

ABSTRAK

Septina Mulia Pratiwi. 2026. Penyusunan E-Modul Fisiologi Hewan Berbasis Penelitian Kandungan Gizi Pakan Suplemen Ikan Berbahan Herbal. Skripsi. Program Studi Pendidikan Biologi, FKIP, Universitas PGRI Madiun. Pembimbing (I) Dr. drh. C. Novi Primiani, M. Pd., Pembimbing (II) Sri Utami, S. Pd., M. Pd.

Pakan merupakan faktor penting dalam budidaya ikan, sehingga pemanfaatan bahan herbal sebagai pakan suplemen menjadi alternatif potensial. Bahan herbal mengandung senyawa bioaktif yang dapat meningkatkan kualitas nutrisi dan kesehatan ikan, serta dapat dimanfaatkan sebagai sumber belajar kontekstual dalam pembelajaran Fisiologi Hewan. Penelitian ini bertujuan untuk menyusun e-modul Fisiologi Hewan berbasis penelitian kandungan gizi dan fitokimia pakan suplemen ikan berbahan herbal serta menguji kelayakannya. Penelitian ini menggunakan pendekatan deskriptif kuantitatif. Data fitokimia diperoleh secara kualitatif dari serbuk daun kelor (*Moringa oleifera*), daun pepaya (*Carica papaya*), dan daun kipahit (*Tithonia diversifolia*) menggunakan pereaksi FeCl_3 1% (tanin), akuades panas (saponin), etanol 96%, HCl pekat, dan serbuk Mg (flavonoid), serta pereaksi Mayer dan Dragendorff (alkaloid), dan CH_3COOH serta H_2SO_4 pekat (steroid). Analisis proksimat dilakukan pada pakan formulasi F1 (kelor–pepaya), F2 (kelor–kipahit), dan F3 (pepaya–kipahit) meliputi kadar air, abu, protein kasar, lemak kasar, dan serat kasar. E-modul divalidasi oleh ahli materi, ahli media, dan mahasiswa menggunakan skala Likert. Hasil penelitian menunjukkan bahwa ketiga bahan mengandung alkaloid, flavonoid, saponin, dan tanin, sedangkan steroid tidak terdeteksi. Hasil proksimat menunjukkan F2 memiliki protein tertinggi sebesar 54,69% dan serat kasar terendah sebesar 11,86%. Hasil validasi menunjukkan e-modul layak digunakan dengan nilai 86,67% (ahli materi), 95% (ahli media), dan 88,12% (mahasiswa). E-modul yang disusun layak digunakan sebagai media pembelajaran kontekstual pada mata kuliah Fisiologi Hewan.

Kata kunci: e-modul, fisiologi hewan, fitokimia, uji proksimat, pakan herbal

ABSTRACT

Septina Mulia Pratiwi. 2026. *Development of an Animal Physiology E-Module Based on Research Findings on the Nutritional Content of Herbal-Based Supplementary Fish Feed*. Thesis. Biology Education Study Program, Faculty of Teacher Training and Education, Universitas PGRI Madiun. Advisor I: Dr. drh. C. Novi Primiani, M.Pd. Advisor II: Sri Utami, S.Pd., M.Pd..

Feed is an important factor in fish farming; therefore, the use of herbal materials as feed supplements is a potential alternative. Herbal plants contain bioactive compounds that may improve fish nutrition and health, and can also be used as contextual learning resources in Animal Physiology courses. This study aims to develop an Animal Physiology e-module based on research on phytochemical content and proximate composition of herbal-based fish feed and to evaluate its feasibility. This study used a descriptive quantitative approach. Phytochemical tests were conducted qualitatively on Moringa (*Moringa oleifera*), papaya (*Carica papaya*), and kipahit (*Tithonia diversifolia*) using FeCl_3 for tannins, hot water for saponins, ethanol 96% with HCl and Mg for flavonoids, Mayer and Dragendorff reagents for alkaloids, and CH_3COOH with H_2SO_4 for steroids. Proximate analysis was carried out on feed formulations F1 (Moringa–papaya), F2 (Moringa–kipahit), and F3 (papaya–kipahit), including moisture, ash, crude protein, crude fat, and crude fiber. The e-module was validated by subject matter experts, media experts, and students using a Likert scale. The results showed that all plant samples contained alkaloids, flavonoids, saponins, and tannins, while steroids were not detected. Proximate analysis indicated that F2 had the highest protein content (54.69%) and the lowest crude fiber (11.86%). Validation results showed feasibility scores of 86.67% (material experts), 95% (media experts), and 88.12% (students). The developed e-module is feasible as contextual learning media for Animal Physiology courses.

Keywords: e-module, animal physiology, phytochemistry, proximate analysis, herbal feed