Methodical Development of the Topic:

“The Impact of Non-Alcoholic Beverages on a Human Body”

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Abstract: The paper presents a development of the topic: “The Impact of Non-Alcoholic Beverages on a Human Body” on the subject: “Sustainable Development and Ecology”. Work execution consists of two stages. The first stage includes the study of literature review, preparation of the abstract and the individual presentation. The second stage includes the following practical works: the inquiry of students of the first course (for clarification of the preferred drinks and value of E codes); the experiment (the impact of the irrigation quality on bean development); practical classroom work (study of E codes, revealing of beverages according to the degree of usefulness to humans). As a result of work done, the students get, first of all, a practical skill, how to choose beverages to drink; an ability to collect and develop material to promote environmental education among the population; replenishment of the archive of methodological experience; a student has further continuation, many schools use the prepared by students films with pleasure for the environmental education of the younger generation.

Key words: A component • E code • A label • A non-alcoholic beverage

INTRODUCTION

Instability of environment results in creation of conditions for implementation of ecologization process to all spheres of human intellectual development. That is why many teachers include different components of environmental knowledge to educational programs. Even now one of the obligatory conditions of execution of the studied discipline program in the institute is the preparation of individual research works, which are presented before the mid-term examinations. To stimulate the students’ interest, the topics shall be interesting, urgent and informative and the methods of their execution shall be simple enough and illustrative [1]. Pedagogical experience shows that it is very interesting to execute the works, connected with the evaluation of social and economic living environment in anthropoecosystems, taking into consideration population nutritional conditions, study of ecological compatibility of the products and their usefulness [2, 3].

It is known that the human health depends on the quality of the consumed beverages [4-6]. The most active consumers of non-alcoholic beverages are children and young people under 30 years. To consumption of beverages, frequently in great quantity, they are attracted by dewy effect, conferred to the drink by such agents, as carbon dioxide, different food additives and organic acids. As a rule, the majority of non-alcoholic beverages contain high concentrations of simple carbohydrates, preserving agents, which make the product acid; afterwards, it can have a negative impact on health and well-being [7-10].

Unfortunately, the inquiry statistics in the Korkyt Ata Institute showed, that the majority of students are sure, that non-alcoholic beverages can not do hurt to a person and drink them in quantity.

It was repeatedly proved, that food and drinks consumer habits are developed early in life and frequently pass to adulthood [11]. That is why, we consider, that in all institutes it is necessary to carry out the explanatory work on study of the risks, connected with their consumption. Formation of "ecological intellect" of the younger generation shall be of primary importance and the programs of subject disciplines shall be reviewed from these positions [12]. Due to the abovementioned, in class of the subject: "Ecology and Sustainable Development" on the topic "Anthropogenic Environmental Factors and
Their Health Effect", the issues of modern technologies of food production and their health hazard are compulsory for study. Today we would like to present a procedure of the following topic execution: "The Impact of Non-Alcoholic Beverages on a Human Body". As there is little time in the curriculum, the presented topic is studied only at SIWT classes (the student's individual work under the teacher's guidance) and includes several stages.

**Work Procedure:** The first stage includes the study of literature review, reflecting the main characteristics of non-alcoholic beverages; preparation of the abstract and the individual presentation on this topic.

The second stage is the practical solution of the definite environmental tasks:

- the inquiry of students of the first course;
- execution of the individual practical work. For this each student carries out the experiment with bean in fourfold replication with two variants. The first variant of the experiment is watered by the beverage, drank by the student every day. The second variant is a control one: beans are irrigated by ordinary water. The whole experiment is reflected on the photo;
- the harmfulness of the most frequently used beverages is determined as per the compiled lists of E codes.

To get 10 points the student shall hand over a literature review on the studied topic; a report; an individual presentation; the results of individual practical work.

**The Results of the Work Done:** As per the literature review, alongside with another information on the given task, the student's report shall include the following data:

- all non-alcoholic beverages are prepared based on portable or mineral water of no more than 1.0g/dm³;
- a volume ratio of ethyl alcohol in non-alcoholic drinks can vary from 0,5 – 1,2%;
- The main types of non-alcohol beverages include: aerated fruity natural; aerated on the basis of synthetic essences; aerated dessert; still; dry concentrates;
- full beverages include fermentative drinks - the cultivation products of mono or associated germ cultures.

Analyzing the required material, the students summarize the acquired information for further argumentation of the topic relevance. The most significant is the following conclusion: "Drinking of non-alcoholic beverages can not always be safe for a man".

The reports are prepared on the topics at option:

- Kazakh culture of consumption of non-alcoholic beverages;
- Characteristics of non-alcoholic beverages, produced in Kyzylorda district;
- Characteristics of non-alcoholic beverages and mineral water;
- Identification and adulteration of non-alcoholic beverages.

Working on the report, the student points out relatively "useful" and dangerous non-alcoholic beverages for a man. He also selects the most acceptable estimation procedure for non-alcoholic beverages, taking into account the existing material resources, providing the reliable and reproducible results. The students select the definition of quality of non-alcoholic beverages based on the labels using a special code (so called INS - International Numbering System), involving three or four numbers, preceded by the letter E in Europe.

Main topics of individual presentations:

- Food colors;
- Preserving agents;
- Antioxidants;
- Stabilizing agents;
- Emulsifying agents;
- Flavor intensifiers;
- Antibiotics;
- Glazing agents, sweeteners, aerators, acidity regulators and other classified additives;
- Ferments, biological catalysts;
- Modified starch;
- Chemical solvents.

All presentations have the following plan:

- Characteristics of the additive;
- E codes, belonging to this group;
- Main diseases, caused by these additives.
One of the important stages in this work in a presentation. Having the required theoretical knowledge on the topic under study, the student vividly makes sure of danger of some non-alcoholic beverages for a man. Execution of the first stage provides the students with the full presentation about the topic under study and also convinces them in significance and weight of this work, thanks to which they will be able to determine the quality of the selected beverage accurately.

After listening and evaluation of presentations, all data is mounted in one film and provided with voice.

A questionnaire of the second stage included the following questions:

- What do you usually drink every day and why?
- Do you read the bottle label before buying the drink?
- Do you know about E-codes?

On the first question from 100 of respondents-students of the first course, 95% replied that they drink aerated beverages (because they allay thirst well), 5% prefers still drinks. The first place - 80% - is taken by the drinks of Coca-Cola Company and only 20% prefers other companies. On the second question from 100 of respondents, 98% replied "no" and only 2% of students replied "yes". On the third question all respondents replied in the negative.

As per the results of the inquiry, the students came to the conclusion by themselves, that it is necessary to strengthen the environmental education among population regarding the problem of drinking non-alcoholic beverages, especially among young people.

Let us review the results of the individual practical work, for instance, where the drink Pensi was used for watering (1 variant). The results were the following: on the 6th day in the 2nd variant - control (irrigated by ordinary water), 100% sprouts were recorded (photo 1-2); In the first variant (watering by Pensi) the sprouts were not recorded. The seeds were bulgy, seed cover freely peeled from seed lobes (photo 1-1). On the 15th day the growth of all germs in the control was equal to 6 sm, whilst in the first variant, almost all seeds lost their peel and became hard (photo 1 -3,4).

Photo 1: The impact of watering quality on bean germination and growth.
Germination on the 6th day and growth of germs on the 15th day: watering by Pensi 1 -1; 1 -3; control 1-2; 1-4.
Individual practical work, from our point of view, is an important element in formation of environmental consciousness, regarding the problem under study. The students, analyzing the death of the bean seeds, which were watered by one or another beverage (as opposed to the presentation, based on the ready material), make sure in their danger for living organisms in case of their usage. Many refuse from their favorite drinks.

The photos of the collected material of the individual practical works are edited and provided with voice as a film continuation, where the presentations of the first stage are included.

The work is finished with the practice in class. The purpose of the work: learn to work with E codes; studying the labels, learn to reveal the drinks based on the degree of usefulness: harmful and "relatively" harmless.

To achieve this aim, the following goals are set: to prepare the labels of the drinks, which are most frequently used in the student environment; download the tables with E additives from the internet.

Each student gets one label, based on which he studies the composition of the drink. Then he makes a conclusion about its value. For instance, the composition of Coca-Cola is studied. For this a student makes a table [11].

<table>
<thead>
<tr>
<th>No.</th>
<th>Component</th>
<th>Functions</th>
<th>E-code</th>
<th>Type</th>
<th>Codes</th>
<th>Impact on a man</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Citric acid</td>
<td>Acidity regulator</td>
<td>E-330</td>
<td>Food additive</td>
<td>E-330-399</td>
<td>Carcinogen in large amounts</td>
</tr>
<tr>
<td>2</td>
<td>Potassium sorbate</td>
<td>Preservation of products</td>
<td>E-202</td>
<td>Food additive</td>
<td>E-200-299</td>
<td>Allowed</td>
</tr>
<tr>
<td>3</td>
<td>Ascorbic acid</td>
<td>Prevents oxidation</td>
<td>E-300</td>
<td>Organic compound</td>
<td>Allowed</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ethers of glycerol and resin acids</td>
<td>Preserve consistence of products</td>
<td>E-445</td>
<td>Food additive</td>
<td>E-400-499</td>
<td>Alimentary tract diseases</td>
</tr>
<tr>
<td>5</td>
<td>Guar copper</td>
<td>Thickener and stabilizer</td>
<td>E-412</td>
<td>Food additive</td>
<td>Skin, kidney, liver diseases</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Beta-carotene</td>
<td>Add color</td>
<td>E-445</td>
<td>Food additive</td>
<td>Harmless</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Food colors</td>
<td>Add color</td>
<td>E-290</td>
<td>Food additive</td>
<td>(E-100-E-199)</td>
<td>Allowed</td>
</tr>
<tr>
<td>8</td>
<td>Carotene</td>
<td>Add color</td>
<td>E-338</td>
<td>Antioxidants</td>
<td>Anticarcinogen</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Carbon dioxide</td>
<td>Preservative and aerator</td>
<td>E-338</td>
<td>Antioxidants</td>
<td>Stomach diseases, bones deformation</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Orthophosphoric acid</td>
<td>Acidity regulator</td>
<td>E-338</td>
<td>Antioxidants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Coffee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The students determine the beverage quality as "relatively" dangerous or safe as per the labels of the analyzed drinks. More often the list of "relatively" dangerous ones is much longer. The effect, reinforcing the obtained knowledge, is a collective analysis, summarized result and the visualization of the obtained results.

The result of the practical work is the conclusion. Each student writes his conclusions on the studied beverage individually. Then all conclusions are placed to an interactive board for visualization. The conclusions with the same meaning and not convincing ones are excluded. As as result we have the following generalized picture. When buying a beverage, make it a rule, first of all, to study the label; choose the hazardous components; analyze; think if it is worth buying, maybe it is better to prefer the ones, produced on natural basis.

A teacher pays much attention to the summarizing practical work. It is important for us if the students have acquired the skills in selection of beverages for drinking. Long-term work experience proves that such classes with set of tasks, different in execution, (where the students get knowledge not only according to the teacher's lectures, but also get on their own) show good results [13].

Work summary:

- Students get a skill, important for life, how to choose the beverages to drink;
- A practical knowledge to collect the material to promote environmental education among the population;
- Replenish the archive of methodological experience;
- This work also has a further continuation, many schools use the prepared by students films with pleasure for the environmental education of the younger generation.
REFERENCES


