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STRUCTURAL AND FUNCTIONAL MODEL OF TERMINOLOGY PHRASING IN RUSSIAN AND ENGLISH FOR SYNTHETIC RESIN PRODUCTION

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ABSTRACT

Terminology smoothes out interdisciplinary barriers and provides a deep connection between often radically divergent branches of science. The purpose of this article is to identify a productive way of term formation in the chemical industry in Russian and English under the terminology system "Synthetic Resins Production" framework. The authors obtained noticeable clarification of nature, functioning, and preferable choice of the special term. The conventional linguistic methodology was used to assess the terminological systems attributed to the chosen part of chemistry science, determine their distinguishing patterns, and substantiate the identified differences and advantages. After the self-contained range of terms, which constitutes the special vocabulary at the local chemical production site, and also materials from open source publishing platforms have been collected and rendered it is argued that such term form as collocation is the most common and reliable for meaning transfer in the context under study. The results of this comparative linguistic research have social significance because they prevent the isolation of terms used in narrow production specializations.

Disciplinary: Languages Integrated Science/Technology Learning, Philology.

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1. INTRODUCTION

Scientific and technological progress, as well as cross-cultural communication, has a significant influence on people's lives. They also shape languages. Neologisms that have no equivalents in other languages continually appear and, conversely, there are often several different ways to describe the same phenomenon. In the modern world, new terminology develops rapidly in response to current conditions.

Processes of knowledge integration in modern science facilitate the rapid development of

terminology. Contemporary learning-oriented on problem-solving is saturated by the ideas and research techniques prior generated in one field of science and further transferred to an entirely different field. Thus technical and engineering investigations very often cross with scientific pursuit models taken from linguistics and formal logic. Issues of fundamental linguistics in their application to natural science are of growing interest in international scholars' community. The point of application turns out to be the notorious linguistic component that serves in the theory of terminology a tool to determine the bonds between term and notion. Linguistic dimension in science is vitalized both by *terminology* - the essence of which rests on natural spontaneity of lexical units clusters; and by *terminological systems* - where natural spontaneity of lexical units is governed and arranged to receive clear hierarchy of terms.

This study looks at how Russian and English terminology function within "The Production of Chemical Resins and Formalin."

The choice of this subject matter is not accidental, as the members of the scientific community in the University represented by the authors are committed to the principles of interdisciplinary scientific research while each Chair sector boundaries are by all means observed.

In the core European languages, terminological systems and their components contain a sufficient number of both similar and different elements. Because of this, terminological systems are supplemented with new elements or are used as a basis for new terminological systems.

The terminological system relating to the chemical industry, namely "Production of synthetic resins and formalin", is appropriately formulated in the languages that we have taken as the basis of the study. However, in the Russian and English languages, this terminological system is functioning in a specific way. Besides, extralinguistic situational stimuli (Quine, 1960) for the determinants of acceptance or non-acceptance of the term in Russian and English can be different. Comparative identification of these distinctive features of the terminological system "Production of synthetic resins and formalin" based on the selected for research languages is very important from integrated interdisciplinary knowledge.

Consideration of a specific structural and functional model of terminological collocation in the field of synthetic resins production on the material of Russian and English is of scientific novelty in the sense that the authors reveal the potential and peculiarities of term manifestations in the designated context, thus make a practical step in the search for means of reducing the degree of translation uncertainty, and therefore improving the essence of a physical object or process transfer in a term. Given that it is hardly possible to state which terminological system – expressed in English or Russian – is absolutely correct, the authors have found the pragmatic factor due to which the Russian version of this terminological system should still be preferred.

This factor in a broad sense is represented by a collocation (a phrase), as the most used in both languages method of term creation for a chemical process. The Russian version is distinguished by linguistic simplicity in the accuracy of the process meaning transfer, which means that this option has a semantic advantage. Thus, the authors demonstrated that the *plane of content* is the same in English and Russian languages, but *the plane of expression* in the Russian language, in this case, is more relevant. Thus, in the conditions of the English language domination in the world, in this article, there is a new approach to estimate the potential of real objects exact reference by structural means of other languages excepting English.

It is common knowledge that the English language is now playing the "lingua franca" role in

the world. In the European Union, successful projects in English such as Terminology Without Borders have been developed to coordinate all translation activities and research into linguistics. The relevance of terminological studies is ongoing, as, according to the head of the TCU Rodolfo Maslias, "language activity is the continuous transfer of perception and thoughts into expression. The human brain constantly converts concepts into terms" (Maslias, 2019).

It should be stated however that universality as a recognized property of the English language does not exclude the phenomenon of the so-called untranslatability in relation to term systems. The term cannot be considered neither fully translatable nor absolutely untranslatable lexical units. The concept meaning can virtually always be translated, if not always technically accurate.

Given the above, this study targeted to prove that verbalized in English chemical terminological systems linguistic advantage is very relative, whereas, in the same context, the Russian-language terms doublet has a greater degree of accuracy to convey the shades of the properties of the real chemical object.

2. LITERATURE REVIEW

The globalization of the English language stimulated a paradigm shift in the forms and methods by which a non-native speaker acquires its linguistic wealth. Thus, there is a departure from the anchor to the native speaker model. This is considered an important multilingual approach (May, 2014) involving methods of cultural linguistics (Novikova et al., 2018; Shatilova et al., 2018). Several publications devoted to criticizing the clarity of the traditional developed within Saussure's structuralism terminology, discuss the paradigm shift. Thus, Temmerman (1997) proposes an alternative to the structural approach, and the findings can be used to develop socio-cognitive terminology. She writes that in languages for specific purposes (LSP - languages for specific purposes), the structure of concepts in the natural sciences terminological systems reflects their epistemological function. For prototypically structured categories, unambiguity cannot be the goal since polysemy, synonymy, and the figurativeness of language are part of the history of their naming scheme. According to Larissa Manerko, whose research interests include Cognitive Universals in languages, the description of terminological systems, social and cultural features in the cognitive sociolinguistic sphere of languages, such works expand the human perception of the world, as well as terms and human consciousness. This perception includes the understanding of concepts and categories as units of human knowledge. In the fourth cognitive-communicative stage of development of the science of terminology, modern terminology should describe characteristics of special communication, rather than languages for special purposes (Manerko & Sharapkov, 2015). The nature of language as a social construct manifests itself in the study of conceptual structures (Valenzuela et al., 2016).

Thus, a study of terminological systems must begin with an area of knowledge that represents the interests of both the public and science. In general, study works devoted to of such specialized terminology systems as the following are the most relevant at the present stage: medicine; indeed, some foreign authors insist that medical linguistics should be distinguished (Džuganová, 2019) as a special area of humanitarian knowledge; jurisprudence (Udina et al., 2018; Stepanova et al., 2018); nanotechnologies (Razduev, 2015); and sports terminology (Cocca et al, 2016; Yafarov, 2016). Chemistry terminology is of special attention as well, since the role played by chemistry for

tackling sustainable development challenges is hard to overestimate. The influence of English as scientific lingua franca on the Russian chemical terminology *in a broad sense* is studied by Mullyadzhanova and Proshina (2014) by “focusing on both traditional forms in which the impact of the English language is manifested, such as direct borrowings and calques, as well as less evident forms of indirect borrowings from Latin and Greek, classic languages of science”. Unlike these authors, we used a different approach to solve this seems very much alike problem. In this article, the investigation context is reduced to a specific part in chemistry – namely of synthetic resins industrial production. Moreover, our intention defines practical means to overcome translation uncertainty in terminology.

The concept of "terminology" and the “terminological system” are interconnected; indeed, one comes from the other. One of the first definitions, which was taken as the basis of our study, originated with the well-known linguist Lotte: “the system of terms that express the totality of specific concepts covered in a specific area”. “Terminology” and “the terminological system” also serve as synonyms. Over time, we have seen the lines between these concepts grow fuzzier. Today, linguists describe the concept of “terminology” as chaotic and spontaneous, i.e., there is no evidence of a systemic approach to developing the terms included in the terminology of any field of knowledge. Lotte emphasizes the consistency of terminology, if three conditions are met: (1) The terminology system should be based on the classification of concepts; (2) signs and concepts that are turned into terms based on classification schemes must be allocated; (3) words must reflect the commonality between terminological concepts and their specificity (Lotte, 1961). As to the notion of “the terminological system,” which may be shortened to “term system,” Manerko gives the following definition: “a term system is consciously constructed with a set of terms, and it is revealed through categorized and conceptualized information based on conceptual logic, cognitive-linguistic, discursive, and, terminological requirements” (Manerko, 2009). In this definition, the author conveys all features inherent in the term system, thereby highlighting the “term system” as a separate and independent object of research.

Key concepts in terminology studies such as “term”, “nomens,” and “professional slang” in Russian and English are also highlighted. These concepts are still being studied and their definitions are being revised. All of these concepts relate to language for special purposes, but their place in terminology and the terminology system has not been defined. It has only been proven that the terms are part of terminology and the terminology system. The word “term” has more than 30 definitions. While it was being studied, the signs, functions, and models of a term were also highlighted. According to Grinyov-Grinevich, “in each historical period, lexemes typical for the next stage begin to appear: in the proto-human period, the first words; in the prescientific period, proto-terminology (craft terms); in the proto-scientific period, the first terms and terminology; and in the postscientific period, the first systems of “nomens” (Grinyov-Grinevich & Sorokin, 2014). In his tutorials on term studies, Grinyov-Grinevich highlights those signs inherent to terms that allow them to be distinguished from common vocabulary: identification of concepts, belonging to a special field of knowledge, definition, knowledge accuracy, contextual independence, conventionality and purposeful appearance, stability and repeatability in speech, nominality, and stylistic neutrality. The main requirements concerning the functions of a term are its common acceptance and use, internationalization, modernity, and euphony. The forms of terms can be simple or complex; they can be derivative terms or terminological collocations, or abbreviations,

which are characteristic of the English language to a greater degree.

Thus, a term is a lexical unit with a special function belonging to a certain area of knowledge and adhering to the rules and regulations of the language in which it originated. And its form and contents also demonstrate that the "term" is the result of an intellectual process and holds special information.

Nomens, in addition to terms, are the lexical units of a specific natural language. They are used to categorize a visible object without correlating it with other items and may not be included in any classification. Nomens can have an alphabetic, digital, or mixed form that is not related to their meaning, i.e. they do not have the semantic load.

Professional slang is used in the oral speech of a particular field. It can form in response to the complex formal structure of a term, such as a multi-terminological phrase or because a term is difficult to pronounce. The quick and intuitive nomination of an object, process, or phenomenon is the main reason for the appearance of "jargon."

In modern linguistics, one can find linguistic research dedicated to exploring the terminology of a particular field in chronological order. In studies conducted in each period, research was done in those fields of knowledge that were in demand in science, society, and industry. For example, in the second half of the 20th century, the greatest preference was given to mechanical engineering, and special attention was paid to internationalism, genetics, and agriculture. Then, in the period of technological growth and electronics development, new directions for the field, including "digitalization" and "automation of the production process," took place. In addition to the study of new machines and aggregates, contemporary terminology studies have examined humanitarian fields of knowledge such as management, the fight against drug use, and other pressing social problems.

A term system is a classification that clearly expresses the logical-conceptual structure of a subject area. We also agree with the definition of the notion of "terminology", established in linguistics in the wake of Grinyov-Grinevich, who understood it as the totality of the terms used in a specific area of knowledge. Terms, nomens, and professional slang are most often used in professional vocabulary and literature. They are an integral part of both the lexical structure of the language and the production process, which is based on scientific knowledge. Today, terminology researchers still face many tasks, and there are still many questions about the concepts of "term," "terminology," and "the term system," etc. At each stage in the development of humankind, there are new discoveries and fields of study. Time moves forward, and new things appear, or perhaps old concepts were not completely studied. And all of this together represents a field for new scientific research in the field of linguistics.

The production of synthetic resins began at the beginning of the last century in Russia, but the investigation of this industry terminological basis is very far from being complete. Streamlining the terms in the terminological system created by "The Production of Synthetic Resins" may be useful for several audiences. Students in universities may use it to more rapidly assimilate the materials and terms of this field and employees at chemical companies that produce synthetic resins may find it useful for reducing distortions in both spoken and written language.

3. MATERIALS AND METHODS

The research was organized around the activities of the city-forming chemical plant, one of the Metafrax Corporation, and held in its production site in 2018. Technical specialists lexicon connected to synthetic resins production were carefully selected, recorded, and analyzed. Likewise, the corporate newspaper “Chemistry Without Borders” for the same period of the year 2018 was thoroughly examined with a focus on synthetic resins and formaldehyde production. This newspaper is issued in German (Chemie Ohne Grenzen) and Russian, no English version, so our limitation was to select only Russian publications. Technical documentation which was allowed by the plant specialists to be at our disposal was under our scrutiny as well. Training manuals on polymers and formalin production, research notes – the courtesy of University Chemistry Chair, explanatory dictionaries, thesauruses, polytechnic, and chemical bilingual Russian-English vocabularies, materials from open source communities and publishing platforms served a helpful supplement.

In this study, the following methods were used: synchronic analysis which renders a structure or system at a given point in time under certain context; elements of diachrony were employed to evaluate the inter-language influence and the resulting change; qualitative and quantitative analysis were used concurrently as two fundamental methods for data collection and interpretation. The accuracy of meaning transfer by both English and Russian terms-collocations under a given model fragment of chemical production was measured by simulation methods. Representation of predicted outcomes was done using conceptual logic. This study was conducted in the context of both semasiology and onomasiology, using the apparatus of comparative linguistics. Semasiology implies the use of the componential analysis of terms meaning by disintegrating it into semes - ‘elementary senses’. Lexical context or field was examined by onomasiological means to determine the principles of the lexical field organization and to expose the bonds between terms in term systems. Conventionally, the words are placed either in the center of the field or on its periphery. In the center are the words which represent the conceptual category most vividly. On the periphery, are the words that refer both to this category and other categories, i.e. the constituents of their meanings are distributed between two or more categories which thus overlap. To expose these constituents, the method of componential analysis is applied. Our appeal to the Belgian author Levshina (2015), who explores almost all of the major methods of analysis used in the linguistic literature, including descriptive statistics, regression analysis, and modeling the semantic vector space has become exceptional facilitation in methodology choice for this research purposes.

4. RESULTS

To represent the technological chain and then further verbalize the terminological systems we used the internet publication “Handbook of chemistry 21. Chemistry and chemical technology” (Chem21, 2018) for the Russian part and the 2nd Edition of “Modern Technology of Synthetic Resins & Their Applications” (NIIR Board of Consultants & Engineers, 2018) for the English part. Both are reliable sources in the industrial sphere for offering relevant information and consultancy services.

Synthetic resin is typically manufactured using a chemical polymerization process. To understand the terminological system of the chemical production of synthetic resins in both Russian and English, we can break down the system into the following lexical thematic groups:

1. Technological systems;
2. Machines and devices;
3. Raw materials used in the production of synthetic resins;
4. Chemicals and reactions;
5. Finished products and applications for synthetic resins (see Figure 1.).

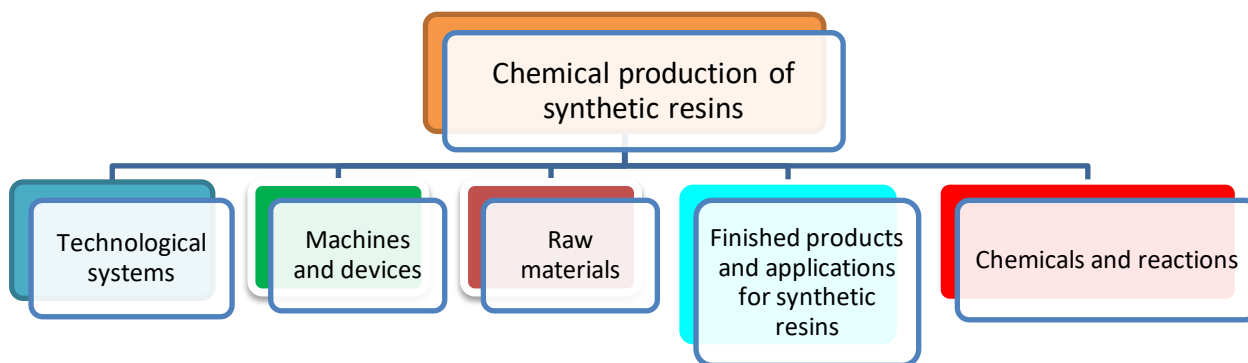


Figure 1: The terminological system of "The Production of Synthetic Resins" in Russian and English.

The technological process of producing synthetic resins occurs in several stages: the reception of original raw materials in warehouses and sending them to resin production, resin output through polycondensation with acid and alkali catalysts, storage of synthetic resins in warehouses, and cleaning of gas emissions from resin production units via absorption and thermo-catalytic oxidation. Thus, we get the following lexical thematic group "Technological Systems for Producing Synthetic Resins," which includes, for example, *the raw materials feed; the preparation unit of sodium hydroxide and ammonium sulfate solutions; the sodium hydroxide and ammonium sulfate solutions feed; the feed system for synthetic resins; the compressed air system; and the gas emissions cleaning system.*

The terminological nomination of this lexical thematic group is expressed, to a greater extent, in the syntactical method of term formation, i.e., terminological phrasings or collocations are used. "Collocation" has the following definition in Cambridge Dictionary: "the combination of words formed when two or more words are often used together in a way that sounds correct" (Cambridge dictionary, 2018).

In the structure of these terms, there are logical connections between the concepts. For example, *the preparation unit of sodium hydroxide and ammonium sulfate solutions* connects the object and its function and also contain the terms *sodium hydroxide* and *ammonium sulfate*, the structure of which is based on a generic connection.

In this group, there are two types of terminological collocations:

- noun + noun + noun
- noun + noun + adjective + noun.

The noun + noun + noun structure is the most common way of forming terminological combinations and terminological collocations, because, first of all, it has a nominative function, which perfectly expresses the noun with a verbal derivative noun and noun in the indirect case.

In the English language, we will examine the "Systems" lexical thematic group, or as it is

translated in Russian, Системы (*Systemy*). It contains all kinds of terms and terminological formations, besides abbreviations. For example, *the Ecology Control system, the system of cooling water, the system of a boiler feed water and steam, the system of pipeline steam tracers, the compressed air system of instrumentation, and conveyor system*. There are logical connections in the structure of these terms, object-function connections, as well as instrument connections; such as *the compressed air system of instrumentation*. This group is dominated by terminological collocations that constitute 47% of the terminological units.

According to this analysis, this lexical thematic group includes various types of terminological collocations. Noun + noun + noun terminological collocations dominate the group:

- noun + noun + noun: 32%;
- noun + noun + noun + noun: 13%;
- noun + noun + noun + noun + noun: 13%.

In the lexical thematic group "Machines and devices," we can also observe the predominance of collocations. For example, *absorber, emergency tank, ureahopper, vacuum pump with water separator, fresh air fan, coolant water tank, methanol evaporators, urea hopper agitator, catalyst feed pump, triethylamine heater, and sampler*. In the structure of these terms, one can observe logical connections and action-function connections, such as *methanol evaporators* and *emergency container*.

The following are types of terminological collocations in the lexical thematic group "Machines and devices":

- Adj. + n.
- N. + adj.
- N. + n.
- Adj. + n. + n.
- N. + adj. + n.
- N. + adj. + adj.
- N. + n. + n.
- Adj. + n. + adj. + n.
- N. + n. + adj. + n.
- N. + n. + n. + n.
- N. + adj. + n. + adj. + n.
- N. + n. + n. + adj. + n.
- Adj. + n. + n. + adj. + n. + n.

The following terminological collocations are dominant:

- Noun + noun: 17%
- Noun + adjective + noun: 21%
- Noun + noun + noun: 28%

In the lexical thematic group "Equipment," in the English language, or translated into Russian as Машины и аппараты (Оборудование) (*Mashiny I apparati [Oborudovaniye]*), all kinds of terms and terminological formations also function. For example, *heat transfer fluid in shell, multipoint thermo elements, HTF condenser, absorption tower, packed beds, valves trays, bubble cup trays, cooling coils, demister, collector, distributors, oxygen valves, and shell and tube preheater*. There are logical connections and action-function connections in the structure of these

terms, such as *heat transfer fluid in the shell* and *multipoint thermos-elements*. There are also terminological collocations with generic connections, such as *oxygen valves* and *cooling coils*. As in many other lexical thematic groups, terminological collocations stand out (61%).

From this analysis, this lexical thematic group stands out for its diversity of types of terminological collocations used in oral and written forms. Noun + noun terminological collocations are dominant:

- noun + noun: 38%;
- adjective + noun: 18%;
- noun + noun + noun: 17%.

Next consider lexical thematic group, “Raw materials for synthetic resin production,” in both Russian and English.

Any manufacturing process requires raw materials to obtain the final product, and source material, or raw material, is also required for the production of synthetic resins.

In this lexical thematic group, the following types of terminological collocations are dominant: simple terms and terminological collocations. They make up 46%. Thus, simple terms expressed as a noun dominate this group, for example, *nitrogen*, *urea*, *melamine*, and *alkali*. There are also two-word collocations consisting of an adjective and a noun, for example, *ammonia water*, *caustic soda*, and *compressed air*. In the structure of these terms, there are generic connections, such as *ammonia water* and *caustic soda*.

The lexical thematic group “Raw Materials” in English, or translated in Russian as Сырье (*Syryo*), is different from other lexical thematic subgroups because it is dominated by simple terms. It contains all kinds of terms and terminological formations, such as *urea*, *melamine*, *phenol*, *mixture with formaldehyde*, *formaldehyde*, *additives*, *air*, and *methanol*. But simple and complex terms take up most of the lexical stock:

- simple terms: 46%;
- complex terms: 25%;
- collocations: 13%.

In light of their scarcity, only a few types of collocations are found, among which there is no dominant type:

- adjective + noun: 25%;
- noun + noun: 25%;
- adjective + noun + adjective + noun: 25%;
- noun + adjective + noun: 25%.

The lexical thematic group "Finished products and applications for synthetic resins" includes the following terms: *urea-formaldehyde resins*, which are widely used as a binder for wood materials and mostly used in the production of interior products, such as furniture; *melamineurea-formaldehyde resins*, which are designed for use in interior and exterior wet conditions; *melamine-formaldehyde resins*, which are used in paper impregnation; *phenol-formaldehyde resins*, which are used in the production of plywood, mineral insulation, laminates, and abrasive materials; *novolac resins*, which are used in machinery manufacturing industries; and *powdered resin* or *pulverized bakelite*, which is used in the abrasive industry to make highly resistant grinding wheels. In the structure of these terms, there are generic connections, such *novolac resin* and *powdered resin*, and

also object-function connections, such as *paper impregnation* and *abrasive materials*. Moreover, in considering the terminological elements of these concepts, we can note that the make-up of the terminological collocations includes terms consisting of two elements, one of which is complex and consists of two bases.

Based on these terms and the application of these concepts, we can see that the usage percentage of simple terms is 22%, while for collocations it is 78%.

Noun + adjective + noun are the most popular forms of collocations; in fact, they represent half of the lexical stock:

- N. + adj. + n.: 50%;
- N.+n. +adj. +n.: 19%;
- N. + adj. + adj. + n.: 12%;
- N. + n.: 12%;
- Adj. +n.: 7%.

To consider the next lexical thematic group, known as “Products” in English, or translated into Russian, *Готовая продукция (Gotovaya produktsiya)*, this group is distinct for having low variation in types of terms and terminological formations. There are only complex terms, terminological collocations, and abbreviations. For example, *UF resins, MF resins, PF resins, Powder resins, Novolac resins, and UFC*. Collocations dominate this group at 42%. Their most common form is adjective + adjective + noun: 28%.

This lexical thematic group can be divided into the subgroups “Range of Products,” or translated into Russian, *Ассортимент продукции (Assortimentm produktsy)*, and “Application,” or translated into Russian, *Область применения (Oblast primeneniya)*. This subgroup contains complex terms and a small number of derivative terms and collocations, which make up the main part of the lexical composition of this sub-group. For example, *impregnation resins, paper impregnation resins, thermosets, insulation resins, and plywood resins*. In the structure of these terms, there are object-function connections, such as *paper impregnation resins* and *insulation resins*. These collocations make up 57% of the lexical stock of this lexical thematic subgroup.

The lexical thematic subgroup “Application” contains all kinds of terms and terminological formations, besides abbreviations. For example, *pre-impregnated paper, edge banding material, and paper-based finish foil*. As in the lexical thematic subgroup “Equipment,” terminological collocations are dominant, and derivatives and simple terms make up a significant percentage of usage:

- Collocations: 34%;
- derivative terms: 33%

According to the analysis of this lexical thematic subgroup, there are several types of terminological collocations. Participle + noun collocations are dominant:

- participle + noun: 50%;
- noun + participle + noun: 25%;
- noun + participle + noun + noun: 25%.

The lexical thematic group "Chemical substances and reactions" contains the following terms in Russian: *высокотемпературная жидкость (vysokotemperaturnaya zhidkost)*, *диметиловыйэфир (demetilovyefir)*, *кислород (kislород)*, *метанол (metanol)*, *муравьиная кислота (muravinaya kislota)*, *пар (par)*, *параформальдегид (paraformaldagid)*, *соляная*

кислота (*solyanaya kislota*), технологическая вода (*tekhnologicheskaya voda*). In the structure of these terms, we see generic connections, in both the Russian and the English, such as муравьиная кислота, *formic acid* and соляная кислота, *hydrochloric acid*.

40% of all the terms are terminological collocations.

Collocations with the form "adjective + noun" dominate this group: 78%.

In English, in the lexical thematic group "Chemistry," there are simple and complex terms, as well as collocations. This group is dominated by complex terms:

- complex terms: 75%;
- collocations: 5%.

The collocations are of the same type: adjective + noun.

This is due to the origin of the terms which we have included in the lexical thematic group "Chemistry," or translated into Russian, Химия (*Khimia*). Like many terms from the fields of chemistry and physics, these terms come from Latin and Greek, which is the reason for their complex structure within the semantics of one lexical unit. Here is a list of terms that are in this sub-group: *aminoplasts, phenoplasts, duroplasts, monomer, polymers, monomethylolmelamine*, etc.

In relation to the predominance of complex terms in this lexical thematic group, we will do a component analysis of these terms. In most cases, the complex terms are divided into two-component, three-component, and multi-component terms. We did not distinguish four-component and n-component terms due to their small number. The most common term form is one consisting of two components, such as aminoplasts, phenoplasts, and polymers:

- two-component terms: 60%.

Using the diagrams, you can clearly see the significant prevalence of collocations in the "The Production of Synthetic Resins" terminological system. This proves the fact that the most productive method of term formation is combining terminological elements from one or several fields of knowledge using both semantic and syntactic methods (See Figures 2 and 3).

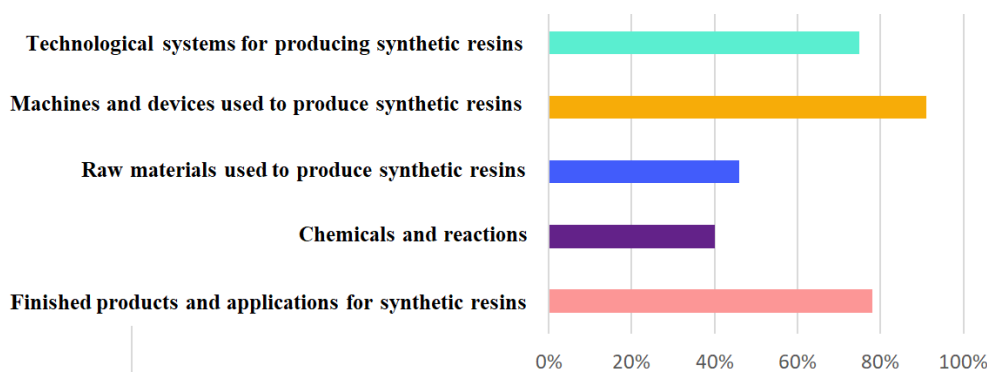


Figure 2. The use of collocations in the lexical thematic subgroups of the term system of "The Production of Synthetic Resins" in Russian

Using the data in Figure 2., we see that in such Russian lexical thematic sub-groups as "Technological systems for producing synthetic resins," "machines and devices used to produce synthetic resins," and "finished products and applications for synthetic resins," terminological collocations occupy more than 50% of all the lexical units of other forms.

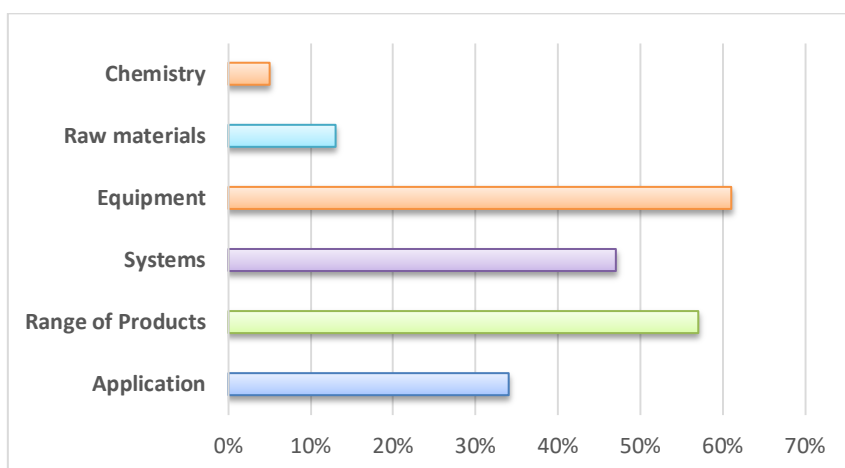


Figure 3: The use of collocations in the lexical thematic subgroups of the term system of “The Production of Synthetic Resins” in English.

Based on the data in diagram 2, we see that in such English lexical thematic subgroups as "Equipment", "Systems" and "Range of Products" terminological collocations occupy more than 40% of all the lexical units of other forms.

5. DISCUSSION

By comparing the Russian and English term systems, we argue that the term formation method in chemical manufacturing using terminological collocations is the most developed one and plays an important role in science. In English, we observe borrowings from other languages, including Latin and Greek, in which such term formation methods are used as word combinations or the morphological method of forming a new word or term using affixes.

According to this research (Table 1.), we found out that the most common forms of terminological collocations in the Russian term system is noun + noun + noun (Table 1.). In English, we can identify two common forms of terminological collocations:

1. noun + noun;
2. adjective + noun (see Table 2).

Table 1: The most common types of collocations in each lexical thematic subgroup in Russian

Technological systems for producing synthetic resins	Noun + noun + noun	40%
Machines and devices	Noun + noun + noun	28%
Raw materials	Adjective + Noun	47%
Industrial safety	Adjective + Noun	36%
Applications for synthetic resins	Noun + adjective + noun	50%

Table 2: The most common types of collocations in each lexical thematic subgroup in English

Raw Materials	Adjective + noun	25%
	Noun + noun	25%
Equipment	Noun + noun	38%
Systems	Noun + noun + noun	32%
Range of Products	Adjective + adjective + noun	28%
Application	Participle + noun	50%
Chemistry	adjective	100%
	noun.	

Therefore, based on these results, we can conclude that terminological collocations are more active in the Russian term system for "The Production of Synthetic Resins" than in the English system. This phenomenon can be explained by the degree of motivation of the terms in Russian and English. In English, the form of lexical units is capacious and limited, moreover, there is a lot of borrowing from other languages, such as Latin and Greek, in which the system of affixation within one lexical unit is well developed. In Russian, concepts are expressed, to a greater extent, with a whole host of terminological elements, as these terms are motivated by this set of terminological elements. Despite foreign etymology, the form of borrowed terms in Russian differs significantly from the original because Russian is a synthetic language, and English is analytical. That is why the following type of phrase stands out in the Russian term system: noun + noun + noun. This type of phrase allows you to adequately convey the essence of a concept or phenomenon thanks to its connection with terminological elements that correspond with an object and its function or action and its instrument. In most cases, it is used to designate equipment or a technological system.

In English, there are two types of terminological collocations, noun + noun, and adjective + noun that reflect the more concise, brief terms in English both in terms of their form and in terms of meaning.

6. CONCLUSION

It has been no more than a decade ago when collocations in terminology attracted particular interest for lexicology scholars. It was recognized that terminological word compounds represent an essential category for their wide further use in specialized glossaries. When a chemical production terminological domain is being formed, borrowings of various terminological units from different languages are inevitable. In this article, borrowed terms in the Russian language have greater distinctions from the original. So when organizing and presenting terms for specialized purposes, namely for describing "The Production of Synthetic Resins" process, the components of the Russian terminological systems reveal greater mobility and motivation. Since a term is an element of language system, it has a property known as motivation which defines the character of its correlation with other lexical units. Results presented in Tables 1 and 2 demonstrate that the set of the Russian terminological system comprised of noun collocations is denser and more compact and much better reflects the underlying concepts chain than that of the English one. Presented in this article, multilingual comparative research into characteristics and linguistic capacity of terminological systems is another step towards recognition of terminology science autonomous status with respect to linguistics. The authors have conducted a survey focused on cultural, etymological, social implications rather unlike purely cognitive research into specialized terminology within the frame theory concepts. Investigations into specialized collocations are still scarce and there is a need to develop sound theoretical-methodological foundations for not prescriptive but descriptive terminology science.

7. AVAILABILITY OF DATA AND MATERIAL

Data can be made available by contacting the corresponding authors

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