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A Comparative Study of the Methods for Preparation of Soil Samples for Analysis

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Abstract

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A comparative study of the most widely spread methods for soil sample preparation for determination of Fe, Mn, Cu and Zn was carried out. Three certified soil samples correspouding to 2 main soil types in Bulgaria were used in the study: Light Alluvial-deluvial Meadow Soil PS-1, SOOMET № 0001 - 1999 BG, SOD № 310a98; Light Meadow Cinnamon Soil PS-2, SOOMET № 0002 - 1999 BG, SOD №311a98; Light Alluvial-deluvial Meadow Soil PS-3, SOOMET № 0003 - 1999 BG, SOD № 312a98. Light Alluvial-deluvial Meadow Soil PS-3, SOOMET № 0003 - 1999 BG, SOD № 312a98. The soils are certified on national and international level and registered with numbers. Six most commonly used methods for sample preparation were used as follows: ISO 11466, ISO 11047, EPA Method 3051, EPA Method 3052, БДС ISO 14869-1, ISBN 01175 19081. It was found out that the extent of extraction of the studied elements is different and depends on the method of sample preparation and the soil type. In all cases the method of soil sample preparation is dominating. The determination of the total content of Fe and Mn in all cases demands the usage of fluoride hydroxide acid and more special work conditions, while at determining that of Cu and Zn this is not necessary. The evaluation of the borders of application of the methods for sample preparation depends on the purposes of the study and demands fractioning of the soil and determining the distribution of the elements in the different fractions. This would enable selection of the most suitable for the concrete purpose method connected with the least losses of time and money.
Key words: methods, analysis, Fe, Mn, Cu, Zn, soils

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Correlation between soil characteristics and lead and cadmium content in the aboveground biomass of Virginia tobacco

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Abstract The study was conducted on alluvial-meadow, maroon-forest soils and vertisols with Virginia tobacco. The total content of lead and cadmium is measured through decomposition by HF, $HClO_4$, and HNO_3 acids. A solution of 0.005 M diethylentriaminepentaacetic acid + 0.1 M triethanolamine, pH 7.3 was used for extraction of the elements' mobile forms from soils. The preparation of plant samples was made by means of dry ashing and dissolution in 3 M HCl. An atomic absorption spectrometer "Spektra AA 220" of the Australian company Varian was used for determination of Pb and Cd content in the soil and plant samples. Certified reference materials (three soils and tobacco leaves) were also analyzed for the verification of the accuracy of Pb and Cd determination. A correlation/regression analysis was conducted between pH, humus content, total and mobile forms of lead and cadmium in the soil, and the concentration of these elements in the aboveground biomass of Virginia tobacco. It was established that there are no statistically significant dependencies determined between soil pH and lead concentration in the plant organs of Virginia tobacco. Regressional dependencies of great significance were determined between the humus content, total and mobile lead and cadmium in the soil, and the element concentration in the leaves of the three harvesting zones.

Keywords Cd · Pb · Uptake · Virginia tobacco

Introduction

The toxic impact of Pb and Cd on the vital processes of almost all plants is well known (Rose et al. 2001; Ghaedi et al. 2007). The significant phytotoxicity of Cd is due to its high transfer coefficient because of its relatively weak sorption by the soil colloids and its easy accumulation in plants (Alloway and Ayres 1994). It is well known that tobacco (*Nicotina tabacum*) can easily accumulate

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Ecological monitoring of the fresh waters in Stara Zagora Region, Bulgaria I. Quality analyses of nitrogen compounds contents

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ABSTRACT

The aim of the present study was the ecological monitoring of the natural waters in Stara Zagora Region, Bulgaria, establishing of a database and correlations regarding three basic parameters – nitrates, nitrites and ammonium, to provide a framework for sustainable management of the natural surface and groundwaters in the stated region. To accomplish this goal, the concentrations of nitrogen compounds in real surface and groundwater samples taken from 16 sampling points situated in four municipalities of Stara Zagora Region were spectrophotometrically determined and the statistical significance of the data was tested.

The results obtained displayed that nitrite-nitrogen could be classified as a potential pollutant in the surface waters from Stara Zagora and Chirpan municipalities. NH_4^+–N concentrations were in the range of 0.118–0.462 mg L^{-1} in 6 of the samples, thus pertaining to II category surface waters. The comparative analyses proved that nitrate-nitrogen could not be classified as a contaminant. The derived exponential correlation between NO_3^-–N and NO_2^-–N concentrations in Tundzha River allows mathematical modelling of the results. The present study ascertained that the pollution thresholds for groundwaters, regarding nitrite and nitrates, were exceeded in three sampling points from Stara Zagora and Chirpan municipalities.

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CORRELATION BETWEEN SOIL CHARACTERISTICS AND IRON CONTENT IN ABOVEGROUND BIOMASS OF VIRGINIA TOBACCO

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Abstract

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The study was conducted on alluvial-meadow, maroon-forest soils and vertisols with Virginia tobacco. The total content of iron was measured through decomposition by HF, HClO and HNO acids. A solution of 0.005 M diethylentriaminepentaacetic acid + 0.1 M triethanolamine, pH 7.3 was used for extraction of the elements' mobile forms from soils. The plant sample preparation was made by means of dry ashing and dissolution in 3 M HCl. A Varian Spectra AA 220 Atomic Absorption Spectrophotometer was used for Fe content determination in soil and plant samples. Certified reference materials (three types of soils and tobacco leaves) were also analyzed for accurate determination of Fe concentrations. A correlation and regression analysis was conducted between pH, humus content, total and mobile iron forms in the soil, and the concentration of these elements in aboveground biomass of Virginia tobacco. It was estimated that there were statistically significant relationships between soil pH and iron concentration in Virginia tobacco plant organs. The correlation - regression analysis results showed that there were no statistically significant relationships between humus and iron concentration in aboveground tobacco biomass of Virginia tobacco. Also, the results of the correlation - regression analysis showed that there were no statistically significant relationships between the total element content in soils and iron content in aboveground tobacco biomass of Virginia type. Regression relationships were established between movable iron in the soil and element content in leaves from the lower, middle and upper harvesting zones.

Key words: Fe, uptake, Virginia tobacco, correlation, soils

Abbreviations: ISO - International Organization for Standardization, DTPA - diethylentriaminepentaacetic acid, TEA - triethanolamine, SPSS - Statistical Package for Social Science, CTA-VTL – certified referent material of Virginia tobacco leaves

FACTORS ASSOCIATED WITH CHANGE IN PH, AMMONIA AND TOTAL NITROGEN OF MANURE MASS IN HIGH PERFORMANCE DAIRY COWS

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Abstract. The purpose of the present study was to monitor the changes in pH, ammonia and total nitrogen contents of manure samples obtained from three populations of dairy cows reared and fed in intensive production systems. The experiments were performed in April–May 2012 with three dairy cows' populations – A, B and C, fed 16, 17 and 18 % dietary crude protein and with 305-day milk yields of 25, 26 and 28 kg, respectively. It was established that the faecal pH of all three populations was between 6.07 and 6.65. The urinal samples showed alkaline values (pH urine 8.47 - 8.62). When urine was mixed with faeces, the ammonia nitrogen content increased correlating with manure mass pH increase. The average manure pH in the three studied populations attained 8.62 (population A), 8.48 (population B) and 8.49 (population C). Field analyses showed increase in manure pH from the beginning towards the end of the manure alley during cleaning. For population A, the respective values were 8.44 in the beginning, 8.88 in the middle and 9.05 at the end of the manure alley. After the passage of the scraper, the pH of manure remaining on the floor was 8.75. For the second population of cows, manure pH in the three manure alley points was 8.30; 8.42 and 8.64, and pH of remaining manure was alkaline (pH=8.50). For the third population, manure pH during scraping was 8.22; 8.52 and 8.78 in the beginning, middle and end of the manure alley respectively, while that of remaining manure on the floor was 8.54. Data showed that dairy cows were in an alkaline environment due to degradation of non-utilised urea nitrogen to ammonia nitrogen.

Abbreviations: MM, manure mass; CP, crude protein; TN, total nitrogen; NH_4-N, ammonia nitrogen; CO_2, carbon dioxide; NH_3, ammonia; NH_4OH, ammonium hydroxide

Keywords: pH, NH_4-N, N, CP, manure mass (MM); dairy cows, total nitrogen

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Culture des plantes

DURUM WHEAT GRAIN YIELD AND QUALITY INFLUENCED BY SOME MIXTURES OF FOLIAR FERTILIZERS AND COMBINED HERBICIDES

Grozi Delchev, Liliko Dospatliev*, Nedyalko Katrandzhiev, Antonia Stoyanova**

(*Submitted by Academician A. Atanassov on June 8, 2015*)

Abstract

The research was conducted on pellic vertisol soil type from 2010 till 2012. Bulgarian durum wheat cultivar Predel that belongs to var. valencina was under investigation. Factor A included no treated check and 3 foliar fertilizers – Lactofol O – 8 L/ha, Terra-sorb – 3 L/ha, Humustim – 1 L/ha. Factor B included weeded, no treated check and 3 combined herbicides – Axial one (pinoxaden + florasulam) – 1 L/ha, Husar max OD (mesosulfuron + iodosulfuron) – 1 L/ha, Palace 75 WG (pyroxsulam) – 250 g/ha. Because of the low adhesion of the herbicide Palace it was used together with adjuvant Dassil – 500 mL/ha. All foliar fertilizers, herbicides and their tank-mixtures were treated in tillering stage of the durum wheat and are applied in a working solution of 200 L/ha. Mixing was done in the tank of the sprayer. There is antagonism of combined use by herbicide Husar max with foliar fertilizers Lactofol and Humustim and by herbicide Palace with foliar fertilizer Lactofol. There is synergism by tank mixtures of herbicide Axial one with the three foliar fertilizers, by tank mixtures of herbicide Palace with foliar fertilizers Lactofol and Humustim, by tank mixtures of herbicide Husar max with foliar fertilizer Terra-sorb. The highest grain yield is obtained by tank mixture Terra-sorb + Axial one. The grain yield increase by these tank mixtures is due to the increase in the grain number per spike and the grain weight per spike.

Key words: wheat, grain yield, grain quality, foliar fertilizers, herbicides

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Original Contribution

EXTRACTION-SPECTROPHOTOMETRIC DETERMINATION OF COBALT IN SOILS BY THE APPLICATION OF IODINE NITROTETRAZOLE CHLORIDE (INT)

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ABSTRACT

An extraction-spectrophotometric method for cobalt determination in soils by the application of iodine nitrotetrazole chloride (INT) was developed and compared to atomic absorption spectrometry (AAS). The method investigated characterized with expressivity, selectivity and satisfactory accuracy.

Keywords: Co, INT, soils, AAS, spectrophotometer, methods.

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ICP determination of phosphorous in soils and plants

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Abstract

The purpose of our study is to evaluate the appropriateness of an ICP–method for the determination of total phosphorus content in soils and plants after complete decomposition by acid mixtures. Three certified soil samples corresponding to two main soil types in Bulgaria and Polish reference material CTA-VTL-2 (Virginia tobacco leaves) were used in the study. It was established that ICP is a fast and correct method for phosphorus determination in plant materials. We have to use a standard supplement method in order to obtain correct results for soil samples.

Key Words

Phosphorous determination, ICP, soils, plants

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Relation between soil characteristics and heavy metal content in Virginia tobacco

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Abstract
The study was conducted on alluvial-meadow soils (Fluvisols), cinnamonic forest soils (Chromic Luvisols) and smolnitzi (Vertisols) with Virginia tobacco. pH, humus, total content and mobile forms of Pb, Cd, Cu and Zn in soils, as well as concentration of the elements in roots and aboveground biomass of tobacco were specified. Statistically significant dependencies between soil reaction and Cd content in leaves, stems and blossoms of Virginia tobacco were established. pH increase led to reduction of Pb, Cu and Zn concentration in plant organs but these relations were not statistically proven. The humus content influenced Pb and Cd accumulation in leaves of the three harvesting zones and of Cu in stems and blossoms. Statistically significant dependencies with varying degree of correlation were established between total Pb, Cd, Cu, Zn content, their mobile forms in soil and element concentration in plant organs (mainly in leaves) of Virginia tobacco. The obtained regression dependencies in the soil-tobacco system may be used for solving various scientific as well as scientific and practical tasks for prognostication and prevention of tobacco heavy meal contamination.

Key Words
Soil, Heavy Metals, Tobacco (Virginia)

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Correlation between soil characteristics and zinc content in the aboveground biomass of Virginia tobacco

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Abstract. *The study was conducted on alluvial-meadow, maroon-forest soils and vertisols with Virginia tobacco. The total content of zinc is measured through decomposition by HF, $HClO_4$, and HNO_3 acids. A solution of 0.005 M diethylentriaminepentaacetic acid + 0.1 M triethanolamine, pH 7.3 was used for extraction of the elements' mobile forms from soils. The preparation of plant samples was made by means of dry ashing and dissolution in 3 M HCl. An atomic absorption spectrometer "Spektra AA 220" of the Australian company Varian was used for determination of Zn content in the soil and plant samples. Certified reference materials (three soils and tobacco leaves) were also analyzed for the verification of the accuracy of Zn determination. A correlation/regression analysis was conducted between pH, humus content, total and mobile forms of zinc in the soil, and the concentration of these elements in the aboveground biomass of Virginia tobacco. It was established that there are no statistically significant dependencies determined between soil pH, humus content and zinc concentration in the plant organs of Virginia tobacco. Regressional dependencies of great significance were determined between the total and mobile zinc in the soil, and the element concentration in the leaves of the three harvesting zones.*

Keywords: Zn, uptake , Virginia tobacco, correlation, soils

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Original Contribution

DETERMINATION OF HEAVY METALS (Pb, Zn, Cd and Ni) IN EGGPLANT

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ABSTRACT
Heavy metals Pb, Zn, Cd and Ni were found in samples of eggplant collected in the Municipality of Plovdiv. Sample preparation was carried by microwave system Mileston 1200 MEGA. In determining the amount of heavy metals in plant samples ICP - OES were used. To check the accuracy of the method, a reference material CTA-VTL-2 (Virginia tobacco leaves) was used. It was found that the concentrations of the heavy metals determined in the tested eggplant samples were lower than the admissible ones regulated by the World Health Organization.

Key words: eggplant, ICP - OES, Microwave mineralization, heavy metals (Pb, Zn, Cd and Ni)

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Plant protection means against Oilseed rape pests

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Abstract. *Oilseed rape, together with its industrial, biological and agricultural advantages, appears as a good host plant to a lot of harmful insects. They appear often as a calamity and lead to considerable damages. Thus, the aim of the present investigation is to approve the influence of some pest control chemicals against cabbage bugs -Eurydema ornata L. and pollen beetles -Meligethes aeneus F. We carried out the investigation in 2004/2005. Each of the chemicals was used in three different concentrations in order to determine the concentration dependency effect. The mortality rate was calculated by the Betim's formula. Based on the results it was established that Vaztak 10 EK in concentration 0.03% could be recommended as a preparation with multipurpose effects against pollen beetles -Meligethes aeneus F. and cabbage bugs – Eurydema ornata L.*

Keywords: Vaztak 10 EK, Decis 2.5 EK, pollen beetle, cabbage bug, oil seed rape.

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Using microwave mineralization in order to determine heavy metal concentration in samples of herbs used for pharmaceutical purposes

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Abstract. *The purpose of the recent study was to determine the heavy metals (Pb, Zn, Cd and Ni) content in samples of medicinal plants collected from Batak Municipality by the application of microwave system Mileston 1200 MEGA for sample preparation. ICP - OES was used for the quantity determination of the heavy metals. Certified Virginia Tobacco CTA-VTL-2 material was applied to test the analyses accuracy. The analytical results obtained displayed that the concentrations of the metals determined were below the permissible levels regulated by the World Health Organization. It was established that due to the considerably reduced acid consumption and analyses time, microwave mineralization could be accepted as the most economically profitable sample preparation method.*

Keywords: microwave mineralization, heavy metals, St John's wort, nettle.

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Use of Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES) to Determine the Macro in the Cow's Milk and Cheese

Abstract

It is presented a method based on ICP-OES that analyse the content of Ca, K, Mg, Na, P and S, in cow's raw milk and cheese. The mineralization of the samples was made with concentrated nitric acid and hydrogen prekis. The heating was carried out with microwave system Mileston 1200 MEGA. It was found that the method is suitable for routine monitoring and quality control of foods produced from cow's milk.

Key words: ICP-OES, cheese, raw milk, macroelements

of mineral elements so that it will be accepted as "standards" (McKinstry et al., 1999; Cichoscki et al., 2002). Moreover, analytical studies are applied that are showing the relationship between animal nutrition, environmental conditions, manufacturing process and distribution of macroelements in milk and cheese. It is known that the composition of milk products requires strict regulatory control associated with mineral content (Gillies et al., 1985). Thus, the emphasis is focused on accuracy and precision. However, a major problem of any quality control

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Влияние на тежкометалното замърсяване в района на КЦМ – Пловдив върху тестови култури

Impact of Heavy Metal Pollution in the Region of KCM – Plovdiv on Test Cultures

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Abstract
Heavy metals and metalloids are the ones of primary significance of all technogenic environmental pollutants. This is a global problem and concerns nearly all countries worldwide, regardless of their location. This is especially valid when it comes to the negative impact on environment and with regard to those countries of small territory and limited areas for agriculture development. Such is the case with the region around the Non-Ferrous Metals Smelter (KCM) – Plovdiv, which has been determined as one of the so-called "hot spots". The level of soil pollution with heavy metals undoubtedly has serious impact on the agricultural production cultivated on these soils as well. This implies inevitable risk for the health of people in their capacity as actual consumers. The main oleaginous-etheric culture included into the sowing circulation of soils polluted with heavy metals is the lavender (*Lavandula angustifolia*). The total area of lavender plantations in the region of the KCM is 385 da, as three experimental sites within the plantation itself have been specified for this purpose. The experiment was carried out in 2008 by bringing utensil experiments with agricultural cultural, namely: sunflower, wheat and radishes at the Agricultural University, Plovdiv.

Key words: soil pollution, heavy metals, pollution, Lavandula angustifolia, sunflower, wheat, radishes

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Total Amount of Selenium in Bone Tissue Determined by Inductively Coupled Plasma

Abstract

Selenium measurement in bones or liver is the most accurate way to assess Se status for diagnostic purposes. This study was conducted to develop a methodology for the mineralization of bone tissue samples using acid mixture of HNO_3 + HCl + HF and also to compare a spectrophotometric method with that using inductively coupled plasma (ICP) for detection and quantification of Se. Detection by ICP was optimized by yttrium for Se^{82}, used as an internal standard. Selenium was determined quantitatively by both methods in samples taken from different calf organs: blade (scapula), large shin bone (tibia) and spine (vertebral column). The results show that ICP can be reliably used in place of a spectrophotometric method to quantify Se in bones using acid mixture of HNO_3 + HCl + HF for sample mineralization.

Key words: Se, bone, acid mixture of HNO_3 + HCl + HF, ICP

thorough investigation of trace element exchange in the human organism as well as in animals under normal and pathological conditions. A new trend called microelementology develops in biomedical research (Abdelrahman et al., 1995; Tutelian et al., 2002). A Se deficit may occur in a variety of diseases, and its restoration can lead to normalizing the impaired functions of the body. Selenium has a specific therapeutic value. Se imbalance is associated with the pathogenesis of diseases going under the name of "Free radical diseases". Se is an essential trace element of body's antioxidant defenses against free radicals. (Avtsyn et al., 1991; Brumbaugh and Walther, 1991). Se is important for the normal activity of glutathione peroxidase. A trace element deficiency may affect the balance of pro- / antioxidant system, leading to weakening of antioxidant status and anti-cancer protection. The importance of Se for the normal develop-

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ICP Determination of Heavy Metals in Rose hip and Chamomile

Abstract

The heavy metals Pb, Zn, Cd and Ni were determined in samples of medicinal plants collected from the territory of Plovdiv Municipality. Sample preparation was carried by microwave system Mileston 1200 MEGA. In determining the amount of heavy metals in plant samples ICP - OES were used.

In determining the accuracy of the task, a certified Virginia Tobacco CTA-VTL-2 material was used.

The analytical results obtained from the investigated metals show higher concentrations than those recommended by the World Health Organization.

Key words: ICP - OES, Microwave mineralization, heavy metals, chamomile, rose hip

cines for safety reasons. One of the main reasons for monitoring levels of toxic metals in medicinal plants is that environmental pollution in recent years has increased dramatically. The sources of this pollution are quite diverse and range from agricultural to industrial (Gosslim et al., 2007). Thus, the monitoring of the content of heavy metals in medicinal plants is a promising tool for their characterization (Brown et al., 1992; Latorre et al., 1999).The monitoring is usually includes a variety of plant species that are able to take in and absorb toxic substances, such as: moss, pine needles, dandelion, chamomile, rose hip, nettle, St. John's wort, black poplar and others. (Ingermann et al., 1997; Simon et al., 2004).

Overall, the most widely used techniques for the

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Product Quality and Safety

Use of nearinfrared spectroscopy technology with a remote reflectance fibre-optic probe for predicting of trace elements contents in tobacco

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Abstract. *The purpose of this study is to analyze the content of trace element contents in tobacco by nearinfrared spectroscopy (NIRS) technology together with a remote reflectance fibre-optic probe. The method allows immediate analysis of the tobacco without prior sample treatment or destruction through direct application of the fibre-optic probe on ground samples. The calibration results obtained using samples of tobacco allowed the determination of Pb, Cd, Cu, Fe, Mn and Zn, with a standard error of prediction (SEC (P)) and a correlation coefficient (RSQ) expressed in mg.kg-1 of tobacco of 1.68 and 0.954 for Pb, 1.05 and 0.860 for Cd, 12.69 and 0.902 for Cu, 16.67 and 0.68 for Fe, 59.96 and 0.737 for Mn and of 12.14 and 0.869 for Zn, respectively. The prediction capacity of the model and the robustness of the method were checked in the external validation of sertified referent material of Virginia tobacco(CTA-VTL-2) which do not belong to the calibration group. Based on the results, it can be concluded that NIRS technology is an appropriate method for determining the concentration of Pb, Cd and Mn in tobacco.*

Keywords: nearinfrared spectroscopy, trace element contents (Pb, Cd, Cu, Fe, Mn and Zn), tobacco variable.

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COMPARISON OF DIGESTION METHODS FOR ICP DETERMINATION OF TOTAL PHOSPHOROUS IN PLANT MATERIALS

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ABSTRACT

A comparative study of the most commonly used methods for sample preparation for ICP determination of the content of total phosphorus and sulfur in plant materials was performed on the basis of reference material CTA-VTL-2 (Virginia tobacco leaves). The methods used in the study were evaluated according to the recovery of total phosphorus and sulfur, ease of application and rapidity of performance. It was found out that microwave digestion is the most suitable method for sample preparation for simultaneous determination of phosphorus and sulfur by ICP in plant material. Dry ashing is not suitable because of the considerable losses of sulfur during thermal processing of the material in open vessels. The investigation revealed high correlation between colorimetric and ICP methods for total phosphorus determination, with results generally differing within 5 to 10 %.

Key words: tobacco, digestion methods, total phosphorus and sulfur, ICP, colorimetric methods

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Ефикасност на химичната борба срещу намножаването на Памуковата листна въшка (*Aphis gossypii* Glover)

Efficacy of Chemical Control against Multiplication of Cotton aphid (*Aphis gossypii* Glover)

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Abstract

Cotton aphid (*Aphis gossypii* Glover) is one of the most dangerous cotton pests. Its emergence and multiplication in cotton crops is determined by environmental conditions, regulatory control factors and human activity. It is adaptable to the developed conditions by three aberrations (black, green and yellow), having different characteristics to the abiotic factors and the applied chemical means of control.

The studies were conducted during the period 2002 – 2009 at the Institute of field crops – Chirpan and in the cotton fields near Merichleri city and Trakiya village.

According to the biological observations the established dependence of the species emergence and development in cotton agrocenosis at different phenophases of cotton, as well as honeydew formation determine the selection, of the approved chemicals.

Key words: cotton, aberrations in cotton aphid, temperature periods during which it develops and applied insecticides selection pressure

Determining the relationship between the dielectric properties and the basic physical and chemical parameters of the air-dry soil

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Abstract- Measurements of the electric conductivity, σ, and relative dielectric permittivity, ε_r, were conducted (0.1Hz –15 MHz) on 40 air-dried soil samples that were subsequently analyzed for pH, total organic matter in soil ($\Delta M/m_t$), P_2O_5, , Fe_2O_3 and heavy metal concentrations (Pb, Cd, Cr, Ni, Cu и Zn). The pH of soil samples varied between pH 5.25 and pH 7.73 (mean pH 6.71), the $\Delta M/m_t$ varied between 1,49 % and 9.96 % (mean 4.56 %). The mean content of Fe_2O_3 was 44352.5 mg/kg, which was 114 fold higher than the mean concentration of the heavy metals (Pb, Cd, Cr, Ni, Cu и Zn). The mean content of P_2O_5 was 0.26% . We found a linear relation between σ (1 MHz) and the indicated physicochemical parameters; P_2O_5 (coefficient of correlation, r = 0.637), pH (R = 0.530), Fe_2O_3 concentration (r = 0.450), content of $\Delta M/m_t$ (r = 0.545) and heavy metal concentration (r = 0.460). Similar relationships and correlation coefficients were found between ε_r (10 kHz) and the same physicochemical parameters. As the latter represent general biogeochemical parameters, our findings suggest that dielectric spectroscopy may provide useful approach to probing soil geochemistry, iron cycling and anaerobic microbial activity. Furthermore, our results yield insights into the impact of various physicochemical parameters on the induced polarization of soils.

Index Terms- Dielectric spectroscopy, Soil, Conductivity, Relative permittivity, Total content of heavy metals (Pb, Cd, Cr, Ni, Cu и Zn), Total organic matter ($\Delta M/m_t$)

and organic carbon content. Results of physical and chemical tests provide information about the capacity of soil to supply mineral nutrients. Martin C. et al. [5] have shown that the electrical conductivity of soil water is a good indicator for absorbing the amount of nutrients available for crops.

Bell R. W. and Dell B. [6] demonstrated that the deficiency of nutrients has become major constraint to productivity, stability and sustainability of soils. The status of available micronutrients in soils and their relationship with various physico-chemical properties have been attempted by several investigators [7,8,9]. Avnimelech Y. et al. [10] estimated the organic content and bulk density of flooded mineral soils and found that the sediment bulk density was inversely related to the organic carbon concentration. The measurements of dielectric constant of soils as a function of moisture content over wide microwave frequency range were carried out in the past by many investigators [10-17]. These investigators have used soils covering different parts all over world and with different texture/structures. Almost all these investigators have concluded that the dielectric constant of soils is strongly dependent on moisture content. Further, Sami S. [19] has reported the effect of chemical and mineral composition of dust on dielectric constant. Srivastava S. K. and Mishra G. P. [13] studied the characteristics of soils of Chhatisgarh at X – band frequency and showed the dependence of dielectric constant of soils on their texture. Calla O. P. N. et al. [20] have studied the variability of dielectric constant of dry soil with its physical constituents at microwave frequencies. Dawood N. K. et al. [21]

Efficient pest control of Pollen beetle (*Meligethes aeneus F.*) and possibilities for protecting the pollinators in oilseed rape agrocenosis

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Abstract- Pollen beetle (*Meligethes aeneus F.*) is a damaging pest of oilseed rape. Its harmful activity directly threatens the production and in some years it could compromise the yield. In many cases, the products applied in pest control, turn to be less efficient due to the conditions under which they are applied and the restricted application regime. In order to avoid the development of resistance, it is necessary to use insecticides having different mechanisms of action, which continue for a long enough period of time, with the aim of limiting the application of chemical substances and protecting natural pollinators and bees. There is a combination of chemicals for a good control of Pollen beetle (*M.aeneus*). Knowing the mechanism of their action and their proper combination enables the increase of their efficiency. For achieving that, the insecticide activity of the chemical compounds indoxacarb, deltamethrin + thiacloprid and thiacloprid in the commercial products Avaunt 150 EC, Proteus 110 OD and Calypso 480 SC, applied separately and in a combination with the adjuvant Codacide (95% rape oil + 5% plant emulsifier), was studied.

The results obtained showed that the product Avaunt 150 EC combined with the adjuvant Codacide, applied at the rate of 200 ml/da, provided an adequate protection against pollen beetle at the buttoning and flowering stages of oilseed rape, allowing the preservation of natural pollinators and providing an efficient pest control.

Index Terms- pollen beetle, chemical control, pollinators.

flowering stage of the oilseed rape and the migration of the pollen beetle, it is often necessary to apply two treatments: the first one during the buttoning stage and the second one in the beginning of the flowering stage [16].

Synthetic pyrethroids and neonicotinoids are usually used in the fight against the pollen beetle [17]. According to some authors Derron et al., [18]; Hansen, [19-20]; Wegorek, [17]; Muller et al., [21]; Glattkowski et al., [22], this pest has rapidly developed resistance to most of the active substances.

In his studies, Hansen [19] examines the resistance of the pollen beetle to synthetic pyrethroids: tau-fluvalinate, lambda-cyhalothrin, esfenvalerate and dimethoate. The conducted surveys show that the beetles survive up to 99% of the standard doses of the synthetic pyrethroids and up to 36% of dimethoate. Neonicotinoids are among the most widely used insecticides in the world but the European Food Safety Agency restricted the use of some compounds of this class owing to the potential risk for the pollinators and the empty hive syndrome „Colony Collapse Disorder".

The studies conducted in Europe in the 90s prove that the neonicotinoid remains can accumulate in the pollen and the nectar of the treated plants and pose a potential risk to the pollinators [23].

Temmekes [24] has established that the neonicotinoids pass through the entire plant and reach the nectar and the pollen but also accumulate in the soil and the underground water. They have a negative effect not only on the insects that feed on the plant but also on those that pollinate it.

Biological thresholds of weeds to seedlingless growing of tomatoes

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Abstract- To establish the weed thresholds of injury to seedlingless growing of tomatoes a field trial was carried out in the conditions of artificial weed infestation, and variants of particular types of weeds with particular density were tested. The trial recorded weed infestation, growth, development and productivity of tomatoes, content of soil humidity and soil nutrients. It was established that at equal number of weeds per area unit, most nitrogen was consumed by *Chenopodium album* L. and *Solanum nigrum* L., phosphorus – *Datura stramonium* L., and potassium – *Solanum nigrum* L., *Chenopodium album* L. and *Echinochloa crus-galli* L. The strongest tomato competitor for water was *Solanum nigrum* L., and the weakest – *Setaria veridis* P.B. The highest injury levels were manifested by *Datura stramonium* L. and *Solanum nigrum* L. and the biological threshold of injury levels for these weeds was 1 per m^2. *Echinochloa crus-galli* L., *Amaranthus retroflexus* L. and *Chenopodium album* L. had lower injury levels, and the biological threshold of injury for them was 2 per m^2. *Setaria veridis* P.B. manifested the lowest injury level. Its biological threshold was 4 per m^2.

Index Terms- Tomatoes, Biological thresholds, Weeds, Injury levels

critical period of weed infestation is between the 15th and 60th day after sowing or the phase of 1st, 3rd triple leaf [4,5]. The competition between weeds and beans is strongest in the period between emergence and second triple leaf of the crop [6]. The weeds have the greatest impact on broad beans in the period 28-30 days after its emergence [7]. The black nightshade has the strongest effect on peas in the period from four to six weeks after sowing [8]. The critical period of competition between the weeds and tomatoes is about 12 days (from 24th to 36th day) after planting the tomatoes [9], and acording other studies the critical period of weed infestation covers the period from 35th to 60th days after tomatoes sowing and its duration depends on the variety [10]. The economical threshold of injury to growing tomatoes for Redroot pigweed is over 1 per m^2, and for cockspur grass it is over 5 per m^2 [11], whereas the biological threshold of injury of black nightshade according to other authors is 0.8 per m^2 of weed plants [12]. In garlic growing, the weeds which developed between the 28th and 49th day of crop emergence affect yield formation the greatest [13]. It was established that fertilization with higher rates of phosphorus fertilizers delays the beginning of the critical period of competition between weeds and lettuce [14]. It is typical for most of the research which cover the injury thresholds and the critical periods of competition

Evaluation of the herbicide treatment on two common wheat varieties on the basis of mathematical-statistical analysis

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Abstract- A field experiment with two varieties of common wheat was conducted during the period 2012 - 2014 in the training experimental terrain at Trakiya University of Stara Zagora. An assessment of the impact of treatment's different options on yield in common wheat variety "Enola" and "Iliko" was made with a two-factor analysis of variance. The effect of the treatment of herbicides was as follows: Axial one (pinoxaden + florasulam) - 1000; Axial 050 EC (pinoxaden) - 900 ml.ha^{-1}; Traksos 045 EC (pinoxaden + clodinafop) - 1200 ml.ha^{-1}; Logran 20 WG (triasulfuron) - 37.5 g.ha^{-1}; Lintur 70 WG (triasulfuron + dicamba) - 150 g.ha^{-1}.

With a high degree of confidence, it was established a statistically significant influence on the grain yield indicator, on the factor "variety", followed by the treatment options.

It was made an assessment of similarity and distance of the different options' influence on the wheat treatment (varieties "Enola" and "Iliko") and their grouping, based on main biometric identifiers by applying cluster analysis. Classification and grouping options are made by hierarchical cluster analysis, which allows the increase of the objectivity in evaluating the complex impact of the options of treatment on the structural elements of the two wheat varieties.

Index Terms- Herbicides, Wheat varieties, ANOVA, Cluster analysis, Dendrogram

is crucial for the efficiency of grain production. The proper variety structure, depending on the specific agro-ecological conditions of the region, can significantly increase yields and quality of production [1-3]. Yields and their structural elements are strongly influenced by the conditions of the year and the plasticity of the variety, considered [4].

Weeds control is an essential element of the complex agronomic techniques. Herbicides are the primary factor in modern integrated technologies for weeds control. Obtaining high yields of agricultural crops is impossible without their use [5-8].

The aim of the study is to assess the effect of the treatment on the yield in common wheat varieties "Enola" and "Illico".

II. MATERIALS AND METHODS

Filed study was conducted in the period 2013-2014, in the area of the training experimental field of Faculty of Agriculture, Trakia University, Stara Zagora. The soil type was characterized as a typical meadow-cinnamon soil. The profile power was 103-105 cm, with well-defined horizons. The humus horizon was clear and had a range 0-50 cm. According to the mechanical composition, the soil was sandy loam. The soil supply with organic and mineral substances in the layer 0-30 cm is reflected in Table 1.

Stability and technological value of common wheat varieties Enola, Illico and Ingenio treated with herbicide mixtures

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Abstract- The research was conducted during 2011 - 2013 in the experimental field of the Department of Plant Production in Agriculture Faculty at Trakia University. Stara Zagora. The field experiment was performed with three varieties of common wheat: Enola, Illico and Ingenio. The objective is to determine the influence of the imported herbicide formulations on the performance of common wheat and determination of the most valuable technological options regarding the stability of the yield. Variants of the experiment are as follows: 1. Control - no treatment with herbicides; 2. Axial one - 1000 ml.ha^{-1}; 3. Lintur + Traksos 150 g.ha^{-1} + 1200 ml.ha^{-1} - tank mixture; 4. Logran + Traksos 37.5 g.ha^{-1} + 1200 ml.ha^{-1} - tank mixture; 5. Lintur + Axial 150 g.ha^{-1} + 900 ml.ha^{-1} - tank mixture; 6. Logran + Axial 37.5 g.ha^{-1} + 900 ml.ha^{-1} - tank mixture; 7. Lintur + Axial 150 g.ha^{-1} + 600 ml.ha^{-1} - separate treatment;8. Lintur + Traksos 150 g.ha^{-1} + 1200 ml.ha^{-1} - separate treatment; 9. Logran + Axial 37.5 g.ha^{-1} + 600 ml.ha^{-1} - separate treatment.10. Logran + Traksos 37.5 g.ha^{-1} + 1200 ml.ha^{-1} - separate treatment. Synthesis criterion for stability YSi by Kang taking into account both the stability and value of production, shows that in terms of technology growing, technologically the most valuable is the variant of decoupling Lintur + Axial (10+). Axial one herbicide was highly complex assessment (11+) for technological stability of yields. In varieties Illico and Ingenio most technologically valuable options appear involving herbicide Axial one (12+) and separately imported Lintur + Axial (5+).

Index Terms- common wheat, herbicides, grain yield, stability

Several studies have examined the influence of individual factors to agriculture couples. Tillage, weeding levels and types, climatic conditions, the sowing and sowing rate, balanced fertilization create conditions for well trimmed and competitive crops against weeds [5-11].

The application of herbicides in wheat is one of the most important moments in her agrotechnics [11- 18]. Weeds are a major limiting factor for grain production in the world and in our country. Successful and effective fight against them in wheat can be relied upon after a detailed and comprehensive survey of the areas and predicting species diversity of weed background.

The aim of this study was to investigate the influence of imported herbicides and herbicide mixtures on productivity of three varieties of common wheat and identification of the most valuable technological options regarding the stability of yields.

II. MATERIALS AND METHODS

Field experimental study was conducted in the experimental field of the Department of Crop, Faculty of Agriculture, Trakia University. In the period 2011-2013 was set experience with three varieties of common wheat - Enola, Illico and Ingenio. The soil type in the experimental field is characterized by typical meadow cinnamonnnic soil. The power of the humus horizon in this soil type varies widely from 30 cm to 75 cm. Meadow cinnamonnnic soil is characterized by slightly acidic soil solution. Climatically, the area of the field study falls within the climatic region of Central and Eastern Bulgaria, European continental climatic region and continental sub it. The main agro-

Сайт за обучение по Photoshop

Недялко Катранджиев, Катя Кошлукова, Лилко Доспатлиев

За подпомагане обучението на студентите по предмета Компютърна графика и дизайн за частта обработка на растерна графика е създаден сайт за обучение по програмата Photoshop. Терминът растерна графика или битмап означава структура от данни, показваща изображенията като съвкупност от точки (пиксели). Този сайт може да послужи и на всички, които желаят да обогатят познанията си по най-използваната в света програма за обработка на растерна графика (съвкупност от точки подредени в правоъгълна матрица).

Website for teaching Photoshop program

Nedyalko Katrandzhiev, Katya Koshlukova, Lilko Dospatliev

A Website for teaching Photoshop program has been made in order to support students' tuition of the subject "Computer graphics and design", particularly for raster graphics (bitmap). In computer graphics, a raster graphics image or bitmap is a data structure representing a generally rectangular grid of pixels, or points of color. The website can be useful for everyone who wants to enrich his knowledge for the world's most used program for raster graphics processing.

Въведение

История на програмата Photoshop

През 1987 г. Томас Кнол, докторант в университета в Мичиган, започва да пише програма на своя Макинтош за изобразяване на картини в сивата гама на монохромен дисплей. Тази програма, наречена Display, заинтригува брат му Джон Кнол, работник в Индъстриъл Лайт Енд Меджик, който предлага на Томас да я превърне в цялостна програма за редакция на образи. През 1988 г. Томас си взима шестмесечна почивка от проучванията си, за да работи заедно с брат си върху програмата, която е преименувана на ImagePro. По-късно същата година Томас преименува програмата си на Photoshop и сключва краткосрочен договор с производителя на скенери Barneyscan. Фирмата закупила 200 копия на програмата, които продавали като добавка към скенерите си. В това време Джон представя програмата на инженери от Apple Computer Inc. и на Ръсел Браун, художествен директор в Adobe[1]. И двете демонстрации са успешни и Adobe решават да закупят разрешителното за производство през септември 1988 г. Докато Джон работи по

Сайт за обучение по CorelDRAW

Недялко Катранджиев, Атанас Ников, Липко Доспатлиев

CorelDRAW е програма за рисуване, основана на векторната графика. Когато даден обект се рисува върху страницата на CorelDRAW неговата форма се определя от математически формули. За разлика от програмите за растерна графика при CorelDRAW в процеса на мащабиране на обекта, качеството се запазва и размера на файла не се променя с промяна на големината на изображението, което се явява основно предимство на програмата.

Website for teaching CorelDRAW program

Nedyalko Katrandzhiev, Atanas Nikov, Lilko Dospatliev

CorelDraw is a drawing program based on vector graphics. When a certain object is being drawn on CorelDraw page his shape of the object is determined by mathematical equations. Unlike the programs for raster graphics, CorelDraw saves file's quality and size while changing the size of the picture in the process of object scaling.

Въведение

История на програмата CorelDRAW

CorelDRAW е разработена от канадската корпорация Корел (Corel[1] Corporation), която е базирана в град Отава, Канада. Това е само една от програмите на Corel, но с годините тя се е наложила като основна пред другите им програми: Corel PHOTO-PAINT, Corel TRACE, Corel CAPTURE, Corel R.A.V.E., Corel Ventura, Corel PAINTER, Corel PDF Fusion, Corel VideoStudio, Corel WinDVD, Corel DESIGNER, Corel WordPerfect Office, Corel CAD, Corel WinZip и др. През януари 1989 год. е създадена първата версия на CorelDRAW!. Това е първият графичен програмен продукт за Windows. Развитието на програмата накратко е проследено в таблица 1. Повече информация може да намерите на създадения сайт на адрес: **http://www.sundybg.com/coreldraw.**

Развитие на програмата CorelDRAW!

Таблица 1

Версия	Дата	Информация за версията
-1-	-2-	-3-
1	01.1989 г.	Революция в индустрията на графичният дизайн. Появява се първият графичен програмен продукт за Windows!
1.11	02.1990 г.	Добавя се входно-изходен файлов формат DXF за AutoCAD.

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POLARITY INDEX: A MEASURE FOR THE DESTABILIZATION EFFECT OF ORGANIC SOLUTES ON ERYTHROCYTE MEMBRANE PROTEINS

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ABSTRACT

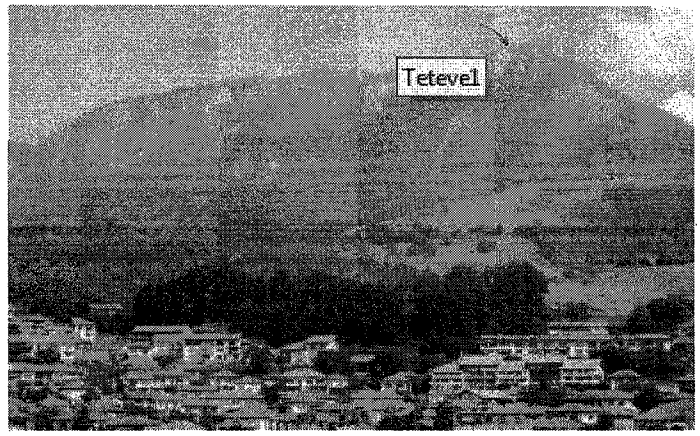
Cytotoxicities of thymol, diethyl maleate, pentanol, ethyl acetate, phenol, butanol, propanol, 2,6-difluoropyridine, pyridine, acetone, ethanol, methanol, N-methylformamide, dimethyl formamide, ethylene glycol, dimethyl sulfoxide, and formamide were assessed by their molar activity to decrease the structural stability of erythrocyte membrane proteins, intrinsic (anion exchanger) and pheripheral (fibrillar spectrin). The denaturation temperatures of these proteins, T_{int} and T_{sp}, respectively, were detected by thermal analysis of erythrocyte suspension admittance. At a molar concentration, C_{ex}, of the solvent these temperatures linearly decreased by ΔT_{int} and ΔT_{sp}. The molar activity of solvent to destabilize these proteins were defined as $k_{int} = \Delta T_{int}/C_{ex}$ and $k_{sp} = \Delta T_{sp}/C_{ex}$, respectively. k_{int} and k_{sp} decreased as the Snyder's polarity index, P', of solvents increased. In semi-log plot the k_{int} and apparently k_{sp} decreased linearly within the entire scale of P'. The relative destabilization strength, k_{sp}/k_{int}, of solvents apparently changed linearly from 0 to 1, when P' changed from 0 to 9. The only exception was formamide, which had normal k_{int} value and extremely high value of $k_{sp}/k_{int} = 3.4$. This highly selective and powerful strength of formamide to destabilize spectrin could be used to design a medicine capable of specifically affecting the under-membrane network of cancer cells.

Key words: cryopreservation, vitrification solution, enzyme stability, spectrin, band3 protein, impedance

Данни за металургична дейност през античността на връх Трескавец, Тетевенско

Иван Танев Иванов, Лилко Каменов Доспатлиев

През 2008 г. по проект, подкрепен от Община Тетевен, бяха направени опасителни археологически разкопки и проучвания на обект, намиращ се на връх Трескавец. Върхът се намира на около 3 км по права линия северно от центъра на град Тетевен и има височина 1151 м. Той има издължена форма с тясно и дълго било ориентирано в посока запад-изток, като обектът се намира в най-източната му част (Обр. 1). Билото на върха има обща площ около 220 дка и е обградено от всички страни със стръмни и високи до 100 м скали, като достъп до него има само посредством тесен проход в източната му част. Голямата височина и отсъствието на необходимите условия (почва, влагозадържане) правят безпредметно използването на върха за целите на земеделието.



Обр. 1. Изглед от град Тетевен и връх Трескавец в дъното. Мястото на разкопките на върха е посочено със стрелка.

USE OF NEARINFRARED SPECTROSCOPY TECHNOLOGY FOR ASSESSMENT OF THE INTERNAL QUALITY OF SOME FRUITS AND VEGETABLES. REVIEW

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ABSTRACT

The purpose of this review is to classify the received NIRS results on assessment of the internal quality of some fruits and vegetables (particularly apples, peaches and potatoes) on the following criteria: Products; Quality index; Informative wavelength(λ - nm); Measurement mode and Literature source.

Keywords: *nearinfrared spectroscopy, assessment of the internal quality, fruits and vegetables*

Abbreviations: near infrared (NIR); nearinfrared spectroscopy(NIRS); soluble solids content (SSC); alcohol insoluble solids (AIS); reflectance (R); transmittance (T); visual spectral regions (VIS), standard error of prediction (SEC (P)); multiple correlation coefficient (RSQ); partial least-squares (PLS) ; principal component regression (PCR); standard error of cross-validation (SECV); standard normal variable (SNV); dry matter content (DM).

STUDY OF Pb AND Cd CONTENT OF CHEPELARE RIVER WATER

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ABSTRACT

The aim of this study is to perform an analysis of the River Chepelarska water content of Pb and Cd. Sampling was carried out during the period 2010-2013 year. Samples were taken at three places along the river from the fount to the outfall of Maritsa River. The sampling places determination was based on pollution sources at the area of Chepelare River. The sampling was performed near to the emitters approved by Plovdiv Water Agency. The analysis for the presence of heavy metals (Pb and Cd) showed that at place 1 and 2 were not exceeded concentrations of Pb according the Average annual value (AAV) of the Environmental quality standards (EQS) for 2013. At place 3 there was an amount of 0,010018 mg/dm^3 that was more than the AAV of the EQS for 2011 (0,00015 mg/dm^3). No excess of Cd was proven at place 1 compared to the AAV of the EQS for 2013. For the period 2011-2012 compared to the standard (0,00015 mg/dm^3) the amount of both heavy metals was excessive, respectively 0,00041 mg/dm^3 Pb and 0,000798 mg/dm^3 Cd. The reason was a breakthrough in tailing pod of the mining company GORUBSO-Lucky.

Key words: Pb, Cd, content, water

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CORRELATION BETWEEN SOME SOIL CHARACHTERISTICS AND CONTENT OF Mn IN ROOTS AND ABOVEGROUND PARTS OF THE VIRGINIA TOBACCO

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Abstract

The study was conducted on alluvial-meadow, maroon-forest soils and vertisols with Virginia tobacco. The total content of Mn is measured through decomposition by HF, $HClO_4$ and HNO_3 acids. A solution of 0.005M DTPA + 0.1M TEA, pH 7.3 was used for extraction of the Mn mobile forms from soils. The preparation of plant samples was made by means of dry ashing and dissolution in 3 M HCl. An atomic-absorption spectrometer "Spektra AA 220" of the Australian company Varian was used for determination of Mn content in the soil and plant samples A correlation-regression analysis was conducted between pH, humus content, total and mobile forms of Mn in soil, as well as the concentration of this element in roots and aboveground biomass of tobacco of the Virginia variety group. It was determined that manganese content was lowest in stems and highest in leaves. The roots and blossoms took intermediate position regarding the element accumulation. pH reduction led to increased element concentration in tobacco plants. Statistically significant regression dependencies with variable degree of correlation were determined between pH of soil and Mn content in the vegetative and reproductive organs of Virginia tobacco. Linear, positive, statistically significant relations were determined between the mobile manganese content in soil and the element concentration in roots and leaves of the lower and medium zone.

Key words: *Mn, uptake, Virginia tobacco*

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ОЦЕНКА НА СЪДЪРЖАНИЕТО НА МАКРОЕЛЕМЕНТИ И ТЯХНОТО СЪОТНОШЕНИЕ В ТРЕВНИ ПЛОЩИ ОТ ПЛАНИНСКИ ПАСИЩА

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ESTIMATE OF MACROELEMENT CONTENT AND THEIR RECIPROCAL RATIOS IN MOUNTAIN GRASSLAND

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РЕЗЮМЕ

Целта на проучването бе да се оцени качеството на тревните площи на планинските пасища в община Смолян, Южна България, въз основа на съдържанието и количествените съотношения между макроелементите. Пасищата показват ниско съдържание на Na и Ca, което подсказва ниското ниво на торене. В 50% от пробите има оптимално съдържание на Mg, 85% - изискват P торене, 6% показват оптимално ниво на Ca и всички проби съдържат изключително ниски нива на Na.

Количественото съотношение между елементите K: (Ca + Mg) (известно в литературата като GT индекс) и съотношението на масите на K:Mg показват не добро качество на тревата в резултат на относителното ниско съдържание на K.

Съотношението между масите на Ca:P в повечето проби значително се отклонява от оптималното поради ниското съдържание на Ca и е резултат от високата почвената киселинност.

SUMMARY

The aim of the study was to estimate quality of grassland sward from the mountain Smolyan Municipality, Southern Bulgaria, on the basis of content and quantitative relations between macroelements.

Grassland sward showed low N and Ca contents which pointed to low level of fertilization.

The 50% of samples had optimal Mg content, 85% - required P amount, 6 % showed optimal Ca level and all samples contained extremely low Na. Mass Ca:P and Ca:Mg ratios in majority of sward samples notably deviated from the optimum because of low Ca content resulted from high soil acidity.

Quantity K:(Ca+Mg) ratio(known in specialized literature as GT index) and mass K:Mg ratio showed unsuitable quality of sward as a result of relatively low K content. Mass K:Ca ratio in about

INHERITANCE OF THE SIZES OF LEAVES IN BURLEY AND VIRGINIA TOBACCO HYBRID COMBINATIONS. II. WIDTH OF LEAVES

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ABSTRACT

The comparative analysis on the inheritance parameters (inheritability coefficient, expressions of heterosis and transgression) are made. There are investigate the width of the leves in two populations and two generation of seven hybrid combination on local and introduced varieties tobacco Burley and Virginia. The results showed that in a hybrid combination of Burley and Virginia tobacco, inheritance of the width of leaves is overdominantly or semidominantly in the direction of the parent with the higher values of research sign. Acts of heterosis and transgression in Burley tobacco are more pronounced than in Virginia tobacco. Virginia tobacco show greater number of genes affecting the expression of the width of the leaves, which makes this type of tobacco difficult for the selection. Obtained low coefficient of heritability in Burley tobacco, and in such medium in Virginia tobacco, which indicates that the selection in Virginia tobacco with respect to the width of the leaves may be started in earlier hybrid generations in comparison with Burley tobacco.

Keywords: *tobacco, hybridological analysis, heraditability, heterosis, width of leaves*