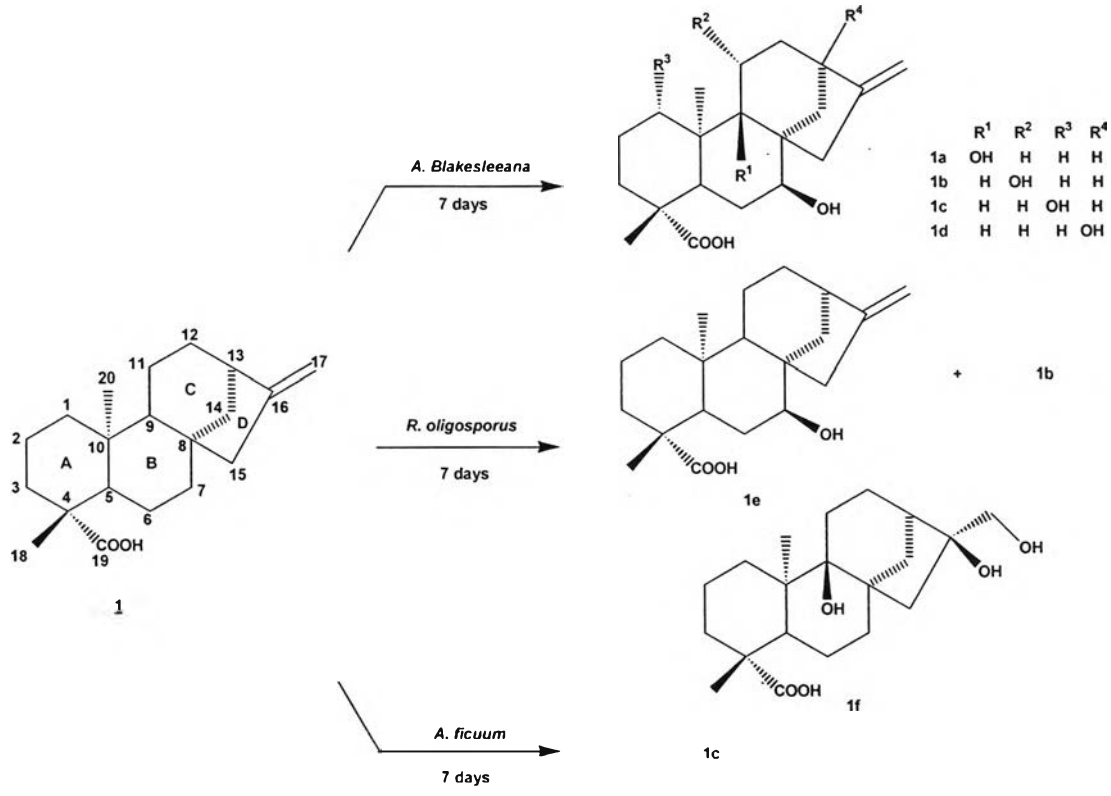
CHAPTER V

CONCLUSION

In this research, *ent*-kaur-16-en-19-oic acid (1) was isolated from the stem bark of *C. oblongifolius* (Amphur Kuiburi, Prachuab Kirikhan Province) and *ent*-1,2-dehydro-3-oxomanoyl oxide (2), *ent*-1β-hydroxy-3-oxomanoyl oxide (3) and *ent*-1,2-dehydro-12α-hydroxy-3-oxomanoyl oxide (4) were isolated from the stem bark of *C. oblongifolius* (Loei Province).

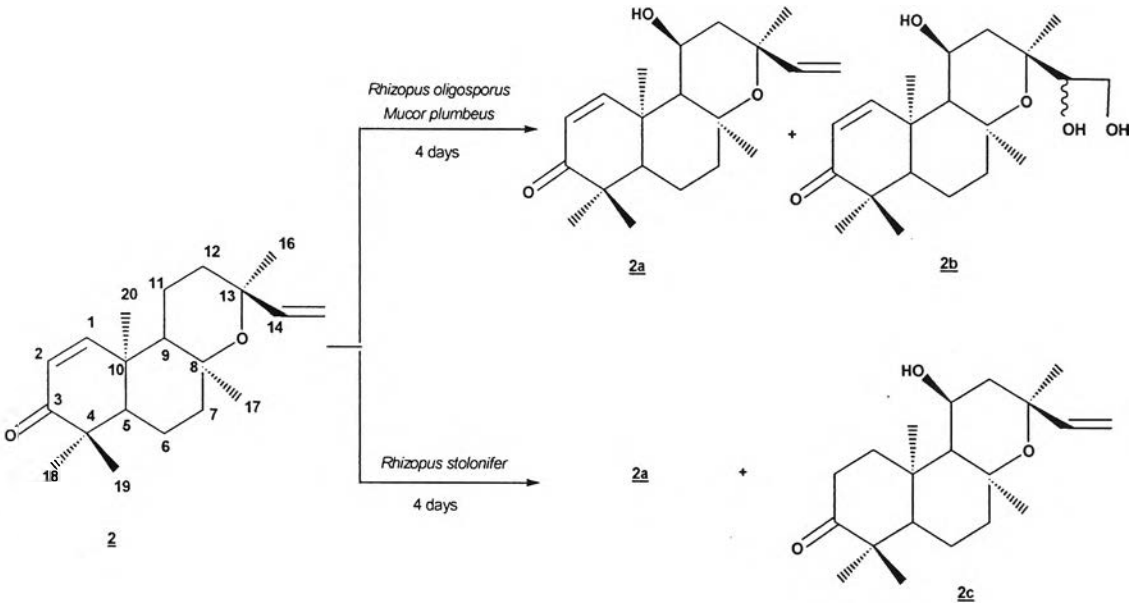
Biotransformation of the kaurane diterpene (*ent*-kaur-16-en-19-oic acid, 1) with *Absidia blakesleeana, Rhizopus oligosporus* and *Aspergillus ficuum* are shown in Table 5.1 and Scheme 5.1. Biotransformation of the labdane diterpene (*ent*-1,2-dehydro-3-oxomanoyl oxide, 2) by *Rhizopus oligosporus*, *Rhizopus stolonifer* and *Mucor plumbeus* are shown in Table 5.2 and Scheme 5.2.



Scheme 5.1 The biotransformation of *ent*-kaur-16-en-19-oic acid.

Table 5.1 The biotransformation of *ent*-kaur-16-en-19-oic acid.

Fungus	Metabolite	Weight (mg)	% yield from starting material
Absidia blakesleeana	**1a,** *ent*-(7α,9α)-dihydroxy-kaur-16-en-19-oic acid	33	6.8
	1b, *ent*-(7α,11β)-dihydroxy-kaur-16-en-19-oic acid	75	15.5
	1c, *ent*-(1β,7α)-dihydroxy-kaur-16-en-19-oic acid	45	9.3
	1d, *ent*-(7α,13)-dihydroxy-kaur-16-en-19-oic acid	65	13.4
Rhizopus oligosporus	**1e,** *ent*-7α-hydroxy-kaur-16-en-19-oic acid	35	8.1
	1a, *ent*-(7α,9α)-dihydroxy-kaur-16-en-19-oic acid	45	10.4
	1f, *ent*-(7α,16, 17)-trihydroxy-kaur-16-en-19-oic acid	23	5.3
Aspergillus ficuum	**1b,** *ent*-(7α,11β)-dihydroxy-kaur-16-en-19-oic acid	102	28.3



Scheme 5.2 The biotransformation of *ent*-1,2-dehydro-3-oxomanoyl oxide.

Table 5.2 The Biotransformation of *ent*-1,2-dehydro-3-oxomanoyl oxide.

Fungus	Metabolite	Weight (mg)	% yield from starting material
Rhizopus oligosporus	**2a,** *ent*-11α-hydroxy-1,2-dehydro-3-oxomanoyl oxide	230	46.0
	2b, *ent*-(11α,14ξ,15)-trihydroxy-1,2-dehydro-3-oxomanoyl oxide	8	1.6
Rhizopus stolonifer	**2a,** *ent*-11α-hydroxy-1,2-dehydro-3-oxomanoyl oxide	64	12.8
	2c, *ent*-11α-hydroxy-3-oxomanoyl oxide	40	8.0
Mucor plumbeus	**2a,** *ent*-11α-hydroxy-1,2-dehydro-3-oxomanoyl oxide	50	10.0
	2b, *ent*-(11α,14ξ,15)-trihydroxy-1,2-dehydro-3-oxomanoyl oxide	72	14.4

The systematic use of different microorganisms may greatly facilitate the production of novel hydroxylated derivatives, which can then be tested for possible biological activity.

Suggestion for the future work

1. More work is needed to be done in order to understand the relationship between the *ent*-kaurane diterpenoids and the enzymes responsible for their hydroxylation, as well as to perform large-scale biotransformations with improved yields of desirable products.
2. Extension of this strategy to obtain rapid access to other diterpenoid derivatives should be investigated and a study of the potential biological activities of the biotransformed products should be carried out.