

Improved Application of *Camellia oleifera* on Biomass Energy by Enlarging Its Production

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Abstract: As the world famous edible and industrial oil tree, tea oil tree (*Camellia oleifera*) originated in China has been planted widely in 18 provinces, cities or municipalities in our country, forming abundant cultivars with the characteristic of early fruition and high yield. Tea oil tree is suitable for the energy trees as its oil has been used as the fuel oil for lighting from of old and can be transformed into biodiesel fuel. So it is very necessary to carry out the researches on tea oil tree strenuously to develop and enlarge the production of tea oil tree, and to plant and use it as biomass energy tree.

Key words: *Camellia oleifera*; tea oil; biomass energy; biodiesel

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Tea oil tree (*Camellia oleifera*) is regarded as one of the four primary edible oil tree plants with oil plant, olive and coconut. The tea oil extracted or distilled from *C. oleifera* seeds is the high quality semi-dry oil. *C. oleifera* originated in China and has developed into the main non-wood forest tree, which is distributed mainly in south of Yangtze River valley, especially in Hunan and Jiangxi province. *C. oleifera* has been the main trees of forestation and gardening in red soil upland area of south China for its character of wide adaptability and endurance to aridity and barren^[1]. Tea oil is abundant in unsaturated fat acids (above 90%) consisting of oleic acid and linoleic acid, which can be expediently transformed into biodiesel fuel. Basing on the background of increasing tensivity of international oil energy sources and the developing biomass energy in China, it is very suited to plant *C. oleifera* as one of the main energy trees for the excellence beyond other energy trees brought forward in our country.

1 Distribution of *C. oleifera*

The definition of generalized tea oil tree covers all tree species in *Camellia* which has a relatively high oil yielded rate in seeds and a certain area of plantation and management^[2]. As the largest genus of Theaceae,

Camellia contains 238 species and more than 50 species have high oil yielded seeds. Among of them, *C. oleifera* Abel is most widely distributed, and other species such as *C. reticulata*, *C. chengkangoleosa*, *C. yuhshensis*, *C. meiocarpa*, *C. vietnamensis*, *C. japonica*, *C. phellocarpa*, and *C. samserana* are planted specially in certain regions. *Camellia* plants are used as ornamentals and seen around the world, but as the oil plants only mainly distributed horizontally in the region between north latitude of $18^{\circ}21'34''$ and in east longitude of $98^{\circ}40'12''$, especially in south China^[2]. *C. oleifera* is widely distributed in 18 provinces, cities or municipalities in south of Yangtze River valley of China, and in the north of other countries such as Vietnam, Laos, Thailand and Burma, meanwhile little distributed in partial regions of south Japan. *C. oleifera* is vertically distributed between altitude 100 m in east China and altitude 2200 m in Yungui altp^[3].

2 Cultivation and breeding

At present the main cultivars of *C. oleifera* were bred from *C. oleifera* Abel, for other species were in wild or semi-wild. The breeding of elite *C. oleifera* cultivars was launched at most producing areas in the middle of 1960s. Firstly investigate the production, re-

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sources and variety type, and then perform the following: select elite trees, choose farmhouse cultivars and excellent types, identify excellent genealogy, and research the technique of asexual propagation, finally carry out to construct the nursery and to identify the excellent clone.

With the rapid development of genetics and biotechnology^[4], researchers of *C. oleifera* breeding began to use modern technology such as molecular marker-assisted selective breeding to expedite the course of directional breeding of *C. oleifera*^[5].

3 Advantages of using *C. oleifera* as energy tree

Though used mainly as raw material of edibility and cosmetic, *C. oleifera* displays unique advantage as biomass energy tree. Firstly, *C. oleifera* is suitable for biomass fuel. Tea oil and tung oil are the main fuel in south China from of old, especially as lighting oil before the introduction of coal oil. The abundant unsaturated fatty acids result in very low freezing point which facilitates the transformation into biodiesel^[6]. Secondly, there is a long-term management on *C. oleifera* in mountainous knap of south China. There are many bred excellent cultivars in most provinces in south China, facilitating the rapid and large-area development in a short time and avoiding the production failure form is used varieties. Furthermore, *C. oleifera* has the characteristic of fast growth, early fructification, and high output makes it turn into the flourishing period which can yield tea oil 450~750 kg/ha. Thirdly, there is a technique team engaged in the plantation, breeding, and processing of *C. oleifera*.

4 Several suggestions

Newly regard the value of *C. oleifera* and tea oil

and again arrange the national projects for the development of biomass energy. List researches on *C. oleifera* into national projects. The slow trend of scientific researches on *C. oleifera* in China necessitates the arrangement of national projects for its foreground in biomass energy. Carry out the test on the transformation of tea oil into biodiesel. Establish the institute of *C. oleifera*. Collect and reserve the *C. oleifera* resource quickly. Therefore, it is very necessary to save and reserve the existing *C. oleifera* resource, underlying the genetic improvement of *C. oleifera* and its enlarging researches and production.

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提高油茶在生物质能源中的应用价值

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摘要: 油茶是我国特产的世界著名的食用与工业油料树种。油茶在我国 18 个省、市、自治区有栽培分布, 栽培分布范围广, 品种资源丰富, 结实早, 产量高。南方山区丘陵的农民都有油茶生产经营习惯, 栽培技术规范齐全。将油茶作为生物质能源树种栽培利用, 对于开发我国生物质能源, 提高我国能源自给能力具有一定的战略意义。

关键词: 油茶; 茶油; 生物质能源; 生物柴油

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