15-15-15 fertilizer (F4), 1,000 kg of compost together with 50 kg of 15-15-15 fertilizer (F5), 50 kg of 8-24-24 fertilizer (F6), 100 kg of 8-24-24 fertilizer (F7), and 1,000 kg of compost together with 50 kg of 8-24-24 fertilizer (F8). Jatropha, KUBP78-9 variety, was planted using direct seed with a spacing of 2 x 2 m. Uses of 50 kg 15-15-15 chemical fertilizer and 1,000 kg compost as topdressing before placing the seed were undertaken. Drip irrigation at the rate of two litres per tree every two days was applied during drought season. Yield of Jatropha was monitored monthly. Leaf samples were collected at two and six months of age for analyses of nutrients concentration and seed sample was also included for this purpose.

Jatropha started to flower in October 2009. The highest average number of inflorescence per plant of 16.5 was found in April 2010 but it was indifferent among fertilizer management patterns as well as the number of capsule cluster of which the highest average number per plant was in between April and May 2010. Application of 8-24-24 fertilizer together with compost at rates of 50 and 1,000 kg rai⁻¹, respectively, tended to give the highest seed yield at 15% moisture content (225.1 kg rai⁻¹) and total oil content in seed with 15% moisture content (35.34%). The highest Jatropha oil yield of 73.1 kg rai⁻¹ was obtained from this fertilization scheme and the amount was statistically very significantly higher than those gained from other fertilizer management practices and the one without fertilization. No fertilization gave the lowest seed yield at 15% moisture content of 159.4 kg rai⁻¹ and the lowest percentage of oil in seed with 15% moisture content (17.04%). Additions of both chemical fertilizer formulas at high rate could not give the highest Jatropha oil yield as well as sole application of compost. The use of 8-24-24 fertilizer at the rate of 50 kg rai⁻¹ tended to give a better Jatropha oil yield than did 15-15-15 fertilizer applied at both rates. The concentrations of plant nutrients in Jatropha leaf and seed had no relationship with all fertilizer managements.

Student's signature

Thesis Advisor's signature