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Research of classroom question design in beverage technology teaching

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Abstract: This paper explored classroom question design of beverage technology. The following principles were considered: constructing classroom question based on actual production situation, dialectical analysis and making the best choice, and promoting the scientific research thinking and innovation ability of students. Teaching measures includes controlling teaching process through appropriate label in lesson plan, eye-catching mark in PPT and interaction with blackboard, appropriately transforming simple knowledge into depth, changing complex into simplification through lively classroom question design, discussing hot issues and exploring their cause, and to make students acquire self affirmation through teacher reasonable summary. The effective designing of classroom questions might active classroom atmosphere, improve their learning interest, and cultivate them to pay close attention to beverage. Learning in relaxed atmosphere, students might solidly master beverage technology knowledge and acquire the exercise of scientific research thinking. Besides, their ability to apply knowledge and solve problems is also strengthened.
Keywords: beverage technology, classroom question, teaching design, Pedagogy

INTRODUCTION

Beverage was favored owing to its rich nutrition and delicious flavor. Its species involves carbonated drinks, fruit and vegetable juice, protein beverage, tea and solid drinks, etc. Meanwhile, many well-known companies and brands are also emerging. Beverage technology is an important application course of food specialty in Colleges and universities [1]. With the rapid development of beverage industry, more beverage special talents are needed. Currently, great importance in colleges and universities has been continuously attached to the teaching of Beverage technology [2].

Beverage knowledge seemed relatively simple and it can be divided into two categories of process and procedure [3]. Process knowledge, such as pressing juice, formulation, homogenization, sterilization and packaging, is to teach ascertain content in detail. Procedure knowledge refers to effectively and reasonable combination during beverage production. However, based on high quality requirements and fierce market competition, the use of beverage knowledge is very complicated. This requires students to have good ability to migrate knowledge and comprehensive decision. Therefore, teaching for training high quality special talents of beverage, needs to be continuously explored.

Classroom question is one of ways to interact in class. Questions may promote students to deeply think and try to answer under the guidance of teacher. During answering process, students discuss with each other and state their own views. Through interaction and communication, they deeply recognize and effectively master learned knowledge [4]. In view of the knowledge characteristic and application requirement of beverage technology, to design a reasonable classroom question is quite necessary. This paper explores to reasonably design classroom question in beverage technology teaching, so as to effectively improve teaching effect. There is no report about this study at current. Our research might promote beverage technology teaching and provide reference for other application course of food specialty.

Design principles

Constructing classroom question based on actual beverage production situation

Actual beverage production situation may increase learning interest of college students and make students have the feeling of scene. Question in actual production of beverage is to the point, promoting students to deeply think. These questions include protein beverage deposition, fruit juice brown, the flavor deterioration of carbonated drinks, solid beverage dissolution and so on, often faced in enterprises [5]. Through analyzing these questions, the application value of knowledge was embodied. Meanwhile students might give a solution after understanding problem causes. Moreover, seeking method is a review and reasonable retrieval of learned knowledge,

Dialectical analysis and making the best choice

Profits are a comprehensive of output, quality and cost. Take apple juice concentrated production as an example. If output enhances in special time, squeezing time is shorter. Accordingly, juice yield is reduced and fruit consumption increases. Thus, production cost probably ascends. However, if output is too low, production capacity can not be effectively played. Even if fruit consumption is reduced, production cost will also increase. In addition, production and quality are sometimes contradictory. Excessive pursuit of output and neglect of production line cleaning will bring quality problems, but mere quality pursuit may reduce output [6]. How to coordinate fruit consumption, production and quality depends on raw materials price and product market price. Actually, no uniform answer might be given. In addition, even if the same problem, such as beverage sterilization, was solved, there are a variety of methods to be chosen. A comprehensive consideration involving in shelf life, consumer groups and cost, needs to careful respect.

Promoting the scientific research thinking and innovation ability of students

In recent years, new beverage varieties, such as rock candy pear and vegetable juice, endless come and popularize in market. And production technology continues to improve. When we design classroom question, divergent thinking might be adopted, inspiring students to think deeply. With the increase and living rhythm and health pursuit, the convenience and nutrition of drink are concerned, needing to balance between them during developing new varieties. For example, what is the reason that the beverage of rock candy pear was prosperous in 2013? After effective control of juice browning and microbial problems, how to maintains more nutrients? Answers to these questions are a process of scientific exploration in itself. It is necessary for knowledge consolidation and sublimation.

Implementation process

Controlling teaching process through appropriate label in lesson plan

Lesson plan is a guiding document in teaching process. Classroom question was appropriately marked in lesson plan, including opportunity, answer discussion and organization implementation, etc. question may be shown before lesson, which promote students learn knowledge with problem, so as to improve their learning interest [7]. It might also be displayed after lesson so that students used learned knowledge to answer. This could consolidate learned knowledge and improve their application ability. As for answers, teacher might enumerate possible key points in lesson plan. However, the curriculum of university has relative divergence. The solving problem method of beverage production is also different, so the answer provided by teacher is only for reference, and specific answer comes from student discussion. In the implementation process of classroom questioning, students might raise their hands to answer some small questions, expressing their own view. As for complex problems, especially balancing problem in beverage production process, appropriate grouping and discussion are necessary. And each group selected a representative to communicate. The whole question contents involving various aspects of beverage production are clearly marked on lesson plan, so that class question process was carried out in an orderly way.

Eye-catching mark in PPT and interaction with blackboard

The knowledge of beverage technology involves technological process, process principle and equipment description, etc. By virtue of PPT, flow chart, schematic diagram, device structure, etc. might clearly display for students. For example, fruit juice clarification includes natural, enzymatic, clarification, frozen, heat and clarifier methods. Each clarification method has a corresponding demonstration in PPT. At the same time, it will be clearly recorded on blackboard [8, 9]. Once all clarification methods are taught, a question arises. If you are production manager, please choose a clarification method for fruit juice in autumn or winter. A picture with busy farmer to harvest apples is listed in autumn, and a photograph with fruit store in winter, and then a glass of clear apple juice. Students naturally think that apple raw material in autumn and winter is a different. Apple experienced storage process and their physical and chemical properties changed. Starch content in just mature apple is high, gradually converting into sugar in winter. Enzymatic clarification method should be chosen. Might Natural clarification be chosen? No, it needs too long time with low production efficiency. Is heat or clarifier methods considered? Adopt. Especially in just mature apple, its composition is complex, heat or clarifier methods are necessary to clarify apple juice. Juice produced with later postharvest apples might only adopt heat methods.

Considering high cost and convenience, frozen clarification is meaningless in actual juice production. According to the discussion result of students, marks were set down near chosen methods in blackboard. And some methods that were unsure were marked with question mark. At the same time, to produce high quality apple juice, chosen clarification methods were rational combination through special sequence.

Appropriately transforming simple and easy knowledge into depth

Beverage technology seems very simple, and there is no something profound to teach. And students are not enough interest in general class. With the help of classroom question design, magical effects might be achieved. For example, the homogenization and sterilization processes of plant protein drinks are quite simple. A classroom question analyzing the impact of homogenization and sterilization process on beverage

quality is designed. First homogenization and then sterilization may effectively control harmful microorganisms, but beverage texture will deteriorate [10]. First sterilization and next homogenization may improve texture, but potential microbial risk may arise. How to implement sterilization and homogenization in actual production? Sanitation condition and market requirement determine the sequence of sterilization and homogenization. Under better sanitation condition and high market requirement, sterilization is first and homogenization is second. Thus, food safety and product texture all achieved. Contrarily, to ensure food safety, poor sanitation requires first homogenization and next sterilization, sacrificing part texture. Via classroom question design, a simple and small content lead to the big background of actual market. Thus, seeming simple question needs to be carefully considered.

Changing complex into simplification through lively classroom question design

Some beverage knowledge is very complex, still constant explored. Take walnut milk precipitation as an example [11]. First of all, the students were leaded to analyzing reason of precipitation. Usually, following reasons bring precipitation. Beverage pH is close to protein isoelectric point and leads to precipitation. Natural polymers, such as cellulose and starch, also form precipitation. Additionally, microorganism or water quality sometimes causes a small portion of walnut milk precipitation. Afterward, students were encouraged to prepare solution projects. Teacher asked that students choose more than one project. To prevent the precipitation of pH induction, organic acid or weak base may be added into beverage, making beverage pH diverge the isoelectric point of walnut protein. With regarded to precipitation caused by natural polymer, beverage particle may be further ground using colloid miller or homogenizer, or an appropriate amount of thickener was added into beverage to avoid precipitation. In this way, a complex issue was dismantled into several small parts. And students solve the questions one after another, solidly mastering beverage knowledge in a relaxed atmosphere. Many students participate in some projects, such as Innovation Cup and Challenge Cup, through choosing the themes in relation to beverage processing problem, and they acquired a variety of honors. This suggested that changing complex into simplification is an effective classroom questioning design.

DISCUSSING HOT ISSUES AND EXPLORING THEIR CAUSE

Hot issues might easily arouse learning interest and inspire students to think deeply. For example, in 2011, it was reported that plasticizer, a non food additive, replaced food grade emulsifiers of protein drink [12]. Here, following classroom questions might be designed. Why did beverage enterprises apply plasticizer? What was the harm to human body of plasticizer? What status of beverage market did plasticizer event reflect? How to adjust regulatory aspects of beverage production in regard to government? How to reduce the production cost of beverage? Through designing a series of classroom questions to inspire students, students might master protein drink knowledge. In addition, they will also actively thinking, attempting to solve the real problems in actual beverage production. Through class discussion, students usually draw following conclusion: emulsifier with hydrophilic and lipophilic groups is very important to stability of fatty protein beverage. Beverage enterprises competition is quite fierce and there are some loopholes of current laws or regulations. Individual enterprise pursued business interests, ignoring food safety. They added plasticizer, a harmful substance to human body, into beverage during production process. Based on this hot issue, beverage enterprise should effectively improve production technology in research aspects, trying to reduce costs and increase quality. In addition, some popular beverages in recent years, such as cereal drinks, fruit juice and functional beverage, involved in a series of issues to be discussed. During discussion process, students paid close attention to market demand, thinking to reform production technology from market demand. Thus, teaching effect was effectively improved.

To make students acquire self affirmation through teacher reasonable summary

Teacher moderately comments on the given answers by students. As beverage technology knowledge, no answer is right or wrong usually, but only is reasonable based on the consideration of quantity and cost. Of course, the rate of quantity and cost is broad, including technical feasibility, the relation of supply and demand of product market, and supplying status of raw material. It is an analysis of comprehensive economic benefits. Beverage usually applies agricultural products, such as fruit, milk, peanuts, tea and so on, as raw materials. The price fluctuations of these agricultural products are often very different. If price is low, the ratio of input and output of raw materials might be neglected to some extent. Beverage enterprises might produce more yields in specific time. On the contrary, if price is high, input-output ratio should be increased for decrease of production cost [13]. Additionally, there is larger price fluctuation of beverage product among different years or different seasons in one year. Therefore, when beverage is produced, the probable acquiring benefit should be taken into account so as to select appropriate process and obtain the maximum profit. Based on different views, students might draw diverse conclusions [14]. Answer content is secondary, and the key is that students can make the most reasonable arrangement in production line according to integrated market environment. Therefore, students may together discuss the same question and then gives an answer. Likewise, each student may supply an answer and several answers were together compared via teacher

guide. Thus, each student may get opportunity to think and overall master knowledge through mutual communication, enjoying learning happiness. In addition, this comment of teacher might help students to continuously make a reasonable judgment when they face fierce market competition, forming effective program for beverage enterprise production.

Prospect

In beverage technology teaching, the effective designing of classroom questions might active classroom atmosphere, improve their learning interest, and cultivate them to pay close attention to beverage. Learning in relaxed atmosphere, students might solidly master beverage technology knowledge and acquire the exercise of scientific research thinking. Besides, their ability to apply knowledge and solve problems is also strengthened.

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