NARODOWE CENTRUM NAUKI

PRELUDIUM-24

Wniosek o finansowanie projektu badawczego realizowanego przez osobę nieposiadającą stopnia doktora

Ocena stopnia narażenia na wybrane związki zaburzające funkcjonowanie układu hormonalnego znajdujące się w produktach przeznaczonych dla dzieci.

mgr inż. Aneta Katarzyna Bałdowska

Politechnika Gdańska

INFORMACJE PODSTAWOWE

Tytuł w języku polskim	Ocena stopnia narażenia na wybrane związki zaburzające funkcjonowanie układu hormonalnego znajdujące się w produktach przeznaczonych dla dzieci.
Tytuł w języku angielskim	Risk assessment of selected endocrine-disrupting compounds from products dedicated to children.
Słowa kluczowe w języku polskim	związki endokrynnie czynne, produkty dedykowane dzieciom, dzieci, scenariusz narażenia
Słowa kluczowe w języku angielskim	endocrine-disrupting compounds, products dedicated to children, children, exposure scenario
Czas realizacji [w miesiącach]	24
Obszar badawczy	ST - Nauki ścisłe i techniczne
Panel dyscyplin	ST4 - Chemia: chemia fizyczna/fizyka chemiczna, chemia teoretyczna, chemia analityczna, chemia nieorganiczna
Pomocnicze określenia identyfikujące	ST4_05 - Chemia analityczna ST4_13 - Chemia środowiska

STRESZCZENIE [w języku angielskim]

The endocrine system consists of glands and tissues that produce and secrete hormones [1]. These hormones regulate the functions of the nervous and reproductive systems, coordinate metabolism, sleep, and mood [2], and oversee the growth and development of the body [1,3]. For all these processes to occur correctly, the endocrine system must work properly and without disruptions. Hormones are synthesised, secreted, and delivered to the appropriate organ, where they bind to specific receptors, forming a hormone-receptor complex. When this process is disrupted, the body does not take the proper actions to maintain homeostasis.

Endocrine-disrupting compounds (EDCs) can interfere with the functioning of the endocrine system, potentially leading to the improper functioning of hormone-controlled cells and ultimately contributing to the development of conditions such as cancer [4]. Preschoolers are particularly vulnerable because their bodies are still developing, and even minor disruptions to hormonal balance can have significant impacts on their health and development. Exposure to EDCs during critical periods of development can lead to various adverse effects, including (i) neurodevelopmental disorders, connected with autism, hyperactivity, and reduced IQ, (ii) reproductive health issues, (iii) metabolic disorders, and (iv) immune system dysfunction. Some bisphenols, phthalates, and pesticides may interact with the reproductive system, causing delayed puberty, altered sex hormone levels, and reproductive tract abnormalities [6]. Studies have shown that early exposure to EDCs is associated with an increased risk of reproductive health issues, including reduced fertility and an increased risk of diseases such as polycystic ovarian syndrome (PCOS) in females and decreased sperm quality in males [5]. It has been proven that EDCs may alter the functioning of cytokines, responsible for immune signalling, leading to infections, allergies, and autoimmune diseases [6].

Due to the adverse effects of EDCs and the fact that children can have daily contact with products contaminated with them, it is essential to monitor their content. However, in the current literature, only a few investigations have focused on products specifically designed for preschoolers, and even fewer studies have assessed the exposure scenario and health risk assessment of EDCs. The goal of this study is to supplement the present state of knowledge by evaluating various routes of exposure (e.g. ingestion, dermal exposure) for selected endocrine-disruptors. Due to the importance of assessing the risks associated with contact with harmful substances, some EDCs will be selected and investigated in products intended for children. Moreover, since society is not aware of the toxicity of EDCs, the project results will be summarised in a popular-science article.

The main aim of this project is to implement an innovative sample preparation solution, such as application of deep eutectic solvents, biosolvents or biosorbents, and develop new procedures for the identification and quantification of selected EDCs, using gas chromatography coupled with mass spectrometry (GC-MS) and/or capillary electrophoresis with a diode-array detector (CE-DAD) (depending on the analyte groups). Results from a real sample analysis will enable the assessment of the risk posed by these compounds, which are present in daily-use products dedicated to vulnerable preschoolers.

All planned studies will be conducted in accordance with the principles of Green Analytical Chemistry (GAC), which aim to reduce the environmental impact of chemical analysis while maintaining or improving the quality of analytical results. Actions, such as minimising solvent quantity, reducing waste generation, and maintaining energy efficiency, will be implemented, which will increase the ecological safety of developed methods. The "green" character, as well as the applicability of the developed procedure, will be evaluated.

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WNIOSKODAWCA

Status wnioskodawcy	14. Osoba fizyczna

LISTA PODMIOTÓW

Lp.	Nazwa podmiotu	Kraj	Status podmiotu
1	**Politechnika Gdańska**	**Polska**	**1. Uczelnia**

PODMIOTY REALIZUJĄCE

1. Politechnika Gdańska	
Nazwa podmiotu w języku angielskim	Gdańsk Tech
Adres siedziby	ul. Gabriela Narutowicza 11/12, 80-233 Gdańsk, pomorskie, Polska
Adres kontaktowy	ul. Gabriela Narutowicza 11/12, 80-233 Gdańsk, pomorskie, Polska
Informacje kontaktowe	Telefon: 58 347 14 74 E-mail: proren@pg.edu.pl Adres strony internetowej: http://pg.edu.pl
Elektroniczna skrzynka podawcza ESP (ePUAP)	/politechnikagdanska/projekty
Adres do doręczeń elektronicznych (ADE)	AE:PL-96874-63482-HDEBH-16
Kierownik podmiotu / Osoba uprawniona do reprezentacji	Dariusz Mikielewicz, Prorektor ds. nauki
NIP	5840203593
REGON	000001620
KRS	-

OPIS SKRÓCONY

[w języku angielskim]

I. Scientific aim of the project

The main objective of this project will be to develop, optimise and validate at least two analytical procedures, dedicated to the analysis of endocrine-disrupting compounds (EDCs) in products dedicated to children aged 3-5 (mainly food and cosmetic samples). For the extraction, Deep Eutectic Solvents (DESs) and/or biosorbents will be applied. Methods will be developed to analyse a broad number of compounds from selected EDCs in a one-step approach, using Gas Chromatography with Mass Spectrometry detection (GC-MS) and Capillary Electrophoresis with Diode Array Detection at the final determination step. Obtained methods will enable the reception of information about the presence and quantity of analytes (such as phthalates, parabens, and/or benzophenones), which have different physicochemical properties, including volatility and polarity. After analyte determination, assessing the exposure scenario and health risk assessment of the chemicals present in daily-use food and cosmetic samples is planned. Moreover, after performing statistical and chemometric analysis of the collected data, the risk assessment will be estimated. The exposure scenario will be evaluated based on literature research and a questionnaire specifically designed for parents of preschool children, taking into consideration their daily routines, to obtain the most reliable data. To avoid the risk of misunderstanding associated with surveys, expert cooperation will be sought. Every stage of the research will be conducted in accordance with the principles of Green Analytical Chemistry.

II. Significance of the project

EDCs can influence the endocrine system due to their structural similarity to endogenous hormones. They can: (i) modify hormone synthesis pathways; (ii) interfere with hormone secretion mechanisms; (iii) disrupt transport mechanisms within cells and the body; (iv) bind to receptors; and (v) alter hormone elimination pathways. These changes can lead to cancer and chronic conditions related to impaired hormonal mechanisms. Substances, which can be included to the group of EDCs can be divided into two main categories: (i) natural chemicals (such as genistein and coumestrol) and (ii) synthetic chemicals (such as polychlorinated biphenyls (PCBs), polybrominated biphenyls (PBBs), polychlorinated dibenzo-p-dioxins (PCDD), bisphenols and their derivatives (BPs), phthalate esters (PAEs) and pesticides) [1,2]. In the literature we can find evidences that those substances may cause effects such as: metabolic disorders (obesity and diabetes) [3], early puberty [4], congenital disability like cryptorchidism (undescended testicles) and hypospadias [5], problems with cognitive development and behavioral disorders [6–8] and immune dysfunction [9]. It is worth highlighting that the EDCs mentioned above are mostly lipophilic and persistent in the environment, which allow them to bioaccumulate over time in human fatty tissue [10]. Such prolonged, chronic exposure increases their concentration over time, which may cause more significant health issues.

EDCs were found in ubiquitous daily products, including foods, cosmetics, pharmaceuticals, plastic household products, toys, medical devices, and plastic containers [11–24].

Due to the adverse effects of EDCs and the fact that humans, especially children, may have everyday contact with products contaminated with them, it is very important to monitor the content of EDCs. Moreover, it is essential to understand that in the case of the joint activity of some EDCs, a synergy effect may occur (meaning that one chemical enhances the impact of the second substance present in the same matrix). Still, they can also interact additively or antagonistically [25]. In addition, children are in the high development stage, and their detoxification system may not be ready for such exposure. Therefore, it is necessary to intensify efforts to determine the health risks associated with such exposure and to find solutions that eliminate hazardous substances in the materials used for the manufacture of the products mentioned above. Despite the issue of EDCs in various everyday products being investigated by researchers worldwide for many years, there is still a lack of comprehensive studies that include monitoring, quantitative determination, and assessment of the degree of children's exposure to specific chemical compounds present in products intended for their use. Moreover, currently used procedures often require large amounts of organic solvents or non-biodegradable polymers, which not only pose a risk to human safety but also harm the environment. Concerning this problem, the developed procedures will be based on the use of DESs and/or biosorbents.

III. Project design

Preschoolers are particularly vulnerable because their bodies are still developing, and even minor disruptions to hormonal balance can have significant impacts on their health and development. Exposure to EDCs during critical periods of development can lead to various adverse effects, including: (i) neurodevelopmental disorders, (ii) reproductive health issues, (iii) metabolic disorders, and (iv) immune system dysfunction. Given those risks, it is essential to minimise preschoolers' exposure to EDCs by avoiding products containing endocrine disruptors. Based on the results obtained from the Scopus database, there are

only 11 publications that focused exactly on EDCs exposure in preschoolers (searched within all fields with the phrase: "preschool children" OR "preschooler" AND "EDC" AND "exposure scenario"). Additionally, some of those articles focused more on the effects of prenatal exposure to EDCs, not exposure in preschoolers' lives. Due to the aforementioned lack of knowledge, we propose research on preschoolers, focusing on products specifically designed for their age group (3-5 years). Moreover, the conducted analysis will be carried out in accordance with the principles of green analytical chemistry, which promote more environmentally friendly analytical laboratory practices [26].

IV. Work plan

The research plan is prepared for a 24-month period. Tasks are described with the timeline schedule in the Table 1. placed below.

Table 1. Timeline of established research tasks

	Research task	Location	Duration [months]
Survey	Formulating and conducting a survey among parents regarding the most frequently chosen products dedicated to children.	Gdańsk University of Technology	0-2
	Selection of products most frequently used by children based on a survey.		2-3
1st method	Development of an analytical procedure for the determination of phthalates in selected products dedicated to children (water, fruit juices, and/or mousses), based on GC-MS detection.		2-8
	Assessment of the greenness and usefulness of the developed analytical procedure using dedicated tools, i.e., GAPI and BAGI.		8-9
	Qualitative and quantitative analysis of real samples using the developed analytical procedure. Chemometric analysis of the obtained results.		8-11
	Estimation of exposure to the analysed endocrine-disrupting compounds based on the obtained data. Identification of factors that potentially increase health risk and assessment of exposure levels.		11-12
2nd method	Development of an analytical procedure for the determination of parabens and/or benzophenones in cosmetic products dedicated to children (such as toothpastes, shower gels, and/or shampoos), with the application of CE-DAD at the final determination stage.		12-18
	Assessment of the greenness and usefulness of the developed analytical procedure using dedicated tools, i.e., GAPI and BAGI.		18-19
	Qualitative and quantitative analysis of real samples using the developed analytical procedure. Chemometric analysis of the obtained results.		18-23
	Estimation of exposure to the analysed endocrine-disrupting compounds based on the obtained data. Identification of factors that potentially increase health risk and assessment of exposure levels.		23-24

Some risks that may occur during research and the mitigation actions implemented in the project are presented in Table 2.

Table 2. Risk analysis

	Risk	Scale of risk (0-5, where: 0 - low risk and 5 – very high risk	Mitigation action
Survey	Privacy and Confidentiality Risks	3	Ensuring the survey is anonymous. Providing data protection regulations like GDPR and strict procedures for data collection. Prioritise access control and secure data storage.

	Incomplete survey responses and dishonesty of Parents.	3	Total anonymisation and data protection to minimise bias. Using validated questionnaires where possible.
	Low response rate	3	Making the survey accessible and as short as possible to collect data. Encourage participation to receive a summary of the conducted project.
	Lack of representativeness of the entire population, limiting the generalizability of the results.	3	Formulating specific questions to characterise the population involved in the survey. In cases of a lack of representativeness, directing research to a specific group within society.
	Misinterpretation of results	2	Formulation of concise survey questions, providing detailed instructions, using cross-verification questions, and conducting pilot testing. Results analysis by the survey's expert.
Methods development	Contamination of analytical standards during analysis.	2	Appropriate storage and handling of analytical standards. Preparation of intermediate dilution solutions.
	Sample contamination	2	Appropriate storage and handling of analytical samples.
	Equipment failure (liquid chromatograph, gas chromatograph, mass spectrometer, capillary electrophoresis, analytical balance, vortex shaker, centrifuge system)	2	Application with the producer’s manuals.
	Misinterpretation of results	2	Maintaining accurate and thorough documentation of all experimental procedures and results. Implementing a peer review system. Cooperation with a statistical and chemometrics expert.

V. Methods and methodology

The main aim of the project will be the development of environmentally friendly analytical procedures using innovative solutions in sample preparation for analysis, such as the use of DESs or biosorbents, as well as gas chromatography coupled with mass spectrometry (GC-MS), and/or capillary electrophoresis with diode array detector (CE-DAD) at the final determination stage. The obtained results will enable the assessment of the exposure scenario of EDCs in products dedicated to preschoolers from various exposure rates. This project will be beneficial not only because it will provide up-to-date information on the levels of EDCs in products dedicated to children, but also because it will reduce the environmental impact caused by the conducted chemical analysis.

Data analysis and interpretation are a crucial step in concluding the actions taken into consideration in this project. To collect meaningful conclusions, methods such as Content Analysis, Grounded Theory, Descriptive statistics, Regression analysis, and Statistical tests will be implemented.

All the necessary apparatus for project implementation is available at Gdańsk University of Technology. Reagents, solvents, and small equipment, such as a vortex, will be purchased within the first three months of the project's commencement. Apparatus, which will be used in the project are: analytical balance, automatic pipettes, capillary electrophoresis with diode array detector, centrifugator, fridge - freezer, gas chromatograph coupled with mass spectrometer, Turbovap evaporation system, vortex mixer and other solvents and reagents essential for the implementation of the research, mentioned in the detailed description.

Research team

The research team consist of 3 persons: Principal Investigator (PI) – mgr inż. Aneta Katarzyna Bałdowska, Mentor – dr hab. inż. Justyna Małgorzata Płotka-Wasylka and the Co-investigator, who will be chosen after project approval. Specific information about the research tasks of the project, required qualifications, confirmed qualifications, and achievements of the executors is shown in Table 3.

Table 3. Research tasks and requirements of project executors.

No.	Team member	Scope of work	Required qualifications	Qualifications and achievements
1	Mgr inż. Aneta Katarzyna Bałdowska	The leadership of the project encompasses setting and implementing the project vision, driving administrative formalities, establishing the work plan for project participants, planning and executing project activities, adhering to timelines, and managing the budget. Specific tasks: - Supervision of the executor during formulation of the survey dedicated to parents, sample preparation and analytical analysis; - Selecting products for the research (samples) based on the survey; - Selecting groups of compounds, which may contaminate chosen products; - Purchasing analytical standards, samples, and equipment necessary for conducting analysis; - Development of an analytical procedure for sample preparation; - Development of analytical procedure for the determination of selected EDCs; - Preparation of an analytical assessment of the greenness and usefulness of the developed analytical procedure; - Chemometric analysis of obtained results; - Risk assessment of selected groups of EDCs in products dedicated to children; - Preparation of scientific articles, to summarise prepared procedures, and editorial help to the executor; - Preparation of a popular-science summary for parents; - Reporting to NCN about the work progress.	- Project management skills; - Ability to meet the requirements listed in the project plan; - Budget management skills; - Ability to conduct scientific investigation; - People management skills; - Experience in analytical research	**Qualifications and experience:** - Experience with scientific research during PhD study at Gdańsk University of Technology; - Experience as an analyst in a certified research laboratory – J. S. Hamilton Poland Sp. z o.o. in Gdynia, Poland **Achievements:** - development of a new analytical procedure based on ultrasound-assisted solvent extraction of porous membrane-packed solid sample with quantification by ultra-performance liquid chromatography coupled with tandem mass spectrometry (UASE-PMSS-UPLC-MS/MS) for the determination of bisphenols (BPs) and some of their derivatives in disposable baby diapers

2	dr hab. inż. Justyna Małgorzata Płotka-Wasylka	Exercising substantive supervision over the implementation of the project: supervision on all research tasks; supervision over the reports prepared on particular parts of the research; supervision on data analysis and interpretation; participation in preparing manuscripts presenting the data obtained; keeping documentation related to the schedule of performed works and costs incurred as part of the implementation of research tasks.	- Project management skills; - People management skills; - Ability of supervision under PI and Co-investigator; - Data analysis; - Experience in analytical research	**Qualifications and experience:** - Experience with scientific research as an associate professor of the Gdańsk University of Technology - PI of PRELUDIUM-3 and OPUS-19 projects financed by the National Centre of Science (NCN) - PI of project financed by the Ministry of Science and Higher Education of the Republic of Poland. - Reviewer in many Scientific Journals - Editor in Microchemical Journal and some Special Issues in Frontiers of Analytical Chemistry and Trends of Analytical Chemistry **Achievements:** - development of Green Analytical Procedure Index (GAPI) - a valuable tool for the assessment of the "green" character of analytical procedure - modification of GAPI to ComplexGAPI
3	Co-investigator	Literature review on the occurrence of endocrine-disrupting compounds in everyday products, methods of detection of selected groups of compounds. Formulation of a survey for parents and its analysis. Conducting project activities such as sample preparation, analytical procedures (detection method, data processing), etc., in cooperation with the head of the project.	- Ability to search for scientific data and implement it in the course of analytical procedures - Ability to select an extraction technique for an analytical sample - Proceedings with Good Laboratory Practice; - Performing qualitative and quantitative analyses - Ability to verify results and implement corrective actions in the event of irregularities; - Data interpretation.	Information will be provided after the hiring of the Co-investigator.

A specific list of achievements confirming the qualifications necessary to conduct the assigned tasks are presented in the OSF system.

VI. Bibliography

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OPIS SZCZEGÓŁOWY

[w języku angielskim]

I. Scientific aim of the project

The main objective of this project will be to develop, optimise, and validate at least two analytical procedures dedicated to the analysis of endocrine-disrupting compounds (EDCs) in products intended for children aged 3-5 (mainly food and cosmetic samples). For the extraction, Deep Eutectic Solvents (DESs) and/or biosorbents will be applied. Methods will be developed to analyse a broad number of compounds from selected EDCs in a one-step approach, using Gas Chromatography with Mass Spectrometry detection (GC-MS) and Capillary Electrophoresis with Diode Array Detection at the final determination step. This method will enable the obtaining of information about the presence and quantity of analytes (such as phthalates, parabens, and/or benzophenones), which have different physicochemical properties, including volatility and polarity. After analyte determination, assessing the exposure scenario and health risk assessment of the chemicals present in daily-use food and cosmetic samples is planned. Moreover, after conducting statistical and chemometric analysis of the collected data, the risk assessment will be estimated. The exposure scenario will be evaluated based on literature research and a questionnaire specifically designed for parents of preschool children, taking into consideration their daily routines, to obtain the most reliable data. Every stage of the study will be conducted following the principles of Green Analytical Chemistry.

II. Significance of the project

Endocrine system and its function

The endocrine system consists of glands and tissues that produce and secrete hormones [1]. They are responsible for controlling many physiological processes in the human body. Its primary role is to maintain homeostasis, which is the biological balance of the body. Endocrine glands release hormones directly into the blood due to their connections with blood capillaries, and if needed, they initiate the release of additional hormones from the glands. In addition, some hormones may regulate the production of other hormones related to them. For example, the anterior pituitary gland produces and releases thyroid-stimulating hormone, which stimulates the release of thyroxine from the thyroid gland, a key factor in metabolism [1]. Hormones present in the bloodborne, are unique indicators of physiological processes in the human body. They regulate functions of the nervous and reproductive systems, coordinate metabolism, sleep and mood [2], and oversee the growth and development of the body [1,3]. For all these processes to occur correctly, the endocrine system must work properly and without disturbance.

Endocrine disrupting-compounds (EDCs) influence to human health

Hormones are synthesised, secreted, and delivered to the appropriate organ, where they bind to specific receptors, forming a hormone-receptor complex. This allows them to regulate the functioning of specific cells, thereby causing the desired biological effect. The level of hormones is controlled, and any excess is metabolised [4]. Endocrine-disrupting compounds (EDCs) can interfere with the functioning of the mechanism described above, potentially leading to the malfunction of cells controlled by hormones, and ultimately contributing to the development of, among other things, cancerous changes [5]. EDCs can influence the endocrine system due to their structural similarity to endogenous hormones. They can: (i) modify hormone synthesis pathways; (ii) interfere with hormone secretion mechanisms; (iii) disrupt transport mechanisms within cells and the body; (iv) bind to receptors; and (v) alter hormone elimination pathways. These changes can lead to cancer and chronic conditions related to impaired hormonal mechanisms.

The effects of exposure to EDCs can be seen immediately or long after the exposure. The second situation is even more dangerous because the action to prevent a harmful effect will not take place before irreversible consequences have occurred. Some of the adverse effects may also become apparent later [2]. Additionally, children are developing their detoxification system, making them more susceptible to the effects of chemicals. Moreover, some studies highlight a higher risk for children compared to adults, which is connected with their lower body weight, which increases the concentration of harmful substances per kg/body weight. It is also worth mentioning that infants and toddlers are discovering the world through hand-to-mouth behaviour, which may be an additional source of exposure to EDCs present in toys, personal care products, or even food containers.

Substances, which can be included to the group of EDCs can be divided into two main categories: (i) natural chemicals (such as genistein and coumestrol) and (ii) synthetic chemicals (such as polychlorinated

biphenyls (PCBs), polybrominated biphenyls (PBBs), polychlorinated dibenzo-p-dioxins (PCDD), bisphenols and their derivatives (BPs), phthalate esters (PAEs) and pesticides) [3,6]. In the literature we can find evidences that those substances may cause effects such as: metabolic disorders (obesity and diabetes) [7], early puberty [8], congenital disability like cryptorchidism (undescended testicles) and hypospadias [9], problems with cognitive development and behavioral disorders [10–12] and immune dysfunction [13]. More effects of EDCs on human health are presented in Figure 1. It is worth highlighting that the above-mentioned EDCs are mostly lipophilic and persistent in the environment, which allows them to bioaccumulate over time in human fatty tissue [14]. Such prolonged chronic exposure increases their concentration over time, which may lead to more significant health issues.

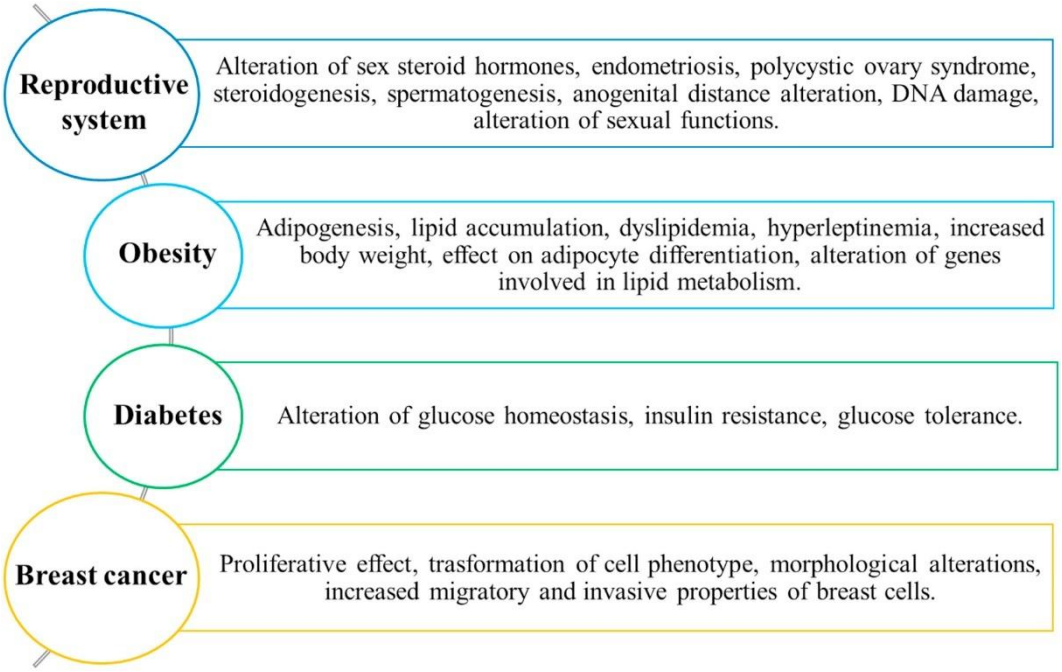


Figure 1. Effects of EDCs on human health [15].

Despite their incontestable negative health impact, only some of the groups mentioned above are currently monitored by the European Chemicals Agency (ECHA). One of the most important documents adopted to protect human health and the environment from chemicals is the REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) Regulation (EC) No. 1907/2006, which came into force on 1 June 2007. However, regulation should be updated, taking into consideration chemicals with proven endocrine-disrupting activity. The regulation mentioned above is not the only one applicable nowadays. In the European Union (EU) Regulations, documents such as those introducing plant protection products (EC 1107/2009) and biocidal products (EU 528/2012) to the market can be found, where EDCs are not applicable. Moreover, EU Directive no. 2000/60/EC in in the Annex X give a list of priority substances in the field of water policy, where some EDCs such as di(2-ethylhexyl)phthalate (DEHP), nonylphenol, dioxin and dioxin-like compounds are identified as priority hazardous substance, which should be eliminate to concentrations near background values for naturally occurring substances.

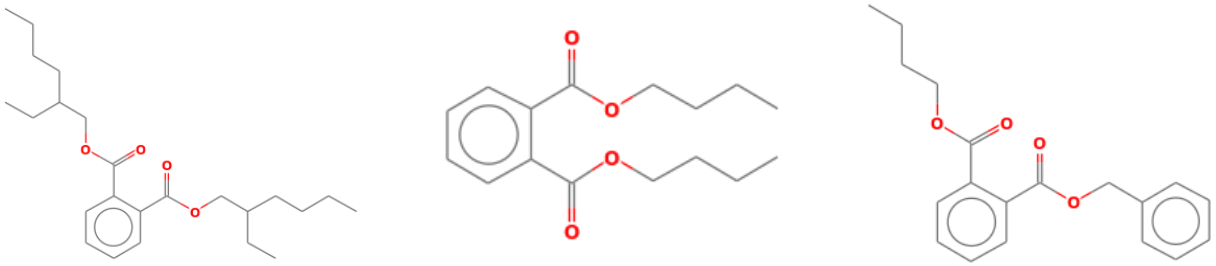
Endocrine-disrupting compounds in daily products

EDCs were found in a wide range of ubiquitous daily products. Table 1. presents the application of selected EDCs.

Table 1. Selected applications of endocrine-disrupting chemicals.

	Endocrine disruptor	Application	Reference
phthalates	Di-(2-ethylhexyl) phthalate (DEHP)	perfumes, PVC plastics used in household products (e.g., toys, floor tiles, furniture upholstery, carpets, roofs, wire and cable sheathing, clothes, garden hoses, wall coverings, and gloves), food packaging, blood storage bags, toys and medical devices.	[16,17]
	Diethyl phthalate (DEP)	solvents and fixatives in fragrances, additives in cosmetics, medical devices, and household and personal care products.	[18]
	Di-n-butyl Phthalate (DBP)	plastic (PVC) piping, various varnishes and lacquers, safety glass, nail polishes, paper coatings, dental materials, pharmaceuticals, and plastic food wrap	[19,20]
bisphenols	Bisphenol A	monomer for polycarbonate plastics, and epoxy resin used in food packaging such as metal cans, water bottles, production of thermal paper, precursor for production of tetrabromobisphenol A (TBBPA), which is a flame retardant	[21,22]
	Bisphenol S	wash fastening agent in cleaning products, an electroplating solvent, a constituent of phenolic resins, and thermal paper production	[23,24]
	Bisphenol F	tank and pipe linings, industrial floors, road and bridge deck toppings, structural adhesives, grouts, coatings, electrical varnishes, lacquers, liners, adhesives, plastics, water pipes, dental sealants, and food packaging	[23]
polychlorinated biphenyls (PCBs)	Aroclors 1221, 1242, 1248, 1254, 1260, 1262	electrical insulating fluids in capacitors and transformers, hydraulic fluids, heat transfer fluids, lubricating fluids, caulks, adhesives, plastics, and carbonless copy paper.	[25]
Parabens	Methylparaben (MePa), propylparaben (PrPa)	preservative in food, cosmetics and pharmaceutics	[26–28]
Pesticides	Dichlorodiphenyl-trichloroethane (DDT), dichlorodiphenyl-dichloroethylene (DDE)	agriculture, home and garden utilisations	[29]

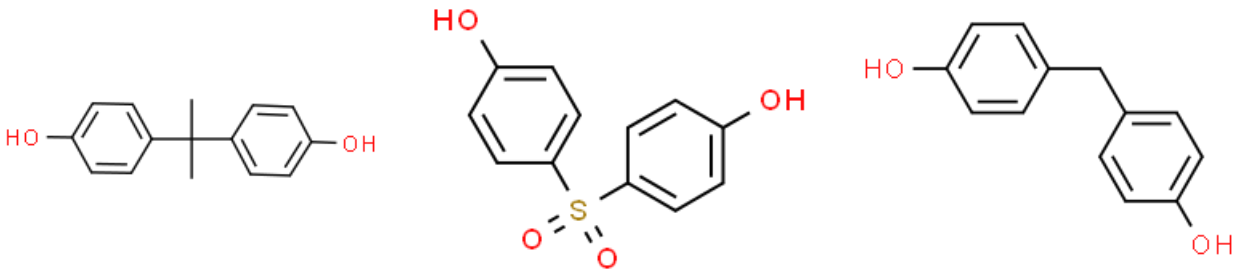
Phthalates, so-called phthalate esters (PAEs), are esters or salts of phthalic acid. They are commonly used to improve the plasticity of goods manufactured from polyvinyl chloride (PVC) [30]. Many daily-use products, such as clothes, cosmetics, personal care products, nutritional supplements, paint, nail polishes, toys, food packaging, cleaning materials, and medical devices, may contain PAEs [31–36]. However, because they are not covalently bound to the plastic matrix, they can be released into the surrounding environment over time [37]. Humans can be exposed to PAEs through ingestion of contaminated food, dermal exposure or inhalation. Phthalates, such as di(2-ethylhexyl) phthalate (DEHP) and dibutyl phthalate (DBP), have a negative impact on the reproductive system, inhibit testosterone production, and reduce fertility [38,39]. DEHP, along with dibutyl phthalate (DBP) and benzyl butyl phthalate (BBP), has been banned in children's toys by the European Union since 1999. However, other harmful PAEs are still widely used. The presence of phthalate esters in children's toys and care products is regulated by the European Commission Regulation (EU) 2018/2005, which limits their concentration to 0.1% by weight of the product. In the Figure 2. examples of phthalate structures are presented.



DEHP DBP BBP

Figure 2. Chemical structure of selected phthalates.

Bisphenol A (BPA) is one of the first compounds classified as an endocrine disruptor. It is usually used as a monomer for polycarbonate plastics [21]. The incomplete polymerisation process or degradation of the polymer may affect the release of this EDC to the surrounding environment, causing exposure to the product consumer. The most common route of exposure to BPA is food (approximately 90%) [21]. However, dermal exposure and contact with polluted air are also dangerous. BPA may migrate from epoxy resin in canned food or other food containers. Moreover, the source of exposure may also be a nursing cup for breastfeeding or a polycarbonate bottle, which mothers widely use. Due to its harmful effects, the application of this substance in children's products is restricted in the European Union. However, in countries like Mexico and Bangladesh, it remains common and unregulated. BPA is used in polycarbonate products, epoxy resins, and polyesters, and it can disrupt the endocrine system, causing breast cancer [40]or fertility issues [41]in both men and women. Moreover, BPA is currently classified as a reproductive toxicant category 1B under the EU CLP Regulation (Regulation 2016/1179). It is also banned for use in baby bottles, sippy cups and food packages used in infant formula by the Food and Drug Administration (FDA) [42]. In addition, the European Union implemented “Toy Safety Directives”, which regulate the highest allowed concentration of some substances in toys. Considering the harmful effects of BPA, substitutes such as bisphenol S (BPS) and bisphenol F (BPF) have been introduced. However, those analogues were also described as cytotoxic, genotoxic, and mutagenic [23]. Although data are limited, a few studies have documented that BPS may be equally or more harmful than BPA in some investigated endpoints [17,43]. In the Figure 3. examples of bisphenol structures are presented.



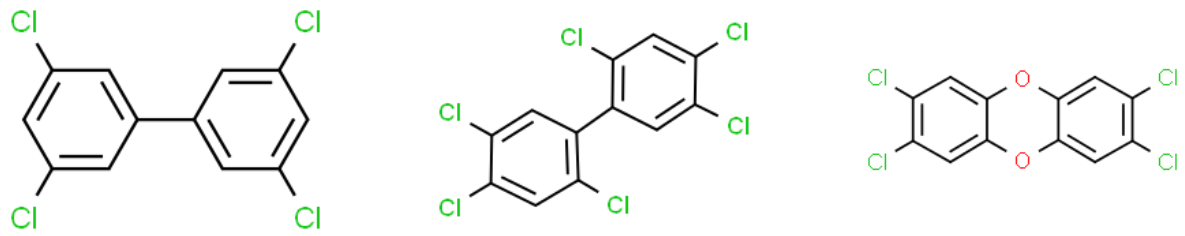
BPA BPS BPF

Figure 3. Chemical structure of selected bisphenols.

Polychlorinated biphenyls (PCBs) are chemically stable, hydrophobic pollutants that were commonly used in industry for purposes such as carbonless copy paper, plastic resins, and insulators [25]. They were widely applied in electrical equipment such as capacitors and transformers due to their insulating and cooling properties. PCBs are commonly divided into two groups: dioxin and non-dioxin like, which is defined basing on the similarity of assessed substance to tetrachlorodibenzo-p-dioxin (TCDD). They were linked with environmental and human dangers, which led to the creation of high restrictions or prohibitions on their use [44,45]. Exposure to PCBs during development may affect neurobiological, cognitive, and behavioural functioning [46]. PCB exposure affects learning and memory, activity level, and cognitive functions, and may cause ADHD-behaviours [46]. It has been reported that PCBs may accumulate in human tissues, breast milk, and reproductive organs [47,48]. PCBs are categorised as Group 2A carcinogens by the International Agency

for Research on Cancer (IARC), which is defined as “probably carcinogenic to humans”. PCBs generally occur as a mixture of congeners, which are called in the industry “Arclors.” The name “Arclor” is created based on the weighted percentage of chlorine in the mixture; for example, Arclor 1248 contains 48% chlorine in its mixture.

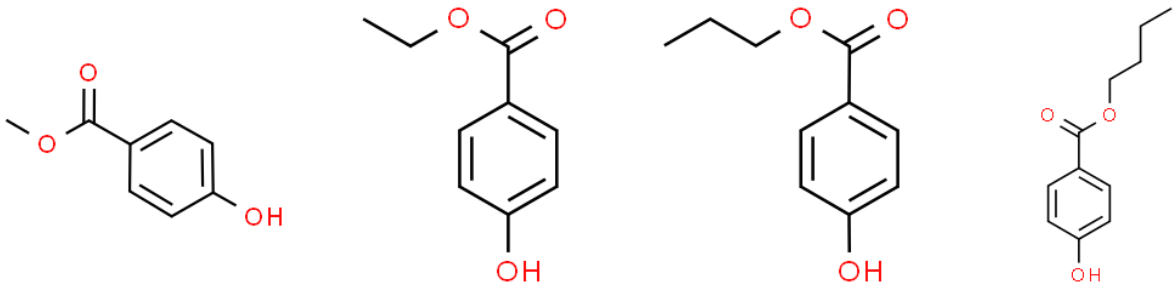
Polychlorinated dibenzodioxins (PCDDs) belong to the same group of PCBs. Similar to them, they were classified as persistent organic pollutants (POPs). Their production and emission are controlled by the Stockholm Convention to protect ecosystems and human health. PCDDs can accumulate in plants used for fibre production, which may be later used in industry, keeping the chain of exposure uninterrupted. They can cause allergies, chloracne, diabetes, cancer, hormonal disruptions, developmental issues, and fertility problems. Moreover, TCDD exposure was connected with spontaneous abortions, cytogenetic abnormalities, congenital malformations, impaired liver function and lipid metabolism, and immunologic and neurologic impairment [41]. In the Figure 4. examples of polychlorinated biphenyl structures are presented.



Aroclor 1248 PCB-153 TCDD

Figure 4. Chemical structure of selected polychlorinated biphenyls.

In comparison to bisphenols, the primary route of exposure to parabens is absorption through the skin. However, humans can also be exposed to them through ingestion or inhalation [15]. Although humans primarily metabolise parabens into PHBA and further form glucuronide and sulfate conjugates, which are excreted in urine, it is also possible to find non-metabolised molecules. Moreover, the urinary concentration of parabens was higher in women compared to men, which can be attributed to the higher use of personal care products (PCPs). The most common parabens present in PCPs are methylparaben (MePa), ethylparaben (EtPa), propylparaben (PrPa) and butylparaben (BuPa). It has been proven that parabens affect oocytes: decrease ovarian weight and increase the incidence of multiple oocyte follicle disturbances in prophase events [49–51]. Moreover, they can alter steroidogenesis and spermatogenesis [52]. They are often used in combination, as they have synergistic effects in a wide variety of products, such as cosmetics, ointments, and suspensions. In Figure 5. examples of paraben structures are presented.



MePa EtPa PrPa BuPa

Figure 5. Chemical structure of selected parabens.

Pesticides play a crucial role in ensuring food production stability by protecting crops from pests and diseases in agriculture [53]. They are chemicals used to control or kill pests, such as insects, fungi and rodents. However, in the group of those substances we can also find some with endocrine potential. A great example are endocrine-disrupting organochloride pesticides, such as DDT or dieldrin, classified as POPs. Exposure to these compounds is correlated with increased risks of cancers, congenital disabilities, and developmental disorders [29]. DDT has been associated with breast cancer and reproductive issues, while dieldrin exposure

has been linked to Parkinson's disease and cognitive impairments. The persistence of these pesticides in the environment means they can accumulate in the food chain, posing long-term health risks to both humans and animals. In addition, some pesticides were correlated with allergies, neurological disorders, cancer, or reproductive issues due to their strong binding potential with estrogen or androgen receptors. Although, on 17 May 2004, the Stockholm Convention on POPs entered into force and became international law, scientists still can find their traces in the environment. In the above-mentioned Convention, the 'dirty dozen' of POPs, such as eight organochloride pesticides (aldrin, dieldrin, endrin, mirex, chlordane, heptachlor, DDT and toxaphene), were presented. Due to their negative health and environment effect, five essential aims were established: 'eliminate dangerous POPs, starting with the 21 listed in the Convention, support the transition to safer alternatives, target additional POPs for action, clean-up old stockpiles and equipment containing POPs, and work together for a POPs-free future' [54]. In the Figure 6. examples of pesticide structures are presented.

DDT dieldrin

Figure 6. Chemical structure of selected pesticides.

Prenatal exposure to endocrine-disrupting compounds

A pregnancy is a period of rapid development, when numerous changes are occurring not only in the mother's, but also in the fetus's body. The zygote, a single-cell entity, is multiplying its genetic material at a high rate to form organs and subsequently organ systems, which are responsible for the fetus's life. This development period is much faster than at any other in a person's lifetime and it is highly related to hormonal changes. Even low levels of EDCs during these critical windows can lead to significant developmental disruptions. For instance, prenatal exposure to BPA has been linked to altered brain development and behavioural changes in animal studies, which may also have implications for human neurodevelopmental disorders [55]. Similarly, exposure to phthalates has been associated with adverse effects on male reproductive development, including reduced anogenital distance and lower testosterone levels in newborns [56].

Exposure to EDCs is also highly related to the period during which it will occur. During the first trimester, when organogenesis occurs, EDCs can lead to congenital malformations, while exposure during the second and third trimesters can affect the growth and maturation of organ systems [57]. Therefore, it is also a period of life, where fetus and mother are more vulnerable to the adverse effects of harmful chemicals [58]. Some studies suggest that maternal exposure to danger may lead to the occurrence of transformative neurobiological and epigenetic effects that may have an impact on the fetus [59,60]. Pregnant women who have faced early-life challenges and mental health issues before pregnancy may face greater risks to their mental health and more disruptions to their stress levels during pregnancy. As a result, their children might be more likely to have problems with stress regulation, mental health, cognitive development, and forming relationships [60,61]. Moreover, the placenta, which typically acts as a barrier to protect the fetus from harmful substances, is not entirely effective against all EDCs. Some EDCs can cross the placental barrier and reach the developing fetus, thereby exerting their harmful effects directly. For example, polychlorinated biphenyls (PCBs) have been detected in umbilical cord blood and are known to disrupt thyroid hormone levels, which are crucial for brain development [62].

It has been proven, that EDCs exposure can be associated with fetal growth retardation, thyroid dysfunction, and neurological disorders. Furthermore, prenatal exposure to EDCs has been associated with long-term health effects that extend into adulthood. Epidemiological studies have linked prenatal EDC exposure to an increased risk of metabolic disorders, such as obesity and type 2 diabetes, in later life [63]. This

is attributed to the concept of "fetal programming," where early-life exposures set the stage for future health outcomes by permanently altering the structure or function of organs and tissues. In addition, there is growing evidence that prenatal exposure to EDCs may also contribute to the development of hormone-related cancers, such as breast and prostate cancer, later in life. For example, prenatal exposure to diethylstilbestrol (DES), a synthetic estrogen, has been linked to a higher risk of breast cancer in women and prostate cancer in men [57].

Due to the adverse effects of the aforementioned compounds and the fact that humans, especially children, may have everyday contact with products contaminated with them, it is essential to monitor the content of EDCs. Moreover, it is important to understand that, in the case of joint activity by some EDCs, a synergistic effect may occur (meaning that one chemical reinforces the effect of a second substance present in the same matrix), but they can also interact additively or antagonistically [64]. In addition, children are in the high development stage, and their detoxification system may not be ready for such exposure. Therefore, it is necessary to intensify efforts to determine the health risks of such exposure and to find solutions that will eliminate hazardous substances in materials used for the manufacturing of the above-mentioned products. Despite the issue of EDCs in various everyday products being investigated by researchers worldwide for many years, there is still a lack of comprehensive studies that include monitoring, quantitative determination, and assessment of the degree of children's exposure to specific chemical compounds present in products intended for their use. Moreover, currently used procedures often require large amounts of organic solvents or non-biodegradable polymers, which not only pose a risk to human safety but also harm the environment. Concerning this problem, the developed procedures will be based on the use of DESs and/or biosorbents.

III. Project design

Preschoolers are particularly vulnerable because their bodies are still developing, and even minor disruptions to hormonal balance can have significant impacts on their health and development. Exposure to EDCs during critical periods of development can lead to various adverse effects, including: (i) neurodevelopmental disorders, (ii) reproductive health issues, (iii) metabolic disorders, and (iv) immune system dysfunction. Besides the adverse effects of specific groups of EDCs were widely described in the theoretical introduction, this section will focus mainly on the health effects of postnatal exposure to children. Because EDCs may cause significant dysfunction in children’s organisms, selected health effects are presented in Table 2.

Table 2. Some of the adverse effects of selected group of EDCs.

Group of compounds	Adverse effects on children	Source
Phthalates	disruptions in the development of the male reproductive system, including reduced anogenital distance and hypospadias, association with ADHD behaviours, autistic behaviours, reduced mental and psychomotor development, emotional problems, reduced IQ, reduced cognitive abilities and behavioural problems	[65,66]
Bisphenols and their derivatives	Problems with brain and reproductive system development Behavioural issues (anxiety, hyperactivity, cognitive impairments), Alteration with neurodevelopment, disrupt thyroid signalling, increased risk of ADHD-related Behaviours, learning problems, and obesity	[66,67]
PCBs	disrupt thyroid signalling, decrements in motor development,	[67,68]
Parabens	retinal microvasculature in preschool children, cardiometabolic health problems, affection on human metabolism,	[69]
Pesticides	asthma, bronchitis, and persistent cough in children, positively associated with	[70–72]

	MDI, neurodevelopmental delay in the social and motor domains	

Given those risks, it is essential to minimise preschoolers' exposure to EDCs by avoiding products containing endocrine-disruptors. Based on the results obtained from the Scopus database, there are only eleven publications that focused exactly on EDCs exposure in preschoolers (searched within all fields with the phrase: "preschool children" OR "preschooler" AND "EDC" AND "exposure scenario"). Additionally, some of those articles focused more on the effects of prenatal exposure to EDCs, not exposure in preschoolers' lives. Due to above mentioned lack of knowledge, we propose research on preschoolers, taking into the consideration only products dedicated to their age (3-5). Moreover, the analysis will be conducted in accordance with the principles of green analytical chemistry.

Green Analytical Chemistry

The impact of chemicals, used for example in the industry, started to be mainly investigated after the release in 1987 in the United States report titled: 'Our Common Future', which encouraged promoting sustainable development. To avoid the introduction of additional hazardous waste into the environment, in 1990, a Pollution Prevention Act was announced, which postulated minimising toxins at the source rather than dealing with their effects. Those events led the Environmental Protection Agency (EPA) to establish a Green Chemistry program in 1991, which later promoted the EPA's staff, including Paul T. Anastas. In 1998, the 12 principles of Green Chemistry were presented [73]. Their main objectives were to minimise or eliminate hazardous feedstock, products, by-products, solvents, and reagents widely used in known techniques and methodologies that are hazardous to human health or the environment. Green Analytical Chemistry (GAC) is an approach which emerged from green chemistry [74] and promotes more environmentally friendly analytical laboratory practice. According to its 12 rules, practical alternatives to monitor wastes and residues are widely investigated [75]. In figure 7. the most important components of GAC procedures are presented.

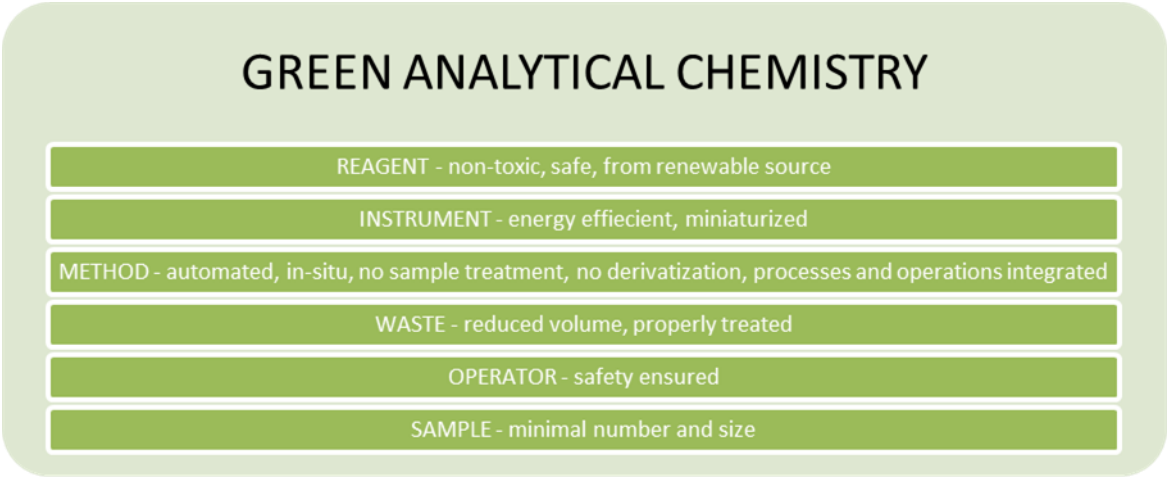


Figure 7. Important components of analytical procedures in the aspect of GAC [76]

The development of GAC led to the invention of metric tools to measure the degree of compliance with 12 established principles. The most known are tools, such as(i) the Green Analytical Procedure Index (GAPI) [77], (ii) the Analytical Greenness Calculator (AGREE) [78], (iii) the Eco-Scale[79], and (iv) the National Environmental Methods Index (NEMI) [80], complementary green analytical procedure index (ComplexGAPI) [81], and analytical greenness metric for sample preparation (AGREEprep) [82,83]. However, the critical challenge for all chemists is to achieve a balance between the environmental friendliness of the proposed method and its practical usefulness, as measured by analytical efficiency in validation criteria. Therefore, none of the above-mentioned tools takes into consideration the practicality of the analytical method; the Blue Applicability Grade Index (BAGI) was developed and proposed [84]. These metrics refer to the concept of White Analytical Chemistry (WAC), introduced by Nowak et al. in 2021 [85] and combines ecological, analytical, and practical perspectives of an analytical method according to the red-green-blue (RGB) model [84].

According to the above-mentioned rules, new extraction agents and sorbents are investigated. Recently, the use of natural origin polymers (biopolymers) due to their biodegradability, low toxicity, low cost and abundant availability has become an attractive alternative in analytical procedures [86]. In the research related to EDCs analysis, biopolymers are gaining higher interest [87]. It is also worth mentioning that recently, DESs are gaining attention due to their low production cost and easy synthesis method. Their versatility is demonstrated in several areas: (i) extraction, (ii) synthesis and modification of sorbents to increase extraction efficiency, (iii) sample digestion and dissolution, (iv) electrochemical analysis, and (v) chromatographic separation [88]. They show similar properties to ionic liquids, such as negligible volatility, a wide range of liquid states, non-flammability, adjustable viscosity and polarity, and a high solubilisation capacity. However, in comparison, they are less toxic and often biodegradable [88]. Moreover, nowadays, so-called natural DESs (NADESs) are increasingly used in analytical procedures due to their natural origin and renewable, biocompatible raw materials, such as sugars, sugar alcohols, organic acids, amino acids, and amines [89,90].

IV. Work plan

The research plan is prepared for 24 months. Tasks are described with the timeline schedule in Table 3. placed below.

Table 3. Timeline of established research tasks

	Research task	Location	Duration [months]
Survey	Formulating and conducting a survey among parents regarding the most frequently chosen products dedicated to children.	Gdańsk University of Technology	0-2
	Selection of products most frequently used by children based on a survey.		2-3
1st method	Development of an analytical procedure for the determination of phthalates in selected products dedicated to children (water, fruit juices, and/or mousses), based on GC-MS detection.		2-8
	Assessment of the greenness and usefulness of the developed analytical procedure using dedicated tools, i.e., GAPI and BAGI.		8-9
	Qualitative and quantitative analysis of real samples using the developed analytical procedure. Chemometric analysis of the obtained results.		8-11
	Estimation of exposure to the analysed endocrine-disrupting compounds based on the obtained data. Identification of factors that potentially increase health risk and assessment of exposure levels.		11-12
2nd method	Development of an analytical procedure for the determination of parabens and/or benzophenones in cosmetic products dedicated to children (such as toothpastes, shower gels, and/or shampoos), with the application of CE-DAD at the final determination stage.		12-18
	Assessment of the greenness and usefulness of the developed analytical procedure using dedicated tools, i.e., GAPI and BAGI.		18-19
	Qualitative and quantitative analysis of real samples using the developed analytical procedure. Chemometric analysis of the obtained results.		18-23
	Estimation of exposure to the analysed endocrine-disrupting compounds based on the obtained data. Identification of factors that potentially increase health risk and assessment of exposure levels.		23-24

Table 4. presents the expected risks that may occur during research and the mitigation actions implemented in the project to address them.

Table 4. Risk analysis

	Risk	Scale of risk (0-5, where: 0 - low risk and 5 – very high risk	Mitigation action
Survey	Privacy and Confidentiality Risks	3	Ensuring the survey is anonymous. Providing data protection regulations like GDPR and strict procedures for data collection. Prioritising access control and secure data storage (e.g. data masking or encryption).
	Incomplete survey responses and dishonesty of Parents.	3	Total anonymisation and data protection to minimise bias. Using validated questionnaires where possible.
	Low response rate	3	Making the survey accessible and as short as possible to collect data. Encourage participation to receive a summary of the conducted project.
	Lack of representativeness of the entire population, limiting the generalizability of the results.	3	Formulating specific questions to characterise the population involved in the survey. In cases of a lack of representativeness, directing research to a specific group within society.
	Misinterpretation of results	2	Formulation of concise survey questions, providing detailed instructions, using cross-verification questions, and conducting pilot testing. Results analysis by the survey's expert.
Methods development	Contamination of analytical standards during analysis.	2	Appropriate storage and handling of analytical standards. Preparation of intermediate dilution solutions.
	Sample contamination	2	Appropriate storage and handling of analytical samples.
	Equipment failure (liquid chromatograph, gas chromatograph, mass spectrometer, capillary electrophoresis, analytical balance, vortex shaker, centrifuge system)	2	Application with the producer’s manuals.
	Misinterpretation of results	2	Maintaining accurate and thorough documentation of all experimental procedures and results. Implementing a peer review system. Cooperation with a statistical and chemometrics expert.

V. Methods and methodology

The main aim of the project will be the development of environmentally friendly analytical procedures using innovative solutions in sample preparation for analysis, such as the use of DESs or biosorbents, as well as gas chromatography coupled with mass spectrometry (GC-MS), and/or capillary electrophoresis with diode array detector (CE-DAD) at the final determination stage. A separation and detection technique will be selected

for a specific group of compounds that will undergo analysis. The obtained results will enable the assessment of the exposure scenario of EDCs in products dedicated to preschoolers from various exposure rates. This project will be beneficial not only because it will provide up-to-date information on the levels of EDCs in products dedicated to children, but also because it will reduce the environmental impact caused by the conducted chemical analysis.

Data analysis and interpretation are a crucial step in concluding the actions taken into consideration in this project. To collect meaningful conclusions, the methods described in Table 5. will be implemented.

Table 5. Data analysis and interpretation methods planned in the research.

Method	Purpose	Example
Content Analysis	Systematically categorising textual information and examination patterns	Analysing open-ended survey responses to categorise common types of feedback
Grounded Theory	Development of a theory grounded in data collected during research	Collecting and analysing data to form a theory on social behaviour
Descriptive statistics	Summarising and describing the main features of a dataset	Mean, median, standard deviation, variance, range of linearity, frequency distributions
Regression analysis	Examination of the relationship between dependent and independent variables.	Linear regression, weighted regression
Statistical tests	Making inferences about a population based on a sample	T-Student test, chi-square tests, ANOVA (Analysis of Variance), regression analysis.

All the necessary apparatus for project implementation is available at Gdańsk University of Technology. Reagents, solvents, and small equipment, such as a vortex, will be purchased within the first three months of the project's commencement. In Table 6., the equipment and apparatus essential for implementing the research are summarised.

Table 6. Equipment, apparatus and reagents necessary for the project.

Equipment	Application	Availability at the destinated location of project
Analytical balance	Weighting of appropriate amount of sample and/or analytical standard.	Yes
Automatic pipettes	Appropriate measuring of volume of liquid reagents.	Yes
Capillary electrophoresis with Diode array detection	CE-DAD analysis	Yes
Centrifugator	Separation of two-phased solutions.	Yes
Fridge - freezer	Storage of samples and analytical standards.	Yes
Gas chromatograph coupled with mass spectrometer	GC-MS analysis	Yes
Laboratory glassware, such as test tubes, beakers, baguettes, volumetric flasks	Standards preparation, sample extraction.	Yes
Turbovap evaporation system	Solvent evaporation.	Yes
Analytical standards of: - benzophenones - parabens	Standards for proposed analysis.	No, to be purchased

- phthalates		
Solvents: - Methanol - Acetone - Isopropyl alcohol - Eucalyptol	Solvents for proposed analysis.	No, to be purchased
Vortex mixer	Mixing of prepared analytical solution and extraction.	No, to be purchased
Chromatography columns: - GC column	GC-MS analysis.	No, to be purchased
Capillary electrophoresis equipment: - Fused silica capillaries - Capillary cassette; - Poliurethane vials and caps; - Ultra pure CE water; - 0.1 N sodium hydroxide solution; - 1.0 N sodium hydroxide solution; - 0.1 N phosphoric acid; - 50 mM sodium phosphate buffer; - 50 mM sodium phosphate buffer; - 50 mM sodium tetraborate buffer; - 20 mM sodium tetraborate buffer,	CE-DAD analysis	No, to be purchased
Gas chromatography vials	GC-MS analysis	No, to be purchased
Single-use pipette tips	Standards preparation, sample extraction.	No, to be purchased

Research team

The research team consist of 3 persons: Principal Investigator (PI) – mgr inż. Aneta Katarzyna Bałdowska, Mentor – dr hab. inż. Justyna Małgorzata Płotka-Wasylka and the Co-investigator, who will be chosen after project approval. Specific information about the research tasks of the project, required qualifications, confirmed qualifications, and achievements of the executors is shown in Table 7.

Table 7. Research tasks and requirements of project executors.

No.	Team member	Scope of work	Required qualifications	Qualifications and achievements
1	Mgr inż. Aneta Katarzyna Bałdowska	The leadership of the project encompasses setting and implementing the project vision, driving administrative formalities, establishing the work plan for project participants, planning and executing project activities, adhering to timelines, and managing the budget. Specific tasks: - Supervision of the executor during formulation of the survey dedicated to parents, sample preparation and analytical analysis; - Selecting products for the research (samples) based on the survey; - Selecting groups of compounds, which may contaminate chosen products; - Purchasing analytical standards, samples, and equipment necessary for conducting analysis; - Development of an analytical procedure for sample preparation; - Development of analytical procedure for the determination of selected EDCs; - Preparation of an analytical assessment of the greenness and usefulness of the developed analytical procedure; - Chemometric analysis of obtained results; - Risk assessment of selected groups of EDCs in products dedicated to children; - Preparation of scientific articles, to summarise prepared procedures, and editorial help to the executor; - Preparation of a popular-science summary for parents; - Reporting to NCN about the work progress.	- Project management skills; - Ability to meet the requirements listed in the project plan; - Budget management skills; - Ability to conduct scientific investigation; - People management skills; - Experience in analytical research	**Qualifications and experience:** - Experience with scientific research during PhD study at Gdańsk University of Technology; - Experience as an analyst in a certified research laboratory – J. S. Hamilton Poland Sp. z o.o. in Gdynia, Poland **Achievements:** - development of a new analytical procedure based on ultrasound-assisted solvent extraction of porous membrane-packed solid sample with quantification by ultra-performance liquid chromatography coupled with tandem mass spectrometry (UASE-PMSS-UPLC-MS/MS) for the determination of bisphenols (BPs) and some of their derivatives in disposable baby diapers

2	dr hab. inż. Justyna Małgorzata Płotka-Wasylka	Exercising substantive supervision over the implementation of the project: supervision on all research tasks; supervision over the reports prepared on particular parts of the research; supervision on data analysis and interpretation; participation in preparing manuscripts presenting the data obtained; keeping documentation related to the schedule of performed works and costs incurred as part of the implementation of research tasks.	- Project management skills; - People management skills; - Ability of supervision under PI and Co-investigator; - Data analysis; - Experience in analytical research	**Qualifications and experience:** - Experience with scientific research as an associate professor of the Gdańsk University of Technology - PI of PRELUDIUM-3 and OPUS-19 projects financed by the National Centre of Science (NCN) - PI of project financed by the Ministry of Science and Higher Education of the Republic of Poland. - Reviewer in many Scientific Journals - Editor in Microchemical Journal and some Special Issues in Frontiers of Analytical Chemistry and Trends of Analytical Chemistry **Achievements:** - development of Green Analytical Procedure Index (GAPI) - a valuable tool for the assessment of the "green" character of analytical procedure - modification of GAPI to ComplexGAPI
3	Co-investigator	Literature review on the occurrence of endocrine-disrupting compounds in everyday products, methods of detection of selected groups of compounds. Formulation of a survey for parents and its analysis. Conducting project activities such as sample preparation, analytical procedures (detection method, data processing), etc., in cooperation with the head of the project.	- Ability to search for scientific data and implement it in the course of analytical procedures - Ability to select an extraction technique for an analytical sample - Proceedings with Good Laboratory Practice; - Performing qualitative and quantitative analyses - Ability to verify results and implement corrective actions in the event of irregularities; - Data interpretation.	Information will be provided after the hiring of the Co-investigator.

A specific list of achievements confirming the qualifications necessary to conduct the assigned tasks are presented in the OSF system.

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STRESZCZENIE POPULARNONAUKOWE

[w języku polskim i angielskim]

Dzieci w wieku przedszkolnym są szczególnie wrażliwe na działanie związków endokrynnie czynnych (EDCs) z uwagi na ich dynamiczny rozwój. Ich niska masa ciała sprawia, że już najniższe dawki substancji szkodliwych mogą być dla nich niebezpieczne i nieść poważne ryzyko wystąpienia skutków zdrowotnych w postaci chorób lub zaburzeń dalszych procesów rozwojowych. Literatura przedmiotu wskazuje, że związki zaburzające działanie układu hormonalnego są obecne w wielu produktach codziennego użytku, takich tak żywność, kosmetyki, zabawki i opakowania. Większość z nich jest rozpuszczalna w tłuszczach, przez co może gromadzić się w tkance tłuszczowej, powodując tak zwane chroniczne (ciągłe) narażenie, szczególnie niekorzystne dla dzieci. Zdarza się, że ekspozycja na działanie szkodliwych substancji, nie skutkuje wystąpieniem negatywnych efektów bezpośrednio po kontakcie z czynnikiem, a z opóźnieniem, czasem nawet po latach. Zjawisko to jest szczególnie niebezpieczne, gdyż nie pozwala na szybką reakcję, jak na przykład natychmiastowe usunięcie toksycznej substancji z życia człowieka, co skutkuje ciągłą ekspozycją na związki zaburzające funkcjonowanie organizmu. Pomimo, że problematyka obecności związków EDCs w różnego rodzaju produktach codziennego użytku, jest podejmowana od wielu lat przez badaczy na całym świecie, nadal brakuje kompleksowych badań uwzględniających monitoring, oznaczenie ilościowe i ocenę stopnia narażenia dzieci na poszczególne związki chemiczne, występujące w produktach przeznaczonych do ich użytku.

W związku z powyższym, głównym celem projektu jest opracowanie procedur analitycznych służących do oznaczania zawartości wybranych związków zaburzających pracę układu hormonalnego (EDCs) opartych na nowych, przyjaznych środowisku rozwiązaniach z zakresu przygotowania próbki do analizy oraz technik chromatograficznych (GC-MS) i/lub elektroforetycznych (CE-DAD) na etapie oznaczeń końcowych. Opracowane procedury posłużą do analizy produktów dedykowanych dzieciom w wieku przedszkolnym, zaś uzyskane wyniki zostaną wykorzystane do oszacowania ryzyka, jakie codzienne użytkowanie wybranych produktów za sobą niesie. Bezwarunkowo, pośrednim celem projektu jest też zwiększanie świadomości społecznej na temat związków zaburzających pracę układu hormonalnego oraz wsparcie działań na rzecz ochrony zdrowia dzieci poprzez rekomendacje dotyczące bezpieczeństwa produktów codziennego użytku.

Zaplanowane badania obejmą wywiad (w formie ankiety) z Rodzicami docelowej grupy badawczej, celem ustalenia ilości i rodzaju produktów, z jakimi dzieci mają codzienny kontakt, w szczególności artykuły spożywcze (napoje, przekąski), kosmetyki (szampony, pasty do zębów), czy zabawki. W dalszej kolejności planuje się opracowanie nowych procedur analitycznych opartych o wykorzystanie nowatorskich rozwiązań w zakresie przygotowania próbek do analizy takich jak: wykorzystanie cieczy głęboko eutektycznych czy biosorbentów, oraz GC-MS i/lub CE-DAD na etapie oznaczeń końcowych. Opracowane procedury zostaną poddane procesowi optymalizacji, celem zapewnienia jak największej dokładności i precyzji pomiarów oraz porównane z istniejącymi już metodykami badawczymi. Dokonana zostanie również walidacja opracowanych metodyk. Kolejnym etapem badań, będzie wykorzystanie danych procedur do monitoringu ilości wybranych związków ECDs w próbkach produktów dedykowanych dzieciom, a uzyskane wyniki posłużą do oszacowania stopnia narażenia na wybrane związki zaburzające funkcjonowanie układu hormonalnego, znajdujące się w przebadanych obiektach. Na podstawie przeprowadzonej z Rodzicami ankiety, uwzględnione zostaną różne scenariusze użytkowania, takie jak częstotliwość kontaktu z produktem oraz możliwe drogi narażenia (doustne, skórne, inhalacyjne). Wymienione wyżej badania posłużą do oszacowania stopnia narażenia na niebezpieczne substancje, występujące w produktach dedykowanych dzieciom w odniesieniu do dopuszczalnych poziomów narażenia, ustalonych przez międzynarodowe organy regulacyjne.

Głównym rezultatem projektu będą opracowane, przyjazne środowisku procedury analityczne służące do wyżej wymienionych celów. Ponadto, dane uzyskane w wyniku realizacji projektu pozwolą na szczegółową analizę problemu badawczego, oraz dostarczenie aktualnych danych, o poziomach zawartości związków EDCs w produktach dedykowanych dzieciom. Wiedza ta, umożliwi wprowadzenie praktyk zaradczych umożliwiających zminimalizowanie lub wykluczenie ekspozycji na wybrane związki negatywnie wpływające na zdrowie dziecka. Efektem realizacji projektu będzie też wpływ na zwiększanie świadomości społecznej na temat obecności wybranych związków zaburzających pracę układu hormonalnego, co być może przyczyni się do świadomego „mądrzejszego” wyboru przez Rodziców bezpieczniejszych, alternatywnych produktów dla swoich pociech.

Preschool children are particularly sensitive to the effects of endocrine-disrupting compounds (EDCs) due to their dynamic development. Their low body weight means that even the smallest doses of harmful substances can be dangerous and carry a serious risk of health effects in the form of diseases or developmental disorders. The literature indicates that EDCs are present in many everyday products, including food, cosmetics, toys, and packaging. Most of these compounds are fat-soluble, allowing them to accumulate in fatty tissue, leading to so-called chronic (continuous) exposure, which is particularly detrimental to children. Sometimes, exposure to harmful substances does not result in immediate adverse effects, but their consequences are observed with a delay, even years later. This phenomenon is hazardous because it does not allow for a quick response, such as removing the toxic substance from a person's life, resulting in continuous exposure to compounds that disrupt bodily functions. Despite the issue of EDCs in various everyday products being investigated by researchers worldwide for many years, there is still a lack of comprehensive studies that include monitoring, quantitative determination, and assessment of the degree of children's exposure to specific chemical compounds present in products intended for their use.

Therefore, the main goal of the project is to develop analytical procedures for determining the content of selected endocrine-disrupting compounds (EDCs) using novel, environmentally friendly solutions in sample preparation for analysis, as well as chromatographic (GC-MS) and/or electrophoretic (CE-DAD) techniques at the final determination stage. The developed procedures will be used to analyse products intended for preschool children, and the obtained results will be used to estimate the risk associated with the daily use of selected products. Unconditionally, an indirect goal of the project is also to raise public awareness about endocrine-disrupting compounds and support efforts to protect children's health through recommendations for the safety of everyday products.

The planned research will include an interview (in the form of a survey) with the parents of the target research group to determine the quantity and type of products children are exposed to daily, particularly food items (beverages, snacks), cosmetics (shampoos, toothpaste), and toys. Subsequently, new analytical procedures will be developed based on innovative solutions in sample preparation for analysis, such as the use of deep eutectic solvents or biosorbents, as well as GC-MS and/or CE-DAD at the final determination stage. The developed procedures will undergo an optimisation process to ensure the highest possible accuracy and precision of measurements, and will be compared with existing methodologies and validated. The next stage of the research will involve using these procedures to monitor the quantity of selected EDCs in samples of products intended for children. The obtained results will be used to estimate the degree of exposure to selected endocrine-disrupting compounds found in the tested objects. Based on the survey conducted with parents, various usage scenarios will be considered, including the frequency of contact with the product and potential routes of exposure (oral, dermal, inhalational). The studies mentioned above will help estimate the degree of exposure to hazardous substances present in products intended for children in relation to permissible exposure levels established by international regulatory bodies.

The main aim of the project is to develop environmentally friendly analytical procedures for the purposes mentioned above. Additionally, the data obtained from the project will enable a detailed analysis of the research problem and provide up-to-date information on the levels of EDCs in products specifically designed for children. This knowledge will allow the introduction of preventive practices to minimise or eliminate exposure to selected compounds that negatively affect children's health. The project's outcome will also contribute to increasing public awareness about the presence of selected endocrine-disrupting compounds, which may lead to more informed and "smarter" choices by parents of safer, alternative products for their children.

KWESTIE ETYCZNE

1. Badania na ludzkich zarodkach oraz materiale pozyskanym z ludzkich zarodków i płodów	
Czy w planowanych badaniach będą wykorzystywane ludzkie zarodki?	NIE
Czy w planowanych badaniach wykorzystane będą tkanki lub komórki pochodzące z ludzkich zarodków lub płodów?	NIE
Czy w planowanych badaniach będą wykorzystywane ludzkie embrionalne komórki macierzyste (hESCs)?	NIE
2. Badania z udziałem ludzi	
Czy planowane badania odbywają się z udziałem ludzi?	NIE
Czy planowane badania polegają na aktywnej interwencji fizycznej lub psychologicznej dotyczącej uczestników badania?	NIE
Czy w planowanych badaniach wykorzystywany będzie ludzki materiał genetyczny?	NIE
Czy planowane badania są eksperymentem medycznym zgodnie z ustawą z dnia 5 grudnia 1996 r. o zawodzie lekarza i lekarza dentysty (Dz. U. z 2018 r. poz. 617 ze zm.)?	NIE
Czy planowane badania stanowią niekomercyjne badanie kliniczne, które wymaga rejestracji w Centralnej Ewidencji Badań Klinicznych (https://www.clinicaltrialsregister.eu/) zgodnie z ustawą z dnia 6 września 2001 r. Prawo Farmaceutyczne (Dz. U. z 2017 r. poz. 2211 ze zm.) oraz ustawą z dnia 20 maja 2010 r. o wyrobach medycznych (Dz. U. z 2017 r. poz. 211 ze zm.)?	NIE
3. Ludzkie komórki/tkanki	
Czy w planowanych badaniach wykorzystywane będą ludzkie komórki lub tkanki dostępne komercyjnie, inne niż wskazane w punkcie 1?	NIE
Czy w planowanych badaniach wykorzystywane będą ludzkie próbki biologiczne pozyskane w projekcie lub pochodzące ze źródeł niekomercyjnych?	NIE
4. Dane osobowe	
Czy planowane badania wiążą się z przetwarzaniem danych osobowych?	TAK
Czy w planowanych badaniach wykorzystywane będą dane osobowe pochodzące z innych źródeł, spoza podmiotu realizującego badania?	TAK
5. Zwierzęta	
Czy w planowanych badaniach wykorzystywane będą zwierzęta kręgowe lub głowonogi?	NIE
Czy w planowanych badaniach wykorzystywany będzie materiał biologiczny pochodzący od zwierząt (np. krew, mocz lub inne)?	NIE
Czy w planowanych badaniach wykorzystywane będą zwierzęce tkanki, komórki lub linie komórkowe dostępne komercyjnie?	NIE
6. Współpraca naukowa z krajami spoza Unii Europejskiej	
Czy działania związane z badaniami podejmowanymi w krajach spoza UE stanowić mogą ryzyko pojawienia się wątpliwości natury etycznej?	NIE
Czy w badaniach planowane jest użycie lokalnych zasobów ludzkich, kulturowych lub naturalnych, np. udziału ludzi, zwierząt, roślin, materiału genetycznego ludzi lub zwierząt, szczątków ludzkich, materiału o wartości historycznej, roślin lub zwierząt chronionych itp.?	NIE
Czy w ramach badań planowany jest import lub eksport materiału badawczego z krajów spoza UE?	NIE

Jeśli zaplanowane badania obejmują kraje o niskim lub średnim dochodzie, czy przewiduje się podział korzyści wynikających z realizacji projektu?	NIE
Czy sytuacja w tym kraju mogłaby narazić osoby biorące udział w badaniach na ryzyko?	NIE
7. Środowisko, zdrowie i bezpieczeństwo (w tym badania na materiale genetycznie zmodyfikowanym)	
Czy planowane badania obejmują wykorzystanie mikroorganizmów, organizmów, tkanek lub komórek genetycznie modyfikowanych (GMO, GMM)?	NIE
Czy planowane badania dotyczą gatunków zwierząt lub roślin chronionych lub obszarów chronionych?	NIE
Czy planowane badania wymagają użycia czynników lub warunków, które mogą być szkodliwe dla ludzi, w tym personelu badawczego?	NIE
8. Dziedzictwo kulturowe	
Czy w badaniach planowane jest użycie zasobów dziedzictwa kulturowego, w tym ludzi, flory i fauny, ich materialnych pozostałości, materialnych i niematerialnych wytworów kultury oraz obszarów chronionych ze względu na ich wartość kulturową?	NIE
9. Nadużycia i podwójne zastosowanie	
Czy w badaniach planowane jest wykorzystanie lub wytworzenie produktu podwójnego zastosowania (np. patogeny, oprogramowanie, technologie), które wymagają autoryzacji eksportowej zgodnie z Rozporządzeniem UE 428/2009?	NIE
Czy planowane badania mogą potencjalnie być źródłem nadużyć, przestępstw, ataków terrorystycznych?	NIE

Opis działań podjętych w celu zapewnienia wykonywania badań zgodnie z zasadami dobrej praktyki w danej dziedzinie/dyscyplinie naukowej oraz informacja, czy jakieś zgody zostały już wydane, bądź informacje, jak te warunki zostaną spełnione [w języku angielskim]
Due to the work involving potentially sensitive information, clear procedures and policies will be implemented when working with surveys. Access to the surveys will be limited only to the PI of the project and the expert responsible for survey analysis. Moreover, to minimise as much as possible the leakage of sensitive information, a secure storage method will be implemented. Additionally, all questionnaires will be anonymous. Compliance with occupational health and safety rules: when handling hazardous substances, using personal protective equipment (laboratory coat, laboratory glasses, gloves, etc.) and group protection equipment (exhaust hood, etc).

Oświadczenie	
Oświadczam, że - w przypadku planowania badań wymagających pozyskania zgód, opinii, zezwoleń lub pozwoleń właściwych organów/komisji zobowiązuję się do ich uzyskania przed rozpoczęciem realizacji badań, których dotyczą; - jestem świadoma/y wymogu przekazania do NCN w raportach rocznych i końcowym wszystkich uzyskanych zgód, opinii, zezwoleń lub pozwoleń niezbędnych do realizacji projektu; - jestem również świadoma/y, że prowadzenie badań bez wymaganych zgód, opinii, zezwoleń lub pozwoleń stanowić może podstawę do nierozliczenia projektu z koniecznością zwrotu części lub całości środków.	TAK

PLAN BADAŃ [w języku polskim i angielskim]

Lp.	Nazwa zadania	Podmioty
1	Sformułowanie i przeprowadzenie ankiety wśród Rodziców, związanej z najczęściej wybieranymi produktami dedykowanymi dzieciom. Wyselekcjonowanie produktów najczęściej stosowanych przez dzieci na podstawie przeprowadzonej ankiety. Formulating and conducting a survey among parents regarding the most frequently chosen products dedicated to children. Selection of products most commonly used by children based on a survey.	• Politechnika Gdańska
2	Opracowanie procedury analitycznej przygotowania próbek dedykowanych dzieciom pod kątem zawartości związków endokrynnie czynnych, takich jak np. ftalany, bisfenole czy parabeny. Development of an analytical procedure for preparing samples dedicated to children in terms of the content of endocrine active compounds, such as phthalates, bisphenols or parabens.	• Politechnika Gdańska
3	Opracowanie procedury analitycznej do oznaczenia wyselekcjonowanych związków z grupy EDC w wybranych produktach dedykowanych dzieciom opartej o wybrane techniki analityczne (GC-MS, CE-DAD - w zależności od grupy analitów). Development of an analytical procedure for the determination of selected compounds from the EDC group in selected products dedicated to children, based on selected analytical techniques (GC-MS, CE-DAD - depending on the group of analytes).	• Politechnika Gdańska
4	Ocena zieloności i użyteczności opracowanej procedury analitycznej z użyciem dedykowanych do tego narzędzi, tj. GAPI, BAGI. Assessment of the greenness and usefulness of the developed analytical procedure using dedicated tools, i.e. GAPI and BAGI.	• Politechnika Gdańska
5	Analiza jakościowa i ilościowa próbek rzeczywistych z wykorzystaniem opracowanej procedury analitycznej. Analiza chemometryczna otrzymanych wyników. Qualitative and quantitative analysis of real samples using the developed analytical procedure. Chemometric analysis of the obtained results.	• Politechnika Gdańska

6	Oszacowanie narażenia na analizowane związki endokrynnie czynne w oparciu o uzyskane dane. Identyfikacja czynników potencjalnie zwiększających ryzyko zdrowotne, ocena stopnia narażenia.	• Politechnika Gdańska
	Estimation of exposure to the analysed endocrine-disrupting compounds based on the obtained data. Identification of factors that potentially increase health risk and assessment of exposure levels.	

ZBLIŻONE ZADANIA BADAWCZE

Czy kierownik (PI) ubiega się o finansowanie wskazanych we wniosku zadań badawczych również z innych źródeł?	NIE
Czy kierownik (PI) realizuje/realizował zadania badawcze zbliżone do zadań objętych tym wnioskiem?	TAK
Kierownik (PI) jest	AUTOREM OPISÓW PROJEKTU

Opis zbliżonych zadań i uzasadnienie konieczności ich finansowania [w języku angielskim] Należy wskazać realizowane i zrealizowane zadania badawcze, co do których mogłoby zajść podejrzenie podwójnego finansowania w przypadku uzyskania finansowania na zadania badawcze objęte niniejszym wnioskiem. Wyjaśnienie powinno w sposób jednoznaczny wskazywać różnice pomiędzy zadaniami badawczymi i zawierać uzasadnienie konieczności finansowania zadań badawczych w niniejszym wniosku.
I have had the opportunity to be a part of a team in a project titled "Jednorazowe pieluchy dziecięce: monitorowanie wybranych związków toksycznych poprzez zastosowanie nowych metod analitycznych" (contract no UMO-2020/37/B/ST4/02886) funded by the National Science Centre, conducted under the direction of Professor Justyna Płotka-Wasylka. In this proposal, my task was to conduct research aimed at developing new analytical procedures for the extraction and determination of endocrine-disrupting compounds (EDCs) in disposable baby diapers. Moreover, some of the studies included in the project assessed dermal exposure, such as a research focused on bisphenols in baby diaper samples intended for newborns and infants [1]. The proposed PRELUDIUM project will supplement the present state of knowledge by assessing routes of exposure to EDCs in products intended for toddlers, such as ingestion or dermal exposure to hazardous compounds. [1] https://doi.org/10.1016/j.ecoenv.2023.115351

Podmioty

Politechnika Gdańska	
Czy podmiot ubiega się o finansowanie wskazanych we wniosku zadań badawczych również z innych źródeł?	NIE

WSPÓŁPRACA MIĘDZYNARODOWA

Czy projekt realizowany we współpracy międzynarodowej?	NIE

ZESPÓŁ BADAWCZY

1. Aneta Bałdowska, Kierownik (PI)	
Podmiot	Politechnika Gdańska
Zakres prac [w języku angielskim]	Leadership of the project, which include setting and implementing project vision, driving administrative formalities, setting the work plan for those involved into project, planning and execution of project activities, adherence to timelines, and budget management. Specific tasks: - Supervision of the executor during formulation of survey dedicated to parents, sample preparation and analytical analysis; - Selecting products for the research (samples) basing on the survey; - Selecting groups of compounds, which may contaminate chosen products; - Purchasing analytical standards, samples, equipment necessary for conducting analysis; - Development of an analytical procedure for sample preparation; - Development of analytical procedure for the determination of selected EDCs; - Preparation of analytical assessment of the greenness and usefulness of developed analytical procedure; - Chemometric analysis of obtained results; - Risk assessment of selected groups of EDCs in product dedicated to children; - Preparation of scientific articles, to summarize prepared procedures, editorial help to executor; - Preparation of popular-science summary for parents; - Reporting to NCN about the progress in work.

2. Justyna Płotka-Wasylka, Opiekun	
Podmiot	Politechnika Gdańska
Zakres prac [w języku angielskim]	Exercising substantive supervision over the implementation of the project: supervision on all research tasks; supervision over the reports prepared on particular parts of the research; supervision on data analysis and interpretation; participation in preparing manuscripts presenting the data obtained; keeping documentation related to the schedule of performed works and costs incurred as part of the implementation of research tasks.

3. Wykonawca_1, Wykonawca	
Podmiot	Politechnika Gdańska
Zakres prac [w języku angielskim]	Literature review on the occurrence of endocrine-disrupting compounds in everyday products, methods of detection of selected groups of compounds. Formulation of a survey for parents and its analysis. Conducting project activities such as sample preparation, analytical procedures (detection method, data processing), etc. - in cooperation with head of the project.
Wymagane kwalifikacje [w języku angielskim]	The ability to search for scientific data and implement them in the course of analytical procedures. Ability to select an extraction technique for an analytical sample. Proceedings with Good Laboratory Practice. Performing qualitative and quantitative analyses. Ability to verify results and implement corrective actions in the event of irregularities. Data interpretation.

KIEROWNIK PROJEKTU (PI)

mgr inż. Aneta Bałdowska	
Podmiot	Politechnika Gdańska

Stopień doktora	
Czy kierownik (PI) posiada stopień doktora?	NIE
Doktorant	
Czy kierownik (PI) jest doktorantem?	TAK

Dyscypliny naukowe (zgodnie z Klasyfikacją dziedzin nauki i dyscyplin naukowych oraz dyscyplin artystycznych)		
Lp.	Kod i nazwa	Dyscypliny naukowe (zgodnie z Klasyfikacją dziedzin nauki i dyscyplin naukowych oraz dyscyplin artystycznych)
1	7.6 - nauki chemiczne	Główna dyscyplina naukowa

Dane osobowe	
Imię	Aneta
Drugie imię	Katarzyna
Nazwisko	Bałdowska
PESEL	97101807081
Data urodzenia (rrrr-mm-dd)	1997-10-18
Płeć	Kobieta
Obywatelstwo	Polska

Informacje kontaktowe	
Telefon	795717808
Adres e-mail	aneta.baldowska@pg.edu.pl
Elektroniczna skrzynka podawcza ESP (ePUAP)	

Adres zamieszkania	
Kraj	Polska
Województwo	pomorskie
Kod pocztowy	81-041
Miejscowość	Gdynia
Ulica, numer domu, numer lokalu	Chylońska 51/4

Adres korespondencyjny

Kraj	Polska
Województwo	pomorskie
Kod pocztowy	81-041
Miejscowość	Gdynia
Ulica, numer domu, numer lokalu	Chylońska 51/4

Elektroniczny identyfikator naukowca	
Elektroniczny identyfikator naukowca	0000-0002-4289-2567
Rodzaj identyfikatora	ORCID

Zatrudnienie	Bez zatrudnienia

OPIEKUN

dr hab. inż. Justyna Płotka-Wasylka	
Podmiot	Politechnika Gdańska

Informacje o przerwach - ankieta dorobku	
Urlopy związane z opieką i wychowaniem dzieci udzielone na zasadach określonych w Kodeksie pracy - liczba dni	1089

Dane osobowe	
Imię	Justyna
Drugie imię	Małgorzata
Nazwisko	Płotka-Wasylka
PESEL	86032411724
Data urodzenia (rrrr-mm-dd)	1986-03-24
Płeć	Kobieta
Obywatelstwo	Polska

Informacje kontaktowe	
Adres e-mail	juswasyl@pg.edu.pl

Elektroniczny identyfikator naukowca	
Elektroniczny identyfikator naukowca	0000-0002-1304-8623
Rodzaj identyfikatora	ORCID

Oświadczenie opiekuna naukowego	
Nazwa pliku	Potwierdzenie promotora.pdf

ANKIETY CZŁONKÓW ZESPOŁU [w języku angielskim]

KIEROWNIK (PI)
mgr inż. Aneta Katarzyna Bałdowska

PRZEBIEG KARIERY NAUKOWEJ

Information on education, academic degrees/titles and employment
15.06.2020 - 31.12.2021 - J. S. Hamilton Poland Sp. z o.o., Gdynia, Woj. Pomorskie, Polska, position - analyst
28.09.2020 - first-cycle studies diploma - obtained professional title: engineer, field of study: Chemical Technology, scope of study: technical and induustrial analytics, discipline: chemical engeneering
29.09.2022 - diploma certyfying completion of Master's degree - obtained professional title: Master of Science, field of study: Green Technologies, discipline: chemical engeneering
01.01.2022 - 30.01.2025 - Scholarship holder in the project financed by the National Science Center - 2020/37/B/ST4/02886: "Disposable children's diapers: monitoring selected toxic compounds through the use of new analytical methods", position - student
01.10.2022 - present - PhD Student at Gdańsk University of Technology, Faculty of Chemistry, Department of Analytical Chemistry

Research stays at home and abroad
25.02.2023 - 31.03.2023 - 1 month, internship in Institute of Chemistry and Technical Electrochemistry, Faculty of Chemical Technology, Poznan University of Technology, Berdychowo 4, 60-965 Poznań, Poland
14-15.09.2023 - active participant in 19th International Student Conference ‘Modern Analytical Chemistry’ at the Department of Analytical Chemistry, Faculty of Science, Charles University, Prague, Czech Republic
05-08.11.2024 - passive participation (poster) in 6th International Environmental Chemistry Congress (EnviroChem), Trabzon, Türkiye

Lectures and presentations

Prizes and awards
Mini-grants for PhD students 2023 - Fund for supporting young scientific staff at Gdańsk University of Technology
Mini-grants for PhD students 2024 - Fund for supporting young scientific staff at Gdańsk University of Technology
Beneficient of Polonium International Doctoral Fellowships in academic year 2022/2023
Beneficient of Francium Supporting Outstanding Doctoral Candidates in academic year 2023/2024 and 2024/2025

Other significant achievements
Chemistry workshops for children at the Baltic Festival of Science

Other key information impacting the evaluation of the academic and research career
Mini-grants for PhD students 2023 - Fund for supporting young scientific staff at Gdańsk University of Technology
The award was granted for a scientific publication published in 2023.
Assessment criteria: publication in a journal of a scientific field related to the doctoral dissertation according to the MEiN classification of February 18, 2021 for a minimum of 100 points.
Mini-grants for PhD students 2024 - Fund for supporting young scientific staff at Gdańsk University of Technology
The award was granted for a scientific publication published in 2024.
Assessment criteria: publication in a journal of a scientific field related to the doctoral dissertation according to the MEiN classification of February 18, 2021 for a minimum of 100 points.
Participation in seminars organized by V4 Summer School on Smart Analytical Science financed by International Visegrad Fund, cycle of 5 seminars - 30.10.2023-12.11.2024
Participation in "V4 Summer School on Smart Analytical Science" financed by International Visegrad Fund - 23-28.10.2024, Pobierowo, Poland
Participation in VIII Academy of Analytical Chemistry, title: "A comprehensive approach to lowering detection limits in liquid and gas chromatography coupled with mass spectrometry. Modern analytical techniques LCMS (/ MS) and GCMS (/ MS) and sample preparation", May 19-22, 2024, Jachranka, Poland

PUBLIKACJE NAUKOWE

1. Justyna Płotka-Wasylka, Aneta Chabowska, Suwijak Pantanit, Opas Bunkoed, Michel Y. Fares, Muhammad Sajid,

Dimitra Lambropoulou, Aleksandra Kurowska-Susdorf, Natalia Jatkowska, *Natural/bio-based sorbents as greener extractive materials for endocrine disrupting compounds in samples of different matrix composition* (**2024**), artykuł, TrAC Trends in Analytical Chemistry, Elsevier, 117773, ISSN: 0165-9936
Liczba cytowań (bez autocytowań): 8
Otwarty dostęp: tak, DOI https://doi.org/10.1016/j.trac.2024.117773
Status publikacji: opublikowane

2. Jose Grau, Aneta Chabowska, Justyna Werner, Agnieszka Zgoła-Grześkowiak, Magdalena Fabjanowicz, Natalia Jatkowska, Alberto Chisvert, Justyna Płotka-Wasylka, *Deep eutectic solvents with solid supports used in microextraction processes applied for endocrine-disrupting chemicals* (**2024**), artykuł, Talanta, Elsevier, 268, 125338, ISSN: 0039-9140
Liczba cytowań (bez autocytowań): 11
Otwarty dostęp: nie, DOI https://doi.org/10.1016/j.talanta.2023.125338
Status publikacji: opublikowane

3. Aneta Chabowska, Natalia Jatkowska, Paweł Kubica, Justyna Płotka-Wasylka, *Exposure scenario and risk assessment of infants and newborns to bisphenols and their derivatives from diapers* (**2023**), artykuł, Ecotoxicology and Environmental Safety, Elsevier, 262, 115351, ISSN: 0147-6513
Liczba cytowań (bez autocytowań): 5
Otwarty dostęp: tak, DOI https://doi.org/10.1016/j.ecoenv.2023.115351
Status publikacji: opublikowane

4. Aneta Chabowska, Justyna Werner, Agnieszka Zgoła-Grześkowiak, Julia Płatkiewicz, Robert Frankowski, Justyna Płotka-Wasylka, *Development of thin film SPME sorbents based on deep eutectic solvents and their application for isolation and preconcentration of endocrine-disrupting compounds leaching from diapers to urine* (**2024**), artykuł, Microchemical Journal, Elsevier, 199, 110023, ISSN: 0026-265X
Liczba cytowań (bez autocytowań): 9
Otwarty dostęp: nie, DOI https://doi.org/10.1016/j.microc.2024.110023
Status publikacji: opublikowane

5. Aneta Chabowska, Jose Grau, Magdalena Fabjanowicz, Patrycja Makoś-Chełstowska, Patrycja Janicka, Natalia Jatkowska, Justyna Płotka-Wasylka, *Polychlorinated biphenyls (PCBs) and polychlorodibenzo-p-dioxins (PCDDs) determination in disposable baby diapers with the application of natural deep eutectic solvent* (**2023**), artykuł, Microchemical Journal, Elsevier, 195, 109482, ISSN: 0026-265X
Liczba cytowań (bez autocytowań): 5
Otwarty dostęp: nie, DOI https://doi.org/10.1016/j.microc.2023.109482
Status publikacji: opublikowane

6. Patrycja Janicka, Justyna Płotka-Wasylka, Natalia Jatkowska, Aneta Chabowska, Michel Y. Fares, Vasil Andruch, Massoud Kaykhaii, Jacek Gębicki, *Trends in the new generation of green solvents in extraction processes* (**2022**), artykuł, Current Opinion in Green and Sustainable Chemistry, Elsevier, 37, 100670, ISSN: 2452-2236
Liczba cytowań (bez autocytowań): 54
Otwarty dostęp: tak, DOI https://doi.org/10.1016/j.cogsc.2022.100670
Status publikacji: opublikowane

7. Aneta Chabowska, Justyna Płotka-Wasylka, Natalia Jatkowska, *Dziecięce pieluchy jednorazowe: walory konsumenckie a wpływ na zdrowie dziecka pod kątem zawartości związków endokrynnie czynnych [Disposable baby diapers: consumer values in comparison to their impact on the child's health in terms of the content of endocrine disrupting compounds]* (**2023**), artykuł, Analityka: Nauka i Praktyka, Wydawnictwo Malamut, 30-34, ISSN: 1509-4650
Liczba cytowań (bez autocytowań): 0
Otwarty dostęp: nie
Status publikacji: opublikowane

DOKONANIA ARTYSTYCZNE

b.d.

BADANIA NAUKOWE FINANSOWANE PRZEZ NCN

b.d.

INNE PROJEKTY BADAWCZE

b.d.

NAJWAŻNIEJSZE OSIĄGNIĘCIE NAUKOWE

The highest achievement is development of a new analytical procedure based on ultrasound assisted solvent extraction of porous membrane-packed solid sample with quantification by ultra-performance liquid chromatography coupled with tandem mass spectrometry (UASE-PMSS-UPLC-MS/MS) for the determination of bisphenols (BPs) and some of their derivatives in disposable baby diapers. The proposed methododology was a response to the lack of a harmonized analytical protocol for the determination of BPs and/or their derivatives in disposable care products for babies and children in the territory of the European Union. For the first time, was used for the disposable baby diapers. Moreover, two groups of analytes, bisphenols and their diglycidyl ethers, were determined within a single run. In addition, the methodology is characterized by a short analysis time and a low sample volume and waste generated. The developed procedure allows to determine and quantify selected analytes in diapers.

OPIEKUN
dr hab. inż. Justyna Małgorzata Płotka-Wasylka

PRZEBIEG KARIERY NAUKOWEJ

Information on education, academic degrees/titles and employment
Scientific career:
10th September 2010, Master of Science, Engineer, Faculty Chemistry, Gdańsk University of Technology.
8th October 2014, Doctor of Philosophy, Faculty Chemistry, Gdańsk University of Technology, chemical science.
10th September 2019, Doctor of Science, Faculty Chemistry, Gdańsk University of Technology, Natural Science, Chemical Science.
Career:
2014-2015 Assistent in Department of Analytical Chemistry, Faculty of Science, Gdańsk University of Technology
2015-2019 Adiunkt in Department of Analytical Chemistry, Faculty of Science, Gdańsk University of Technology
2018-today Associate Editor in Microchemical Journal, Elsevier, Amsterdam
2018-2021 Member of Council of Young scientists (Ministry of Science and High Education, Ministry of Education and Science);
2019-today Profesor in Department of Analytical Chemistry, Faculty of Science, Gdańsk University of Technology
2021-2024 Member in Polish Academy of Science, Divisions of Polish Academy of Sciences; Division III Exact Sciences and Earth Sciences; Committee on Analytical Chemistry; Food, Raw Materials and Food Products Analytics Team
2024- Member in Polish Academy of Science, Divisions of Polish Academy of Sciences; Division III Exact Sciences and Earth Sciences; Committee on Analytical Chemistry
2024-today Dean for Science, Faculty of Chemistry, Gdańsk University of Technology
2024-today Member of Commision for Internationalization of Gdańsk University of Technology

Research stays
12.2024, Barcelona, Spain. University of Barcelona. Participation in an intensive laboratory course related to the complexmatrice analysis.
07.2015, Trento, Italy. University of Adelaide. Participation in an intensive laboratory course related to the analysis of wine samples. The course allowed to learn how to prepare wine samples for analysis using various analytical techniques based on the OIV guide.
03.02 – 03.03.2014; 1 – 30.03.2015, Vien, Austria. Vienna University of Technology - monthly study visit as a part of inter-university cooperation. I was responsible for reviewing the literature on the use of green extraction techniques and conducting an experimental part in the field of the SDME technique application for the isolation of amine compounds from water samples. 0
5.2014, Glasgow, Scotland, UK. University of Glasgow – 3-weeks study visit as a part of cooperation with Dr. Calum Morrison. Participation in the course on the analysis of biological material.
03 – 06.2012, Paisley, Scotland, UK. University of the West of Scotland – 3-months internship in the framework of interPhD program. The implementation of laboratory tests being the basis of the doctoral thesis.
09 – 12.2011, Paisley, Scotland, UK. University of the West of Scotland – 6-months internship in the framework of ERASMUS program. The implementation of laboratory tests being the basis of the doctoral thesis.
02 – 08.2010, Paisley, Scotland, UK. University of the West of Scotland – 6-month internship in the framework of ERASMUS program. The implementation of laboratory tests being the basis of the master thesis

Lectures, presentations
2015.09.20-2015.09.24, Greece, Kalamata, International conference.Organization: Department of Food Technology, Technological Educational Institute of Peloponnese; Laboratory of Inorganic and Analytical Chemistry, School of Chemical Engineering NTUA; Title of presentation: A novel dispersive liquid-liquid microextraction gas chromatography-mass spectrometry method for the determination of selected biogenic amines in wine
2017.07.17-2017.07.20, Spain, Salamanca, 10th In Vino Analytica Scientia Symposium: Analytical Chemistry for Wine, Brandy and Spirits, Organization:University of Salamanca; EuCHeMS, Title of presentation: An in situ derivatization – dispersive liquid–liquid microextraction combined with gaschromatography – mass spectrometry for determining biogenic amines in home-made fermented alcoholic drinks
2015.07.14-2015.07.18, Italy, Mezzocorona, 9th In Vino Analytica Scientia (IVAS2015), Organizators: Divisions of Analytical Chemistry and Food Chemistry of the European Association for Chemical and Molecular Sciences (EuCheMS), Justyna Płotka-Wasylka, Politechnika Gdańska 637084
Title of presentation: Microextraction in conjuction with the derivatization–strategies for the determination of BAs in wines by chromatographic techniques
2022.06.19-2023.06.23, Poland, Łódź, XI Polish Analytical Chemistry Conference Organizators: Faculty of Chemistry, University of Łódź and Faculty of Chemistry, Technology University of Łódź. Title of presentation: Miniaturized method for

the determination of biogenic amines in wine samples based on liquid-liquid microextraction assisted by salting-out effect in combination with gas chromatography coupled with mass spectrometry
2021.11.16-2021.11.18, Germany, Luneburg, 6th Green and Sustainable Chemistry Conference Organizators: Elsevier, Title of presenatation: Green Analytical Chemistry (Invited speaker)
23-28.09.2024, Pobierowo, Poland, Title of presenation: Sample preparation techniques relevant to Green Analytical Chemistry, Summer School, Partner of the project
5-8.11.2024, Trabzone, Turkey, 6th International Environmental Chemistry Congress (EnviroChem); Title of presentation: Trends in the new generation of green solvents in extraction processes (Invited Speaker)

Prizes and awards
Rector's of GUT prize for outstanding scientific achievements obtained in 2023.
Rector's of GUT prize for outstanding scientific achievements obtained in 2022.
Rector's of GUT prize for outstanding scientific achievements obtained in 2021.
Rector's of GUT prize for outstanding scientific achievements obtained in 2020.
Scientific Award given by Minister of Science and Higher Education for the best scientist in 2020.
Rector's of GUT prize for outstanding scientific achievements obtained in 2019.
Scientidic award given in 2020 by Committee of Analytical Chemistry of Polish Academy of Science for for outstanding habilitation achievement.
Scientific award of the Polish Academy of Science branch in Gdańsk for young scientists for 2018, category of Sciences and Earth Sciences
Rector's of GUT prize for young researchers for outstanding scientific achievements obtained in 2018.
Rector's of GUT prize for young researchers for outstanding scientific achievements obtained in 2017.
Rector's of GUT prize for young researchers for outstanding scientific achievements obtained in 2016.
Rector's of GUT prize for young researchers for outstanding scientific achievements obtained in 2015.
Rector's of GUT prize „Success on the YEAR" for the publication published in the journal of the Highest Impact Factor in 2015. Rector's of GUT prize for young researchers for outstanding scientific achievements obtained in 2014.
Award: "Advanced PhD" – scholarship for the young reseracher given in 2014.

Other significant achievements
Editor of Speciall Issues in Green Analytical Chemistry
Editor of Speciall Issues in Trends in Analytical Chemistry (2023-2024)
Editor in Microchemical Journal from 2018.
Editor of Speciall Issues in Frontiers of Analytical Chemistry (2021, 2023).
Editor of Special Issue in Trends of Analytical Chemistry (opened in June 2023).
Participation as co-partner in "V4 Summer School on Smart Analytical Science – V4SSSAS" project under the Visegrad Grants programme as part of the lecture team (2023-2024).
Reviewer in many Scientific Journal from JCR list, such as: Trends in Analytical Chemistry, Food Chemistry, Science of the Total Environment, etc. (around 200 manuscript has been reviewed).
Inviter for inteview by Nature journalist Elissa Welle in May 2023 for upcoming article in her site.
10.2020-10.2021: member of the expert body for evaluating applications for the award of the minister responsible for higher education and science, processed in two consecutive years.

Other key information impacting the evaluation of the academic and research career
More than 1000 days of break due to the birth of 3 children (2016, 2019, 2023).

PUBLIKACJE NAUKOWE

1. Glinka M., Jażdżewska K., Vakh C., Drążkowska I., Bagińska E., Majchrzak T., Młynarczyk M., Rachon D., Wasik A., Płotka-Wasylka J, *Assessment of baby disposable diapers application for urine collection and determination of phthalate metabolites* (**2024**), artykuł, Ecotoxicology and Environmental Safety, Elsevier, 272, 116033.
   Liczba cytowań (bez autocytowań): 2
   Otwarty dostęp: tak, DOI 10.1016/j.ecoenv.2024.116033
   Status publikacji: opublikowane

2. Chabowska A., Werner J., Zgoła-Grześkowiak A., Płatkiewicz J., Frankowski R., Płotka-Wasylka J., *Development of thin film SPME sorbents based on deep eutectic solvents and their application for isolation and preconcentration of endocrine-disrupting compounds leaching from diapers to urine* (**2024**), artykuł, Microchemical Journal, Elsevier, 199, 110023.
   Liczba cytowań (bez autocytowań): 9

Otwarty dostęp: nie, DOI 10.1016/j.microc.2024.110023
Status publikacji: opublikowane

3. Treviño M. J.S., Pereira-Coelho M., López A., Guadalupe R.,. Zarazúa S, dos Santos Madureira L.A., Majchrzak T., Płotka-Wasylka Justyna J., *How pesticides affect neonates? - Exposure, health implications and determination of metabolites* (**2023**), artykuł, Science of the Total Environment, Elsevier, 856 , 158859.
Liczba cytowań (bez autocytowań): 11
Otwarty dostęp: tak, DOI 10.1016/j.scitotenv.2022.158859
Status publikacji: opublikowane

4. Płotka-Wasylka J., Mulkiewicz E., Lis H., Godlewska K., Kurowska-Susdorf A., Sajid M., Lambropoulou D., Jatkowska N., *Endocrine disrupting compounds in the baby's world - A harmful environment to the health of babies* (**2023**), artykuł, Science of the Total Environment, Elsevier, 881, 163350.
Liczba cytowań (bez autocytowań): 14
Otwarty dostęp: nie, DOI 10.1016/j.scitotenv.2023.163350
Status publikacji: opublikowane

5. Georgiev P., Belka M., Baczek T., Płotka-Wasylka J, *The presence of polycyclic aromatic hydrocarbons in disposable baby diapers: A facile determination method via salting-out assisted liquid-liquid extraction coupled with gas chromatography-mass spectrometry* (**2023**), artykuł, Journal of Chromatography A, Elsevier, 1698, 463981.
Liczba cytowań (bez autocytowań): 6
Otwarty dostęp: nie, DOI 10.1016/j.chroma.2023.463981
Status publikacji: opublikowane

6. Manousi N., Wojnowski W., Płotka-Wasylka J., Samanidou V. F., *Blue applicability grade index (BAGI) and software: a new tool for the evaluation of method practicality* (**2023**), artykuł, Green Chemistry, The Royal Society of Chemistry, 19, 7598-7604
Liczba cytowań (bez autocytowań): 571
Otwarty dostęp: tak, DOI 10.1039/d3gc02347h
Status publikacji: opublikowane

7. Płotka-Wasylka J., Wojnowski W., *Complementary green analytical procedure index (ComplexGAPI) and software* (**2021**), artykuł, Green Chemistry, The Royal Society of Chemistry, 23, 8657-8665.
Liczba cytowań (bez autocytowań): 533
Otwarty dostęp: tak, DOI 10.1039/D1GC02318G
Status publikacji: opublikowane

8. Płotka-Wasylka J., *A new tool for the evaluation of the analytical procedure: Green Analytical Procedure Index* (**2018**), artykuł, Talanta, Elsevier, 181, 204-209.
Liczba cytowań (bez autocytowań): 1652
Otwarty dostęp: nie, DOI 10.1016/j.talanta.2018.01.013
Status publikacji: opublikowane

9. Makoś-Chełstowska P., Kurowska-Susdorf A., Płotka-Wasylka J., *Environmental problems and health risks with disposable baby diapers: Monitoring of toxic compounds by application of analytical techniques and need of education* (**2021**), artykuł, TrAC - Trends in Analytical Chemistry, Elsevier, 143, 116408.
Liczba cytowań (bez autocytowań): 26
Otwarty dostęp: tak, DOI 10.1016/j.trac.2021.116408
Status publikacji: opublikowane

10. Chabowska A., Jatkowska N., Kubica P., Płotka-Wasylka J., *Exposure scenario and risk assessment of infants and newborns to bisphenols and their derivatives from diapers* (**2023**), artykuł, Ecotoxicology and Environmental Safety, Elsevier, 262, 115351.
Liczba cytowań (bez autocytowań): 5
Otwarty dostęp: tak, DOI 10.1016/j.ecoenv.2023.115351
Status publikacji: opublikowane

DOKONANIA ARTYSTYCZNE

b.d.

BADANIA NAUKOWE FINANSOWANE PRZEZ NCN

DANE POBRANE AUTOMATYCZNIE

Tytuł: **Opracowanie nowej metodyki rozdzielania enancjomerów oraz oznaczania jakościowego i ilościowego metamfetaminy otrzymanej metodą Emde oraz jej zanieczyszczeń i półproduktów w celu sporządzenia charakterystyki próbek metamfetaminy otrzymanej tą metodą**

Nr rejestracyjny:
2012/05/N/ST4/02001

Źródło(a) finansowania: NCN, Nazwa konkursu: PRELUDIUM-3

Kwota: **70 000 PLN**

Podmiot realizujący:
Politechnika Gdańska; Wydział Chemiczny

Data rozpoczęcia realizacji: **2013-03-25,** Data zakończenia realizacji: **2015-03-24**

Wynik oceny:
Uznanie umowy za wykonaną

Lista najważniejszych publikacji będących rezultatem projektu:
Publikacje w czasopismach:
- Justyna M. Płotka, Vasil Simeonov, Calum Morrison, Marek Biziuk, Jacek Namieśnik, Capillary gas chromatography using a γ-cyclodextrin for enantiomeric separation of methylamphetamine, its precursors and chloro intermediates after optimization of the derivatization reaction, Journal of Chromatography A, 1347, 146-156, Elsevier, 2014, IF: 4.258, - Opublikowane
- Justyna M. Płotka, Marek Biziuk, Calum Morrison, Jacek Namieśnik, Pharmaceutical and forensic drug applications of chiral supercritical fluid chromatography, Trends in Analytical Chemistry, 56, 74-89, Elsevier, 2014, IF: 6351, - Opublikowane

Teksty w publikacjach pokonferencyjnych
- Justyna M. Płotka, Calum Morrison, Marek Biziuk, A novel methodology for the enantiomeric resolution of methamphetamine, its precursors and intermediates by GC-MS, 9th ISC Modern Analytical Chemistry, 37-40, Charles University in Prague, 2013, Praga, - Opublikowane
- Justyna Płotka, Calum Morrison, Marek Biziuk, Simultaneous chiral separation of methylamphetamine, its common precursors and intermediates using gas chromatography-mas spectrometry, 8th International Conference on Instrumental Methods of Analysis: Modern Trends and Applications, 110, Aristotle University of Thessaloniki, 2013, Grecja, - Opublikowane
- Justyna M. Płotka, Calum Morrison, Marek Biziuk, Chiral Gas Chromatography together with Nuclear Magnetic Resonance as a tool for investigations into illicitly manufactured methylamphetamine, 8th International Conference on Instrumental Methods of Analysis: Modern Trends and Applications, 125, AUTh, 2013, Grecja, - Opublikowane

Tytuł: **Jednorazowe pieluchy dziecięce: monitorowanie wybranych związków toksycznych poprzez zastosowanie nowych metod analitycznych**

Nr rejestracyjny:
2020/37/B/ST4/02886

Źródło(a) finansowania: NCN, Nazwa konkursu: OPUS-19

Kwota: **1 262 880 PLN**

Podmiot realizujący:
Politechnika Gdańska

Data rozpoczęcia realizacji: **2021-02-01,** Data zakończenia realizacji: **2025-07-31**

Wynik oceny:
brak wyniku oceny - projekt w trakcie realizacji/raport w przygotowaniu/raport w trakcie oceny

Lista najważniejszych publikacji będących rezultatem projektu:
Publikacje w czasopismach:
- Vasil Andruch, Radoslav Halko, Jozef Tuček, JustynaPłotka-Wasylka, Application of deep eutectic solvents in atomic absorption spectrometry, TRAC-TRENDS IN ANALYTICAL CHEMISTRY, 147, 116510, Elsevier, 2022, - Opublikowane
- Aneta Chabowska, Justyna Werner, Agnieszka Zgoła-Grześkowiak, Julia Płatkiewicz, Robert Frankowski, Justyna Płotka-Wasylka, Development of thin film SPME sorbents based on deep eutectic solvents and their application for isolation and preconcentration of endocrine-disrupting compounds leaching from diapers to urine, Microchemical Journal, 199, 110023, Elsevier, 2024, - Opublikowane
- Patrycja Makoś-Chełstowska, Aleksandra Kurowska-Susdorf, Justyna Płotka-Wasylka, Environmental problems and health risks with disposable baby diapers: Monitoring of toxic compounds by application of analytical techniques and need of education, TRAC-TRENDS IN ANALYTICAL CHEMISTRY, 143, 116408, Elsevier, 2021, - Opublikowane
- Janicka P., Płotka-Wasylka J., Jatkowska N., Chabowska A., Fares M. Y., Andruch V., Kaykhaii M., Gębicki J, Trends in the new generation of green solvents in extraction processes, Current Opinion in Green and Sustainable Chemistry, 37, 100670-100681, Elsevier, 2022, - Opublikowane
- Płotka-Wasylka J., Makoś-Chełstowska P., Kurowska-Susdorf A., Treviño M. J. S., Guzmán S. Z., Mostafa H., Cordella M., End-of-life management of single-use baby diapers: Analysis of technical, health and environment aspects, SCIENCE OF THE TOTAL ENVIRONMENT, 836, 155339-155352, Elsevier, 2022, - Opublikowane
- Andruch V., Varfalvyová A., Halko R., Jatkowska N., Płotka-Wasylka J., Application of deep eutectic solvents in bioanalysis, TRAC-TRENDS IN ANALYTICAL CHEMISTRY, 154, 116660-116679, Elsevier, 2022, - Opublikowane
- Andruch V., Makoś-Chełstowska P., Płotka-Wasylka J., Remarks on use of the term “deep eutectic solvent” in analytical chemistry, MICROCHEMICAL JOURNAL, 179, 107498-107501, Elsevier, 2022, - Opublikowane
- Rattanakunsong N., Jullakan S., Płotka-Wasylka J., Bunkoed, A hierarchical porous composite magnetic sorbent of reduced graphene oxide embedded in polyvinyl alcohol cryogel for solvent-assisted-solid phase extraction of polycyclic aromatic hydrocarbons, JOURNAL OF SEPARATION SCIENCE, 45, 1774-1783, Wiley, 2022, - Opublikowane
- Rożańska, A., Bunkoed, O., & Płotka-Wasylka, J., Development of a new green analytical methodology for the determination of phthalates in single-use babies diapers using ultrasound-assisted extraction and polypropylene porous membrane, Microchemical Journal, 193, 109228-109237, Elsevier, 2023, - Opublikowane
- Chabowska, A., Jatkowska, N., Kubica, P., & Płotka-Wasylka, J., Exposure scenario and risk assessment of infants and newborns to bisphenols and their derivatives from diapers, ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY, 262, 115351-115362, Elsevier, 2023, - Opublikowane
- Chabowska, A., Grau, J., Fabjanowicz, M., Makoś-Chełstowska, P., Janicka, P., Jatkowska, N., & Płotka-Wasylka, J., Polychlorinated biphenyls (PCBs) and polychlorodibenzo-p-dioxins (PCDDs) determination in disposable baby diapers with the application of natural deep eutectic solvent, Microchemical Journal, 195, 109482-109491, Elsevier, 2023, - Opublikowane
- Georgiev, P., Belka, M., Baczek, T., & Płotka-Wasylka, J., The presence of polycyclic aromatic hydrocarbons in disposable baby diapers: A facile determination method via salting-out assisted liquid-liquid extraction coupled with gas chromatography-mass spectrometry, Journal of Chromatography A, 1698, 463981-463989, Elsevier, 2023, - Opublikowane
- Andruch, V., Kalyniukova, A., Płotka-Wasylka, J., Jatkowska, N., Snigur, D., Zaruba, S., Płatkiewicz, J., Zgoła-Grześkowiak, A., & Werner, J., Application of deep eutectic solvents in analytical sample pretreatment (update 2017–2022). Part A: Liquid phase microextraction, Microchemical Journal, 189, 108509, Elsevier, 2023, - Opublikowane
- Marta Glinka, Katarzyna Jażdżewska, Christina Vakh, Izabela Drążkowska, Ewa Bagińska, Tomasz Majchrzak, Michał Młynarczyk, Dominik Rachon, Andrzej Wasik, Justyna Płotka-Wasylka, Assessment of baby disposable diapers application for urine collection and determination of phthalate metabolites, ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY, 272, 116033, Elsevier, 2024, - Opublikowane
- Magdalena Fabjanowicz, Justyna Płotka-Wasylka, Marek Tobiszewski, Multicriteria Decision Analysis and Grouping of Analytical Procedures for Phthalates Determination in Disposable Baby Diapers, Molecules, 26, 7009, MDPI, 2021, - Opublikowane

Publikacje książkowe/ rozdziały w publikacjach książkowych:

- Aneta Chabowska, Natalia Jatkowska, Paweł Kubica, Justyna Płotka-Wasylka, Bisphenols and their derivatives in baby diaper samples, Proceedings of the 19th International Students Conference “Modern Analytical Chemistry”, 1, 15-20, Charles University, 2023, Praga, - Opublikowane

Teksty w publikacjach pokonferencyjnych
- Martyna Jurczyk, Emilia Gontarek-Castro, Justyna Płotka-Wasylka, SYNTHETIZED MEMBRANES FOR ULTRASOUND-ASSISTED SOLVENT EXTRACTION OF POROUS MEMBRANE PACKED SOLID SAMPLES., Proceedings of the 17th ISC Modern Analytical Chemistry, 17th ISC Modern Analytical Che, 205-209, Charles University, 2021, Praga, Czechy, - Opublikowane
- Aleksanda Kramarz, Patrycja Makoś-Chełstowska, Justyna Płotka-Wasylka, Application of deep eutectic solvents (DES) in analytical chemistry, Proceedings of the 17th International Students Conference “Modern Analytical Chemistry”, 17th International Students Co, 210-215, Charles University, 2021, Praga, Czechy, - Opublikowane

b.d.

INNE PROJEKTY BADAWCZE

Tytuł: **Determination of home-made wine quality in terms of biogenic amines content**

Nr rejestracyjny: P2014037573

Źródło(a) finansowania: Ministry of Science and Higher Education of the Republic of Poland

Kwota: **199 800 PLN**

Podmiot realizujący: **Gdańsk Tech**

Data rozpoczęcia realizacji: **2015-03-19,** Data zakończenia realizacji: **2018-03-18**

Lista najważniejszych publikacji będących rezultatem projektu:
1. J. M. Płotka, C. Morrison, M. Biziuk, J. Namiśnik,Chemical Derivatization Processes Applied to Amine Determination in Samples of Different Matrix Composition, Chemical Reviews, 115 (11), 2015, 4693–4718. 2. M.Woźniakiewicz, A. Woźniakiewicz, P.M. Nowak, E. Kłodzińska, J. Namieśnik, J. Płotka-Wasylka, CE-MS and GC-MS as “green” and complementary methods for the analysis of biogenic amines in wine, Food Anal Methods, 11, 2018, 2614–2627. 3. J.Płotka-Wasylka, A new tool for the evaluation of the analytical procedure: Green Analytical Procedure Index, Talanta 181, 2018, 204-209. 4. M. Papageorgiou, D. Lambropoulou, C. Morrison, J. Namieśnik, J. Płotka-Wasylka, Direct solid phase microextraction combined with gas chromatography – mass spectrometry for thedetermination of biogenic amines in wine. Talanta, 183, 2018, 276-282. 5 .J . Płotka-Wasylka, V. Simeonov, J. Namieśnik, An in situ derivatization – dispersive liquid–liquid microextraction combined with gas- chromatography – mass spectrometry for determining biogenic amines in home-made fermented alcoholic drinks, J. Chromatogr. A, 2016, 1453, 10-18.

NAJWAŻNIEJSZE OSIĄGNIĘCIE NAUKOWE

One of the most important scientific achievement was the development of Green Analytical Procedure Index, a valuable tool for the assesment of the "green" character of analytical procedur. The tool is described in mono-author's work published in Talanta in 2018. This tool, called GAPI, evaluates the green character of an entire analytical methodology, from sample collection to final determination, and was created using such tools as the National Environmental Methods Index (NEMI) or Analytical Eco-Scale to provide not only general but also qualitative information. In GAPI, a specific symbol with five pentagrams can be used to evaluate and quantify the environmental impact involved in each step of an analytical methodology, mainly from green through yellow to red depicting low, medium to high impact, respectively. For this achievement I won the award granted in 2019 by the Polish Academy of Sciences branch in Gdansk.
GAPI tool was modified and in 2021, a extended matrix was introduced by myself, called ComplexGAPI. Both publications described these indexes gain a status HIGHLY CITED PAPERS.
Proposed tools gain a huge attention by the analytical chemists and are commonly useful. It can be also stayd that they are motivation to improve the analytical procedures, but also to improve existing tools.

WYNAGRODZENIA I STYPENDIA

Wynagrodzenia i stypendia		
Lp.		
1	Nazwa	mgr inż. Aneta Katarzyna Bałdowska
	Rodzaj udziału	Kierownik (PI)
	Podmiot	Politechnika Gdańska
	Rodzaj zatrudnienia	wynagrodzenie dodatkowe
	Okres pobierania wynagrodzenia [w miesiącach]	24
	Wynagrodzenie całkowite [PLN]	12 000
2	Nazwa	dr hab. inż. Justyna Małgorzata Płotka-Wasylka
	Rodzaj udziału	Opiekun
	Podmiot	Politechnika Gdańska
	Rodzaj zatrudnienia	bez wynagrodzenia
	Okres pobierania wynagrodzenia [w miesiącach]	0
	Wynagrodzenie całkowite [PLN]	0
3	Nazwa	Wykonawca_1
	Rodzaj udziału	Wykonawca
	Podmiot	Politechnika Gdańska
	Rodzaj zatrudnienia	wynagrodzenie dodatkowe
	Okres pobierania wynagrodzenia [w miesiącach]	24
	Wynagrodzenie całkowite [PLN]	24 000

APARATURA

Lp.	Aparatura	Podmiot	Rok zakupu lub wytworzenia	Koszt jednostkowy [PLN]	Liczba	Dofinansowanie z podmiotu realizującego (jeśli dotyczy) [PLN]	Wnioskowane dofinansowanie z NCN [PLN]
1	Mieszadło Vortex Vortex mixer	Politechnika Gdańska	2026	2 000	1	0	2 000
	Opis [w języku angielskim]	A simple device used commonly in laboratories to mix liquids in small vials.					
	Uzasadnienie konieczności zakupu [w języku angielskim]	Equipment necessary for preparing standard solution, extraction, mixing.					
						Razem:	2 000

INNE KOSZTY

Lp.	Inne koszty bezpośrednie	
1.	Nazwa / opis [w języku angielskim]	Analytical standards
	Kategoria	Materiały i drobny sprzęt
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	29 000
	Uzasadnienie i kalkulacja [w języku angielskim]	Costs calculated basing on prizes given in the available online shop offers. Examples: Phthalates analytical standards: 8000 PLN, Parabens analytical standards: 4000 PLN, Bisphenols: 6500 PLN, Bisphenol derivatives analytical standards: 10500PLN.
2.	Nazwa / opis [w języku angielskim]	Solvents
	Kategoria	Materiały i drobny sprzęt
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	2 400
	Uzasadnienie i kalkulacja [w języku angielskim]	Estimating approximate costs: Methanol: Prize for 2.5L = 300 PLN, Total cost for 7.5L = 900 PLN Acetone: Prize for 1L = 100 PLN, Total cost for 3L = 300 PLN Isopropyl alcohol: 1L = 100 PLN, Total cost for 2L = 200 PLN Eucalyptol: 500 mg = 1000 PLN.
3.	Nazwa / opis [w języku angielskim]	Chromatography columns
	Kategoria	Materiały i drobny sprzęt
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	10 000
	Uzasadnienie i kalkulacja [w języku angielskim]	Chromatography columns (approximate cost: 5000 PLN, number of columns needed: 2, total cost: 10000 PLN) dedicated to selected analytes.
4.	Nazwa / opis [w języku angielskim]	Capillary for capillary electrophoresis
	Kategoria	Materiały i drobny sprzęt
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	5 000
	Uzasadnienie i kalkulacja [w języku angielskim]	Fused silica capillaries with extended light path (bubble cell) - cost: 1667 PLN/2pc, total cost: 3 sets x 1667 PLN = 5000 PLN, or 25m Fused silica capillary - cost: 5000 PLN/pc, one needed.

5.	Nazwa / opis [w języku angielskim]	Capillary cassette
	Kategoria	Materiały i drobny sprzęt
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	3 000
	Uzasadnienie i kalkulacja [w języku angielskim]	Cost of 1 capillary cassette - 3000 PLN
6.	Nazwa / opis [w języku angielskim]	Gas chromatography vials
	Kategoria	Materiały i drobny sprzęt
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	2 000
	Uzasadnienie i kalkulacja [w języku angielskim]	Set of 1000 chromatographic vials with caps - approximately 200 PLN/pc, total cost: 10 sets x 200 PLN =2000 PLN.
7.	Nazwa / opis [w języku angielskim]	CE vials
	Kategoria	Materiały i drobny sprzęt
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	4 000
	Uzasadnienie i kalkulacja [w języku angielskim]	Poliurethane snap caps - approximately 200 PLN/set, total cost: 10 sets x 200 PLN = 2000 PLN, Vials - approximately 200 PLN/set, total cost: 10 sets x 200 PLN = 2000 PLN
8.	Nazwa / opis [w języku angielskim]	Capillary electrophoresis solutions
	Kategoria	Materiały i drobny sprzęt
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	8 000
	Uzasadnienie i kalkulacja [w języku angielskim]	Ultra pure CE water - cost: 1000 PLN/500 mL, 0.1 N sodium hydroxide - cost: 1000 PLN/250 mL, total cost: 2000 PLN/500 mL, 1.0 N sodium hydroxide - cost: 1000 PLN/250 mL, 0.1 N phosphoric acid - cost: 1000 PLN/250 mL, total cost: 2000 PLN/500 mL, 50 mM sodium phosphate buffer, cost: 500 PLN/250 mL 50 mM sodium phosphate buffer, cost: 500 PLN/250 mL 50 mM sodium tetraborate buffer, cost: 500 PLN/250 mL 20 mM sodium tetraborate buffer, cost: 500 PLN/250 mL

9.	Nazwa / opis [w języku angielskim]	Samples
	Kategoria	Materiały i drobny sprzęt
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	1 000
	Uzasadnienie i kalkulacja [w języku angielskim]	Products dedicated to children in selected age, such as meals (fruit mousse - approximately 5 PLN/pc, total cost: 20 samples x 5 PLN = 100 PLN) or drinks (fruit juice - approximately 5 PLN/pc, total cost: 20 samples x 5 PLN = 100 PLN), cosmetics used for daily care routine (toothpaste for kids - approximately 20 PLN/pc, total cost: 10 samples x 20 PLN =200 PLN; shower gel for kids - approximately 20 PLN/pc, total cost: 15 samples x 20 PLN = 300 PLN; shampoo for kids - approximately 20 PLN/pc, total cost: 15 samples x 20 PLN = 300 PLN)
10.	Nazwa / opis [w języku angielskim]	Single-use pipette tips
	Kategoria	Materiały i drobny sprzęt
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	4 000
	Uzasadnienie i kalkulacja [w języku angielskim]	2-200 uL pipette tips - approximately 300 PLN/set (1000 pc), total cost: 300 PLN x 3 sets = 900 PLN, 50-1000 uL pipette tips - approximately 300 PLN/set (1000 pc), total cost: 300 PLN x 3 sets = 900 PLN, 1-10 mL pipette tips - approximately 550 PLN/set (200 pc), total cost: 550 PLN x 4 sets = 2200 PLN
11.	Nazwa / opis [w języku angielskim]	Consultation with questionnary expert
	Kategoria	Wizyty, konsultacje
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	2 400
	Uzasadnienie i kalkulacja [w języku angielskim]	Survey expertise requires specific skills and experience to analyse important information gathered in questionnaires. To minimise costs, an expert from Gdańsk Tech will be involved in the project.
12.	Nazwa / opis [w języku angielskim]	Grammar checker subscription
	Kategoria	Usługi obce
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	1 500
	Uzasadnienie i kalkulacja [w języku angielskim]	A grammar checker application is necessary for writing a scientific article. Example: Grammarly - prize for a year of monthly payment subscription = €12, for a year: €144 = 650 PLN. Possible monthly subscription: €30 = approximately 150 PLN per month.

13.	Nazwa / opis [w języku angielskim]	Participation in conference
	Kategoria	Wyjazdy służbowe
	Podmiot	Politechnika Gdańska
	Kwota łącznie [PLN]	4 500
	Uzasadnienie i kalkulacja [w języku angielskim]	Result presentation on scientific conference: Approximated cost 1500-2500 PLN for a national conference: conference "PoKoChA - Polska Konferencja Chemii Analitycznej", price 2400 PLN, location - Gdańsk - no need to organise transport and accommodation, total cost = 2400 PLN; or international conference (1 participation) - example: European Conference on Food Chemistry EUROFOODCHEM: prize €700 (approximately 3200 PLN) + transport, diet and accommodation, total cost = approximately 4500 PLN

OPEN ACCESS

Nazwa podmiotu	Koszty pośrednie OA (%)	RAZEM [PLN]
1. Politechnika Gdańska	1.95	2 240

POZOSTAŁE KOSZTY POŚREDNIE

Nazwa podmiotu	Pozostałe koszty pośrednie (%)	RAZEM [PLN]
1. Politechnika Gdańska	20.00	22 960

POMOC PUBLICZNA

1. Politechnika Gdańska	
Czy finansowanie będzie stanowiło pomoc publiczną?	NIE
Kierownik (PI) i osoby reprezentujące podmiot zapoznały się z zasadami występowania pomocy publicznej	TAK

ZESTAWIENIE KOSZTÓW PODMIOTÓW

Politechnika Gdańska	
Koszty pośrednie OA (%)	1,95
Pozostałe koszty pośrednie (%)	20,00
	Razem [PLN]
Koszty bezpośrednie, w tym:	114 800
- koszty wynagrodzeń	36 000
- koszty aparatury naukowo-badawczej, urządzeń i oprogramowania	2 000
- inne koszty bezpośrednie	76 800
Koszty pośrednie, w tym:	25 200
- koszty pośrednie OA	2 240
- pozostałe koszty pośrednie	22 960
Koszty ogółem	140 000

ZESTAWIENIE CAŁKOWITYCH KOSZTÓW

	Razem [PLN]
Koszty bezpośrednie, w tym:	114 800
- koszty wynagrodzeń	36 000
- koszty aparatury naukowo-badawczej, urządzeń i oprogramowania	2 000
- inne koszty bezpośrednie	76 800
Koszty pośrednie, w tym:	25 200
- koszty pośrednie OA	2 240
- pozostałe koszty pośrednie	22 960
Koszty ogółem	140 000

PLAN ZARZĄDZANIA DANYMI [w języku angielskim]

1. Opis danych oraz pozyskiwanie lub ponowne wykorzystanie dostępnych danych
Sposób pozyskiwania i opracowywania nowych danych i/lub ponownego wykorzystania dostępnych danych
The data generated will come from performed measurements using listed in the project analytical equipment. Information about the participants of the project, products etc. will be generated as the result of prepared questionnaires. Information about the analytical investigations will be obetined using simulations and analysis of results.
Pozyskiwane lub opracowywane dane (np. rodzaj, format, ilość)
The data generated are in various formats depending on analytical equipment, but typically they are in Excel (xls, csv or xlsx), Notepad (txt) or pdf compatible formats. The size of a single data set is typically <1 MB. Around twenty five such files are expected to be created during a single analysis.
2. Dokumentacja i jakość danych
Metadane i dokumenty (np. metodologia lub pozyskiwanie danych oraz sposób porządkowania danych) towarzyszące danym
Raw data are typically generated by the equipment or applied analytical device. Data files are stored in computer assigned to analytical device as well as on the external hard drive in a case of unexpected equipment error or destruction. Selected data generated from experiments will be deposited in the MOST Wiedzy Open Research Data Catalog – repository provided by the Gdańsk University of Technology - and described using attributes compatible with general metadata standards. Metadata description will be stored in JSON-LD format. Author will be identified and authorized by ORCID number.
Stosowane środki kontroli jakości danych
The analytical chemistry data will be subject to standard quality control/quality assurance protocols and good laboratory practice. They are developed and well established in analytical chemistry using several types of analytical tests or statistical tools. The data will be cataloged in a standardized way fulfilling the requirements of FAIR standards. The data available in an open repository will have DOI assigned and they will be positioned to ensure its accessibility. The reliability of the results obtained will be possible thanks to the use of high-quality analytical standards and software available with the analytical equipment.
3. Przechowywanie i tworzenie kopii zapasowych podczas badań
Przechowywanie i tworzenie kopii zapasowych danych i metadanych podczas badań
All the data will be stored on computers assigned to analytical device and on portable disks or pendrives. The backup will be carried out once every 2 months or immediately after the completion of a given stage of research.
Sposób zapewnienia bezpieczeństwa danych oraz ochrony danych wrażliwych podczas badań
Due to the work involving potentially sensitive information, clear procedures and policies will be implemented when working with surveys. Access to the surveys will be limited only to the PI of the project and the expert responsible for survey analysis. Moreover, to minimise as much as possible the leakage of sensitive information, a secure storage methods will be implemented. Additionally, all questionnaires will be anonymous. Data recovery will be possible thanks to backup procedures. Only the members of the research team will have access to obtained data, all computers will be protected by a password and antivirus, as well as the portable disks will be kept in lockers.
4. Wymogi prawne, kodeks postępowania
Sposób zapewnienia zgodności z przepisami dotyczącymi danych osobowych i bezpieczeństwa danych w przypadku przetwarzania danych osobowych
Nie dotyczy
Sposób zarządzania innymi kwestiami prawnymi, np. prawami własności intelektualnej lub własnością. Obowiązujące przepisy

Intellectual property for any results of the Project will be owned by Gdansk University of Technology regulations (Resolution of the Senate of the Gdańsk University of Technology No. 117/2021/XXV of 19 May 2021 https://link.pg.edu.pl/GdańskTech_intprop). The data and results will be published in open-access model under the one of the Creative Commons licenses (CC0 or CC BY). Metadata created for datasets deposited in the MOST Wiedzy Open Research Data Catalog will be always available without any restrictions (CC0).

5. Udostępnianie i długotrwałe przechowywanie danych

Sposób i termin udostępnienia danych. Ewentualne ograniczenia w udostępnianiu danych lub przyczyny embarga

The part of data will be shared via in the MOST Wiedzy Open Research Data Catalog and will be placed there after finishing each task/step of the project. No embargos will be applied.

Sposób wyboru danych przeznaczonych do przechowania oraz miejsce długotrwałego przechowywania danych (np. repozytorium lub archiwum danych)

The data will be stored in The MOST Wiedzy Open Research Data Catalog.
The repository is the only service in Poland CoreTrustSeal certified, which means that it has established good preservation and dissemination practices.The data provided in the repository will fulfill FAIR requirements and will be labeled and categorized according to standard file formats. Moreover, all data will be stored for at least 10 years after the project is finished and access to them will be possible only with the PI consent.

Metody lub narzędzia programowe umożliwiające dostęp do danych i korzystanie z danych

The MOST Wiedzy Open Research Data Catalog will be produced in standard xls, xlsx, pdf or txt formats, therefore it is assessable to every user.

Sposób zapewniający stosowanie unikalnego i trwałego identyfikatora (np. cyfrowego identyfikatora obiektu (DOI)) dla każdego zestawu danych

The MOST Wiedzy Open Research Data Catalog will offer DOI number to each dataset.

6. Zadania związane z zarządzaniem danymi oraz zasoby

Osoba (np. funkcja, stanowisko i instytucja) odpowiedzialna za zarządzanie danymi (np. data steward)

Open Science Competence Center at Gdansk University of Technology will be responsible for DMP and quality of metadata descriptions of datasets deposited in MOST Wiedzy repository. Project PI will be responsible for the data quality.

Środki (np. finansowe i czasowe) przeznaczone do zarządzania danymi i zapewnienia możliwości odnalezienia, dostępu, interoperacyjności i ponownego wykorzystania danych

Nie dotyczy

OŚWIADCZENIA ADMINISTRACYJNE

OŚWIADCZENIA KIEROWNIKA (PI)

Oświadczam, że:

1. zadania badawcze objęte niniejszym wnioskiem nie są i nie były finansowane z NCN ani z innego źródła;
2. w przypadku ubiegania się lub uzyskania finansowania zadań badawczych objętych tym wnioskiem z innego źródła niż NCN:
   a) w razie uzyskania finansowania z NCN
      - zrezygnuję z ubiegania się o finansowanie z innego źródła
      albo
      - zrezygnuję ze środków przyznanych na realizację zadań badawczych przez Dyrektora NCN
   b) w razie uzyskania finansowania z innego źródła
      - zrezygnuję z ubiegania się o finansowanie w tym konkursie NCN
      albo
      - zrezygnuję z przyjęcia finansowania z innego źródła
3. w przypadku zakwalifikowania wniosku do finansowania wyniki badań uzyskane w wyniku realizacji projektu badawczego będą poddane ewaluacji i opublikowane w wydawnictwie/wydawnictwach o zasięgu międzynarodowym;
4. w przypadku zakwalifikowania wniosku do finansowania, wyrażam zgodę na zamieszczenie, wraz z informacją o wynikach konkursu, na stronie podmiotowej NCN, popularnonaukowego streszczenia projektu;
5. zapoznałem się z zasadami doręczania decyzji Dyrektora NCN;
6. wyrażam zgodę na dokonanie weryfikacji wniosku przy pomocy oprogramowania antyplagiatowego oraz umieszczenie treści wniosku w bazie danych oprogramowania;
7. zapoznałem się z treścią Kodeksu Narodowego Centrum Nauki dotyczącego rzetelności badań naukowych i starania o fundusze na badania i zobowiązuję się do jego stosowania;
8. w przypadku uzyskania finansowania zobowiązuję się do przebywania przez co najmniej 50% czasu trwania projektu na terytorium Rzeczpospolitej Polskiej i pozostawania w dyspozycji podmiotu realizującego projekt na zasadach określonych w Regulaminie przyznawania środków na realizację zadań finansowanych przez Narodowe Centrum Nauki w zakresie projektów badawczych.

Akceptacja oświadczenia: TAK

OŚWIADCZENIA KIEROWNIKA PODMIOTU / OSOBY UPRAWNIONEJ DO REPREZENTACJI

Oświadczam, że:

1. zadania badawcze objęte niniejszym wnioskiem nie są i nie były finansowane z NCN ani z innego źródła;
2. w przypadku ubiegania się lub uzyskania finansowania zadań badawczych objętych tym wnioskiem z innego źródła niż NCN:
   a) w razie uzyskania finansowania z NCN
      - zrezygnuję z ubiegania się o finansowanie z innego źródła

      albo
      - powiadomię osobę fizyczną będącą wnioskodawcą o rezygnacji ze środków przyznanych na realizację zadań badawczych przez Dyrektora NCN

   b) w razie uzyskania finansowania z innego źródła
      - powiadomię osobę fizyczną będącą wnioskodawcą o rezygnacji z ubiegania się o finansowanie w tym konkursie NCN

      albo
      - zrezygnuję z przyjęcia finansowania z innego źródła
3. działając w imieniu podmiotu, który reprezentuję, w przypadku uzyskania finansowania projektu badawczego zobowiązuję się do:
   a) włączenia projektu badawczego do planu zadaniowo-finansowego podmiotu;
   b) zatrudnienia kierownika projektu badawczego na zasadach zgodnych z wnioskiem i warunkami konkursu;
   c) zatrudniania wykonawców niezbędnych do realizacji projektu badawczego na zasadach zgodnych z wnioskiem i warunkami konkursu;
   d) zapewnienia warunków do realizacji prowadzonych badań, w tym udostępnienia przestrzeni biurowej/laboratoryjnej oraz aparatury naukowo-badawczej niezbędnej do realizacji tych badań;
   e) zapewnienie obsługi administracyjno-finansowej realizacji projektu badawczego;
   f) sprawowania nadzoru nad realizacją projektu badawczego i prawidłowością wydatkowanych na ten cel środków finansowych;
4. w przypadku zakwalifikowania wniosku do finansowania wyrażam zgodę na zamieszczenie, wraz z informacją o wynikach konkursu, na stronie podmiotowej NCN, popularnonaukowego streszczenia projektu;
5. zapoznałem się z zasadami doręczania decyzji Dyrektora NCN;
6. wyrażam zgodę na dokonanie weryfikacji wniosku przy pomocy oprogramowania antyplagiatowego oraz umieszczenie treści wniosku w bazie danych oprogramowania;
7. zapoznałem się z treścią Kodeksu Narodowego Centrum Nauki dotyczącego rzetelności badań naukowych i starania o fundusze na badania i zobowiązuję się do jego stosowania;
8. podmiot, który reprezentuję, nie pozostaje pod zarządem komisarycznym ani nie znajduje się w toku likwidacji lub postępowania upadłościowego.

Akceptacja oświadczenia: TAK

OCHRONA DANYCH OSOBOWYCH

INFORMACJA O ZASADACH PRZETWARZANIA DANYCH OSOBOWYCH

Administratorem Pani/Pana danych osobowych jest Narodowe Centrum Nauki z siedzibą w Krakowie przy ul. Twardowskiego 16, 30-312 Kraków. Kontakt do Inspektora Ochrony Danych: iod@ncn.gov.pl. Pani/Pana dane będą przetwarzane w celach:

a) dokonania oceny wniosku o finansowanie projektu badawczego,
b) nadzoru, obsługi finansowo-księgowej, kontroli w trakcie jak i po zakończeniu projektu, oceny jego realizacji i rozliczenia umów o finansowanie - w przypadku przyznania środków finansowych na realizację projektu badawczego,
c) przeprowadzania ewaluacji realizacji zadań Centrum, sprawozdawczości, upowszechniania w środowisku naukowym informacji o ogłaszanych przez Centrum konkursach.

Pełna treść klauzuli informacyjnej odnośnie przetwarzania Pani/Pana danych znajduje się na stronie internetowej: https://www.ncn.gov.pl/dane-osobowe.