Production and Breeding of Kenaf for Use of Phyto-remediation and Environment-Friendly Industrial Materials

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Kenaf (*Hibiscus cannabinus* L.), an annual plant of the family Malvaceae, has been cultivated for thousands of years in parts of Africa and Asia as a source of fiber for making clothing, rope and others. It can grow to 3-5m in height in a 150-day growing season and produce more than 10 ton of dry fiber per ha. The kenaf plant has two types of fiber; bast fiber of outer stem is long and thin (about 1/3 of the plant) and core fiber of inner stem is shorter and wide (about 2/3 of the plant). It is considered to be the most promising for alternative plants with potential use as a non-wood fiber source. Besides the use of paper, many attempts are being made not only to use kenaf products as a bio-plastic, animal bedding and forage, oil-absorbent materials, grass mat, particle board and potting soil, etc, but also to culture kenaf plants for phyto-remediation. Recently, kenaf became to be used as teaching materials for environmental education and campaign by school teachers and environment campaigners in the Japan In Korea, the RDA began research on kenaf in the early 1960's for use the rope and cereal sacks, but the research was cut off in the early 1970's, when the synthetic plastics was broadly used for those. In 2000, the first author and others had introduced the kenaf to Jeju island to investigate the possibility for use of animal forage. Compared to sorghum hybrid, the dry matter yield of kenaf was lower, but crude protein was higher. As the results of culture trial among newly introduced three kenaf cultivars in Jeju island, the shoot yield was highest in a Chineses cultivar "Chingpi-3", but three cultivars did not bear the seeds. We have been collected the genetic resources in the world and conducted field trial to their characterization. We are also trying to breed kenaf cultivars that have adaptable growth characteristics and seed production in Korea. In recent, some of Korean researchers have been involved not only in the application of kenaf materials for use making the functional papers, bio-plastics and clothes, but also in the cultivation of kenaf plant for phyto-remediation and alternative crops in contaminated soil and idle land. Our team's efforts will support the Korean researchers and producers involved in kenaf.

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Table 1 Utilization and cultivation purposes of kenaf plant and materials.

Using parts	Uses
Whole plant	animal forage (fresh, dry)
Stem	charcoal
-Bast	rope, sack, paper, clothes, grass mat, fiberglass, bio-plastic, cardboard, animal forage(chopping)
-Core	animal bedding, mushroom bedding, oil-absorbent materials, chicken litter, particle board, potting soil, animal forage(chopping)
Leaf	vegetables, animal forage
Seed	oil
Other cultivation purpose	phyto-remediation, landscape, environmental education

Fig 1. Kenaf culture trial features in a grassland of Jeju island.