



UNIVERSITI PUTRA MALAYSIA

***ASSESSMENT OF CHEMORECEPTIVITY IN GOLDFISH
(*Carassius auratus*) FINGERLINGS TO IDENTIFY NATURAL FOOD
ATTRACTANTS FOR FEED FORMULATION***

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**ASSESSMENT OF CHEMORECEPTIVITY IN GOLDFISH
(*Carassius auratus*) FINGERLINGS TO IDENTIFY NATURAL FOOD
ATTRACTANTS FOR FEED FORMULATION**

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A project submitted to the
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It is hereby certified that we have read this project paper entitled “Assessment of Chemoreceptivity in Goldfish (*Carassius Auratus*) Fingerlings to Identify Natural Food Attractants for Feed Formulation”, by Crystal Lim Li Ying and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfilment of the requirement for the course VPD 4999 – Project.

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CONTENTS

	Page
TITLE	i
CERTIFICATION	ii
ACKNOWLEDGEMENTS	iii
CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
ABSTRACT	viii
ABSTRAK	x
1.0 INTRODUCTION	1
2.0 LITERATURE REVIEW	3
2.1 Goldfish chemoreceptivity	3
2.2 Feeding habits	4
2.3 Feed palatability	5
2.4 Feed sample	6
2.4.1 Artemia (Brine shrimp)	6
2.4.2 Bloodworm	7
2.4.3 Mosquito larvae	8
2.4.4 Commercial fish pellet	10
3.0 MATERIALS AND METHODS	10
3.1 Acclimatization of the fish	10
3.2 Preparation of feed solution	

3.3 Preparation of the three-compartment maze	11
3.4 Experiment Work-Flow	12
3.4.1 Feed Solution Response Test	12
3.4.2 Feed choice test	14
4.0 RESULTS	16
5.0 DISCUSSION	28
6.0 CONCLUSION & RECOMMENDATIONS	33
7.0 REFERENCES	34
APPENDIX	38



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LIST OF TABLES

Table 1.0: Feed pairing	15
Table 4.1: Response Test	16
Table 4.2.1: Paired T-test for commercial pellet and bloodworm	18
Table 4.2.2: Paired T-test for commercial pellet and mosquito larvae	18
Table 4.2.3: Paired T-test for commercial pellet and brine shrimp	19
Table 4.2.4: Paired T-test for brine shrimp and mosquito larvae	20
Table 4.2.5: Paired T-test for bloodworm and brine shrimp	21
Table 4.2.6: Paired T-test for mosquito larvae and brine shrimp	22

LIST OF FIGURES

Figure 1.0: The compartments where feed solution was placed	13
Figure 1.1: The compartments where feed solutions were placed	14
Figure 4.2.1: Mean time spent between commercial pellet and bloodworm	17
Figure 4.2.2: Mean time spent between commercial pellet and mosquito larvae	18
Figure 4.2.3: Mean time spent between commercial pellet and brine shrimp	19
Figure 4.2.4: Mean time spent between bloodworm and mosquito larvae	20
Figure 4.2.5: Mean time spent between bloodworm and brine shrimp	21
Figure 4.2.6: Mean time spent between mosquito larvae and brine shrimp	22
Figure 4.2.7: Total mean time spent among the 4 types of feeds	23
Figure 4.2.8: Mean number of entries between commercial pellet and bloodworm	24
Figure 4.2.9: Mean number of entries between commercial pellet and mosquito larvae	24
Figure 4.2.10: Mean number of entries between commercial pellet and brine shrimp	25
Figure 4.2.11: Mean number of entries between bloodworm and mosquito larvae	25
Figure 4.2.12: Mean number of entries between bloodworm and brine shrimp	26
Figure 4.2.13: Mean number of entries between mosquito larvae and brine shrimp	26
Figure 4.2.14: Number of entries among the 4 types of feeds	27

ABSTRACT

Abstract of the project paper presented to the Faculty of Veterinary Medicine in partial requirement for the course VPD 4999 Project.

ASSESSMENT OF CHEMORECEPTIVITY IN GOLDFISH (*Carassius auratus*) FINGERLINGS TO IDENTIFY NATURAL FOOD ATTRACTANTS FOR FEED FORMULATION

By

Crystal Lim Li Ying

2018

Supervisor: Assoc. Prof. Dr. Hassan Hj Mohd Daud

Co-Supervisor: Dr. Hafandi Ahmad

Goldfish (*Carassius auratus*) is one of the popular choice of fish hobbyist among the ornamental fish and usually kept in large numbers in aquarium or ponds. Thus type of feed and feeding routine are crucial to prevent overfeeding that will lead to the pollution of the aquarium. The assessment of chemoreceptivity in goldfish fingerlings was conducted to determine the chemoreceptivity between commercial fish pellet and the live feed. The aim was to suggest a formulation for the best diet using live food supplementation as feed attractants added to commercial pellet. In this experiment, the feeding behaviour of the goldfish were recorded using

GoPro recorder for 15 minutes after feeding them with six different pairs of feed formulation. Findings showed that the average time spent on bloodworm was the longest, followed by brine shrimp and mosquito larvae, while commercial pellet was the shortest. In addition, the highest frequency of number of entries preferred were for bloodworm, brine shrimp, mosquito larvae and commercial pellet accordingly. As a conclusion, the current study has indicated highly significant results from the time spent ($P=0.001$) and the number of entries ($P=0.000$) in each compartments, thus the goldfish was more receptive to the live fresh feed as compared to the commercial fish pellets as hypothesised.

Keywords: chemoreceptivity, live feed, commercial feed, time spent, *Carassius auratus*

ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus VPD 4999 Projek.

PENILAIAN KEMORESEPTIVITI DALAM IKAN EMAS (*Carassius auratus*) JUNENIL DALAM MENGENAL PASTI BAHAN PENARIK SEMULAJADI UNTUK FORMULASI MAKANAN

By

Crystal Lim Li Ying

2018

Penyelia: Prof.Madya Dr. Hassan Hj Mohd Daud

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Ikan emas (*Carassius auratus*) adalah salah satu pilihan ikan yang popular di kalangan penggemar ikan hiasan dan biasanya dipelihara dalam jumlah yang besar di dalam akuarium atau pun kolam. Oleh itu, jenis makanan dan rutin makan adalah penting untuk mengelakkan pembaziran yang akan mengakibatkan pencemaran akuarium. Penilaian kemoreseptiviti di antara ikan emas juvenile telah dijalankan untuk menentukan kemoreseptiviti antara pellet ikan komersial dan makanan hidup. Tujuan eksperimen ini adalah untuk mencadangkan perumusan diet terbaik menggunakan suplemen makanan hidup secara langsung sebagai penarik makanan yang ditambahkan kepada pellet komersial. Dalam eksperimen ini,

tingkahlaku pemakanan ikan emas telah direkodkan menggunakan perakam GoPro selama 15 minit selepas memberi makan kepada mereka dengan enam pasang penyediaan makanan. Dapatan menunjukkan bahawa masa purata yang paling panjang digunakan untuk mengidap adalah cacing darah, diikuti oleh artemia dan jejentik nyamuk, manakala pellet komersial adalah yang paling pendek. Di samping itu, frekuensi tertinggi bilangan penyertaan yang disukai oleh juvenile adalah cacing darah, artemia, jejentik nyamuk dan pellet komersial. Kesimpulannya, kajian ini telah berjaya menunjukkan bahawa makanan semulajadi mempunyai kesedapan yang lebih tinggi berbanding dengan makanan komersial kerana ia mempunyai kemoatraktan yang lebih tinggi ($P=0.001$).

Kata kunci: kemoreceptiviti, makanan hidup, makanan pellet komersial, masa, *Carassius auratus*

1.0 INTRODUCTION

Fish keeping is an activity that colourful fishes were kept in an aquarium or garden pond at home. This hobby has live since thousands years ago, this can be supported by the evidence that the ancient Romans maintained elaborate ornamental marine fish ponds back in second century (Higginbotham, 1997). Ornamental fish come in a great variety of colour, species, shape and swimming pattern that gives people a tranquil and calming effect (Ng, 2016). In Malaysia, this industry started since the 1950's through collection of fish from natural water. Currently there is more than 250 species of 550 varieties of ornamental fish are cultured in Malaysia including the local species and exotic species from South America and Africa (Department of Fisheries, 2015). Goldfish (*Carassius auratus*) is the choice of the fish hobbyist among the ornamental fish due to the low maintenance and relatively cheaper price compare to other ornamental fish.

Owner tend to feed their goldfish with commercial pellet only which lacks of variety of other feed indirectly lead to the problem of underfeeding. Underfed goldfish tend to produce abundant of leftover food which lead to the pollution of the fish tank and deterioration of the water quality. Low water quality causing stress and immunosuppression to the fish leading to the decline of the fish health. Therefor a good aquarium management and the formulation of specific feed for the variety of the ornamental fish is crucial to prevent this problem from happening (Ostrow, 2003).

With the concern stated above has led to my project regarding the assessment of chemoreceptivity in Goldfish (*Carassius auratus*) juvenile to identify the preferred food attractants for the feed formulation especially for goldfish. Feed selection from a fish is decided by the amino acid content in the feed through chemoreception. Chemoreception defines as the physiological response of a sense organ to a chemical stimulus which through olfactory and gustation (Green & Zielinski, 2014). In this project, goldfish juveniles were used as they are more naïve in selecting the most attractive feed through their olfactory sense. The choices of feed for goldfish are commercial fish pellets, bloodworm, mosquito larvae and brine shrimp.

Realising with the issues stated, this study was undertaken with the objectives to determine the chemoreceptivity between commercial fish pellets and fresh feed for goldfish juvenile. And with that to suggest a formulation of the best diet for goldfish juveniles using live food supplementation as feed attractants. The expected outcome would be goldfish is receptive to the live fresh feed compared to the commercial fish pellets.

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