MODULE 1. CONTENT

Elaborated by Ege University Faculty of Fisheries, Izmir - TURKIYE

MODULE 1. EVALUATION OF DISCARD FISH AS A VALUE-ADDED PRODUCT

AUTHORS

1. Prof. Dr. Ozgur ALTAN, Ege University Faculty of Fisheries, Department of Aquaculture

2. Assoc. Prof. Dr. Ilker AYDIN, Ege University Faculty of Fisheries, Department of Fishing Technology and Seafood Processing Technology

STRUCTURE FOR MODULE CONTENT

The content will be what the trainee/student will learn throughout the module after starting to take it.

TEACHING SPECIFICS

- SETTING (INDOOR/OUTDOOR/DISTANCE/BLENDED): Online (E-learning)
- DURATION (HOURS): 20h
- MATERIALS: Presentation, questions, case studies, self-study
- NO. OF LEARNERS/REPRESENTATIVES: Depending on the number of participants
- INDIVIDUAL OR GROUP WORK: Both, depending on the number and distribution of participants

INFORMATION ABOUT THE TOPIC

Discarding is a term specifically used for catches of species that are not kept but returned to the sea. Discarding constitutes a substantial waste of resources and negatively affects the sustainable exploitation of marine biological resources and marine ecosystems and the financial viability of fisheries. Globally, it is estimated that between 7 and 10 million tonnes of commercial fishery catches are discarded annually. The levels of discards vary across regions, species and fisheries and there are different reasons why fishers discard. The EU's common fisheries policy aims to put an end to this wasteful practice. The landing obligation was introduced in 2015 and has been fully in force since January 2019. Its goal is to eliminate discards by encouraging fishers to fish more selectively and to avoid unwanted catches [1]

Although the products that have to be landed in the light of the determined criteria cannot be used directly as human food, they can be made available as raw materials in the production of fish meal and pet food as a product with increased added value. In this module, information is given about the conversion of discarded fish into fish meals and its usability as a raw material in the pet food industry.

In this section, apart from the use of discarded fish as human food, the first of the most important products that can be discussed is fish meal. Fish meal, which is used as the main protein source in the commercial fish feeds

used in aquaculture today, is a remarkable product due to its high crude protein content, the amino acid sequence that works in harmony with the metabolism of the fish, and high digestion rate. Since the last 10 years, there has been a decrease in the number of products to be used for fishmeal due to reasons such as overfishing, increased amounts of discarded fishing, climate change, and pollution in the seas. Accordingly, production and sales costs are increasing day by day. The latest FAO data shows that since the amount of fish produced through aquaculture is over 100 million tons, the need for fish meals in at least similar amounts indicates the importance of the issue.

Another product is BARF, which has become popular and allows pets to eat healthier, although there have been various recommendations for its use for many years. The basis of this product consists mainly of animal protein of terrestrial origin, which cannot be used as human food, an herbal mixture consisting of various vegetables and fruits, and spice additions. Considering the global need, although it is not as high as fish meal, it is certain that it will play a major role in reducing the terrestrial protein content in pet nutrition and delivering the w-3 and w-6 series fatty acids, which are also important for humans, to our dear friends. In this way, it will be possible to produce a product with increased added value thanks to its use in BARF products such as fish meal.

CAUSES AND DESCRIPTION OF HOW IT MANIFESTS

Module 1 provides essential knowledge on converting discarded fish into fish meal and BARF, two of the most economical products in fish and pet nutrition. Nowadays, many raw material mixtures are used in pet foods and various amounts of additives are used to facilitate their digestion. Considering that animal protein sources increase costs, the high usage values of plant-based products with high protein content, such as soy and corn, are rapidly alienating pets from their natural diet. This situation creates negative effects on animal health in the medium and long term. Module 1 supports the use of BARF due to the balance of the raw material mixture it contains, the closeness of the raw materials used to the products consumed by living things in nature, and most importantly, the absence of additives.

PRINCIPLES, BASIC TERMS, AND MEASURES WITHIN THE SPECIFIC MODULE

As previously mentioned, the module consists of two essential sub-topics:

- Explanation of the terms of discarded fish and fish meal
- Use of discarded fish in raw food content

TRAINING MATERIAL FORMAT (TASKS, CASE STUDIES, EXERCISES) WITH A SHORT DESCRIPTION

The training material for module 1 consists of a written chapter (13 pages) supported by a presentation (17 slides) that includes questions to the five sub-topics presented, as well as two cases connected to sub-topics 2 and 4, respectively. Moreover, the detailed presentation of the two cases is given in a separate file. In addition, a reading list is presented recommended for self-studying.

INSTRUCTION FOR ASSESSMENT

IQuiz assessment to be taken on Moodle

LINK TO ONLINE RESOURCES AND SPECIFIC IMAGES

- European Commission, https://oceans-and-fisheries.ec.europa.eu/fisheries/rules/discarding-fisheries_en).
- Saleh, N.E., Wassef, E.A., Abdel-Mohsen, H.H. 2022. Sustainable Fish and Seafood Production and Processing. Academic Press, pp: 259-291. https://doi.org/10.1016/B978-0-12-824296-4.00002-5.
- Masagounder, K., Ramos, S., Reimann, I., Channarayapatna, G. 2016. Optimizing nutritional quality of aquafeeds in Aquafeed Formulation, pp: 239-264. DOI:10.1016/B978-0-12-800873-7.00006-3
- Daniel, N., 2018. A review on replacing fish meal in aqua feeds using plant protein sources. International Journal of Fisheries and Aquatic Studies 2018; 6(2): 164-179. https://www.fisheriesjournal.com/archives/2018/vol6issue2/PartC/6-1-35-823.pdf
- Baeza-Ariño, R., Martínez-Llorens, S., Nogales-Mérida, S., Jover-Cerda, M., Tomás-Vidal, A. 2016. Study of liver and gut alterations in sea bream, *Sparus aurata* L., fed a mixture of vegetable protein concentrates. Aquac. Res., 47 (2016), pp. 460-471, 10.1111/are.12507.
- FAO. 2022. The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation. Rome, FAO. https://doi.org/10.4060/cc0461en
- IFFO (The Marine Ingredients Organization). 2017. Fish Meal Production. https://www.iffo.com/production (Access: May 2023).
- Chaudhary, T., 2022. Pet Food Market Research. www.marketresearchfuture.com

STEP-BY-STEP GUIDE

INTRODUCTION – **2 SLIDES**

The introduction explains the main idea of the study (MARIPET Project) which is a real situation that discarded fish is a very big fisheries problem, by using processing technologies and obeying basic principles, discarded fish can easily be converted to fish meal and BARF that is value-added products in fish and pet nutrition.

FIRST PART - FISH MEAL – 3 **SLIDES**

The first part explains what fish meal is, the effective sectors for its utilization and finally provides a global overview about its production.

FIRST ACTIVITY - QUESTIONS – **1 SLIDE**

Two questions for discussion related to the sub-topic presented in the first part of the module are presented.

SECOND PART – USING DISCARDED FISH IN RAW FOOD CONTENT - 2 **SLIDES**

The second part gives another main idea about the raw food (BARF) ingredient, after fish meal which is the most common ingredient for the aquaculture industry. This part also provides a quick look at the global pet food sector.

SECOND ACTIVITY - QUESTIONS – **1 SLIDE**

Two questions for discussion related to the sub-topic presented in the second part of the module are presented.

THIRD PART – VARIETIES OF PET FOOD AND THE PRODUCT METHODOLOGY – **6 SLIDES**

The third part explains the varieties of pet foods and gives detailed information about dry food, canned food and final raw food (BARF). This part also underlines the advantages and disadvantages of each food type and their production methods.

THIRD ACTIVITY - QUESTIONS – **1 SLIDE**

The third part introduces the hurdle principle as well as gives an overview of available non-thermal and mild processing technologies.

FACILITATOR'S NOTES

-

TITLE	ESTIMATED TIMING	FACILITATOR NOTES	MATERIALS NEEDED
Questions - Part 1	15 min	**Individual,** followed by online class discussions.	Internet connection
Questions - Part 2	15 min	**Individual,** followed by online class discussions.	Internet connection
Case study 1	120 mins	**Individual:** Depending on the number of participants and distribution **Class:** Depending on the number of participants and distribution	Internet connection
Questions - Part 3	15 min	**Individual,** followed by online class discussions.	Internet connection
Questions - Part 4	15 min	**Individual,** followed by online class discussions.	Internet connection
Case study 2	120 mins	**Individual:** Depending on the number of participants and distribution **Class:** Depending on the number of participants and distribution	Internet connection

Questions - Part 5	15 min	**Individual,** followed by online class discussions.	Internet connection

APPENDIX 1 - TITLE

Add here:

- N/A

APPENDIX 1: REFERENCES

The following table summarizes the documents referenced in this document.

Location	Description
<URL or file path to where document is located>	*A detailed presentation of the Module`s two case studies*
<URL or file path to where document is located>	*The module syllabus presented as a text file*
<URL or file path to where document is located>	*The module presentation, which also includes questions and cases studies*

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author and the commission cannot be held responsible for any use which may be made of the information contained therein.