Ph.D. Candidate

Muhammad Abdallah Algamal

Graduate Academic Unit

Chemistry

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March 16, 2022

2:00 p.m. (Atlantic)

Virtual Defence

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Examining Board:
Dr. Larry Calhoun (Chemistry)
Dr. Ghislain Deslongchamps (Chemistry)
Dr. Steve Heard (Biology)
Dr. David MaGee (Chemistry) Supervisor

External Examiner: Dr. Ian Pottie
Department of Chemistry and Physics
Mount Saint Vincent University

The Oral Examination will be chaired by:
Dr. Kevin Englehart, Acting Dean of Graduate Studies

BIOGRAPHY

Universities attended (with dates & degrees obtained):

2014 – present	Ph.D. candidate, University of New Brunswick
2013	Ph.D., Agric. Sci., Pesticide Chemistry, Alexandria University
2002	M.Sc., Agric. Sci., Pesticide Chemistry, Alexandria University
1997	B.Sc., Agric. Sci., Pesticide Chemistry, Alexandria University

Conference Presentations:

Algamal, M. A. and MaGee, D. I. Studies towards the total synthesis of some pheromonal himachalene sesquiterpenes: Total Synthesis of norhimachalene ketone. The 256th ACS National Meeting, August 19-23, 2018. Boston, MA, USA.

Algamal, M. A. and MaGee, D. I. Studies towards the total synthesis of some himachalene sesquiterpenes: Total Synthesis of (±)-norhimachalene ketone. The 101st Canadian Chemistry Conference and Exhibition May 27-31, 2018. Edmonton, AB. Canada.

Algamal, M. A. and MaGee, D. I. Triflic imide catalyzed Mukaiyama-Michael addition. The 25th Canadian symposium on catalysis. May 8-11, 2018. Saskatoon, Sk, Canada.

Algamal, M. A. and MaGee, D. I. Racemic synthesis of Himachalene sesquiterpenes framework. The 25th Graduate students research conference, March 23rd, 2018. UNB, Fredericton, NB, Canada.

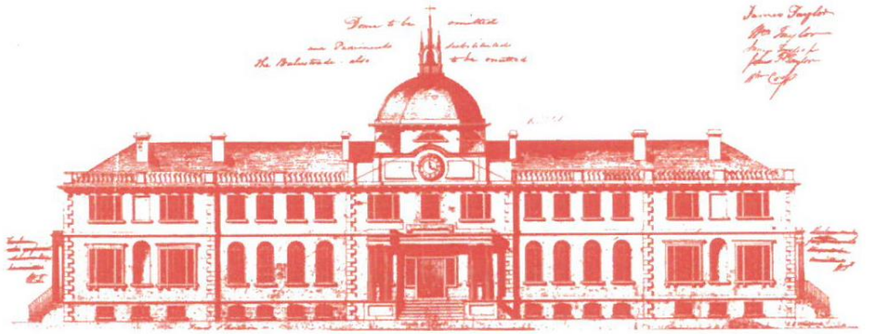
Algamal, M. A. and MaGee, D. I. Studies towards the total synthesis of some himachalene sesquiterpenes, potent flea beetles' pheromone constituents. The 255th ACS National Meeting, Mar 18-22, 2018. New Orleans, LA, USA.

Algamal, M. A. and MaGee, D. I. Troubleshooting Mori's synthetic route to Himachalene type sesquiterpenes: Potential pheromone candidates for the Blueberry Flea beetle (*Altica Sylvia* Malloch). ACAO's AIF Pheromones Pest Management Project 4th annual meeting program. May 20, 2015, Acadia University, Wolfville, NS, Canada.

A Formal Synthesis of Himachalene Sesquiterpenes

Abstract

In an endeavor to study the pheromonal activity of four himachalene sesquiterpenes as an insect pest management strategy for the control of the blueberry flea beetle *Altica sylvia* Malloch (a major insect pest of the blueberry plantations in North America), attempts to repeat literature synthetic routes were found to be low yielding. Where the norhimachalene ketone **34** was considered a convenient precursor to the rest of the target himachalenes, several strategies were investigated, of which two new routes to achieve the desired himachalenes were found to be more efficient. The first relied on ring closing metathesis to construct the required 2, 2, 6-trimethylcyclohexanone that could then be subjected to Robinson annulation to furnish **34**. The second route furnished the 6, 7-bicyclic core of the himachalenes via a sequence of allyic alkylations, Cope rearrangement and ring closing metathesis. These routes are easily amenable to result in an asymmetric version.



Home of the School of Graduate Studies, Sir Howard Douglas Hall was designed by J.E. Woolford in 1825 and is the oldest university building in Canada still in use.

The University of New Brunswick recognizes that the university sits on traditional Wolastoqey territory. The river that runs right by our university – the St. John River – is also known as Wolastoq, along which live the Wolastoqiyik -- the people of the beautiful and bountiful river.

UNIVERSITY OF NEW BRUNSWICK

SCHOOL OF GRADUATE STUDIES

ORAL EXAMINATION

Muhammad Abdallah Algamal

IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY