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METHODS OF TEACHING ORGANIC CHEMISTRY TOPICS THROUGH PROBLEM-BASED LEARNING

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ABSTRACT

Organic chemistry is a complex branch of chemistry, and mastering its processes and reactions can be difficult for students. This article discusses effective methods for teaching organic chemistry topics through problem-based learning methods. Theoretical foundations, practical problem-based learning methods, and their use in teaching organic chemistry experiences analysis will be done.

Keywords: *problematic education, innovation pedagogy, education process, laboratory experiments, isomers, molecular structure, esterification reaction, didactic approach, mutual communication, student activity, creative thinking, analysis and synthesis, interactive games, real-life problems.*

Organic chemistry has modern technologies and plays an important role in the development of science. This field of science involves complex chemical processes and the structure of molecules. Therefore, it is important to increase the activity of students in the learning process and develop their independent thinking skills. Problem-based learning methods in this regard effective tool is [1].

Problematic of education theoretical basics. Problematic Education is about teaching students to independently research, analyze problems, and find solutions. Instigator pedagogical method [2]. This method is as follows main to the principles relies on:

1. Problem Creation: By presenting students with a new, yet unsolved problem, they attention attraction to do

2. Interaction: Enriching knowledge through group work and discussing problems together.

3. Analysis and synthesis: Applying the necessary knowledge to find a solution to a given problem.

4. Reflection: Analyzing the process carried out and drawing conclusions.

Organic chemistry problematic education application methods.

Problem-based learning in organic chemistry is implemented through various methods that interest students and encourage them to explore:

1. Problematic questions put. Organic chemistry in their classes the clarity and interest of the questions students to think encourages [3]. For example:

- ✓ Alcohols what for in the water good soluble, but hydrocarbons does it not melt ?
- ✓ Isomers how as physicist and differ in chemical properties?

2. Laboratory Practical experiences. in training students problematic to situations to put through knowledge reinforcement possible. For example:

- ✓ What for one kind of the substance various isomers every kind in color will it be?
- ✓ Esterification in reaction which factors process to the speed impact does it?

3. Interactive games and simulations. Computer programs and virtual labs using organic chemicals processes to teach effective is [4] .

4. Real life problems solution to do . Students daily in life organic chemistry with Engaging them in science-related issues increases their interest in science. For example, the use of preservatives in food products chemical the composition study.

Organic chemistry in teaching problematic in education stay possible was from questions samples:

Question	Purpose
What for carbon chains length organic of compounds physicist properties impact does it?	Molecular structure and properties dependence analysis to do
What for alkanes and alkenes to react accessibility according to different?	In the joints connection type and their to react to enter features explanation.
What for aromatic compounds permanent accordingly high to stability have?	Aromaticity and delocalization concepts interpretation.
Alcohols what for in the water good soluble, but hydrocarbons does it not melt?	Polarity of molecules and apollo features analysis to do
What for carboxylic acids in the water strong acidic property have?	Acidic hydrogen and resonance stabilization explanation.
Acetone and water mixture evaporation speed what for difference does it?	Water and organic solvents between hydrogen connection explanation.
What for polymers physicist properties monomers to the structure related?	Polymerization process mechanisms analysis to do
What for boiling point one kind molecular mass with isomers between difference does it?	Molecule shape and mutual impact forces between dependency explanation.
Amino acids what for juicy in solutions amphoteric properties manifestation will it?	Amino and carboxyl groups acid and basis properties interpretation.
Catalysts what for esterification reaction speed increases?	Reaction energy barrier and catalyst role about concept to give

Problematic of education advantages: problematic education through Teaching organic chemistry topics leads to the following results:

✓ Students' independent thinking skills develops.

✓ Students' own knowledge learns to apply it in practice.

✓ Fannie's mastery level increases.

✓ Creative thinking and analytical skills are formed.

Organic chemistry topics Teaching through problem-based learning methods makes the learning process more interesting and effective. Students develop independent thinking and problem-solving skills, and learn to apply theoretical knowledge in practice. This will allow them to successfully work not only in organic chemistry, but also in other fields. to go help gives.

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