Proceeding
The 1st International Seminar on Chemical Education 2015
September, 30th 2015

Analysis of Psychomotor Students Ability the Practicum Bioethanol from Banana Peel

Nurdianti Awaliyah[1*], Mahwar Qurbaniah[1], Daniel Eriko[1]

[1]Department of Chemical Education, Muhammadiyah University of Pontianak
Jalan Ahmad Yani No.111 Pontianak, *email: pinkvenusia@yahoo.co.id

Abstract

Psychomotor learning outcomes is the result of learning related to the skills and abilities of individual acts. The purpose of this research was to analyze the results of learning (ability) psychomotor students for the course Practicum Organic Chemistry at the trial manufacture of bioethanol from banana peel in Program of Chemical Education Faculty of Teacher and Education University of Muhammadiyah Pontianak. Bioethanol is ethanol produced from plants by fermentation and at this practicum using a banana peel which is a waste of processing bananas were not utilized. Banana peel has a fairly high content of lignocellulose can be degraded to a simple form called glucose as a source of bioethanol formation. The method used is the direct observation of the students who are doing this experiment. Of the 24 aspects of psychomotor who wants observed with a maximum score of 96, the results of tests of psychomotor ability of student assessment instruments showed that there were 11,76% received the maximum score, 5,88% got a score of ≥ 90, 38,23% got a score of ≥ 80 and 44,11% who score ≥ 70.

Keywords: Practicum, Bioethanol, Psychomotor, Fermentation, Glucose

Introduction

According Sudjana (1990: 3) that the assessment of learning outcomes is a process of giving value to the learning outcomes achieved learners with specific criteria. Learning outcomes according to Gagne (1984: 63) there are five, namely intellectual skills, cognitive strategies, verbal information, motor skills, and attitudes. The results of the study psychomotor according Sudjana (1990: 30) is the result of learning related to the skills and abilities of individual acts.

Practicum is a special feature chemistry learning where students are expected to have the skills and ability to do the experiment, it is according to Susilaningsih (2012: 237) in order to gain the laboratory skills, laboratory experience, science process skills, investigation experience and increased chemical attitude. Practicum of Organic Chemistry is part of the courses of Organic Chemistry at which this course students learn about the structure, properties, composition, reactions, and synthesis of organic compounds. Experiments conducted in Practical Organic Chemistry is an experimental science related Chemicals

isolation of a compound in plants, the isolation of a compound in food as well as the reaction that occurs in organic compounds that exist in everyday life.

One of the experiments that exist in practicum of Organic Chemistry is making bioethanol from banana peels. Bioethanol is ethanol produced from plants by fermentation. Bioethanol not only become a very attractive alternative to gasoline substitute, but was also able to lower CO_2 emissions. The importance of this experiment in the practicum of Organic Chemistry at the Departement of Chemical Education, Faculty of Teaching and Education, University of Muhammadiyah Pontianak to be a provision to students as prospective teachers to utilize waste in everyday life into a new energy source that is safe for the environment.

Departement of Chemical Education, Faculty of Teaching and Education, University of Muhammadiyah Pontianak already started up in 2007. That departement create graduates who are prepared to be educators of chemistry at secondary school level and vocational competence adapted to the Minister of National Education in the Republic of Indonesia Number 16 In 2007 on Standars of Academic Qualification and Teacher Competency.

During this time, assessment of learning outcomes in the subject Practicum of Organic Chemistry in Departemen of Chemical Education, the Faculty of Teaching and Education, University of Muhammadiyah Pontianak only in the form of cognitive pre-test results, journals, practicum reports and responsiveness. This is contrary to the implementation of the courses Practical Organic Chemistry that more use of psychomotor skills. This is related to Government Rules No.19 of 2005 on National Education Standards in clause 25 subsection 4 that the competence of graduates includes attitudes, knowledge and skills. Psychomotor assessment conducted only limited to observation or unstructured observation so that an assessment considered unfavorable because it could be aspects of the skills assessed in each different learners. Because of this the need for assessment of learning in the psychomotor aspects of the courses Practicum of Organic Chemistry, so it can be seen psychomotor abilities when doing a practicum student.

Material and Method

Location of the research conducted at the campus of the University Muhammadiyah of Pontianak on Ahmad Yani street No.111 Pontianak with research subjects are students in departemen of Chemical Education who took a course Chemistry Organic Chemistry. The approach used in this research is qualitative, descriptive research with the aim to see the phenomena from the perspective of the participants to the environment as a data source where

from the data that has been found and the explanation of the theory that there emerged a new theory. The method used is the observation of practical implementation of the banana peels of bioethanol manufacture.

The first step is the preparation of samples, namely wash discarded banana peels after its end. Then the banana peels cut into small, blended, filtered and the filtrate was taken and deposited. The precipitate was then dried in the sun to dry. If the weather does not allow the drying can be done in the oven with a temperature of 45-50˚C. The second step is hydrolysis where the banana peels starch plus H_2SO_4 0,5 N solution with a specific weight in the three-neck flask. Then refluxed until a temperature of 100^0C for 2.5 hours. After it is cooled to the temperature of the room. Hydrolysis is filtered, to obtain a filtrate. The filtrate set a pH between 4 - 6. The third step is the fermentation where the filtrate of 100 ml put in erlenmeyer and added 6 grams of ammonium sulfate and 6 grams of urea as nutrients. Furthermore, pasteurized at a temperature of 120^0C for 15 minutes and then cooled. Add yeast 6.24 gram as media of fermentation. Then incubation is done by closing the meeting Erlenmeyer flask at a temperature range between 27-30^{o}C for 6 days and did distillation to obtain pure bioethanol.

Result and Discussion

Each of the steps in the lab making bioethanol from banana peels observed where the observations made is the psychomotor abilities of students during practical process of making bioethanol from banana peels. Here are the aspects of psychomotor abilities who wish observed.

Table 1. Ability Psychomotor Students who wish observed

NO	ASPEC OF PSYCHOMOTOR ABILITY
1	**Ability of sampel preparation**
	Ability of washing banana peels
	Ability of cutting banana peels
	Ability of blending banana peels
	Ability of filter
	Ability of dry up filtrat
2	**Ability of washing practicum instruments before practicum**
	Ability of washing labu alas bulat
	Ability of washing pipet tetes
	Ability of washing pipet ukur
	Ability of washing corong gelas

	Ability of washing Erlenmeyer
3	**Ability of setting practicum instruments**
	Ability of setting refluk instruments
	Ability of setting destilation instruments
4	**Ability of using practicum instruments**
	Ability of using pipet ukur
	Ability of using neraca analitis
	Ability of using pipet tetes
	Ability of reading meniskus
	Ability of fold up whatman paper
5	**Ability of doing practicum**
	Ability of doing hydrolysis
	Ability of doing fermentation
6	**Ability of washing practicum instruments after practicum**
	Ability of washing labu alas bulat
	Ability of washing pipet tetes
	Ability of washing pipet ukur
	Ability of washing corong gelas
	Ability of washing erlenmeyer

The table above is a psychomotor abilities of students who want to be observed by using numerical scala equipped with a rubric. Furthermore, based on this observation and calculated psychomotor assessment results as below.

Table 2. Results of assessment of psychomotor ability

NO	NAME	PSYCHOMOTOR ABILITY
1	ETR	72
2	RTW	84
3	YAS	86
4	RAK	84
5	EN	84
6	WTU	84
7	R	86
8	M	84
9	S	84
10	WMGI	86
11	SA	85
12	NH	84
13	DW	71
14	SS	74
15	PS	73
16	NF	74
17	SR	73

ISBN: 978-602-73192-0-2

18	N	73
19	RO	76
20	G	77
21	UL	76
22	MR	79
23	F	79
24	RSS	78
25	LDP	84
26	NS	72
27	I	85
28	RA	79
29	SJ	96
30	TP	95
31	NY	96
32	W	96
33	ZA	96
34	WK	94

Of the 24 aspects of the psychomotor wish observed with a maximum score of 96, the results of assessment of students psychomotor ability showed 11.76% are receiving the maximum score, 5.88% above that scores ≥ 90, 38.23% who score ≥ 80 and 44 , 11% who score ≥ 70.

Conclusion

Psychomotor ability of student assessment results show that there are 11.76% received the maximum score, 5.88% above that scores ≥ 90, who got a score of 38.23% and 44.11% ≥ 80 who score ≥ 70.

References

Anynomous, 1978. Statistika Indonesia. Biro Pusat Statistika. Jakarta.

Arikunto, Suharsimi dan Jabar Cepi Safrudin, 2008, Evaluasi Program Pendidikan Pedoman Teoritis Praktis Bagi Mahasiswa dan Praktisi Pendidikan, Edisi Kedua, Jakarta : Penerbit Bumi Aksara

Daryanto, 2012, Evaluasi Pendidikan, Jakarta : Penerbit Rineka Cipta

Gagne,Robert M, 1985, The Conditions Of Learning And Theory Of Instruction, Edisi IV, New York : Holt, Rinehart dan Winston

Harrow, Anita, J, 1976, Competency-Based Education and Behavioral Objectives,

Ibrahim. Sutini, 2011, Belajar, Pengajaran dan Pembelajaran. Pontianak : Fahruna Bahagia Press

Khairani, Rini. 2007. Tanaman Jagung Sebagai Bahan Bio-fuel. http://www.Macklintmip unpad. net/ Biofuel/ Jagung/ Pati.pdf. diakses tanggal 10 Oktober 2001

Muslich, Masnur, 2011, Authentic Assessment : Penilaian Berbasis Kelas dan Kompetensi, Bandung : PT Refika Aditama

Peraturan Pemerintah Republik Indonesia Nomor 19 Tahun 2005, Tentang Standar Nasional Pendidikan

Peraturan Menteri Pendidikan Nasional Republik Indonesia Nomor 16 Tahun 2007, Tentang Standar Kualifikasi Akademik dan Kompetensi Guru

Peraturan Menteri Pendidikan Nasional Republik Indonesia Nomor 20 Tahun 2007, Tentang Standar Penilaian Pendidikan

Popham. W.James, 1995. Classroom Assessment : What Teachers Need To Know, Needham Heights : Allyn & Bacon

Putra, Sitiatava Rizema, 2013, Desain Evaluasi Belajar Berbasis Kinerja, Jogjakarta : Diva Press

Sudijono, Anas, 1995, Pengantar Evaluasi Pendidikan, Jakarta : PT Rajagrafindo Persada

Sudjana, Nana, 2011, Penilaian Hasil Proses Belajar Mengajar, Bandung : PT Remaja Rosdakarya

Sukirman, 2012, Pengembangan Sistem Evaluasi, Yogyakarta : Penerbit Insan Madani

Susilaningsih, Endang, Model Evaluasi Praktikum Kimia di Lembaga Pendidikan Tenaga Kependidikan, Jurnal Penelitian dan Evaluasi Pendidikan Program Pascasarjana Universitas Negeri Yogyakarta

Widoyoko, S.Eko Putro, 2009, Evaluasi Program Pembelajaran Panduan Praktis Bagi Pendidik dan Calon Pendidik, Yogyakarta : Penerbit Pustaka Pelajar