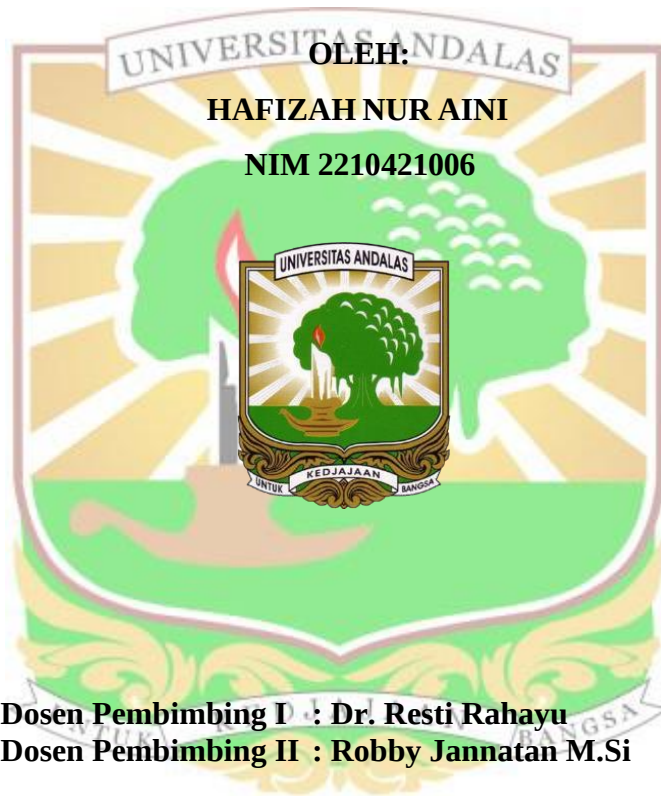


PENGARUH KOMBINASI *Indigofera zollingeriana* DAN LARVA *Hermetia illucens* TERHADAP BIOKIMIA DAN KEAMANAN PAKAN SERTA HISTOLOGI, KADAR *MALONDIALDEHIDA* DAN KATALASE USUS IKAN NILA

SKRIPSI SARJANA BIOLOGI



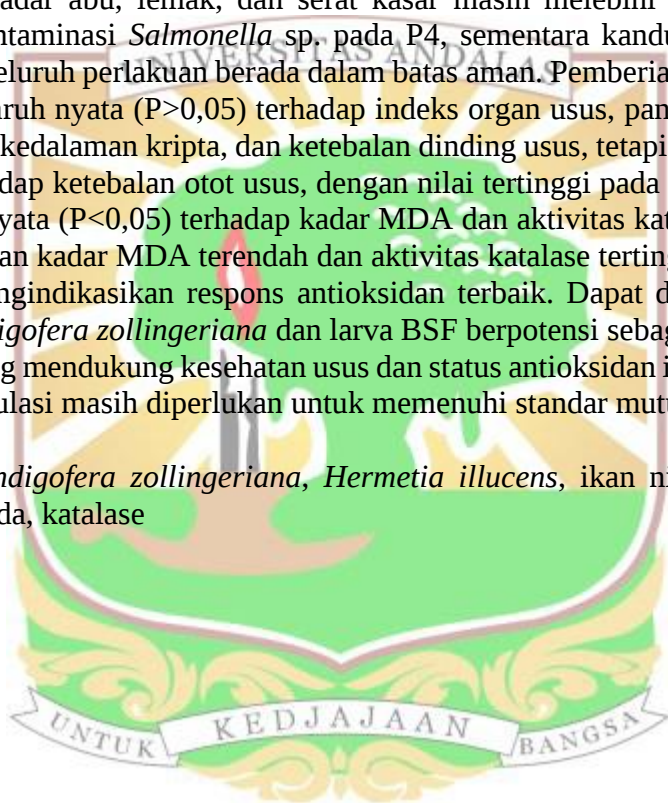
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PADANG
2026**

ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh kombinasi pakan *Indigofera zollingeriana* dan larva *Hermetia illucens* (*Black Soldier Fly*) terhadap kualitas biokimia dan keamanan pakan, serta efeknya terhadap struktur histologi, kadar malondialdehida (MDA), dan aktivitas enzim katalase pada usus ikan nila (*Oreochromis niloticus*). Penelitian menggunakan Rancangan Acak Lengkap (RAL) dengan lima perlakuan dan tiga ulangan selama 42 hari, yaitu P1 (pakan komersial), P2 (maggot segar), P3 (*Indigofera* 0% : maggot 25%), P4 (*Indigofera* 5% : maggot 20%), dan P5 (*Indigofera* 10% : maggot 15%). Hasil analisis proksimat menunjukkan kadar protein pakan formulasi (35,16–35,89%) telah memenuhi kebutuhan nutrisi ikan nila, namun kadar abu, lemak, dan serat kasar masih melebihi standar SNI, serta ditemukan kontaminasi *Salmonella* sp. pada P4, sementara kandungan logam berat (Hg, Pb, Cd) seluruh perlakuan berada dalam batas aman. Pemberian pakan kombinasi tidak berpengaruh nyata ($P>0,05$) terhadap indeks organ usus, panjang usus, panjang vili, lebar vili, kedalaman kript, dan ketebalan dinding usus, tetapi berpengaruh nyata ($P<0,05$) terhadap ketebalan otot usus, dengan nilai tertinggi pada P4. Perlakuan juga berpengaruh nyata ($P<0,05$) terhadap kadar MDA dan aktivitas katalase usus, dengan P5 menunjukkan kadar MDA terendah dan aktivitas katalase tertinggi di antara pakan formulasi, mengindikasikan respons antioksidan terbaik. Dapat disimpulkan bahwa kombinasi *Indigofera zollingeriana* dan larva BSF berpotensi sebagai pakan alternatif fungsional yang mendukung kesehatan usus dan status antioksidan ikan nila, meskipun optimasi formulasi masih diperlukan untuk memenuhi standar mutu pakan.

Kata kunci: *Indigofera zollingeriana*, *Hermetia illucens*, ikan nila, histologi usus, malondialdehida, katalase



ABSTRACT

This study aimed to determine the effect of combining *Indigofera zollingeriana* and Black Soldier Fly (*Hermetia illucens*) larvae feed on feed biochemical quality and safety, as well as its effects on intestinal histological structure, malondialdehyde (MDA) levels, and catalase enzyme activity in Nile tilapia (*Oreochromis niloticus*). The study employed a Completely Randomized Design (CRD) with five treatments and three replications over 42 days: P1 (commercial feed), P2 (fresh maggot), P3 (*Indigofera* 0% : maggot 25%), P4 (*Indigofera* 5% : maggot 20%), and P5 (*Indigofera* 10% : maggot 15%). Proximate analysis showed that the protein content of the formulated feeds (35.16–35.89%) met the nutritional requirements of tilapia, although ash, fat, and crude fiber contents exceeded the Indonesian National Standard (SNI), and *Salmonella* sp. contamination was detected in P4, while heavy metal content (Hg, Pb, Cd) in all treatments remained within safe limits. The combined feed had no significant effect ($P>0.05$) on intestinal organ index, intestinal length, villus height, villus width, crypt depth, or intestinal wall thickness, but significantly affected ($P<0.05$) muscle layer thickness, with the highest value observed in P4. Treatments also significantly affected ($P<0.05$) intestinal MDA levels and catalase activity, with P5 showing the lowest MDA level and highest catalase activity among the formulated feeds, indicating the best antioxidant response. It can be concluded that the combination of *Indigofera zollingeriana* and BSF larvae has potential as a functional alternative feed supporting intestinal health and antioxidant status in Nile tilapia, although further formulation optimization is needed to meet feed quality standards.

Keywords : *Indigofera zollingeriana*, *Hermetia illucens*, Nile tilapia, intestinal histology, malondialdehyde, catalase

