INFLUENCE OF DIFFERENT FERTILIZATION LEVEL OF ZINC SULPHATE AND PLANT DENSITY ON THE BREAKAGE SUSCEPTIBILITY OF TRITICALE SEEDS

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ABSTRACT. In order to determine the effects of different fertilization level of zinc sulphate and plant density on the breakage susceptibility of triticale seeds an experiment was conducted during 2011 growing season, at the experimental research station of Lorestan University, Iran. A factorial experiment was conducted with 3×3 treatments and three replications in a completely randomized block design (CRBD). Factors included three plant densities (200, 300 and 400 plants/m²) and three levels of zinc sulphate (0 - control, 40 and 60 kg/ha). The harvested seeds were then subjected to impact energies of 0.05 and 0.1 J at constant moisture content of 15% using an impact test apparatus. The analysis of variance showed that fertilization level of zinc sulphate (at the 1% probability level), plant density (at the 5% level) and interaction between two variables (at the 5% level) significantly influenced breakage susceptibility of triticale seeds. The average values of percentage breakage of seeds decreased from 32.592 to 16.9268% as the fertilization level of zinc sulphate increased from 0 to 60kg/ha. As the plant density increased from 200 to 400 plants/m² the percentage breakage of seeds decreased from 27.942 to 21.350%. Increasin g the impact energy from 0.05 to 0.1 J caused an increase in the percentage breakage of seeds from 14.07 to 36.9%.

Key words: Triticale; Mechanical damage; Harvesting; Handling; Fertilization; Zinc sulphate; Plant density.

INVESTIGATION OF AVALANCHE TIME AND CARR’S INDEX OF POULTRY LITTER POWDER AS FLOWABILITY INDICES

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ABSTRACT. The world’s dependence on chemical fertilizer as the primary source for enriching agricultural fields is continually increasing that cause nature pollution. This has led researchers to aggressively investigate renewable fertilizer resources, biomass, to produce organic crops and reduced wastage. Poultry litter is a bulk solid and biomass feed stocks. Flow behavior of bulk solid is a critical factor in designing and developing suitable equipments (e.g. pelletizing machine). The bulk density, tap density, Carr’s index and powder avalanche time technique were applied to evaluate the flow properties of poultry litter. The experiments were carried out at moisture content (10, 20 and 30% w.b.), particle size (0.3, 0.6 and 1.18 mm) for the bulk and tap densities as well as Carr’s index. In addition to the moisture content (10, 20 and 30 %w.b.) and particle size (0.3, 0.6 and 1.18 mm) the rotational speed of drum (0.5, 1 and1.5 rpm) were also investigated for the avalanche time. The results showed that with increasing moisture content Carr’s index increased significantly (P<0.01) in the ranges of 16.2% to 18.5% and with increasing particle size the Carr’s index decreased from 20.35% to 14.78%. The litter powder avalanche time (AT) increased significantly (P<0.01) with increasing moisture content and decreasing rotational speed and particle size. The bulk and tap densities of the litter powder was decreased with increasing moisture content and increasing the particle size. The bulk and tap densities of the driest and finest poultry litter sample were higher than other ones.

Key words: Avalanche time; Compressibility index; Poultry litter; Flowability.
SOIL EROSION AND CONSERVATION MEASURES IN MOLDAVIAN PLATEAU

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ABSTRACT. The long-term experiments carried out at the Agricultural Research Station of Podu-Iloaiei, Iași County, Romania, tried to establish some fertilization systems for getting efficient yield increases, which maintain or increase the content of organic carbon from soil. These trials were set up on a 16% slope field, with a cambic Chernozem soil, which has a clayey-loam texture, a neuter to weakly acid response and a mean supply in nutrients. Analyzes performed on soil profiles after 44 years, on land with a slope of 16% and slope length of 310 m, shows that the entire length of slope soil fertility were very different, being influenced by processes of erosion and silting. Soil organic carbon, the depth of 0-20 cm, was between 45.94 t / ha, the foot slope and 27.45 t / ha in the mid-slope area with strong erosion. From the results obtained on erosion in different crop rotations, we have found out that in 16% slope fields from the Moldavian Plateau, soil losses by erosion were diminished below the allowable limit of 3-4 t/ha/year only in case of 4 year-crop rotations with two reserve fields, cultivated with legumes and perennial grasses, which protect soil. Annual soil losses by erosion, registered during the last 30 years, in the Moldavian Plateau, were between 0.246 t/ha in perennial grasses, on the second year of vegetation, and 8.976 t/ha in sunflower. The fertilization of wheat and maize crops at the rate of N80P80 + 60 t/ha manure has determined the increase with 5.5 t/ha (7.8%) in the content of organic carbon from soil, as compared to the rate of N140P100.

Key words: Soil erosion; Long-term fertilization; Organic carbon.

REZUMAT. Eroziunea solului și măsuri de conservare în Podișul Moldovei. Cercetări de lungă durată, efectuate la Stațiunea de Cercetări Agricole Podu-Iloaiei, județul Iași, au urmat stabilirea unor sisteme de fertilizare pentru a obține creșteri eficiente de producție și care mențin sau sporesc conținutul de carbon organic din sol. Aceste studii au fost stabilite pe un teren cu panta de 16%, cu un sol cernoziom cambic, care are o textură luto-argiloasă, un pH neutru spre slab acid și o aprovizionare mijlocie în substanțe nutritive. Analizele efectuate pe profilurile de sol după 44 de ani, pe un teren cu panta de 16% și lungimea versantului de 310 m, arată că, pe întreaga lungime a versantului, solurile au fertilitate foarte diferită, fiind influențate de procese de eroziune și colmatare. Cantitatea de carbon organic din sol, pe adancimea de 0-20 cm, a fost cuprinsă între 45.94 t / ha la baza pantei și 27.45 t/ha la mijlocul pantei, în zona cu eroziune puternică. Din rezultatele obținute privind eroziunea la diferite asolamente s-a constatat că, în condițiile terenurilor cu panta de 16% din Podișul Moldovei, reducerea pierderilor de sol prin eroziune sub limita „tolerabilă” de 3-4 t/ha/an se realizează numai în cazul asolamentelor de 4 ani, cu două sole sărătoare cu leguminoase și graminee perene, care protejează mai bine solul. Pierderile anuale de sol prin eroziune, înregistrate în ultimii 30 de ani în Podișul Moldovei, au fost cuprinse între 0.246 t / ha la ierburi perene, în al doilea an de vegetație, și 8.976 t / ha la floarea-soarelui. Fertilizarea culturilor de grâu și porumb, la rata de N80P80 + 60 t / ha gunoi de grajd, a determinat creșterea cu 5,5 t / ha (7,8%) în conținutul de carbon organic din sol, în comparație cu rata de N140P100.

Cuvinte cheie: eroziunea solului; fertilizare de lungă durată; carbon organic.
NATURAL OCCURRENCE OF DEOXYNIVALENOL AND OCHRATOXIN A IN CONVENTIONAL MAIZE HYBRIDS AND THEIR BIOSAFETY COMPARED WITH GM EQUIVALENTS

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ABSTRACT. Familiarity based approval of the newly developed GM cereal events is based upon the stable and safe consumption of conventional grains. The level of concentrations of mycotoxins and biomolecules establishes the criteria for pre-market evaluation of genetically modified cereals e.g. MON 810 maize. The objective of the present study was to comparatively evaluate food biosafety of the conventional and GM maize. Grain samples from the harvest lot of 10 maize hybrids in the year 2011 were collected arbitrarily. Well ground and homogenized samples were analysed for the deoxynivalenol (DON) and ochratoxin A (OTA) mycotoxins. Contamination rates and levels of DON and OTA were low and did not exceed the maximum levels, indicating their possible safe use as food and feed under the EC regulation 1881/2006. The samples were further analysed for the possible effect of mycotoxin concentration upon that of starch and proteins. The study reveals the absence of any negative impact of the presence of mycotoxins upon these biomolecules as their concentrations lie within the normal range. A comparative review of data for the mycotoxins in conventional maize grains invalidate the argument from the producers of GM maize hybrids that conventional hybrids are inferior for food biosafety with respect to mycotoxins.

Key words: Conventional maize; Deoxynivalenol; Ochratoxin A; Food biosafety.

REZUMAT. Frecvența naturală a deoxinivalenolului și a ochratoxinei A în hibrizii convenționali de porumb și biosecuritatea acestora, comparativ cu echivalente modificate genetic. Aprobarea apariției de noi cereale modificate genetic (MG) pe baza conceptului de familiaritate se bazează pe consumul stabil și sigur al cerealelor convenționale. Nivelul concentrațiilor de micotoxine și biomolecule stabilește criteriile de evaluare a cerealelor modificate genetic înainte de comercializarea acestora, de exemplu, apariția porumbului MON 810. Obiectivul prezentului studiu a fost de a evalua, comparativ, biosecuritatea alimentară a porumbului convențional și a celuilalt modificat genetic. Probele din lotul de 10 hibrizi de porumb din anul 2011 au fost colectate arbitrari. Probele, bine macinate și omogenizate, au fost analizate pentru a se evalua conținutul de micotoxine, deoxinivalenol (DON) și ochratoxina A (OTA). Ratele de contaminare și nivelurile de DON și OTA au fost reduse și nu au depășit nivelurile maxim admise, ceea ce indică posibilitatea de a fi folosite în siguranță ca hrană și nutreț, în conformitate cu regulamentul EC nr. 1881/2006. De asemenea, probele au fost analizate pentru a determina posibilul efect al concentrației de micotoxine asupra concentrației de amidon și proteine. Studiul relevă absența vreunui impact negativ al prezenței micotoxinelor asupra acestor biomolecule, concentrațiile acestora fiind la un nivel normal. O analiză comparativă a datelor privind micotoxinele din boabele de porumb convențional invalidizează argumentul producătorilor de hibrizi de porumb MG, care susțin că hibrizii convenționali sunt inferiori, din punct de vedere al micotoxinelor, pentru biosecuritatea alimentară.

Cuvinte cheie: porumb convențional; deoxinivalenol; ochratoxina A; biosecuritate alimentară.
RESPONSE OF CHICKPEA (*Cicer arietinum* L.) CULTIVARS TO NITROGEN APPLICATIONS AT VEGETATIVE AND REPRODUCTIVE STAGES

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**ABSTRACT.** A field experiment was conducted to study the effects of foliar spraying of aqueous solutions 2 and 4% urea at two stages (before and after flowering) and 20 kg/ha urea application in soil (three-week after sowing) on growth, yield and yield components of chickpea cultivars (Azad and ILC 482) under rain-fed conditions. Results showed that the plant height, height of lower pod and 100-seed weight were significantly affected by cultivars. Plant height of Azad cultivar was significantly higher than that of cv. ILC 482. There was no significantly difference between cv. Azad and cv. ILC482 on biological yield. Grain yield of cv. ILC 482 was 4.2% less than that of cv. Azad, however, this difference was not statistically significant. The interaction of urea application × cultivar for days to maturity and pods per plant was significant. Lowest days to maturity of Azad were achieved under 20 kg urea applications but for ILC482, it was recorded under 4% urea spraying before flowering. Urea spraying at before flowering of ILC 482 cause reduction in days to maturity, and lowest period was observed at this stage. The effect of urea treatment on plant height was notable but other traits were not significantly affected by nitrogen applications. Highest plant height was obtained by application of 20 kg/ha urea in soil. However, difference among 20 kg urea application, 2% and 4% urea spraying before flowering was not significant. It can be concluded that the nitrogen fertilizer applying in rain-fed chickpea is not effective. Consequently, unused nitrogen in the soil/or plant can cause soil and air pollution.

**Key words:** Chickpea; Nitrogen; Yield; Yield Components.

EFFECT OF NITROGEN ON GROWTH AND YIELD OF SORGHUM FORAGE (*Sorghum bicolor* (L.) Moench cv.) UNDER THREE CUTTINGS SYSTEM

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**ABSTRACT.** A field experiment was conducted on sorghum (*Sorghum bicolor* (L.) Moench cv.) under three cutting system to determine the effect of nitrogen on growth and yield at University of Agriculture Faisalabad, Pakistan, during the season 2010-2011. The experiment was laid out in Randomized Complete Block Design (RCBD), using three replications. There were four levels of nitrogen 0, 50, 75 and 100 kg N/acre in the form of urea. The growth parameters like plant height, number of leaves, leaf area is determined periodically. First reading taken after 20 days of sowing while second and third was taken after 15 days of first cutting. Yield parameter like plant population, fresh and dry weight was determined in three cuttings. Results showed that increasing nitrogen dose increased all growth attributes. Results revealed for first, second and third cuttings showed significant differences at all growth attributes. Thus, the maximum plant height was observed in N4 (100 kg N/acre), having plant height 193.92, 195.24 and 192.79 cm in first, second and third cutting, respectively, which was followed by the treatment N3 (75 kg N/acre), having 179.70 cm in first cutting, while second and third cutting have same plant height 168.62 cm. The exception was the plant population showed non significant behavior in second and third cutting while number of leaves per plant...
in second cutting only and protein % in third cutting showed non significant difference with nitrogen application.

**Key words:** Nitrogen; Growth; Green forage; Protein.

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**ABSTRACT.** These days, there are many types of chemicals which have ability to hasten the ripe fruit and affect the quality of fruits like calcium carbide, ethylene, acetylene, gibberellic acid. The objective of this research determines the influence of ethephon (2-chloroethyl phosphonic acid or ethrel) on the ripe acerolas (*Malpighia glabra* L.). Because the acerolas are the common fruit in Vietnam and another Asia countries, it had a lot of water and high nutrition, especially reducing sugars and acid ascorbic. The acerolas samples was soaked into ethephon solution at concentrations of 0, 1, 1.5, 2 and 2.5 % (v/v), then preserved in basket covered with cloth in conditions: temperature 30±1.4 °C, relative humidity 72±10 %. The use of specifications for evaluating were the percentage of ripe fruits, weight loss, the content of reducing sugar, total acidity and sensory evaluation of acerolas. The results showed that acerolas soaked into concentration of 2 % (v/v) ethephon have stimulated fruits that were the quick and uniform maturity; peel of acerolas was very smooth, red and characteristic flavour. Consumers are not unpleasant with the sensory evaluation quality of fruits soaked with ethephon. The ethephon residue in fruit after treatment did not harm in consumer’s health and it was absolutely suitable for the food law in Vietnam.

**Key words:** Ethephon; 2-chloroethyl phosphonic acid; Ethrel; Acerolas; Maturity.
GIS-AIDED ANALYSIS OF VINEYARDS DAMAGED BY WINTER FROSTS. CASE STUDY: COTNARI VINEYARD (ROMANIA)

L. IRIMIA, C.V. PATRICHE, H. QUÉNOL

ABSTRACT. Thermal regime of Cotnari vineyard, Iași County, Romania, was surveyed between 2011-2012 using 10 Tinytag temperature loggers TK-4014, spread in 10 different lands of the vineyard. Research is developed in the framework of the international project TERVICLIM (France), by means of was created a global network of analyses points of vineyard climate, spread in 13 countries from both hemispheres of the globe, at different latitudes. The data recorded by temperature loggers in Cotnari vineyard shows that in 2011-2012 winter, the minimum temperatures dropped to -28.6ºC, with differences of up to 7.1ºC between the coldest and the mildest lands of the vineyard. Spatial distribution of the most harmful frost (12 February 2012) shows that more than 80% from the vineyard area was exposed to temperatures lower than -24ºC, 17% to harmful temperatures between -21..-24ºC and 3% to temperatures between -18..-21ºC, less damaging to vines. As consequences, the damages in the vine plantations varied from less significant negative consequences for vines in the mildest location, up to massive losses of winter buds, damages of annual branches and frozen vines in the coldest land of the vineyard. Analytical data of winter buds losses spatial distribution shows that at -28.6ºC (absolute minimum temperature for the vineyard), 0.46% (7.29 ha) of vine plantations were exposed to vines losses, 3.81% of plantations to losses of annual branches, 62.49% from vine plantations to winter buds losses exceeding 40%, difficult to compensate by pruning, 13.5% to losses of winter buds exceeding 60%, requiring reestablishing the vegetative potential of vines. The only vine plantations protected by harmful frosts were those located at over 175 m altitude, in the highest lands of the vineyards.

Key words: Vines; Vineyard; Frost; Winter buds; Temperature loggers; GIS.

REZUMAT. Analiza asistată de Sistemul Informatic Geografic (SIG) a podgoriilor afectate de înghețuri. Studiu de caz: podgoria Cotnari, România. Regimul termic al podgoriei Cotnari a fost monitorizat în perioada 2011-2012 cu ajutorul a 10 senzori termici Tinytag TK-4014, amplasati în 10 locatii diferite din podgorie. Cercetarea se desfasoară în cadrul proiectului internațional TERVICLIM (Univ. Rennes 2, Franța), prin care s-a creat o rețea de monitorizare a climatului areal celor viticole cu puncte de observație în 20 de podgorii din 13 țări, situate la diferite latitudini, în ambele emisfere ale globului. Datele înregistrate de senzori termici Tinytag în podgoria Cotnari arată că, în iarna 2011-2012, temperaturile minime negative au coborât până la -28.6ºC (12 februarie 2012), cu diferențe de până la 7.1ºC între cel mai rece și cel mai puțin rece plai al podgoriei. Din analiza distribuției spațiale a gerului din data de 12 februarie 2012 rezultă că mai mult de 80% din plantațiile viticele ale podgoriei au fost expuse la temperaturi mai mici de -24ºC (dânătoare pentru lemnul multianual), 17% la temperaturi de -21..-24ºC (dânătoare pentru ochii de iarnă și lemnul anual) și 3% la temperaturi de -18..-21ºC (mai puțin dăunatoare pentru viața de vie). Ca urmare, daunele produse planțațiilor viticele au variat de la nesemnificative pe plaiurile cu climat blând, până la pierderi masive de ochi de iarnă, distrugerea prin înghet a coarcelor anuale și chiar distrugerea prin înghet a butucilor de viață de vie. Datele analitice privind distribuția spațială a daunelor provocate viaței de vie arată că, la temperatura de -28.6ºC (minima absolută din iarna 2011-2012), 0.46% (7.29 ha) din suprafața podgoriei a fost expusă distrugerii butucilor de viață de vie, 3.81% distrugerii coarcelor anuale, 62.49% pierderilor de muguri mai mari de 40%, dificil de compensat prin tăiere, 13.5% pierderilor de muguri care depășesc 60% și care impun refacerea butucilor de viață de vie. Singurele plantații ferite de înghețurile nocive din iarna 2011-2012 au fost cele situate la mai mult de 175 m altitudine.

Cuvinte cheie: butuci de viață de vie; podgorie; înghet; ochi de iarnă; senzori termici; SIG.
PHENOLIC COMPOUNDS IN MERLOT WINES OBTAINED THROUGH DIFFERENT TECHNOLOGIES IN IAŞI VINEYARD, ROMANIA

Şt. TUDOSE-SANDU-VILLE, V.V. COTEA, Cintia COLIBABA, B. NECHITA, M. NICULAUA, Maria CODREANU

ABSTRACT. Obtaining red quality wines depends on the raw matter composition and also on the extraction technology, used in the processing of grape and must. Thus, two methods of maceration-fermentation on lees (classical and in rotating tanks), two thermal methods (thermomaceration and microwave maceration) and two methods rarely used industrially in wine-making (cryomaceration and ultrasound maceration) were experimented. Even in the years with less than favorable climatic conditions, from Merlot grape variety one obtained for the most part, legally speaking, quality wines (with the exception of microwave macerated and cryomacerated wines, which had only 21–22 g/L non-reducing extract. In regard to alcohol content, all obtained samples had more than 11% vol. The obtained Merlot wines were rich in glycerol (8–9 g/L), fact that favorably influenced their organoleptic traits. Total phenolic content had values between 1,97 and 2,86 g/L for the Merlot wines obtained through maceration-fermentation and thermomaceration. Ultrasound maceration did not favor phenolic extraction from grape skins and the obtained wines were poor in anthocyanins and tannins (0,94–1,1 g/L). In regard to the maceration technology used, free anthocyanins were found in variable proportions in wines, between 77 and 91%. The sum of acylated anthocyanins participation percentages was between 8,8 and 22,7%, and the ratio between the acetylated and cumarilated participation percentages registered small values, variety-specific, between 1,1 and 2,8.

Key words: Merlot; Maceration; Polyphenols; Anthocyanins.

REZUMAT. Compuşi fenolici din vinurile Merlot, obţinute prin diferite procedee în podgoria Iaşi. Obţinerea vinurilor roşii de calitate depinde atât de compoziţia materiei prime, cât şi de tehnologia de extracţie, aplicată la prelucrarea strugurilor şi a musturilor. În acest scop, s-au experimentat două metode de macerare-fermentare pe boştină (clasică şi în cisterne rotative), două metode termice (macerarea cu microunde şi termomacerarea) şi două metode neimplementate pe scară largă în producţie (criomacerarea şi macerarea cu ultrasunete). Chiar şi în anii cu condiţiile climatice mai puţin favorabile, din soiul Merlot s-au obţinut vinuri de calitate, care întrunesc, în mare parte, condiţiile prevăzute în legislaţie, cu excepţia celor obţinute prin macerare cu microunde şi ultrasunete, care conţin numai 21–22 g/L extract sec nereducător. Sub aspectul conţinutului în alcool, la toate varianţele analizate s-au realizat mai mult de 11% vol. Vinurile obţinute din soiul Merlot au fost bogate în glicerol (8–9 g/L), ceea ce a influenţat favorabil însuşirile organoleptice ale acestora. Conţinutul în polifenoli totali a avut valori cuprinse între 1,97 şi 2,86 g/L la vinurile Merlot, obţinute prin macerare-fermentare şi termomacerare. Macerarea cu ultrasunete nu a favorizat extragerea compuşiilor fenolici din pietla boabelor, iar vinurile obţinute au fost sărace în antociani şi tanini (0,94–1,1 g/L). În funcţie de modalitatea de macerare, antocianii liberi s-au regăsit în vinuri în proporţii diferite, variabile între 77 şi 91%. Suma dintre proporţii de participare ale antocianilor acilăci s-a situat între 8,8 şi 22,7%, iar raportul dintre procentele de participare ale antocianilor acilăci şi cumarilaţi a înregistrat valori mici, specifice soiului, situate în intervalul 1,1–2,8.

Cuvinte cheie: Merlot; macerare; polifenoli; antociani.
IMMUNOSUPPRESSIVE ACTION OF DEOXYNIVALENOL OF THYMUS IN CHICKENS

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ABSTRACT. Deoxynivalenol (DON, vomitoxin) is a type $B$-trichothecene, naturally occurring contaminants of animal feed, being implicated in several mycotoxicooses in farm livestock. This mycotoxin occurs predominantly in grains such as wheat, barley, oats, rye, and maize, and less often in rice, sorghum, and triticale. Deoxynivalenol is potent nefrotoxic, hepatotoxic and immunosuppressant. High doses of trichothecenes promote rapid onset of leukocyte apoptosis (programmed cell death), which is manifested as immunosuppression. The study aimed to prove the immunosuppressant action of deoxynivalenol in chickens experimentally treated each day, from the 7th day of life, using 5.4 mg/kg b.w in E group for 28 days (since 35 days of life). Histopathology studies of thymus were made on 7th, 14th, 21st and 28th days of experiment. In E group small lesions of thymus were observed even after 7th day of poisoning but intense lesions, hydropic degeneration, necrotic foci and moderate lymphoid depletion was observed after the 14th and 21st day of poisoning. After 28th day a marked proliferation of stromal cells in the reticulum network, in medulla zone, presence of mucous cells, small mucous cysts and haemorages were observed.

Key words: Trichotecens; Broiler chickens; Immunosupression.

REZUMAT. Efectul imunosupresor al deoxinivalenolului asupra timusului la pui broiler. Deoxinivalenolul (DON, vomitoxină) face parte din categoria trichotecenelor de tip B, contaminanți naturali ai furajelor, implicați în producerea unor micotoxicoze la animalele de fermă. Aceste micotoxine se întâlnesc, predominant, în boabe de cereale, grâu, orz, ovăz, secări și porumb, mai rar în orez, sorg și triticale. Deoxinivalenolul este puternic nefrotoxic, hepatotoxic și imunosupresor. Dozele mari de trichothecene determină apoptoza rapidă (moartea celulară programată) a leucocitelor, manifestată prin imunodepresie. Studiul are ca scop demonstrarea efectului imunosupresor al deoxinivalenolului la pui broiler, tratați experimental cu DON, în doză de 5,4 mg/kg/zi, timp de 28 zile (de la vârsta de 7 zile până la 35 zile). S-au studiat leziunile histologice ale timusului prin sacrificarea randomizată a unor grupe de câte cinci pui în zilele a 7-a, a 14-a, a 21-a și a 28-a ale experimentului. La lotul experimental s-au observat ușoare leziuni ale timusului, începând din ziua a 7-a a intoxicației, dar acestea au devenit mult mai intense în a 14-a și a 21-a zi, constând în degenerare hidropică, focare necrotice și depleție limfoideală moderată. După cea de-a 28-a zi s-au constatat proliferarea marcantă a celulelor stromale reticulare și din zona medulară, prezența de celule mucoase, mici chiști mucoși și hemoragii.

Cuvinte cheie: deoxinivalenol; pui broiler; efect imunosupresor.