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THE STUDY OF BASIL FLOWER ATTRACTANT (OCIMUM BASILICUM) TOWARDS FRUIT FLIES AS BIOLOGY LEARNING RESOURCE IN VOCATIONAL HIGH SCHOOL

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Abstract

Biotechnology is one of the Biology subject at the vocational school (SMK) in the field of Agribusiness and Agrotechnology program. In contrast, the fact indicates that these topics are taught by lecturing method and the teachers only used student's handbook as the learning resources. Moreover, teachers are seldom using current research as learning resources. One of them is the Basil flower (Ocimum basilicum). This qualitative descriptive study is aimed to analyze the potential of the attractant compound Basil flower as a learning resource for Biotechnology subject in SMK. The curriculum analysis is done by adjusting the process and research product with the core curriculum standards in 2013. Based on the analysis of processes and products (facts, concepts, principles and procedures) study, the results of the research on attractant compound Basil flower (Ocimum basilicum) toward fruit flies can be used as a Biology learning resource of 11th grade at KD. 3.6 Curriculum 2013 SMK.

Keywords: *Attractant, basil flower (Ocimum basilicum), learning resource*

I. Introduction

One of the special purposes of vocational high school is to facilitate students by competences that are suitable with their chosen programmes. In 2013 curriculum structure, that competence is available on basic skill subject (C2). In vocational high school focused on agribusiness and agro technology becomes one of the important subjects that give basic concepts related to chosen programme. One of the main discussions in biology subject of eleventh grade students of vocational high school majoring in agribusiness and agro technology is biotechnology.

Based on the basic design and structure of 2013 curriculum for vocational high school, basic competence that has to be reached in the main discussion of biotechnology is by understanding principle and application of biotechnology in agribusiness and agro technology. In order to reach that competence, it is hoped that it is contextual by showing relevant biotechnology example in agribusiness and agro technology. However, the fact in the field shows that biotechnology material in vocational high school is still given conventionally by textual approach with

teacher's domination as a learning resource. Teacher has not presented contextual example that is appropriate with their competences yet. This condition is not appropriate with today's paradigm of learning. Permendikbud No. 65 in 2013 mentioned that one of the main principle of learning that is emphasized is the process of learning that is hoped to use process approach as a reinforcement of scientific approach. Besides, learning resource that is used is hoped to be various, so that teacher is not the only place to learn something.

According to Suhardi (2012) in Munajah and Susilo (2015), biology learning resource is all of things even things or its symptoms that can be used for acquiring experience in order to solve certain biology problems. In biotechnology material for vocational high school majoring in agribusiness and agro technology, lots of phenomena and problems in that mentioned field can be harnessed as a learning resource. One of them is the problem of pest control. Pest control is still become a main problem in agriculture as well as contextual problem for vocational high school students who focused on agribusiness and agro technology. In line with the complexity of problem and environmental issues recently, so that pest control tends to use environmental-friendly methods. Concerning about learning, so far, biology teacher in vocational high school has not harnessed problem in pest control yet, especially environmental-friendly pest control as a learning resource of biotechnology material. Teacher mostly uses learning resources that purposively designed for learning i.e. text book. Besides purposively designed learning resource for learning, teacher has learning resource that is unintentionally designed for learning but utilized in learning. One of them is the result of the research.

Various researches related to body control have been done most of the time. One of them is the research that is conducted by Akhmadi and Eurika (2014), which discussed basil flower attractant compound (Ocimum Basilicum) as an agent to control pests. This research has a purpose to analyze the potential of basil flower attractant compound oward fruit flies as a learning resource of biology in vocational high school on biotechnology material.

II. Method

This research is a continuum from previous experimental study of basil flower attractant compound towards fruit flies (Akhmadi and Eurika, 2014). The kind of the research is qualitative descriptive. The data analysis of the experiment is done by describing process and research result product while potential analysis of learning resource is done by looking the appropriateness between process and research result product with 2013 curriculum content.

III. Result and Discussion

Description of Process and Product from Experimental Research Result

Learning resource can be obtained from anywhere, including research result. According to Munajah and Susilo (2015), before using as learning resource, the research has to pass through a study towards process and research product. The study of research process is related to skill development while research product is a fact, concept, and procedure.

The result of the research from Akhmadi and Eurika (2014), which discussed attractant compound from basil flower (Ocimum Basilicum) as a rotten pest control has resulted knowledge product in the form of facts, concepts, and procedures. According to Susanto (2010), as a part of science product, fact is a singular information or separated information about one of several realities. Fact has no prediction score in the other situations. Fact can related to time, place, event, and thing characteristics. Some facts that are related to the above-mentioned research are that:

1. Fruit flies are the main pest on the growth of horticulture, especially fruits.
2. Fruit flies (Dacus dorsalis) are interested in basil flowers (Ocimum basilicum);
3. The appeal of basil flower towards fruit flies in the fresh form is better than its extract.

Besides the fact, concept, principle, and procedures exist in the research Susanto (2010) mentioned that concept is an idea that explains about class or category that covers things or events that has similar characteristics. The same characteristics contrast a category with another category. Meanwhile, procedure is

the steps in a certain job. In various events, procedure covers natural processes. Several important concepts that can be explained related to the research result of Akhmadi and Eurika (2014) i.e. as follows:

1. Attractant is a synthetic chemical compound or even natural that has the ability to attract insects.
2. Natural attractant is an attractant compound that comes from plants.

Principle or generalisation is an idea that states the relationship between two concepts or more. Principle is an abstraction from several similar facts about the relationship between two variables or more (Susanto, 2010). In the research of Akhmadi and Eurika (2014), the principle that can be explained is how attractant compound of basil flower works in attracting fruit flies resembles pheromone sex in stimulating and controlling insects' reproduction behaviour.

Meanwhile, procedure that is obtained from that research result is that application procedure either in the fresh or extracted form. In Akhmadi and Eurika (2014) research, the procedure of testing the attractant of basil flower in the fresh from is done by putting sbasil flower that has been cut in the corner of first olfactometer tool. Then, in the second edge, it is placed a test material i.e. star fruit as a controller. On the third corner, 20 fruit flies are released. The observation is done since the first release of fruit flies so that all flies left third corner through the first corner or the second corner. Then, the number of fruit flies that go through the first corner and second corner are noted. Meanwhile, in the test procedure of attraction test of basil flower in the extracted form is done by dropping basil flower extract on the cotton that is placed in a petri vessel, and then closed by sticky gauze, and placed into an insect box sized 100x60x60cm. The insect box then is filled by male fruit flies. The observation is done at 1, 2, 4, 6, 12, and 24 hours after treatment by noting the number of fruit flies that are attracted to basil flower extract.

Besides producing knowledge products in the form of facts, concepts, principles, and procedures, a research result also results a process. Research process is related with research stages, starting from formulating the problem, deciding hypothesis, deciding the method of the research (deciding research sample, tool, and material, working procedure), and the management of data including a conclusion. The study towards research process needs to be done before harnessed

as learning resource to match it with learning purpose, the needs of students including the available resources. Moreover, Glover (2005) in Abdullah (2012) stated that several criteria of learning resource selection i.e. (1) in line with targeted resource. Learning resource is chosen based on the learning purpose that has been decided in general refers to one or combination from two or three cognitive, affective, and psychomotor. (2) Appropriately to support the learning content those are facts, concepts, principles or generalizations. Learning resources or a different media, such as films and graphics require different symbols and codes, and therefore requires a process and different mental skills to understand it. In order to help the learning process effectively, learning resources must be in harmony and in accordance with the needs of the learning task and mental ability learners. (3) Practical, flexible, and survive. Selected sources should be used, and whenever the equipment available in the vicinity is available easily moved anywhere and (4) skilled Learners use.

Correspondence between process and product research with curriculum content standards in 2013

Utilization of research results as a source of learning needs to be accompanied by measures specific utilization in order to be meaningful to the learner. Mulyasa (2002) in Suratsih (2010) suggested that the utilization of learning resources has a very important meaning, i.e. equip, maintain, and enrich learning. In addition, learning resources can also increase the activity and creativity in learning, which is beneficial to both teachers and for students. Utilization of learning resources to the maximum, will allow people to learn to explore various types of knowledge in accordance with the field. Thus, the knowledge gained is always actual, and is able to follow the acceleration of technology and art is constantly changing.

1. Referring to the explanation Widowati (2012), utilization of research results as a learning resource Biology can be done with the following steps:
2. Defining the issue of learning to utilize the research results. This can be done by identifying the object and issues of research results that can be raised in

learning, then synchronize the identification of the issues raised from the results of research with the applicable curriculum,

3. Formulate learning objectives clearly, in a specific and measurable;
4. Designing learning activities for learners to use the potential of research results;
5. Determine the concepts that can be learnt by using the potential of research results;

Overall suitability analysis process and product research studies attractant compound interest basil (Ocimum basilicum) as a pest controller foul (Akhmadi and Eurika, 2014) as a learning resource of biology students is described as follows.

Table 1. Analysis of Results as a Learning Resource Biology SMK

Observed Object	**Observed symptoms**	**Biology Matters**	**Potential that can be used for learning**	**Basic Competence**	**Learning Result**	**Learning Resource Format**
Scientific Article from Research Result	Utilization attractant compound interest basil (Ocimum basilicum) pest control pod (fruit flies)	- How do the principles of biotechnology in pest control using the fruit fly attractant compound interest basil? - How basil flower attractant compound application to control pests in fruit flies?	Products include: Fact: - Hama main cause damage to fruit flies of various types of fruits - Infatuation with fruit flies (Dacuc dorsalis) against the interest basil (*Ocimum basilicum*) Concept: - Biotechnology is the application of the principles of science (natural science) and engineering (technology) for the processing of a material with activity involves living bodies to produce goods and / or services. - Efforts to pest control using biological agents (plant) is an example of biotechnology in agriculture Principle: Principles of Biotechnology in the utilization of the attractant compound interest basil pest control fruit flies are: 1. The involvement of biological agents (interest basil) 2. There utilization of	SMK curriculum areas of expertise Biology 2013 Agribusiness and Agro-KD 3.6. Understanding the principles and applications biotechnology in agribusiness and agrotechnology Learning objectives: - Students are able to explain the concept of biotechnology in agriculture through the study of scientific research articles - Students are able to analyze the principles of biotechnology in agriculture through the study of scientific research articles - Students are able to explain the application of biotechnology in agriculture through the study	- - Read and observe the results of the research article - Identify the problems related material in the article Biotechnology research - Formulate hypothesis terkit issues that have been identified - Testing the hypothesis through review of the literature - Perform data analysis - Make conclusions - Prepare reports on the results of group discussions	Learning Module or LKS

	technologically (extraction technology) 3. Produce services / benefits for human well-being, which is to control fruit fly pest Procedure: The application procedure attractant compound interest basil to control fruit fly pest. The process includes: 1. Formulation of the problem 2. Determination of the hypothesis 3. Testing the hypothesis 4. Data analysis 5. Withdrawal conclusion	of scientific research articles

Based on the table above can be explained that, the results of research studies attractant compound interest basil (Ocimum basilicum) as a pest control agent of fruit rot have fulfilled the terms of a learning resource. Djohar (1987) in Suratsih (2010) stated that the terms of the learning resources are: 1) clarity of potential, 2) compliance with the purpose of learning, 3) clarity of objectives, 4) clarify the information that can be disclosed, 5) clarity of the document exploration, and 6) acquisition expected clarity. Conformity can be explained as follows:

1. Clarity potential, that the results of research studies attractant compound interest basil (Ocimum basilicum) as a pest control agent rotting fruit produce process and product knowledge of facts, concepts, principles and procedures relating to the biology class XI SMK material, especially material Biotechnology
2. Compliance with the purpose of learning, that is based on the analysis of the material is known that the process and product research results that correspond to the learning objectives of Biology class XI SMK at KD 3.6, ie understanding the principles and applications of biotechnology in agribusiness and agro technology (Permendikbud No. 70, 2013)
3. Clarity of objectives, that the results of these studies have a clear subject and object and contextual to be studied with regard to the example of Biotechnology in agriculture.

4. Clarity of information that can be disclosed. This has to do with the clarity of information acquisition either in the form of facts, concepts, principles and procedures that can be brought by the students associated with the example of biotechnology in agriculture.
5. Clarity exploration guidelines, it relates to the selection of a clear plan activities for students in the exploration of the learning resources, in this case through a review of scientific research articles. The design of this study course tailored to the available resources and abilities of students.
6. Clarity acquisition is expected, it is due to the acquisition of student learning outcomes, whether cognitive, behavioural or skill on Biotechnology material using these learning resources.

IV. Conclusion

The analysis of research result potential in the study of basil flower attractant compound as pest control agent in fruit has resulted some processes and products of knowledge such as facts, concepts, principles, and procedures. Based on the analysis result towards process and product (fact, concept, principle, and procedure) of research, the result can be used as a learning resource of biology XI class Basic Competence 3.6. in 2013 curriculum.

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1.	First Plenary Session	2 Hours, 30 Minutes
2.	First Parallel Presentation	2 Hours
3.	Second Plenary Session	2 Hours, 30 Minutes
4.	Second Parallel Presentation	2 Hours
Total		9 Hours

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