CHAPTER 2.1

INTRODUCTION

2.1.1 Introduction

Mesua kunstleri, a plant, belongs to the Guttiferae family. The family Guttiferae contains about 40 genera and over 1000 species. Only 6 genera and 60 species are found in Thailand; *Calophyllum*, *Cratoxylum*, *Garcinia*, *Mesua*, *Kayea* and *Orchorcarpus* (Rittiwigrom, 2002). *Mesua kunstleri* is a medium tree. Leaves opposite, rigidly coriaceous. Often pellucid-dotted; veins innumerable, very slender, at right angles to the midrib. Flowers polygamous or hermaphrodite, large, axilly, solitary. Sepals and petals 4 each, imbricate. Stamens very numerous filaments filiform free or connate at the base; anthers erect, oblong, 2-celled, dehiscence vertical. Ovary 2-celled; style long, stigma peltate; ovules 2 in each cell, erect. Fruits between fleshy and woody, 1-celled by the absorption of the septum, at length 4-valved, 1-3 seeded. Seeds without an aril, tasta fragile (Hooker, 1875).

Figure 2. *Mesua kunstleri* (Guttiferae)

2.1.2 Review of Literatures

Plants in the *Mesua* genus (Guttiferae) are rich of variety of compounds, e.g., triterpenes (Gunasekera, *et al.,* 1977); xanthones (Singh, 1993) and coumarins (De barnardi, *et al.,* 1987).

Information from NAPRALERT database developed by University of Illinois at Chicago, indicated that there was no report on chemical constituents isolated from *Mesua kunstleri*. However, it revealed several types of compounds present in plants of *Mesua* genus and they can be classified into nine groups. These compounds are present in **Table 22**.

Table 22 Compounds from the plants of *Mesua* genus

1 = Benzenoids 2 = Chromones 3 = Coumarins

4 = Flavanones 5 = Flavonoids 6 = Lipids

7 = Steroids 8 = Triterpenes 9 = Xanthones

Scientific name	Investigated Part	Compound	Reference
M. ferrea	Bark	Euxanthone, **9a** Mesuferrol B, **9b** 5-Hydroxy-1-methoxy xanthone, **9c**	Iinuma, *et al.,* 1996
	Heartwood	Euxanthone-7-methylether, **9e** Ferrxanthone, **9f** β-Sitosterol, **7a** Stigmasterol, **7b** 1,5,6-Trihydroxy xanthone, **9g** 1,5-Dihydroxy-3-methoxyxanthone, **9h** 2-Methoxyxanthone, **9i**	Chow, *et al.,* 1968 Walia, *et al*., 1984
	Leaves	Gentisic acid, **1a** Mesuein, **4**	Griffiths, 1959 Alam, *et al*., 1987
	Seed oil	Linoleic acid, **6a**	Hossain, *et al*., 1992

Table 22 (continued)

Scientific name	Investigated Part	Compound	Reference
M. ferrea	Seed oil	Mesuagin, **3a** Oleic acid, **6b** Palmitic acid, **6c** Palmitoleic acid, **6d** Stearic acid, **6e**	Bhattachryya, *et al*., 1979 Hossain, *et al*., 1992
	Stamens	β-Amyrin, **8e** Mesuaferrol, **2a** Mesuaferrone B, **5b**	Dennis, *et al*.,1988 Raju, *et al*., 1976
	Stem bark	Betulinnic acid, **8a** epi-Catechin, **5a** Mesuabixanthone A, **9j** Mesuabixanthone B, **9k** Pyranojacareubin, **9l** 1-6-Dihydroxyxanthone, **9m**	Singh, *et al*., 1993
	Wood	1, 5-Dihydroxyxanthone, **9o** 1-Hydroxy-5-methoxy xanthone, **9p** 2-Hydroxyxanthone, **9q**	Gunasekera, *et al*., 1976

Table 22 (continued)

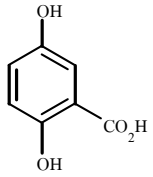
Scientific name	Investigated Part	Compound	Reference
M. ferrea	Wood	3-Hydroxy-4-methoxy xanthone, **9r** 4-Hydroxyxanthone, **9s**	Gunasekera, *et al*., 1976
M. myrtifolia	Bark	Betulinic acid, **8a** Myrtifolic acid, **8b** Simiarenone, **8c** β-Sitosterol, **7a** Taraxerol, **8d**	Gunasekra, *et al*., 1977
	Trunkwood	Jacareubin, **9n** Oleanolic acid, **8f**	Gunasekra, *et al*., 1977
M. racemosa	Leaves	Furanoracemosone, **3b** Isoracemosone, **3c** Racemosone, **3d**	Morel, *et al*., 1999
M. thwaitesii	Bark	5-Hydroxy-1,3-dimethoxyxanthone, **9d**	Bandaranayake, *et al*., 1975
	Seeds	Mammeigin, **3e** Mammeisin, **3f** Mesuagin, **3a** Mesuol, **3g**	Bandaranayake, *et al*., 1975
	Wood	Euxanthone, **9a** β-Sitosterol, **7a**	Bandaranayake, *et al*., 1975

Table 22 (continued)

Scientific name	Investigated Part	Compound	Reference
M. thwaitesii	Wood	1,5,6-Trihydroxy xanthone, **9g** 1,5-Dihydroxyxanthone, **9o**	Bandaranayake, *et al*., 1975

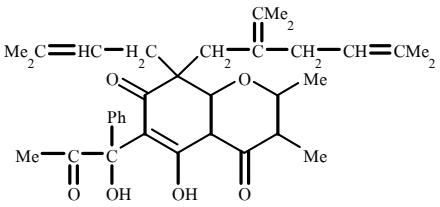
Structures of compounds isolated from the plants of the genus *Mesua*

1. Benzenoids



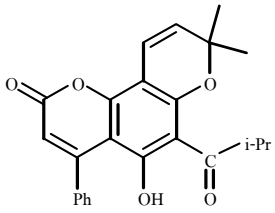
1: Gentisic acid

2. Chromones

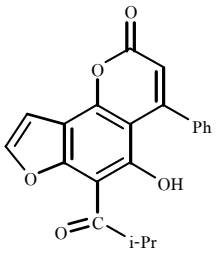


2: Mesuaferrol

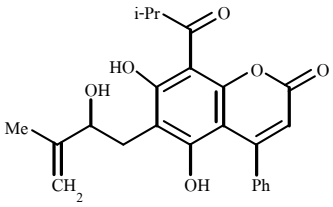
3. Coumarins



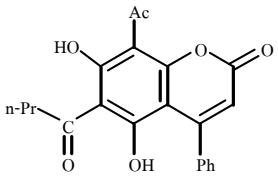
3a: Mesuagin



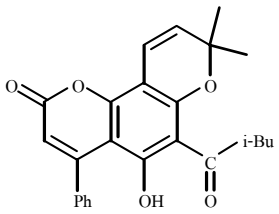
3b: Furanoracemosone



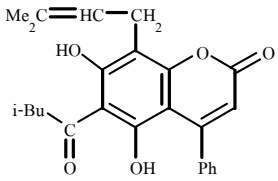
3c: Isoracemosone



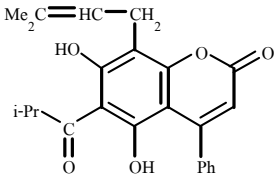
3d: Racemosone



3e: Mammeigin

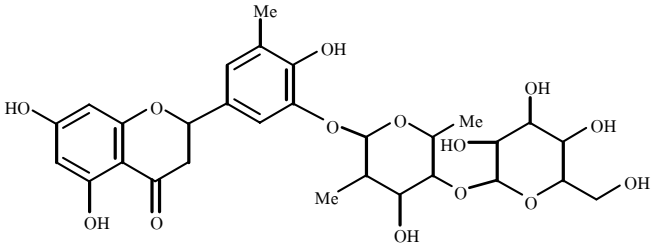


3f: Mammeisin



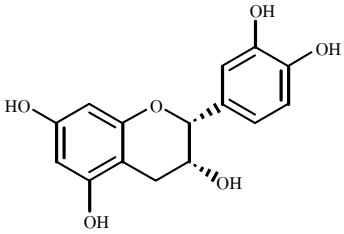
3g: Mesuol

4. Flavanones

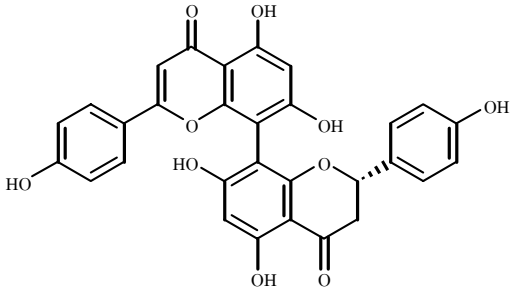


4: Mesuein

5. Flavanoids

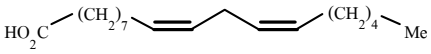


5a: epi-Catechin

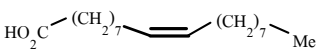


5b: Mesuaferrone B

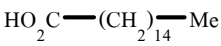
6. Lipids



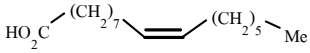
6a: Linoleic acid



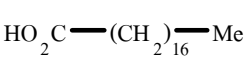
6b: Oleic acid



6c: Palmitic acid

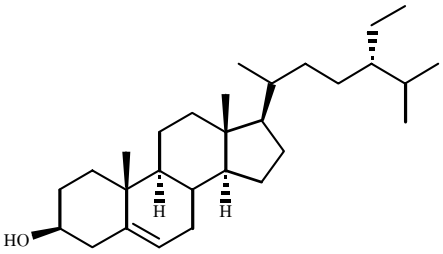


6d: Palmitoleic acid

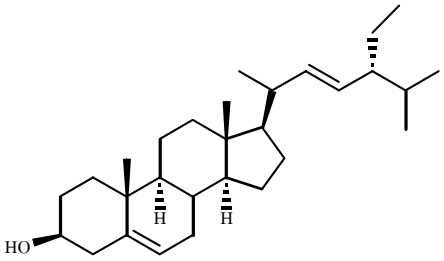


6e: Stearic acid

7. Steroids

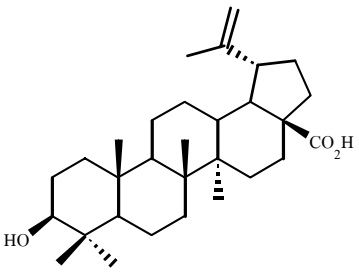


7a: β-Sitosterol

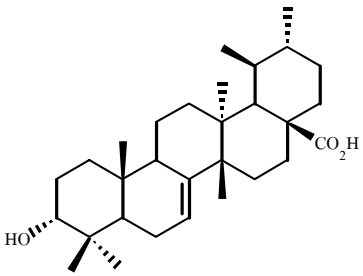


7b: Stigmasterol

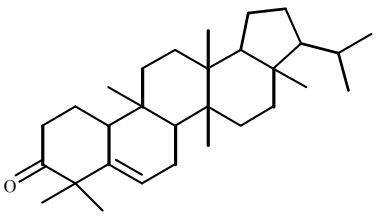
8. Triterpenes



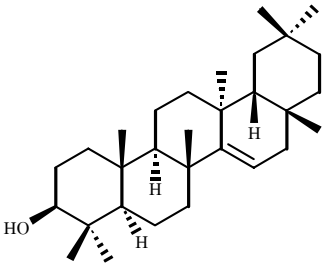
8a: Betulinic acid



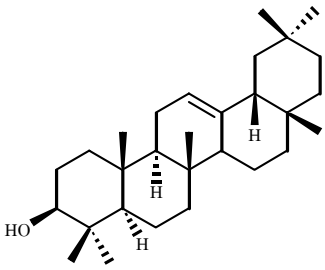
8b: Myrtifolic acid



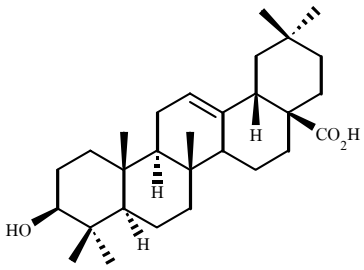
8c: Simiarenone



8d: Taraxerol

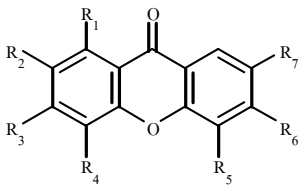


8e: β-Amyrin

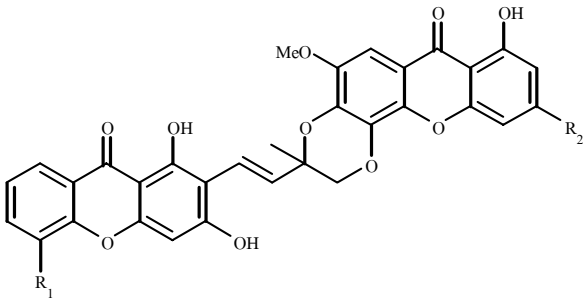


8f: Oleanolic acid

9. Xanthones



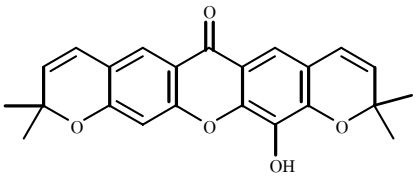
	R_1	R_2	R_3	R_4	R_5	R_6	R_7	
9a:	OH	H	H	H	H	H	OH	: Euxanthone
9c:	OMe	H	H	H	OH	H	H	: 5-Hydroxy-1-methoxyxanthone
9d:	OMe	H	OMe	H	OH	H	H	: 5-Hydroxy-1,3-dimethoxyxantone
9e:	OH	H	H	H	H	H	OMe	: 1-Hydroxy-7-mehoxyxanthone
9f:	OMe	H	OMe	H	OH	OH	H	: Ferrxanthone
9g:	OH	H	H	H	OH	OH	H	: 1,5,6-Trihydroxyxanthone
9h:	OH	H	OMe	H	OH	H	H	: 1,5-Dihydroxyxanthone
9i:	OH	OMe	H	H	H	H	H	: 2-Methoxyxanthone
9o:	OH	H	H	H	OH	H	H	: 1,5-Dihydroxyxanthone
9p:	OH	H	H	H	OMe	H	H	: 1-Hydroxy-5-methoxyxanthone
9r:	H	H	OH	OMe	H	H	H	: 3-Hydroxy-4-methoxyxanthone
9s:	H	H	H	OH	H	H	H	: 4-Hydroxyxanthone
9q:	H	OH	H	H	H	H	H	: 2-Hydroxyxanthone



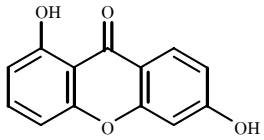
9b: R_1 = OMe; R_2 = OH :Mesuaferrol B

9j: R_1 = OH; R_2 = OMe : Mesuabixanthone A

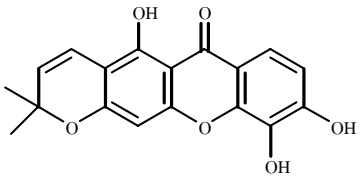
9k: R_1 = OMe; R_2 = OMe : Mesuabixanthone B



9l: Pyranojacareubin



9m: 1,6-Dihydroxyxanthone



9n: Jacareubin