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RESEARCH ON THE MANAGEMENT OF THE MAIN CHEMICAL PROPERTIES OF CHROMIC LUVISOLS FROM FARMS/HOUSEHOLDS AGRITOURISTIC IN DOLJ, IN THE PERIOD 1995-2021

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Abstract

The research addresses an original and complex topic concerning the evolution of the main chemical properties of the chromic luvisols in the southwestern part of Romania, in Dolj County, exploited under the specific cultivation conditions of agritourist farms. The novelty of this research consists in the multidisciplinary interpretation of the analyses on chemical properties and their influence on the quality and quantity of agricultural productions. In the second part, the main chemical properties of the chromic luvisols were analysed, both for the soil developed under woody vegetation, and both for the cultivated soils. Comparing the results of the analyses, we found that the natural fertility of the cultivated soil decreased considerably, which led to a significant deterioration of the main chemical properties, precisely due to cultivation. In the third part, a study was carried out on the presence and concentration of heavy metals in this type of soil, finding from the interpretation of the analyses that the values of all the studied elements fall below the alert threshold. he recommendation on the researched aspects is that in order to limit the degradation and even improve the main chemical properties of chromic luvisols, in the agritourism farms, an ecological agriculture must be practiced.

Key words: *chemical properties, agritourism, heavy metals, soil profile, soil pollution.*

INTRODUCTION

Starting from the current conception regarding the evolution of tourism characterized by the deep renewal of the world tourist offer, especially by developing a range of new tourist products, superior both in terms of quality and quantity, tourism must be considered in close interaction with the abiotic, biotic, anthropic, economic, social, cultural elements of the environment, exceeding the exact limitations of the environment, an objective which is achievable through the large-scale development of sustainable tourism and agritourism (Ibănescu et al., 2018; Adamov et al., 2020)

The principles of sustainable tourism were set out more specifically in the Declaration of the Berlin International Conference on the relationship between biodiversity and tourism (March, 6-8, 1997). It stresses the consensus between sustainable tourism and environmental protection, namely: - sustainable tourism, especially ecotourism and agritourism (as an integral part of the two concepts), allows the rational use of biological diversity and contributes to its development; - the development of tourism activities must be accomplished in a balanced and sustainable manner and must be controllable; - paying special attention to the forms of tourism practiced in fragile ecological and cultural areas, where mass tourism is to be avoided; - attracting local population and local institutions to apply these principles of ecotourism in order for them to be the main beneficiaries of ecotourism and agritourism (Chiriţă et al., 1967; Călina & Călina, 2019).

The ecological development of tourism mainly focusses on four plans: economic, by increasing the degree of capitalization of resources, especially those least known, to reduce the pressure on the most intensively exploited; - ecological, by ensuring the rational use of all resources, reducing and eliminating waste, recycling it, ensuring the conservation and protection of the environment, reducing the process of stealing agricultural and forest land from their respective circuit; social, by increasing the number of jobs, maintaining traditional trades, attracting the population to practice different forms of tourism; cultural, by capitalizing on the special elements of civilization, art and culture, which express a certain cultural identity and develop the spirit of resilience (Galluzzo, 2021; Stanciu et al., 2023). In order to practice sustainable tourism, we must first identify the sources of pollution such as the intensification of industrial, agricultural, and transportation activities, which affect both the environment and the general framework of tourism activities, with the components of tourism potential taken as separate entities, namely air, water, soil, vegetation, fauna, landscapes, natural, and architectural monuments, etc. (Iagăru et al., 2016; Ciolac et al., 2019). The main forms through which this category of degradations is manifested and which are felt by the environment of our country are: ***air pollution; water pollution; soil pollution; noise pollution; landscape pollution; forest degradation; degradation of natural reserves and natural monuments; degradation of man-made tourist objectives***.

The research undertaken in this paper focused mainly on ***soil pollution*** with pollutants from contaminated rainwater with various chemicals, and directly through the dumping of waste, the application of pesticides and chemical fertilizers, etc. In addition to their economic and socio-sanitary consequences, they have consequences for tourism through the degradation of groundwater and water sources used in balneary tourism and leisure activities (Călina et al., 2022). A series of clear and precise objectives were pursued to highlight the impact of the anthropogenic factor on the evolution of the main chemical properties for both the soil developed under woody vegetation, as well utilized for cultivation, natural fertility, of the chromic luvisols. Based on the results of the obtained, it was concluded that on this type of soil, in farms and agritourism guest houses the degree of damage to the the main chemical properties over the 25 year period of evolution is not irreversible, but to stop the degradation of these properties, farms must practice a type of cultivation based on the principles of sustainable agriculture, to use cultivation technologies based on minimal environmental modifications and which are environmentally friendly.

MATERIALS AND METHODS

In order to achieve the stated objectives, field research was necessary, during which several soil profiles were analysed, and samples were collected from the most representative soils for laboratory analysis (Călina & Călina, 2019). Field maps and mapping works from the Dolj County Offices of Pedological and Agri-chemistry Studies were utilized. The soil profiles were taken from a depth of about 200 cm.

Soil samples were collected from every layer of the profiles distributed by soil genesis, replicated 3 times, in its undisturbed and disturbed structure, using cylinders (5 x 5 cm).

Soil profiles have the following particularities:

Profile under forest vegetation: location - North-West from Șimnic in Tufarul Viilor forest; altitude - 170 m average height; relief - piedmont plateau Leu-Rotunda, flat terrain; vegetation - Querce forest formed by: *Quercus freinetto, Quercus cerris, Quercus pubescents, Acer campestre, Crataegus monogina, Ulmus* sp.; parent material - clay deposits combined with loess deposits; natural drainage - good; groundwater depth - more than 15 m.

Profiles under agricultural corps - location - North-Est from Șimnic altitude - 168 m average height; relief - piedmont plateau Leu-Rotunda, parent material - marly deposits and clayey marls, natural drainage - not good; groundwater depth - more than 16 m.

Soil profiles were taken in approximately the same place, 25 years apart, in the same climatic, relief, fauna, and anthropic conditions, thus the same paedogenetic conditions.

a) Determination of chemical properties: pH measured in aqueous solution (soil/water ratio-1:2.5) - potentiometric determination using a double glass-calomel electrode (Păunescu, 1975; Stănilă, 2016); *humus* (H, %)-determined by volumetric method, Walkley-Black modified by Gogoașă, wet oxidation (Florea et al., 1987); *total nitrogen* (N, %) - the Kjeldahl method (Lăcătuşu & Lăcătuşu, 2008); *mobile phosphorus* (P, ppm) - the Egner-Riehm-Domingo method; *mobile potassium* (K, ppm) - the Egner-Riehm-Domingo method (Liu et al., 2015); *sum of bases* (SBs, me/100 g soil) - Kappen-Chiriţă method (Florea et al., 1987; Canarache, 1990); *hydrolytic acidity* (Ha, me/100 g soil) - by percolation at exhaustion with 1N potassium acetate solution (Cernescu, 1964; Stătescu, et al., 2013); *cationic exchangeable capacity* (CEC, me/100 g soil) - by calculation (Eq. 1):

$CEC = SBs + Ha$ (1)

percentage of base saturation (BS %), - through calculation (Pierre & Scarseth, 1931), using (Eq. 2):

$$BS = \frac{SBs}{CEC} \cdot 10 \quad (2)$$

Index of nitrogen (IN) by calculation (Eq. 3):

$$IN = \frac{H \cdot BS}{100} \quad (3)$$

b) Heavy metals were determined using the method of 1:5 acidic mineralization and through flame absorption - the recommended methods of the Avanta GBC SN A 5378 flame atomic absorption spectrometer and of the Milestone microwave disintegration system, model the interpretation of soil contamination ETHOS D series 127327. Atomic Absorption Spectrometry is considered a usual technique for determining metals in a wide range of environmental samples (Haswell, 1991; Fang et al., 2019).

The soil samples are collected from the 0-20 cm depth of the Ao horizon. The interpretation of the soil contamination levels with Cr, Cu, Ni, Pb, Cd, Zn was accomplished according to Romanian legislation regarding soil pollution (Dumitru et al., 2011).

RESULTS AND ISCUSSIONS

Spread of chromic luvisols

The chromic luvisols in Romania, according to (Merlescu & Teşu, 1982), occupies an area of 760,000 ha and 5.24% of the agricultural area of the country. Detailed research later elaborated by (Coteț, 1973; Șorop & Vasile, 1990), showed that the reddish preluvisols (brown-reddish) is found only in the South and South-West regions of the country. It occupies the largest part of the oak sub-area in the High Plains of Muntenia, Oltenia, as well as in Banat and Dobrogea. In Oltenia it occupies a strip defined by the North by Turnu-Severin, Bistrita, Terpezita, Gherceşti, Bals, Piatra-Olt, and in the South by Burila Mare, Branişte, Mărăcinele, Segarcea, Tâmbureşti, Deveselu and Caracal (Figure 1).

Chromic luvisols are defined by the presence of the El and Bt horizons and formed in the wetter part, north of the researched area. These soils are found in a complex with other chromic luvisols, occupying in the researched area approximately 10,283.28 ha, 7.4% respectively of the total *chromic luvisols* in this area (Figure 1) (Păunescu, 1975; Stănilă, 2016).

Figure 1. Chromic luvisols in Romania. 1 - Chromic luvisols, developed on loamy clays, on alluvio-prolluvial deposits of Pleistocene; 2 - Chromic luvisols, developed on loess-like deposits, loamy clays and alluvio-prolluvial deposits (Stănilă, 2016)

The relief is represented by flat surfaces and depressions, such as the Getic Piedmont, the high Leu-Rotunda field and the high terraces of the Jiu, where rainwater accumulates due to the impermeable soil layer, leading to the phenomenon of podzolization. The average altitude of the relief is about 170 m. From a geological point of view, the area with chromic luvisols falls in the Upper Pleistocene (Coteț, 1973; Răduțoiu et al., 2018).

The parent material on which it was formed is generally composed less often of loess deposits, with the predominance of marly deposits and marly clays which hinder the internal drainage capabilities of the soil. The puddle phenomenon is also manifested due to the compaction of the land, under the continuous action of the equipment and machines used for agriculture (Mihalache et al., 2014).

The climate of this area according to Kopper falls mostly under Cfax type and to a lesser extent under Cfbx. The climatic conditions in the area of *chromic luvisols* in Oltenia contributed greatly to the formation of these types of soils, which have different properties from other types existing in our country. Characterized on the basis of meteorological data from Craiova station, it falls within the continental type with a weak Mediterranean influence and has the following Cfax formula, according to Köper (Șorop & Vasile, 1990).

Chemical characterization of chromic luvisols

From a chemical point of view, the large accumulation of organic matter in the soil developed under woody vegetation, at a depth of up to 70-80 cm, must be highlighted. Firstly, the percentage of humus is 4.02% and remains above 1%, up to the Bt_1 horizon. The soil is medium supplied with phosphorus and mobile potassium, in the Ao horizon, the phosphorus content is 35.6 ppm, and the potassium content is 150.3 ppm. We can also observe a decrease in the pH value in the eluvial horizons, reaching 5.7 in AB and 5.9 in BE, as well as a slight increase of hydrolytic acidity, being of 4.64 me/100 g of soil in AB and of 3.62 me/100 g of soil, in the BE Horizon. Lastly, in the AB horizon there is also a slight decrease in the degree of base saturation (V, %) to 75.55% (Table 1).

Thus, it becomes clear that the chromic luvisols from Șimnic which evolved under woody vegetation has a good natural productive potential, but slightly lower than other soils of this kind developed under the same conditions.

Table 1. Main chemical properties of the chromic luvisols

Horizon	Sampling depth (cm)	pH in (H_2O)	H (%)	Total nitrogen (%)	Index of Nitrogen	Mineral residues (mg/100 g sol)	P	K	SBs	Ha	CEC	BS (%)
							ppm		*me/100 g sol*			
YEAR - 1995 - Forest vegetation												
Ao	5-15	6.4	4.02	0.198	3.21	99.7	35.6	150.3	15.6	3.91	19.51	79.95
AB	22-32	5.7	2.11	0.176	1.6	81.6	31.2	146.1	14.5	4.64	19.14	75.55
BE	35-45	5.9	1.46	0.094	1.2	50.3	24.1	120.9	16.1	3.62	19.72	81.64
Bt_1	70-80	6.1	1.09	0.082	0.93	41.9	29.3	106.7	18.1	3.04	21.14	85.61
Bt_2	120-130	6.3	0.56	0.046	0.52	35.6	16.6	70.8	21.4	1.82	23.22	92.16
Bt_3	175-185	6.5	0.31	0.043	0.29	35.8	6.4	61.2	19.2	1.35	20.55	93.43
YEAR - 1995- Agricultural crop												
Ao	10-20	6.31	2.65	0.169	2.2	60.2	39.13	185.3	13.8	2.8	16.60	83.13
AE	30-40	5.80	2.36	0.154	1.79	53.7	26.97	141.9	14.5	4.6	19.10	75.91
Bt_1	50-60	6.49	2.01	0.118	1.80	37.9	21.35	117.6	18.5	2.1	20.60	89.80
Bt_2	85-95	6.50	1.48	0.082	1.31	29.1	20.49	83.5	19.1	2.4	21.50	88.83
Bt_3	120-130	6.78	0.73	0.047	0.69	24.5	15.61	70.1	22.8	1.05	23.85	95.59
BC	175-185	6.80	0.46	0.031	0.44	28.7	14.83	36.4	25.6	0.96	26.56	96.38
YEAR - 2021- Agricultural crop												
Ao	10-20	6.12	2.35	0.149	1.87	122.3	36.4	178.0	13.0	3.32	16.32	79.60
EB	50-60	5.80	1.81	0.121	1.44	47.2	32.5	137.7	12.0	3.02	15.02	79.89
Bt_1	85-95	5.90	1.10	0.106	0.86	42.3	49.8	137.0	15.2	4.21	19.41	78.31
Bt_2	115-125	6.05	0.91	0.083	0.84	35.8	20.6	111.22	15.4	3.65	19.05	80.83
Bt_3	150-160	6.18	0.81	0.076	0.69	35.8	31.1	104.58	16.6	2.69	19.29	86.05
BC	180-190	6.40	0.62	0.053	0.56	31.9	10.5	76.30	16.6	1.75	18.35	90.46

H - Humus; P - Mobile phosphorus; K - Mobil potassium; SBs - Sum of bases; Ha - Hydrolytic acidity; CEC - Cation exchange capacity; BS -Percentage of base saturation; Source: own results.

Compared to the soil developed under woody vegetation, the chromic luvisols from Șimnic evolved under agricultural activities is characterized from a chemical point of view by a low humus content, the percentage decreasing from 2.35 (Ao), to 0.62 (BC). The same poor soil supply is found in terms of nutrients, the mobile phosphorus content being 36.4 ppm, in the Ao horizon, and the mobile potassium content is 178 ppm (Table 1). The soil has a weak acidic reaction, registering a slight decrease in pH at the level of the EB horizon, where the value drops to 5.80. The degree of base saturation increases in profile from 79.6% to 90.46% (Table 1).

In conclusion, based on the analytical data presented, it was discovered that the chromic luvisols from Șimnic developed under agricultural activities has a medium to low production capacity, requiring deep loosening and a balanced organo-mineral fertilization, depending on the cultivated plants.

Heavy metals contents in the chromic luvisols under agricultural crop

In agritourist farms around the world as well as in our country, quality products must be obtained, with very good nutritional value and as natural as possible, fully respecting the traceability conditions imposed on agri-food products, in order to prepare the culinary specialties served to the tourists who visit the agritourist guest houses or the tourist reception structures of the area (Petrescu et al., 2017; Bampa et al., 2019).

For these conditions to be met, in addition to the chemical analyses presented above, the chromic luvisols utilized for crop cultivation there was also a necessity in 2021 to determine the presence of heavy metal content in the surface soil layer - the Ao horizon.

Table 2. Heavy metals contents in the Ao horizon of the chromic luvisols under agricultural crop

Heavy metals	**Heavy metal concentration**	**Values for heavy metals in agricultural soil***		
		Normal values	***Alert threshold***	***Intervention threshold***
	(mg kg^{-1})			
Cr	34.5	30	100	300
Cu	19.8	20	100	200
Ni	22.1	20	75	150
Zn	59.6	100	300	600
Cd	0.93	1	3	5
Pb	16.7	20	50	100

Source: own results and* EM (1997) (Environment Ministry, Order 756)

Existing research in specialized literature has found that heavy metals occur naturally in the soil in relatively low concentrations. Some of them have a beneficial role, physiological speaking, but with increasing concentration above the tolerance limit they become toxic, both for plants and for animals and humans (Beek et al., 1991), Most heavy metals detected in the soil have different origins: of lithogenic origin - they come directly from the lithosphere (parent material) or are of anthropogenic origin - originating directly or indirectly the result of human activities. The mere presence of the metal in the soil is not enough for it to become harmful to living organisms, but its bioactive chemical form (s.s. toxic) (Bervoets & Blust, 2003), Once in the soil, heavy metals interact with clay minerals, humic substances, extracellular enzymes, microorganisms, organic and inorganic ligands, or associate with mobile organic or inorganic colloidal particles (Lăcătuşu & Lăcătuşu, 2008; Mihalache et al., 2014).

Furthermore, it has been observed that on andosols, heavy metals are exclusively of paedogenetic origin (derived from the parent material in the pedogenesis processes), and their natural geochemical associations are undisturbed. On anthroposols, heavy metals are mostly of anthropogenic origin, and the degree of stabilization of geochemical associations is relatively low, being determined by the form of entry of heavy metals into the soil and their residence time (Mihalache et al., 2014; Huang et al., 2019).

The analysis of the data presented in Table 2 shows that the average values of the heavy metal content increased by several units compared to other chromic soils studied by us and previously published in other journals. This increase is mainly explained by the appearance of the weak acidic reaction, the pH being lower than 6.4 in the surface layer of the soil and decreasing below 5.8 in the deeper layers. The acidic reaction of the soil negatively influences both their concentration and bioavailability (Bünemann et al., 2018; Yadav et al., 2019). In addition, from this table it can be seen very clearly that the concentration values of all heavy metals are below the alert limit, most of them being within the normal values, except for chromium, which exceeds by 4.5 mg kg^{-1} the normal value and nickel, which exceeds the normal value by 2.1 mg kg^{-1}.

Discussions

A positive aspect observed is that in all studied chromic luvisols in the deep horizons, the influence the anthropogenic factor is felt strongly only at the upper level of the soil profile.

How it is used is also very significantly negative for some chemical properties, especially in terms of organic matter content. Thus, in the soils under woody vegetation the percentage of organic matter is high, 4.02%, and in the cultivated ones, the soil content in organic matter decreased almost by half, being in the first horizon of 2.35%. It should also be noted that in the soil developed under woody vegetation, the accumulation of humus is achieved at a much greater depth, up to about 1 m.

The reaction of chromic soil to all kinds of use is maintained in the surface horizon in the weak acidic range, and in the eluvial horizons decreases slightly to moderate acidic. Thus, for the soil under the forest, the pH value is 6.4 in Ao and 5.7 in the AE horizon. In soil from 1995, the pH is 6.31 in the Ao horizon and decreases to 5.8 in the EB horizon. In the chromic luvisols cultivated in 2021, there is a slight increase in the pH value starting from the surface, this being explained by an acceleration of the debasification and elution processes on this soil. Thus, we can state that by cultivating crops on the chromic luvisols in the researched area, they undergo more or less accentuated changes. Given these trends, measures must be taken to counteract them, such as a deep loosening and organic fertilization to increase porosity, improve the structure and increase the humus reserve in the soil.

Concerning the good values of the concentration of heavy metals in the researched soil, they are mainly due to the specifics of agritourist farms, these being located in more remote areas, protected from any form of pollution with a picturesque relief, high landscape value, away from roads with heavy traffic. This translates to almost all the heavy metals studied were of paedogenetic origin, the anthropogenic factor being almost absent or with very little influence (Prundeanu & Buzgar, 2011; Tudor et al., 2019).

Interpreting the values of heavy metal concentrations in Table 2 in terms of chromium (Cr), it slightly exceeded the normal value but it becomes a pollutant only when it is found in the form of species derived from the oxidation state Cr (VI). Copper (Cu) is below the normal (ordinary) concentration, which makes soil pollution by a change in the hydric structure and stability not manifest on this type of soil. Nickel has a concentration of 22.1 mg kg^{-1}, but it is well below the tolerance limit of about 50 mg kg^{-1} (Răuţă et al., 1995). Zinc has a concentration of 59.6 mg kg^{-1}, but should not be of concern because the metal becomes harmful only above the concentration value of over 400 mg kg^{-1}, when it does not allow the absorption of essential elements. Cadmium is one of the heavy metals with the highest toxicity to plants, animals and humans, but its concentration is <1 mg kg^{-1}, however, the type of phosphate fertilizer used for different crops must be considered, because the highest concentrations of Cd are present in brown phosphates. Lead has a low concentration of only 16.7 mg kg^{-1}, which is good news for tourists visiting the guest house, because the maximum human tolerance for this element is 20 mg kg^{-1}. But for plants, a higher level of lead reduces the oxidation and photosynthesis processes, and the side effects consist in slowing down their growth or even their death (Prundeanu & Buzgar, 2011).

In what concerns the soil's own factors that influence the mobility of heavy metals and their accessibility to plants, in the chromic luvisols the soil texture is mostly clayey so it is a heavy soil, presents a lower danger for plants because excess heavy metals are retained by fixation by the clay, so their accessibility to plants is limited. The pH of the soil in the surface horizon is about 6.5, which makes the accessibility of heavy metals in the soil as low as possible, most heavy metals are in the form of insoluble combinations (carbonates and hydroxides), so that plant and groundwater pollution is reduced (Răuţă et al., 1995; Sescu et al., 2018). The content of organic matter in the Ao horizon is good, over 2.35%, which reduced the accessibility of heavy metals in plants, because they are fixed due to the formation of complexes between organic matter and insoluble heavy metals in the soil solution (Pierre & Scarseth, 1931).

The cationic exchange capacity is very good and the content of clay and soluble organic matter is higher, giving the soil a high retention capacity, thus limiting the possibility for toxic concentrations to reach the plants. Soil drainage is good, and excess soil moisture is reduced, which makes the presence of heavy metals in soluble forms very limited, preventing their accessibility to plants (Prundeanu & Buzgar, 2011; Wu, 2021). The resistance of the soil to heavy metal pollution depends on its buffering capacity. The researched soils have a high adsorption capacity (higher content of clay and organic matter) which leads to the retention of these elements in the upper horizons, the number of toxic compounds that can be absorbed by plants, or leached into groundwater, being lower than on sandy soils.

CONCLUSIONS

Analysing all the properties of chromic luvisols and correlating them with their main chemical properties, we found that the natural fertility of the soil has decreased greatly on cultivated soils, compared to those under woody vegetation, primarily due to the significant decrease in the percentage of humus in the soil, from 4.02 to the soil under woody vegetation, to 2.65 to the soil cultivated in 1995 and to only 2.35 in 2021. Its significant decrease led to a chain deterioration of all other agri-productive properties (granulometric fractions, texture, structure, physical and water indices) of this type of soil, during the 25 years of evolution, given that the plant cultivation techniques based on sustainable development have not been fully observed. The low percentage of humus also had a negative effect on the amount of total nitrogen in the soil and the nitrogen index. The same negative effect was also manifested on the cation exchange capacity which decreased considerably on the crop cultivated soil, with over 3.0 me/100 g soil.

Concerning the presence and content of soil in heavy metals, we found that most of the analysed elements did not exceed normal values, except for Ni and Cr, but which have values well below the alert threshold. This aspect was primarily a result of the specifics of the agritourism farms in our country, which, according to legal regulations, must be located in more isolated areas, free of pollution. Also important in terms of their low values was the origin of heavy metals (especially from paedogenetic sources) and soil factors that influence the mobility of heavy metals and their accessibility to plants, such as soil texture, soil pH at the surface horizon of about 6.5, good organic matter content in the Ao horizon, more than 2.35%, very good cation exchange capacity and high clay and soluble organic matter content, good soil drainage, high adsorption capacity which leads to the retention of these elements.

To sum up, it can be stated that from following the research, the main agri-productive properties of chromic luvisols have changed very significantly, natural fertility decreasing greatly on cultivated soils, compared to those developed in a natural state, under woody vegetation. It has also been highlighted that due to the cultivation technologies applied in agritourism farms, with a lower number of processing works and inputs of pesticides, fungicides and insecticides, the main agri-productive properties of the soil have been preserved even after an operating period of more than 25 years. Regarding the presence and concentration of heavy metals in chromic luvisols, an aspect researched for the first time in our country in agritourism farms, it was very clear that the value of their concentration is below the alert threshold, and their paedogenetic origin, meaning they do not pose any threat to the health of tourists.

Following these conclusions, it is recommended that, for the total protection of the soils, crops and tourists, the agritourist farms in Romania must practice an organic agriculture that involves the application of agricultural technologies that are sustainable, diversified and balanced to ensure the preservation of the environment and a certain nutritional and traceable quality of the food served.

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