

ALLELOPATHY ASSESSMENT OF SEVERAL EDIBLE
CROPS FOR CONTROLLING GOOSEGRASS,
Echinochloa indica (L.) Gaertn.

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**ALLELOPATHY ASSESSMENT OF SEVERAL EDIBLE CROPS
FOR CONTROLLING GOOSEGRASS,
Eleusine indica (L.) Gaertn.**

By
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**DEPARTMENT OF BIOLOGICAL SCIENCES
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PENGAKUAN DAN PENGESAHAN LAPORAN PITA I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **Allelopathy Assessment of Several Edible Crops for Controlling Goosegrass, *Eleusine Indica* (L) Gaertn.** oleh **Tiun Siew Mond**, No. Matrik: **UK12483** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah Sarjana Muda Sains (**Sains Biologi**), Fakulti Sains dan Teknologi, UMT.

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DECLARATION

I hereby declare that this thesis entitled **Allelopathy Assessment of Several Edible Crops for Controlling Goosegrass, *Eleusine indica* (L.) Gaertn.** is the result of my own research except as cited in the references.

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ABSTRACT

A study was undertaken to examine allelopathic effect of chilli, rice and okra extracts on germination and growth of *Eleusine indica* under laboratory environments besides studying the allelopathic effect of crop residue-applied sterilized and non-sterilized soil on growth of *E. indica* under greenhouse conditions. The most phytotoxic extract were chilli leave, followed by chilli stem which fully inhibited the seed germination at 20 and 30 g L⁻¹, respectively. Chilli leave and chilli stem extracts inhibited the seedling growth but the okra pod and rice straw-plus-leave extracts had no effect on seedling growth under laboratory conditions. The chilli stem and chilli leave extracts had equally high allelopathic effects which caused growth inhibition to 38.2 and 54.6 %, respectively. The crop residues showed less allelopathic effects on seedling height except the seedlings treated with okra pod residue and grown using sterilized soil. The height of weed seedling was significantly reduced to 69.3 % by okra pod residue at 1.0 ton ha⁻¹, while the seedling fresh weight was reduced by 60.2 % in comparison to control. The fresh weights of rice straw-plus-leave applied seedlings that grown using sterilized soil and seedlings of all treatments that were grown using non-sterilized soil were stimulated as the concentrations of crop residues increased, with the fresh weights of rice straw-plus-leave and chilli leave residues applied seedlings being increased by 41.5% and 69.4 %, respectively. This study suggests that all the crops extracts and crops residues exhibit the allelopathic effects on germination and seedling growth of *E. indica* depending on seedling age, duration of residues decomposition, compounds presence and the soil conditions. However, only chilli extract and okra residue show potent herbicidal activity.

ABSTRAK

Satu kajian telah dijalankan untuk mengkaji kesan allelopati ekstrak cili, padi dan kacang bendi ke atas percambahan dan pertumbuhan *Eleusine indica* di dalam keadaan makmal, di samping, kesan allelopati sisa tanaman terhadap pertumbuhan *E. indica* juga dijalankan dengan menggunakan tanah steril dan tidak steril di rumah hijau. Kajian ini dijalankan dengan mengguna semula sisa-sisa tanaman selepas penuaian. Ekstrak daun cili memperlihatkan kesan fitotoxin yang tertinggi, diikuti dengan ekstrak batang cili, di mana percambahan *E. indica* terbantut sepenuhnya pada 20 dan 30 g L⁻¹. Ekstrak daun cili dan batang cili dapat membantut pertumbuhan anak benih *E. indica*, tetapi ekstrak kulit kacang bendi dan daun-dan-batang padi tidak memberi kesan terhadap pertumbuhan anak benih di bawah keadaan makmal. Ekstrak batang cili dan daun cili mempunyai kesan allelopati yang sama dengan membantut pertumbuhan anak pokok sebanyak 38.2 dan 54.6%. Semua sisa tanaman tidak mempengaruhi pertumbuhan anak benih *E. indica* kecuali anak benih yang ditanam menggunakan tanah steril dan dirawat dengan ekstrak kulit kacang bendi. Ketinggian anak benih terbantut sebanyak 69.3% pada kadar 1.0 ton ha⁻¹, manakala berat basah anak benih menyusut sebanyak 60.2% berbanding dengan berat basah anak benih kawalan. Berat basah anak benih yang ditanam dalam tanah steril dan dirawat dengan campuran sisa daun dan batang padi serta anak benih yang ditanam dalam tanah tidak steril menunjukkan kesan rangsangan terhadap pertumbuhann apabila kadar sisa tanaman ditingkatkan, yang mana, berat basah anak benih yang dirawat dengan campuran sisa daun dan batang padi dan daun cili meningkat sebanyak 41.5% dan 69.4% berbanding dengan kawalan masing-masing. Kajian ini mencadangkan semua ekstrak dan sisa tanaman yang dikaji menunjukkan kesan allelopati terhadap percambahan dan pertumbuhan *E. indica*. Kesan allelopati ini bergantung pada umur anak benih, tempoh penguraian, kehadiran komponen dan keadaan tanah. Walaubagaimana pun, ekstrak cili dan sisa kulit kacang bendi menunjukkan ahtiviti herbisid yang berkesan.