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TRANSLATING SCIENTIFIC TERMINOLOGY

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ABSTRACT

This article explores the difficulties in translation of scientific terms, particularly scientific terms and terminology related to the chemical industry. Translating terms related to synthetic cannabinoid are in the focus of research study. A key aspect of article is to study structural and semantic peculiarities of the chemical terminology. In addition to this, the article attempts to investigate the difficulties faced in chemical research document translation. The author reveals regularities in formation and operation of English chemical terminology both in English and Uzbek languages. It will make a contribution to further development of terminology, and to the process of the study and systematization of the professional knowledge of chemical translators.

KEYWORDS: *Scientific Terminology, Method And Principle Of Term Formation, Chemical Translation, Chemical Terminology, Analysis Of Synthetic Cannabinoid Receptor Agonists, Classical Cannabinoids, Organic Solvent, Active Compound, Methanol, Ethanol, Acetonitrile, Syntheses Of Aminoalkylindole*

INTRODUCTION

THE METHODS OF RESEARCH

The methods of research cover the ways of translation through such as descriptive method of translation, transliteration and some important points of transformations in the process of translation.

It is essential to highlight that Uzbekistan is a country in whose area development of science and culture has begun since ancient times. In particular, there were broadly developed such sciences as chemistry, astronomy, mathematics, medicine, history, philosophy, linguistics, literature, and, pottery, etc. We have the right to say with great pride that our science goes back to very ancient times, has indeed deep roots. Throughout the centuries it reliably serves to the Uzbek nation, to all mankind in knowledge of secrets of the nature, chemistry, medicine, philosophy, algebra, literary and linguistics. Currently, scientists of Uzbekistan's are actively exploring scientific heritage left by ancient scholars, enrich science with their new discoveries and research work, and of course, making a significant contribution to world science. **[1]**

Chemical industry of the Republic of Uzbekistan includes enterprises, producing mineral fertilisers, chemical plant protection agents, chemical fibres and threads, polymeric items and other products

The ongoing large-scale reforms have a profound effect on the chemical industry in Uzbekistan. However, the systemic problems in the industry that have accumulated over the years still await their solution. Hence, industrial enterprises for the production of mineral fertilizers found themselves in a complicated financial situation. In this connection, Uzkimyosanoat JSC was instructed jointly with the relevant ministries and departments to develop a program of concrete measures to reduce the cost of production of chemical products and increase its competitiveness in 2020-2022. **[2]**

The development of education programs on various profiles of chemistryin higher education institutions also demands their unification as there are quite often problems in the interpretation of various Uzbek-language and English-language chemical terms. Dictionaries, especially in which English equivalents are given along with their Uzbek terms, play a significant part in the solution of these problems. However, we leant that there is a great lack of explanatory dictionaries **[3]**

It should be pointed out that this article represents a theoretical value for those willing to take up their future carrier in the field of translations as invaluable reference to the methods and the ways of translation of scientific documents. Theoretical value of the research work is concluded in that it reveals regularities in formation and operation of English chemical terminology. It will make a certain contribution to further development of terminology, and to the process of the study and systematization of the professional knowledge in chemistry industry. **[4]**

MAIN PART

Chemical terminology is one of the most complex and challenging. The qualitative translation of chemical documents has a number of features, such as translating specific vocabulary, chemical formulas and equations, chemical reactions, accurate presentation of the material in the total absence of emotional elements.

Approaches and methods of translating terms from English were in the focus of research of Juan C. Sager,E. Mantzari, K. Valeontis*M. T. Cabre and Russian researches E.A. Alekseeva, V.N. Komissarov, M. N. Latu, V. Z. Tarantul.*

A considerable amount of literature has been published on formation of the scientific terms. For example, Juan C. Sager claims that there are two types of term formation that can be distinguished in relation to pragmatic circumstances of their creation: primary term formation and secondary term formation.(C. Sager,2001)Primary creation accompanies the formation of a concept and is monolingual. Secondary term formation occurs when a new term is created for an existing concept. E. Mantzari and K.Valeontis investigated three methods of term formation applied in the English language, such as creating new forms, using existing forms and translingual borrowing**.** (K. Valeontis and E. Mantazari 2006). Professor Blaise Nkwenti- Azeh supports the idea that the speed of scientific and technological development has given rise to an unprecedented growth of special vocabulary. In his analysis of scientific terminology formation he identifies that terminology is now being created simultaneously in many parts of the world, which leads to an inevitable multiplicity of terms, formed according to different principles, many of them with an equal claim to acceptance and use. **[5]**

Chemical terminology is the means of communication within the Physical chemistry, Inorganic and Organic chemistry, Agrochemistry, Analytical chemistry, Astrochemistry, Pharmaceutical

chemistry and Biochemistry. Subsequently, it is become too obvious that modern chemistry deals with almost all areas of human activity: pharmacology, industry, medicine, agriculture, and ecology.

In recent decades, the interest of translators and interpreters in various branches of science and technology to the problems of specific-sector terminology has dramatically risen, which is explained by growing flow of scientific and technical information and the intensification of science terminology. The latter factor is especially essential for scientific terminology due to adoption in recent years of a large number of new laws and research studies in chemistry sector in the contemporary world.

It is well-known that the dictionary is to assist in promoting basic understanding of the main chemical processes by specialists, to help with planning of researches; publishing and patenting of obtained scientific results. Especially it is important in educational process when forming competences of bachelors, masters, and graduate students. Moreover, it is especially important when students learn chemistry and acquire a complicated scientific language, and when researchers and practices use correct terms. **[6]**

Majority of chemical terms are derived from Greek and Latin and originated in 300 - 400 B.C. Today, both of these are considered to be dead languages (they are unchanging). Moreover, modern chemical terminology is enriched by borrowings from not only Greek and Latin, but also English, Arabic, French, German languages.

Most terms contain two or three components and can be broken down into parts. The best way to learn chemical terminology is to become familiar with the structure and the most commonly used components. Chemical terms are formed from two or more word parts. There are several major word parts that are used to make chemical terms. A word root is the fundamental part of the word that provides the main meaning for the word. In chemistry a root identifies the longest continuous chain of carbon atoms. They usually are derived from Greek or Latin. Suffixes are word parts attached to the end of a word or word root that alter the meaning of that word root. In chemistry a suffix identifies the main functional group in the molecule. The particular suffix used on a noun often categorizes what the chemical is. An "*ase*" suffix denotes enzymes. An "ene" suffix often defines a gas like benzene. "Oxyl" is added for hydrogen compounds, hydroxyls. There are suffixes which denote proteins, salts, minerals, radicals.

In 1990, famous translator and linguist V.N. Komissarov published a book, Theory of translation in which he explored five regulatory requirements for translation. Have a close look at them. First it is the equivalence rate of the translation (communicative equivalence of the original and translation texts) The second point is the genre-stylistic norm of translation (the requirement of correspondence of translation of the dominant function, type and stylistic features of the text to which the translation refers) The next point focuses on the norm of translation speech (interaction of rules of norm and language of language); The forth explores the conventional norm of translation (the requirement of maximum proximity of the translation to the original) and last points ends up with the pragmatic norm of translation (the requirement of providing a pragmatic value of translation).Have a close look at the main ways of translating chemical terms.

1. ***Transliteration*** and ***transcription*** are often used to translate ***eponymic*** terms. An eponym is a word derived from the name of a person, whether real or fictional. In medicine the term eponym

is generally understood to mean something (like a disease or device in medicine) which has been named after a person. These eponyms are generally understood to honour the discoverer. The most common way is to add an apostrophe‘s’ to the name of a person. Take an example, ***Boltzmann distribution-Boltzmantaqsimoti; Bingel reaction- Bingelta’siri***

In grammar, this is called a synthetic genitive, possessive type. Take one example of this, the syndrome caused by trisomy is either Down syndrome or Down’s syndrome, and not Downs’ syndrome, because it is named after John Langdon Haydon Down. We consider it appropriate to combine both methods, since in modern translation practice it is customary to transcribe a foreign language lexeme, while retaining certain elements of transliteration. In addition, the transmission of both the form and the sound composition is always conditional and approximate, since the phonetic and graphic systems of the Source Language (SL) and Target Language (TL) are, as a rule, significantly different. A significantly smaller number of non-eponymic English terms in the sphere of chemistry are translated using ***transcription and transliteration.*** Take an example, ***cation- kation; clathrate- klatrat; hadron-adron***

2. Another way to translate chemical terminology is ***calque.*** This technique is often applied to translating compound terms or term phrases, as well as the word-by-word translation of terminological phrases. For example, ***fluoronanotube- fluoronanotrubkasi; nanocell-nanohujayra****;* Moreover, syntactically formed terminological units can be translated by the method of ***calque*****:** For example: ***biochemical nanodevice- biokimiyo***

3. ***Explicatory (descriptive) translation*** *and* ***expansion.***This technique is used for verbalizing new objects, not existing in the target language; For example, ***reacclimatization – ilgariyashaganorganizmlarniatrofmuhitgakiritish***, In addition to the above methods of translation of terminology, chemical term can be translated by a descriptive construction. In the absence of an equivalent and analogue, including their ignorance, as well as the impossibility of using transcription and /or transliteration, the term is translated by means of a descriptive translation, in which the meaning of a foreign word is revealed with the help of a detailed phrase. However, the descriptive technique is justified by the lack of an appropriate technical term in the source language. In English-to-Uzbek translation, a more explicit character of Uzbek language can necessitate the descriptive technique. For example: ***CVD-method- bug '(gaz) fazasidankimyoviycho'kishusuli;ionic deposition - yo'naltirilgan ion nurlariningbirikishi***

4. ***Contextual translation*** is another way of translating terminological vocabulary, within the framework of which the dictionary correspondence is replaced. In this case, the translator pays attention to the context in which the term is placed, and chooses the correct correspondence from the translation options or a number of synonyms. The difficulty in translating can also be caused by the presence of interdisciplinary terminological homonymy and the polysemy of terms. For example: ***alpha- alfa-radiatsiya, alfa-zarracha, alfa-funktsiyasi; nanocolloid-nanokolloideritma, kolloidnanosistemsi***

A translator who embarks upon the path of chemical translation has two main obstacles: chemical knowledge and chemical terminology. Chemical terminology presents problems which are different from other specialised. We try to present the most obvious problems in determining the right chemical terminology. One of these problems is a special category of words, and the so-called **“false friends of a translator”**(R.A. Budagov,2004)It should be noted in this connection that “false friends of a translator” are a problem not only for learners of foreign language but also

for those whose command of foreign languages is excellent. And it is quite natural because the first reaction of a person to a foreign word resembling his/her native word is to consider its meaning as coinciding with the meaning of a similar native word. Moreover, the existence of the international vocabulary and borrowings can be misleading. The only way for a translator to distinguish "**false friends of a translator"** from international vocabulary and borrowings is to learn and to know them. Words which formally, graphically or by sound are similar and semantically different. English and Uzbek terms can be more or less similar in form but different in meaning. As we mentioned above such words are often referred to as the so-called translators false friends. These linguistic units are of great interest to the translators as they are naturally inclined to take this formal similarity for the semantic proximity and to regard the words that look alike as permanent equivalents. However, their formal similarity suggesting that they are interchangeable may cause translation errors. As a rule, the formal similarity is the result of the two words having the common origin, mainly derived from either Greek or Latin. For example in the sphere of chemical industry these terms shall be translated as: ***benzene*** *- benzol (but not benzin);* ***angle*** *- burchak(but not angel);* ***billet*** *- yog'ontayoq; (but not bilet);*

The purpose of the current study was to determine that the chemical translator faces in translation of chemical documents are the following:

- Some chemical terms have their permanent equivalents in Uzbek terminological systems: ***alkaline medium*** – ***ishqorlimuhit***
- Many terminological equivalents in Uzbek language are formed from the English terms by ***transcription or loan translations***: ***atom*** – ***atom***, ***proton*** – ***proton***, ***diode*** – ***diod, ion- ion***
- ***Transliteration*** and ***transcription*** are often used to translate ***eponymic*** terms. Eponyms – terms named after the person who first identified the condition, described the procedure.For example, ***Bingel reaction- Bingelta'siri, Boltzmann distribution-Boltzmantaqsimoti***
- In some cases there are parallel forms in Uzbek: one formed translated by transcription (a loan-word) and the other which is usually a native word. For example:**ekvivalentlik**and **tenglik**; **balans**and **muvozanat**; **rezistor**and **qarshilik**; **buster** and **tezlatkich**;
- The chemical terms that consist of one word or a word combination consisting of two words may cause difficulties while translating. Such combinations may consist of two or more elements.

1) by an adjective: **fuel cock** – **yoqilg'ilijumrak**;

2) by a noun in the Genitive case: isobutylene oxide – oksidizobutulini

These findings suggest that there are some primary ways of interpretation of terms and in the practice of translation of the chemical documents and chemical terms can be translated by applying the most common following four methods:

1. by direct borrowing (transliteration or transcription):

The most frequent transformation of chemical terms is a transliteration. The vast majority of terms – the names of elements, chemical compounds and quotations, and other terms taken from the Latin, they are international, so it is often passed down from one language to another via transliteration. Have a close look at the translation examples, ***Aminoalkylindoles*** *are by far the most prevalent compounds found in herbal products laced with synthetic cannabinoids. This is*

due to the fact that ***syntheses of aminoalkylindoles are less elaborate and complicated than syntheses of classical, non-classical or hybrid cannabinoids****. In general,* ***aminoalkylindoles can be synthesized*** *without sophisticated laboratory equipment usinginexpensive reagents and chemicals. However, there are a few exceptions where the compounds carry uncommon substituents such as* ***adamantyl, tetramethylcyclopropyl and methyl piperidine*** *which may be harder to synthesize and purify -* ***Aminoalkylindols are the most common compound in plant products with the addition of synthetic cannabinoids.*** *This is because aminoalkylindollar synthesis is a more complex process than synthetic, non-classical or hybrid cannabinoid synthesis. Umumanolganda,* ***the synthesis can be carried out with the help of complex laboratory equipment and chemical substances with the help of amino-alkylindol synthesis.*** *Biroq, In some cases, the traditional components of the substance, in particular, man-made anthyl, tetramethylcyclopropyl and methylpiperidine, are added..*

Cannabinoidreceptor agonists *can be classified based on their chemical structures into the following main groups-* ***Cannabinoid receptor agonists can be classified based on their chemical structure. They are included in the following main groups****- Many derivatives and analogues in the above classes of compounds could be synthesized by the addition of a* ***halogen, alkyl, alkoxy*** *or other substituents to one of the aromatic ring systems - Many of the above substances are halogenated in aromatic systems,* ***can be synthesized by the addition of alkyl, alkoxy or other similar groups.***

The ***aminoalkylindoles*** *are by far the most prevalent class of* ***synthetic cannabinoids*** *found in herbal products as they are easier to synthesize, compared to the other classes of compounds-* ***Aminoalkilindollar****o'simlikmahsulotlaridagiengkengtarqalgan****sintetikkannabinoidlar****sinfihisobl anadichunkiularningtarkibiyqismlariniboshqasinflargasintezqilishosonroqdir*

2. by translation loans:

In general, aminoalkylindoles can be synthesizedwithout sophisticated laboratory equipment using inexpensive ***reagents*** *andchemicals -Umumanolganda, The synthesis can be carried out with the help of complex laboratory equipment and chemical substances with the help of amino-alkylindol synthesis.*

3. by calque:

Another way to translate chemical terminology is **calque.** This technique is often applied to translating compound terms or term phrases

Most of the compounds are highly lipophilic and show good solubility in solvents with ***low polarity*** *(e.g. isooctane) as well as in* ***methanol, ethanol, acetonitrile, ethyl acetate, acetone*** *and other* ***medium polarorganic solvents -****Most of the compounds have a high degree of lipophilic properties in polar organic solvents, such as octane, as well as in medium-polar organic solvents, in particular methanol, ethanol, acetonitrile, ethyl acetate, acetone and other solvents.*

Other small changes such as variation of the length and configuration of the ***alkyl chain*** *can also be made -* ***The change in alkyl chain length and configuration is small***

4. By descriptive or interpreting translation.

They were added to plant material, e.g. crushed leaves or strips of leaves, by ***soaking or spraying*** *a solution of one or more synthetic cannabinoids in an organic solvent which was later*

evaporated *- Added to plant products, such as crushed leaves or cut leaves,* ***The process is carried out by adding the solution to the liquid, as well as by evaporation in the case of vaporization.***

In some cases, synthetic cannabinoids in ***solid form****(crystalline powder) were used, leading to an* ***inhomogeneous distribution*** *of the* ***active compound*** *in the plant material - In some cases, synthetic cannabinoids are used in solid form (crystalline powder), which leads to the differentiation of the active ingredient in plants.*

Encompassing other structural types *such as diarylpyrazoles (e.g. rimonabant), naphthoylpyrroles (e.g. JWH-307), naphthylmethylindenes (e.g. JWH-176) and indazole carboxamides -Diarilpirazoller (masalan, rimonabant)* ***such as naphthoylpyrroles (eg, JWH-307), naphthylylmethylins (eg, JWH-176) and zinc carboxamides***

CONCLUSION

As a result of the investigation the following conclusion has been drawn, chemical terms are characterized by the presence of definitions, lack of expression and emotional coloring, stylistic neutrality, correlation with specific concepts and strict logic. Secondly, the main stylistic feature of chemical texts is exact and clear interpretation of the material without any expressive elements. There are almost no metaphors and other stylistic features in chemical documents while they are widely used in literary works. Thirdly, it contains a number of neutral phraseological units. Main requirements for translations are to comply with precision, clearness, and conciseness. It is obvious, that all terms should be translated laconically.

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