

DIFFERENCES BETWEEN KYNAM AND NORMAL AGARWOOD

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1. **Wood grains** (Wood-fibres). In genuine Kynam piece straight grains run roughly parallel, rarely see spiral grains, irregular grains and wavy grains that are available in normal agarwood (and in low grade Kynam), see Fig1.
Tip: You should use a digital microscope to magnify wood-fibres in Kynam piece and normal agarwood, see Fig2.

Fig1.

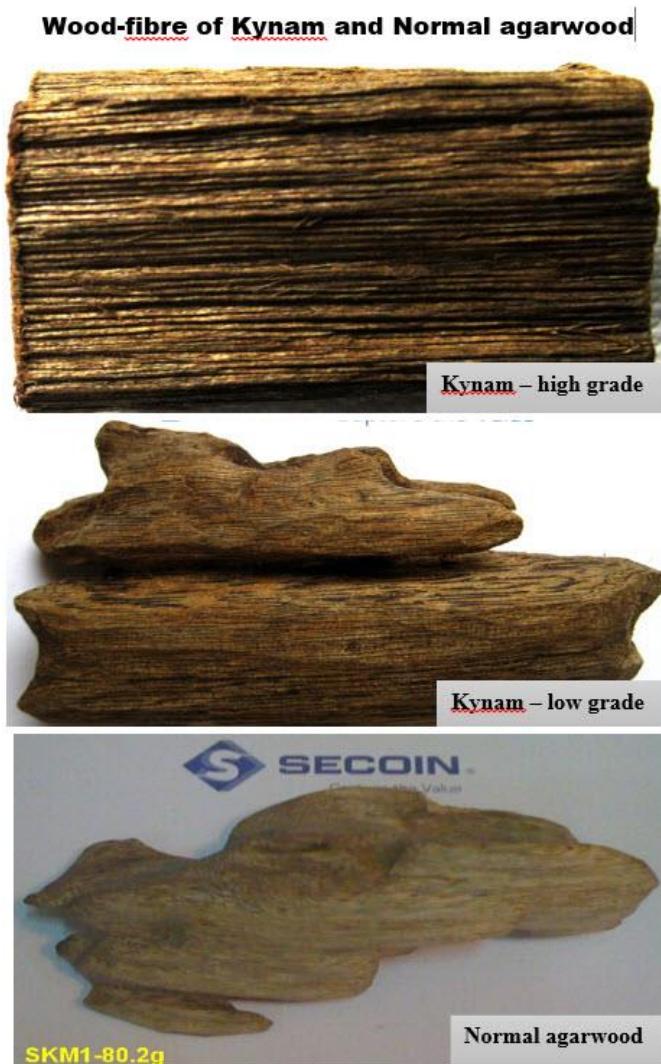


Fig2.



2. **Hardness.** Kynam is classified as softwood whose side hardness is under 150 lbf (pounds-force). When newly dug up from the ground, Kynam is very soft, but over time it becomes harder and harder. In general Kynam is not as hard as normal agarwood.
3. **Odoriferous properties.** Kynam has delicious & charming odour. Kynam has its own special fragrance that does not resemble the smell of normal agarwood. It is difficult to

describe Kynam odour in words. In classification of fragrances (using Fragrance wheel), Kynam odour belongs to the classes Dry woods, Mossy woods, Woods and Woody Oriental, see Fig3.

Tip: To wet Kynam piece by a small quantity of warm water, afterwards tightly wrap it by a nylon sheet (a banana ocrea is better) then you open it after about 10 minutes of exposure to the sun your will find a sweet-smelling aroma that you cannot see in normal agarwood.

Fig3



4. **Specific gravity.** Kynam (and normal agarwood) has specific gravity from 0.90 g/cm^3 to 1.13 g/cm^3 , high grade Kynam often has specific gravity > 1 (sinking kynam). Rarely find sinking Kynam.
5. **Smoke & taste.** To chew a tiny splinter of Kynam piece you can find in your tongue tip several tastes like acrid, sweet, bitter and somewhat sour. But for normal agarwood, you can find bitter taste and somewhat acrid only.

When burning a small chip of Kynam piece you can see a straight smoke rising up that is slowly disappeared and accompanied by a captivating aroma. When burning a small chip

of normal Agarwood you can see a spiral smoke that is swiftly disappeared and also accompanied by a scented fragrance.

In general, to recognize the taste and smell of smoke, you must rely on your sensory imagination and your own feeling.

6. Chemical composition. In 2006, Japanese scientists found in Kynam collected from Khanh Hoa province a new spirovetivane-type sesquiterpene (*4R,5R,7R*)-*1(10)-Spirovetiven-11-ol-2-one*. Until now, we did not find this sesquiterpene in our normal agarwood chips, so this sesquiterpene might be used as one of the important indications of quality evaluation of Kynam. An other important chemical found in Kynam is the sesquiterpenoid *2,6-ditert-butyl-4-methylphenol*, see Fig4.

Fig4
An important chemical found in Kynam essential oil
 (after the publication of Kyara Zen in <http://www.kvarazen.com/kyara-is-it-or-is-it-not/>)

IUPAC name & preferred common names	Content (%)	CAS#	Molecular Formula/Weight (g/mol)	Structural Formula	Classification
4-Methyl-2,6-di-tert-butylphenol; <u>Dibunol</u> ; <u>Di-tert-butylcresol</u> ; <u>2,6-ditert-butyl-4-methylphenol</u> ; <u>Butylated hydroxytoluene</u> ;	10.257	128-37-0, 42615-30-5 53571-70-3 58500-82-6 950-56-1, 97123-41-6	C ₁₅ H ₂₄ O 220.35046		<u>Sesquiterpenoid</u>

Notes: - IUPAC stands for *International Union of Pure and Applied Chemistry*

- IUPAC name written in bold letter, compound names are separated by semi-colon (;

- CAS stands for *Chemical Abstracts Service*

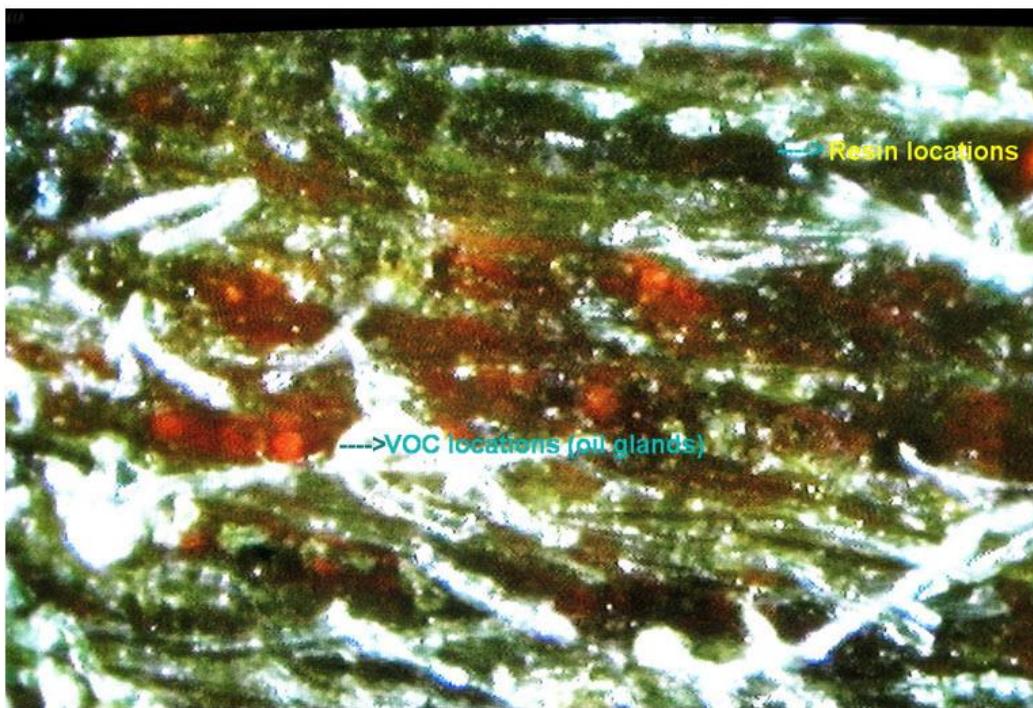
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We assume that a Kynam piece is considered to be of high quality if the total content of sesquiterpenes, sesquiterpenoids and sesquiterpene alcohols is big (> 75% for example) in which sesquiterpenoids and sesquiterpene alcohols occupy a large portion, see publication named “Method SEC1 for evaluation of agarwood oil quality” in <http://www.dinhxuanba.com/2017/12/how-to-evaluate-quality-of-agarwood.html#more>.

Tip: Kynam (and Agarwood) traders and collectors tend to prefer such Kynam piece (and Agarwood chip) that contains more oil glands (i.e. VOC deposits), see Fig5.

7. Plant source and provenance. We think that Kynam is originated from the species *Aquilaria crassna* Pierre ex Lecomte of the family *Thymelaeaceae*. Kynam exists only in the virgin and deep forests of the provinces located in the Center of Vietnam: Quang Nam, Quang Ngai, Phu Yen, Khanh Hoa, Gia Lai, Kontum. Please be noted that normal agarwood can be originated from 7 genera (*Aquilaria* Lam., *Gyrinops* Gaertn., *Gonystylus* Teijsm. & Binn., *Wikstroemia* Endl., *Aetoxylon* <Airy Shaw> Airy Shaw, *Phaleria* Jack, *Enkleia* Griff.) and about 30 main species (see attachment named “Distribution of 26 main *Aquilaria* species by 15 countries”). See an *Aquilaria* ancient tree in Tiên Cảnh, Tiên Phước, Quảng Nam (Fig6)

Fig5
AGARWOOD CHIP UNDER DIGITAL MICROSCOPE



Oil glands or VOC locations (red areas) and Resin deposits (black areas)

Fig6

