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Categorization of Marijuana Suspected Policies' Seizures in Southeast Serbia According to Cannabinoids Content

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Abstract: Background: The cannabis plant or marijuana has been used since ancient times for different purposes. An increase in the content of THC in cannabis has been observed worldwide, whereas the CBD content is dropping. This study's main goal was to categorize marijuana suspected policies' seizures (MSPS) based on the cannabinoid component concentrations concerning their potency and age. Methods: The samples were MSPS seized in southeast Serbia from April 2019 to April 2020. The cannabinoid content was determined using gas chromatography with mass spectrometry. Descriptive statistics were performed using Linux LibreOffice Calc. Results: All of the samples had a THC content higher than 0.3%, thus classifying the samples as marijuana according to the Serbian Law on Psychoactive Controlled Substances. The highest concentration of THC was 16.10%, while the lowest was 4.90%. The highest average concentration of THC (12.39%) was found in the buds. Only 11.81% of the samples had a CBD concentration higher than 1%, making all other marijuana samples extremely psychoactive. Most of the samples were older than 2 years, according to the calculated CBN/THC ratio. Conclusion: Our results confirm trends regarding the dominance of THC content in contemporary cannabis worldwide. It is necessary to monitor trends of cannabis potency in Serbia continuously because of its location.

Keywords: cannabis; classification; cannabinoids; seizures; volatiles; gas chromatography

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1. Introduction

The cannabis plant or marijuana is an annual flowering plant from eastern Asia, that has a long history of use as food, fiber, oil, and medicine. The plant has two subspecies: C. sativa subsp. sativa and C. sativa subsp. indica, from the Cannabaceae family, of the genus Cannabis [1].

Unique to cannabis, cannabinoids are volatile terpenophenolic chemicals. Cannabis contains nearly 500 compounds [2], of which cannabinoids occur in the range of 65 to 144 [3]. Cannabinoids are classified into eleven groups due to their chemical contents including (−)-Δ9-trans-tetrahydrocannabinol (Δ9-THC), (−)-Δ8-trans-tetrahydrocannabinol (Δ8-THC), cannabidiol (CBD), cannabinol (CBN), cannabigerol (CBG), cannabichromene (CBC), cannabicyclol (CBL), cannabielsoin (CBE), cannabinodiol (CBND), cannabitriol (CBT), and miscellaneous substances [4]. In addition, cannabis contains aromatic terpenes, of which more than 100 have been identified. More than 200 volatiles, including 58 monoterpenes and 38 sesquiterpenes, have been identified so far from the various cannabis genotypes. With traces of terpinolene and trans-ocimene, the main monoterpene

constituents are limonene, β-myrcene, α-pinene, and linalool. The major sesquiterpenes are E-caryophyllene, E-β-farnesene, caryophyllene oxide, and β-caryophyllene. Synergic effects in cannabinoid and terpenoid combinations have been suggested [5].

There have been data on cannabis use in different cultures since ancient times. Indians used it as an entheogen in spiritual rites in 2000 BC (Vedic period). For medical reasons, to eliminate anguish and sorrow, it was used from the 5th to 2nd century BC (distinguished in Greece mythology). Recently, in addition to its usage as a crop, it has also been utilized as a painkiller, laxative, and antimalarial medication [6,7]. Since the 1930s, cannabis has been used as a recreational drug (Jamaica). Nowadays, it is the most commonly encountered illicit drug worldwide. According to the National Institute on Drug Abuse (NIDA) report [8] on the prevalence of cannabis abuse, about 15% of consumers aged 12–17 and 51% of 18–25 aged consumers have used cannabis at least once in their lifetime; 22% of the respondents to a questionnaire used cannabis [9]. Cannabis use was illegal in the USA until April 2019, when 11 states legalized its recreational use, and 34 states legalized its medical use [10]. According to EMCDDA figures, drugs were responsible for 57% of an estimated 1.6 million offenses in 2014 [11]. Cannabis is also Europe's most commonly used illicit drug. In the European Union, it is predicted that at least one in eight young adults (aged 15 to 34) have used cannabis in the previous year. The topic of modifying cannabis regulations is being discussed in the media and by the general public across Europe.

According to EMCDDA reports, cannabis products are the most widely trafficked drugs nowadays. Different cannabis products are present on illegal markets and refer to cannabis-dried leaves and flower tops used in tobacco-like product manufacturing such as a joint (a loosely rolled cigarette) or blunts-hollowed-out (commercial cigar products such as cookies and tea-like drinks). The street names for cannabis are weed, pot, and grass. Alternatives to cannabis, so-called smoking herbal mix legal highs, such as Spice are spiked herbs (Turnera diffusa/aphrodisiac—Damiana herb or Lamiaceae herbs: Melissa, Thymus, and Menthe) with psychotropic substances such as newly synthesized cannabinoid (JWH-018, WIN-55,212-2, and CP-55,940) or hallucinogens, including phencyclidine (PCP). Psychotropic substances determine the toxicological profile of legal highs, while their combination results in totally unpredictable outcomes. Unstandardized manufacturing of legal highs is linked to the unequal distribution of psychotropic substances throughout the herbal mix products. Parts of spiked herbal mixes with higher psychoactive compound contents, so-called hot pockets, are the reason for the unpredictable higher intensity of outcomes among consumers of the same source bag shares (packs). Thus, such products pose a particular health risk [11,12].

Furthermore, hemp that originates from Cannabis sativa shares some similarities with cannabis but dissimilarities in cannabinoid status. It is grown for industrial use, while cannabis is for recreational and medical purposes. The tetrahydrocannabinol (THC) content in hemp is significantly lower than in cannabis: 0.3% vs. 15–20% [13]. Therefore, products from those two plants differ. Hemp products are cannabidiol (CBD), hemp, and cannabis oils, and marijuana products include THC, marijuana, and cannabis oils [14]. Both or their mixtures can be the subject of police seizures.

It is consumed by smoking or vaporizing or in food or extracts; thus, the routes of cannabinoid administration are inhalation and oral intake. The principal cannabis cannabinoid is THC—the main psychoactive component that induces elation, sedation, energy, hunger, laughter, and dizziness. It can lead to red eyes, a dry mouth, or anxiety. THC has been found beneficial for post-traumatic stress disorder (PTSD), sleep apnea, Crohn's disease, ADHD, appetite loss, inflammation, and other conditions and illnesses [15]. Opposite to the psychotropic effect of THC, cannabinol (CBN) and cannabidiol (CBD) provide a predominately immunosuppressive and anti-inflammatory effect. They might be used in the therapy of multiple sclerosis; in addition, they impose an anticonvulsant effect and can help in the treatment of opioid withdrawal, anxiety [16], epilepsy (patients remain fully functional and clear-headed for day-to-day activities), and insomnia due to its sedative effect (5 mg of CBN is as useful as 10 mg of diazepam) [14].

Cannabis is the most commonly seized and consumed illicit drug in the southeast region of Serbia. In geopolitical terms, southeast Serbia borders Bulgaria, Romania, North Macedonia, and Kosovo, making this region of Serbia more influenced by illegal drug trafficking. This is the reason for monitoring cannabis potency in this region.

A countrywide analysis of police seizures is the main method used to obtain data on cannabis potency. In an overview of Manthey and collaborators from 2021, the results of cannabis potency in different European countries were presented. For 22 countries, the median THC levels in herbal cannabis were reported. There are no results from Serbia, making our research extremely important, because of Serbia's geopolitical location in the Balkans. From 2010 to 2019, the THC concentration slightly increased from 6.9% to 10.6%. It was noted that none of the European nations saw a discernible decline in the THC content of herbal cannabis. On the other hand, at an annual rate of 0.5 to 1.1 percentage points, six nations (Portugal, Poland, Estonia, Sweden, Czechia, and Hungary) were found to have significantly higher THC levels in herbal cannabis. In addition, data on THC concentrations in cannabis resin from 20 countries have shown that it tripled from 7.6% to 24.1% between 2010 and 2019. Annualized change rates varied between +0.8 and +1.5 percentage points in Austria, Italy, Germany, Portugal, and Estonia, while they increased by 2.5 percentage points annually in France, Sweden, and Luxembourg for THC concentrations in resin [17].

The fact that cannabis is used prevalently as previously mentioned makes it necessary to monitor cannabis potency in cannabis products and also cannabis abuse in the population. Cannabinoids and other chemicals in cannabis plants have been quantified and characterized using a range of analytical techniques. In the past ten years, improvements in analytical techniques have also enabled the detection of other chemicals from cannabis extracts, such as terpenes, in addition to cannabinoids. The analytical techniques that are mostly used are chromatographic techniques such as thin layer chromatography (TLC), high-pressure liquid chromatography (HPLC), and gas chromatography (GC), spectroscopic techniques such as ultraviolet (UV), mass spectroscopy (MS), and Fourier transformation-infrared spectroscopy (FTIR), and nuclear magnetic resonance (NMR). When analyzing cannabis, chromatographic separation can be combined with a variety of detection methods [18].

One of the most popular chromatographic techniques for cannabis analysis is gas chromatography (GC). Cannabinoids are often present in small amounts in fresh plant material and are considered to have been synthesized from acid forms (THCA, CBDA, and CBNA) during storage and use. Due to the high column temperatures required for gas chromatography, the acidic cannabinoids undergo decarboxylation while going through the column [19]. In order to identify acidic cannabinoids, they must first be derivatized prior to analysis. Derivatization not only preserves the structure of cannabinoids intact, but it additionally makes them more volatile, which enhances their peak shape [20]. To precisely quantify the overall amount of cannabis content, it is suggested to calculate the amounts of neutral and acidic cannabinoids separately [21]. For quantitative cannabinoid analysis, HPLC is also a commonly used chromatography technique [22]. Different detection techniques can be coupled with HPLC for cannabinoid analysis. The methods most used for detection are MS and UV absorbance (190 to 400 nm) [23]. It is known that UV detection is much less expensive and more straightforward than MS detection. Acidic cannabinoids show absorption peaks at around 270 nm and 310 nm while neutral cannabinoids show absorption peaks at about 220 nm [19]. As ion sources, liquid chromatography (LC) frequently employs electrospray ionization (ESI) and atmospheric-pressure chemical ionization (APCI) [24]; MS/MS is required to obtain diagnostic information when using LC because it can usually generate only a protonated molecule without diagnostic fragmentation. In addition, ESI and APCI are ineffective at the ionization of the phenolic and carboxylic functional groups present in cannabis. Compared to LC-MS, GC-MS may provide superior sensitivity [20].

Since substances are not degraded during analysis, HPLC has the advantage of being able to distinguish between acidic and neutral cannabinoids without the need for a derivatization step before analysis. Due to the fact that cannabinoids are not decarboxylated

in an HPLC column, it offers a more thorough chemical analysis of cannabis samples than GC [18].

This study's main goal was to categorize the marijuana suspected policies' seizures (MSPS) seized in southeast Serbia from April 2019 to April 2020 based on the cannabinoid component concentrations. This study provides the first comprehensive data on illegal market cannabis potency in southeast Serbia. Analysis of concentrations of cannabinoids with a psychoactive effect (THC) and therapeutic potential (CBD) was carried out. Comparing the patterns with the observed data from the region and the world was another aim. In addition, the identification of chemotypes was conducted, as well as an estimation of the freshness (age) of the confiscated materials.

2. Materials and Methods

2.1. Marijuana Suspected Policies' Seizures

The marijuana suspected policies' seizures (MSPS) were sent to the Toxicology Laboratory of the Institute of Forensic Medicine in Nis. The toxicology laboratory refers to fresh or dried plant tops or other parts of plant material (marijuana) and improvised cigarettes (joints). Following the Manual Guide of UNODC [25], we prepared and categorized MSPS according to chemical characteristics (the content of THC, CBD, and CBN). The origin (local or imported), type (such as sinsemilla and industrial hemp), and way of growing (indoor or outdoor) were not reported due to a lack of appropriate data.

2.2. Analytical Methodology

Analyses of cannabinoids (THC, CBD, and CBN) in the MSPS were performed by the gas chromatography with mass spectrometry (GC-MS) method according to the manual of Recommended Methods for the Identification and Analysis of Cannabis and Cannabis Products by the United Nations Office on Drugs and Crime (UNODC) in the Toxicology Laboratory of the Institute of Forensic Medicine in Nis. The Toxicology laboratory is accredited according to the ISO 17025/2017 standard by the Serbian Accreditation Body (ATS).

2.3. Regents

The chemicals used for analysis were of high analytical grade. Methanol was obtained from Merck. The Certified Reference Standards of Cannabinoids were obtained from Lipomed® (UNODC Early Warning Advisory on New Psychoactive Substances).

2.4. Instrument and Instrument Parameters

GC separation was carried out with a Shimadzu gas chromatograph QP 2010 system with a ZB-5 column (30 m × 0.25 mm; 0.25 μm). The parameter analysis for the gas chromatographer and the mass spectrometer is available in the Supplementary Material.

2.5. Stock and Working Solutions and Calibration

Methanol stock solutions of 1 mg/mL THC, CBD, CBN, and the internal standard (verapamil) were stored at −20 °C. Calibration curves for THC were made in the range of concentrations from 1 to 10 mg/L and from 0.1 to 0.5 mg/L for CBD and CBN.

2.6. Sample Preparation

Upon receipt, the MSPS samples were weighed and stored at room temperature in a dry, dark space prior to analysis. Where possible, the MSPS samples were divided based on their appearance according to the previously mentioned manual: (a) the female buds were separated; (b) if present, tobacco was removed from the joints; (c) fresh (wet) plant material was dried at 70 °C until the leaves become brittle; and (d) dried material was pulverized and sieved (mesh size of 1 mm). For preparing the stock extracts (1 mg pulverized material/mL solution), in brief: 100 mg of the pulverized material was dissolved in 100 mL of a mixture of methanol/chloroform containing 1 mg/L verapamil in a volumetric flask

and (*v*/*v*: 9/1) was ultrasonicated for 15 min at 55 °C. The obtained extract was filtered in a polyethylene vial.

2.7. Qualitative and Quantitative Analysis

Qualitative analysis and confirmation of the presence of cannabinoids were performed in SCAN mode, comparing the mass spectrums of the obtained peaks with SWG Drug libraries and comparing the retention times of individual cannabinoids in previously analyzed referent standard solutions of cannabinoids. The retention times of THC, CBD, CBN, and verapamil were 18.68, 19.18, 19.55, and 24.65 min, respectively. The analysis was performed in the SIM (single ion monitoring) mode. The quantifier ions for THC, CBD, CBN, and verapamil were: 299, 231, 295, and 303, respectively. Intra- and inter-day precision were controlled with verapamil as an internal standard.

2.8. Statistical Analysis

The regression analysis was performed using LabSolution, while descriptive statistics and calculations of mutual ratios of essential cannabinoids were processed with Linux LibreOffice Calc.

3. Results

This report addresses cannabinoid concentration analysis in MSPS seized in southeast Serbia for April 2019–April 2020, which included 127 mixtures of buds and leaves, buds, and joints. The MSPS were analyzed for THC, CBD, and CBN content.

3.1. Weights of MSPS

The weight of the seized cannabis products ranged from 0.185 g to 1510 g. The share of weight ranges of the MSPS is presented in Table 1.

Table 1. The share of weight ranges of the MSPS.

Sample Weight of the Cannabis Plant and Products	Number of Samples	Percentage of Samples
>900 g	45	35.43
<50 mg	45	35.43
50 mg–900 g	37	29.14

Measuring the weight of the seized material is very important for public prosecutors because different amounts of seized drugs can be considered as for personal use or supply, which can completely change the course of the trial.

Some countries establish quantity limits of drugs for personal possession, so if the person is found with more than this amount, they can be prosecuted for supplying. Weight may be expressed as the overall quantity of the seizure or as the THC content in the plant or resin. In addition, quantities are expressed as the sum of 'doses' or as a monetary value.

According to the EMCDDA document, Cannabis Legislation in Europe, in some countries (Greece, Croatia, and Slovenia), as well as in Serbia, the law specifies 'small' or 'large' quantities, so there are no limits established by law or prosecutor guidelines. Instead, legal precedent or expert judgment are used to interpret these terms.

3.2. Cannabinoid Content

Since total cannabinoid concentrations best reflect the substance's pharmacological activity, measuring them is a common technique. Decarboxylation is completed during injection in gas chromatography injector systems.

The perceptual content of cannabinoids measured in dry-weighted plant material is presented in Table 2.

Table 2. Descriptive statistics of the cannabinoid content in the MSPS.

Cannabinoids	% THC	% CBD	% CBN
Min	4.9	0.046	0.03
Max	16.1	2.54	2.59
Average	8.91	0.51	0.64
STV DEV	2.42	0.55	0.61
Median	8.8	0.33	0.44

The analyzed samples of herbal cannabis vary in their THC concentration. Approximately 64.56% of the samples had less than 10% THC, while the rest had more than 10%.

The content of cannabinoids and their calculated ratios across different dried MSPS is presented in Table 3.

Table 3. The content of cannabinoids and their calculated ratios in MSPS.

Types of MSPS	Number of Samples	% THC	% CBD	% CBN	THC/CBD	CBD/THC
Joint	29	5.94	0.37	0.58	36.4	0.062
Mixture of buds and leaves	72	8.89	0.55	0.62	36.80	0.062
Buds	26	12.39	0.50	0.75	47.14	0.040

According to the UNODC World Drug Report 2009, "Why does cannabis potency matter?", the THC concentration varies throughout the plant, ranging from 10–12% in the flowers to 1–2% in the leaves, 0.1–0.3% in the stalks, and less than 0.03% in the roots. Values of THC in the buds have increased in the last decades [26].

In our study, the THC content in the buds was the highest compared to the joint and the mixture of buds and leaves. The average concentration of THC in the buds was 12.39%.

The UNODC has recommended monitoring CBD levels in the evaluation of cannabis potential. Higher levels of CBD can antagonize some aspects other than the psychoactive THC effects, such as muscle relaxation and the reduction of spasticity [27].

Cannabis flower's THC content increased by 212% between 1995 and 2015 in the USA. The most popular strains in Colorado dispensaries in 2017 ranged in THC content from 17 to 28%, such as the popular variety known as "Girl Scout Cookie". This strain has only 0.09–0.2% CBD. High THC-producing strains are unable to produce much CBD [28].

Of all of the analyzed samples in our study, only 11.81% contained more than 1% CBD.

3.3. Classification of Seized Plant Material

The contents of cannabinoids and their relative ratios are used to categorize drug-type or fiber-type samples. Samples with no CBD detected were excluded from this evaluation. The classification of the analyzed samples, according to the different authors, is presented in Table 4.

Table 4. Classification of seized plant material according to the literature.

	Criteria for Classification		
Hilih at al. 2004 [1]			
Type of cannabis	Chemotype I Drug type: THC/CBD > 10	Chemotype II Intermediate type: THC/CBD 0.25–10	Chemotype III Fiber-type: THC/CBD < 0.2
Percentage of samples	85.59	14.41	/
Note	Approximately 6.78% of the samples have a ratio of more than 100, which makes these cannabis samples extremely psychoactive.		

Table 4. *Cont.*

		Criteria for Classification
De Meier et al. 1992 [29]		
Type of cannabis	Drug type: THC+CBD/CBN > 1	Fiber type: THC+CBD/CBN < 1
Percentage of samples	100	/
Note	All of the confiscated samples analyzed have a ratio of more than 1. The highest obtained ratio is 150.	
Fetterman et al. 1971 [30]		
Type of cannabis	Drug type: THC/CBD > 1	Fiber type: THC/CBD < 1
Percentage of samples	100	/
Serbian Law on psychoactive controlled substances		
Type of cannabis	Drug type THC > 0.3%	Fiber type THC < 0.3%
Percentage of samples	100	/

The THC/CBD ratio is hugely significant for the pharmacological activity of cannabis. A high ratio is linked to increased cannabis abuse and health risks of cannabis dependence, which increases other health care, economic, and justice system issues [30–32]. Of all of the samples in this study, 6.78% had a ratio of more than 100, which classified these samples as extremely psychoactive.

In addition, the reverse ratio (CBD/THC ratio) is frequently calculated. The maximum CBD/THC ratio in our set of samples was 0.30. The average CBD/THC ratio in a survey conducted in the United Kingdom was 0.273 [33].

3.4. Changes in the Ratio CBN/THC in MSPS with the Time-Determination of MSPS Age

There is no CBN in freshly and carefully dried marihuana. The age of the plant has an impact on the CBN concentration. It is feasible to estimate the age of a sample based on its THC and CBN content, assuming that the samples were stored at room temperature. It was confirmed that THC degrades to CBN at a higher rate during the first year after harvesting than later, according to Ross and ElSohly [34]. For the reliable interpretation and evaluation of the obtained analytical results of THC and CBN contents and CBN/THC ratio in MSPS, the following information is essential: the time of harvesting and the condition of marijuana product storage before and after confiscation by the police. Time elapsed from MSPS confiscation is not decisive for evaluating MSPS age, as Dragoljic et al. [35] stated. According to the CBN/THC ratio, we were able to classify the samples with regard to their age (Figure 1). The highest number of analyzed samples was older than 2 years.

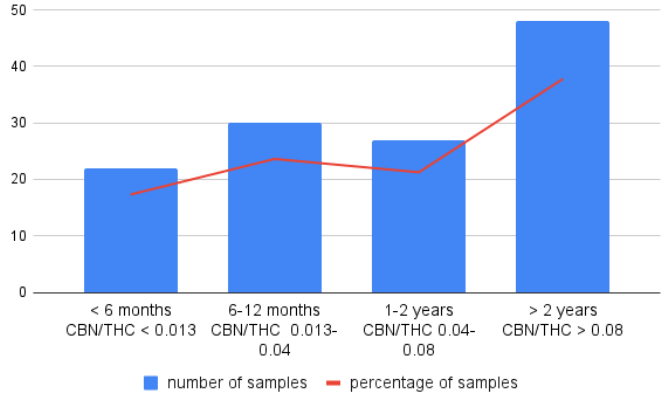

Figure 1. Categorization of the samples of MSPS regarding age and concerning the CBN/THC ratio.

4. Discussion

During the past few decades, reports on the concentration of THC and CBD in MSPS have shown the tendency of THC to increase on account of the CBD decrease (thus an elevated THC/CBD ratio) in Europe, the USA, Australia, and, regarding the Balkan region, in the Republic of Srpska [35–39]. To obtain marijuana strains with high psychoactive properties (i.e., a high THC concentration), several premises of its cultivation and growing should be considered: the genus and type of cannabis (for instance, THC is higher in sinsemilla—female marijuana plants) or selective breeding of specific cannabis strains with a high THC/low CBD level; furthermore, the controlled conditions of cannabis cultivation and growing (temperature, light, humidity, and type of soil) in the indoor and outdoor environment influence the level of THC in the cannabis plant. However, the availability of seeds and appropriate equipment for cannabis cultivation over the Internet facilitates this process [36,40,41]. The contents of the main cannabinoids in different countries are shown in Table 5.

Table 5. Profile of cannabinoid content in different countries.

Reference	Country	Note	% THC	% CBD	% CBN
[39]	The Netherlands	domestic	15.3	/	/
		imported	4.8	/	/
[42]	Italy		9.8	/	/
[31]	The United Kingdom		14.2	/	/
[37]	Australia	indoor	19.16	0.14	0.01
		outdoor	15.47	0.03	0.01
		rural	18.66	0.05	0.09
		urban	12.38	0.03	0.02
		average	14.88	0.14	0.09
[35]	The Republic of Srpska		4.95	0.26	0.48
[43]	EU, Norway, and Turkey		10.22	/	/

As is obvious from the presented table, the CBD level is not always analyzed, which means not all countries follow UNODC recommendations. Our research provides results of the analysis of all three main cannabinoids in the seized material.

Dragoljic et al. concluded that with time, the proportion of high-potency samples (THC > 10%) increases while the proportion of low-potency samples (THC 2%) decreases, leading to an overall increase in the average annual potential of the samples of seized cannabis plant material [35].

The high number (35.43%) of our samples with more than 10% of THC corresponds with these statements. In addition, the number of samples without CBD is increasing (17.4%), as well as in our research (7.08%).

Dujordy et al. reported an increase in the THC/CBD ratio with evidence that from 2010, plants with the 'drug type' were predominant over the 'intermediate type', which is similar to the results of our research (only 14.41% of the samples were classified as the intermediate type) [38].

The health and toxic effects of cannabis and cannabis products depend not only on the levels of phytochemicals but also on the levels of compounds from the environment. These are trace elements, pesticides, pollutants, etc. [44–47]. To evaluate the quality of cannabis and the potential risk of use, it is necessary to monitor all these compounds. Dourvis et al. showed that cannabis samples in Ghana have high levels of As and Pb, which are toxic elements [48].

Our future studies will focus on a more elaborate analysis of other compounds possibly present in cannabis and their effects on health.

5. Conclusions

The fact that the cannabinoid contents in the seized MSPS differ among the types of cannabis, the parts of the plant, the location where it was cultivated and the seasons when it was cultivated, the procedures of manufacturing, the freshness/dryness, the duration and condition of storage, as well as between shares (packs) of the same smoking herbal mixes bags/sources (hot pockets), suggests two types of risks: health risks for the consumers and from an analytical point of view, unequally spiked smoking herbal mixes (parts with high concentrations of psychotropic compounds may be the cause of bias).

Our findings support global tendencies toward the THC content predominance in modern cannabis. It is necessary to continuously monitor trends of cannabis potency in our country because of Serbia's location. Thus, this research is of great importance, as it should be used as a basis for comparison in the future.

For a more comprehensive study, essential information such as the date of harvesting (if it is available), if it was cultivated indoors or outdoors, and whether it was imported or cultivated in Serbia should be provided. Some kind of procedural protocol has to be created and followed by the police service in that line. Consumers of cannabis products are at risk of the psychotropic substance's presence, and the content may vary between shares (packs) within the same source.

Trends of an unknown variety of seized MSPS, the illegal production of smoking herbal mixes, and the illegal manufacturing of cannabis products on the illegal market may indicate that cannabis users are now exposed to an increased risk of harm in comparison to the years before.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/separations10050307/s1. Table S1: Gas chromatographer and mass spectrometer parameters.

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