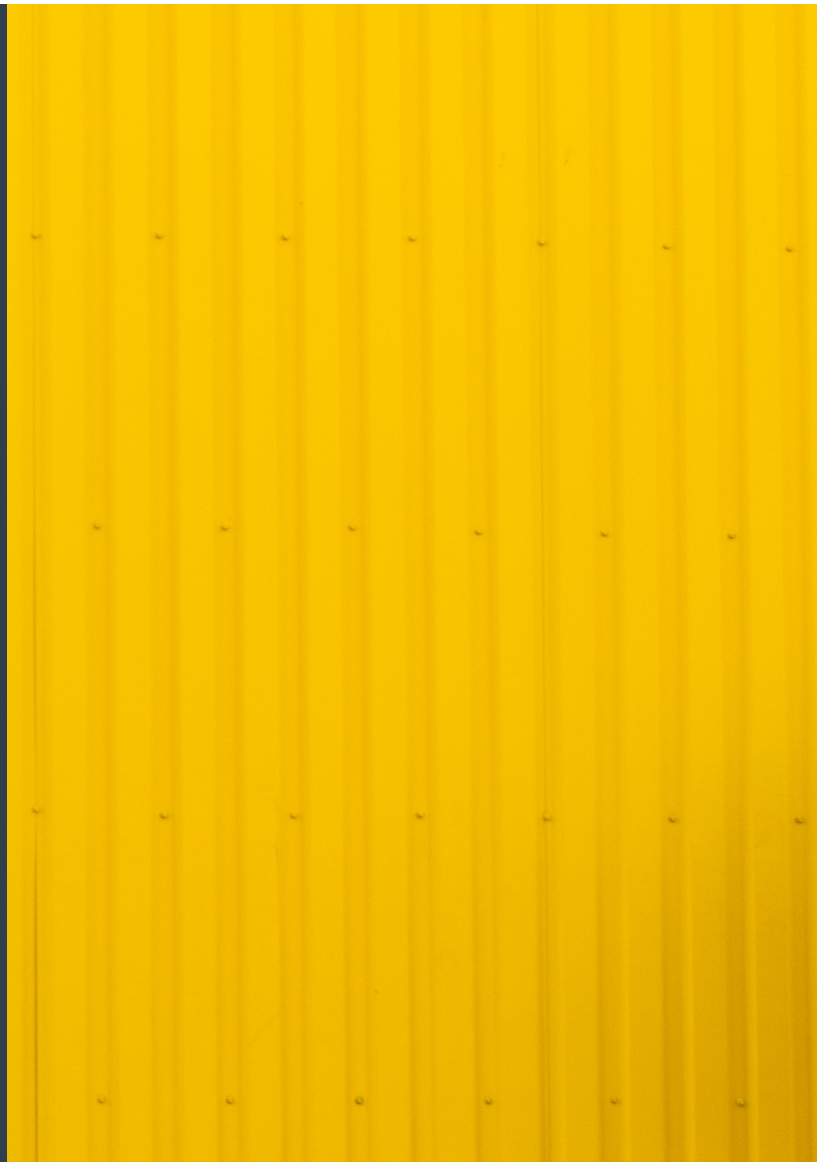
PROCEEDINGS BOOK

5. INTERNATIONAL GAP FOOD, AGRICULTURE AND VETERINARY SCIENCES CONGRESS

1-2 November 2021

Sanliurfa, TURKEY

Harran University Campus



EDITOR:

Assist. Prof. Dr. Muhammed Yasar DORTBUDAK

ISBN 978-625-7464-44-4

5. INTERNATIONAL GAP FOOD, AGRICULTURE AND VETERINARY SCIENCES CONGRESS

1-2 November 2021
Sanliurfa, TURKEY
Harran University Campus

PROCEEDINGS BOOK

Editor:
Assist. Prof. Dr. Muhammed Yaşar DÖRTBUDAK

All rights of this book belong to IKSAD GLOBAL-2021©.
Without permission can't be duplicate or copied.
Authors of chapters are responsible both ethically and juridically.

Issued: 21.11.2021

WWW.GAPZİRVESI.ORG
ISBN: 978-625-7464-44-4

CONGRESS ID

CONGRESS TITLE

5. International GAP FOOD, AGRICULTURE AND VETERINARY SCIENCES Congress

DATE AND PLACE

1-2 November 2021
Sanliurfa, TURKEY
Harran University Campus

ORGANIZATION

Harran University Campus & İKSAD

EVALUATION PROCESS

All applications have undergone a double-blind peer review process

PARTICIPATING COUNTRIES

Turkey, India, Algeria, Bulgaria, Romania, South Africa, Ethiopia

TOTAL NUMBER OF PAPERS: 13
THE NUMBER OF PAPERS FROM TURKEY: 5
OTHER COUNTRIES: 8

HONORARY CHAIRMAN OF CONGRESS

Prof. Dr. Mehmet Sabri ÇELİK
Harran University Rector

SUMMIT HONOR BOARD MEMBERS

Prof. Dr. Tahir Güllüoğlu
Harran University
Prof. Dr. Murat DEMİR
Harran University
Prof. Dr. Mehmet HANÇER
Harran University
Prof. Dr. Abdullah ÇELİK
Harran University
Prof. Dr. Mustafa Talas
Nigde Omer Halisdemir University

ORGANIZING COMMITTEE

Prof. Dr. Mustafa TALAS
Assoc. Prof. Dr. Hasan ÇİFTÇİ
Assoc. Prof. Dr. .Elvira NURLANOVA
Assoc. Prof. Dr. Veli BATDI
Assoc. Prof. Dr. Hakan EYGÜ
Assist. Prof. Dr. Hüseyin ERİŞ
Assist Prof. Dr. Muhammed Yaşar DÖRTBUDAK
Dr. Mehriban EMEK
Lect. Feray KABALCIOĞLU BUCAK

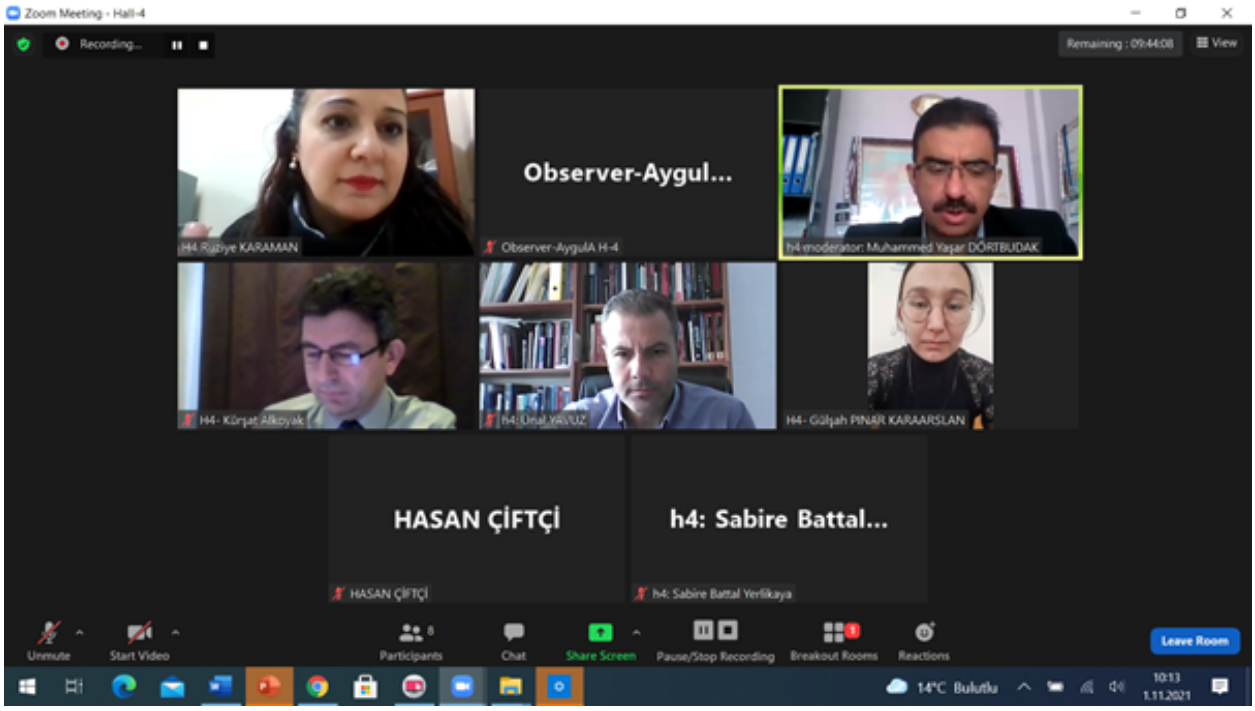
SCIENTIFIC & REVIEW COMMITTEE

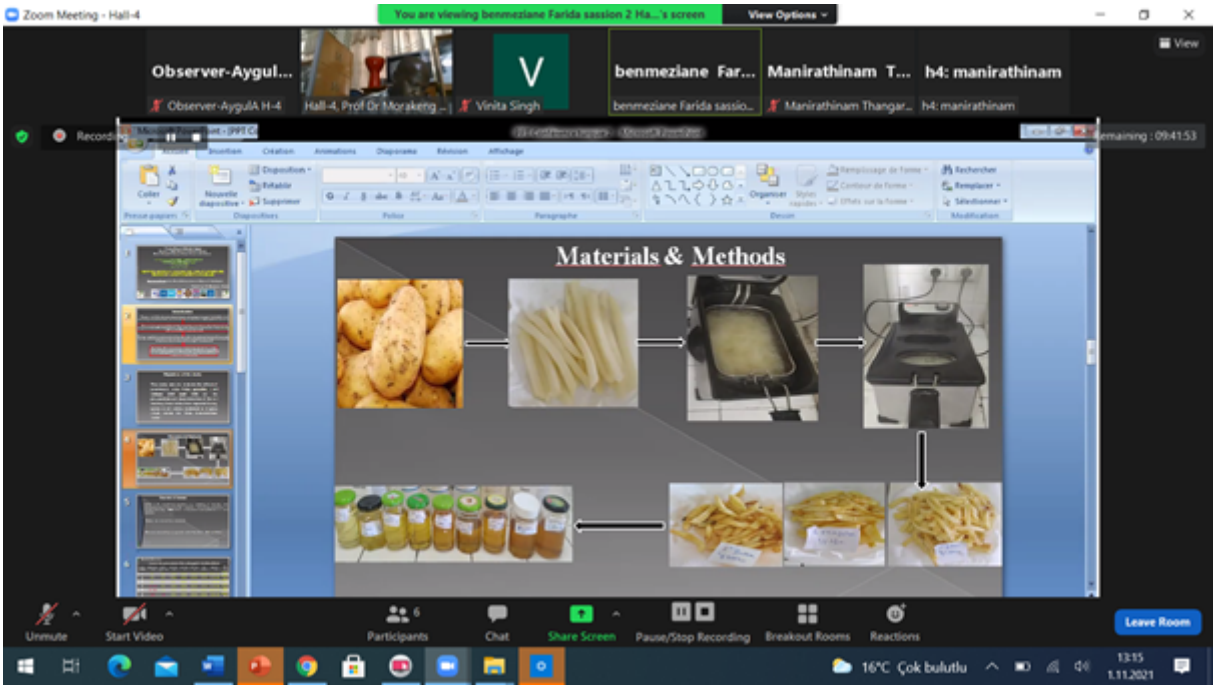
Dr. Adil AKINCI, Kırklareli University
Dr. Ibrahim HAYOĞLU, Harran University
Dr. Hasan VARDİN, Harran University
Dr. Mutlu AKIN, Harran University
Dr. Şerafettin ÇELİK, Harran University
Dr. Ali YILDIRIM, Harran University
Dr. Harika ÇANKAYA, Harran University
Dr. Yegane HACIYEVA, Azerbaijan University of Languages
Dr. Bayram POLAT, Omer Halisdemir University
Dr. Elvan YALCINKAYA, Omer Halisdemir University
Dr. Durmuş Çağrı YILDIRIM, Namık Kemal University
Dr. Çinarə QƏHRƏMANOVA, Azerbaijan University of Languages
Dr. Maha Hamdan ALANAZI, Riyadh King Abdulaziz University
Dr. Xatirə ƏLİYEVA, Azerbaijan State Pedagogical University
Dr. Mustafa TALAS, Ömer Halisdemir University
Dr. Vaqif ƏLİYEV, Azerbaijan State Pedagogical University
Dr. Umran TURKYILMAZ, Gazi University
Dr. Gülçöhrə ALIYEVA, Azerbaijan State Pedagogical University
Dr. Salih OZTURK, Namık Kemal University
Dr. Sehrana KASIMI, Azerbaijan National Academy of Sciences
Dr. Hakan EYGÜ, Atatürk University
Dr. Seyithan SEYDOŞOĞLU, Siirt University
Dr. Melahat BABAYEVA, Azerbaijan State Pedagogical University
Dr. Sarash KONYRBAEVA, Kazakh State Women's Pedagogy University
Dr. Nuri KAVAK, Eskişehir Osmangazi University

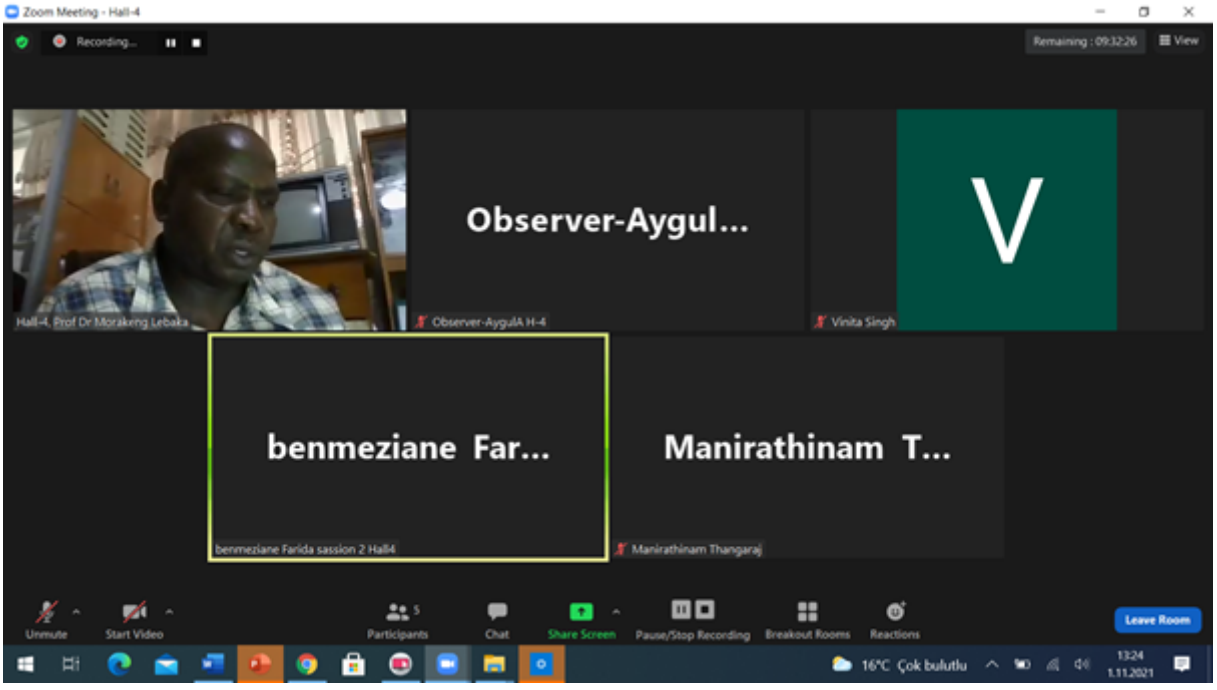
SCIENTIFIC & REVIEW COMMITTEE

Dr. Mehriban EMEK, Adiyaman University
Dr. Mehmet Nuri ÇINARCI, Van 100 Yıl University
Dr. Nazilə ABDULLAZADE, Azerbaijan State Pedagogical University
Dr. Şahin FİLİZ, Akdeniz University
Dr. TALEH HALİLOV, Nakhchıvan State University
Dr. GÜLLER ŞAHİN, Kütahya Sağlık Bilimleri Üniversitesi
Dr. Mustafa Hilmi BULUT, Sivas Cumhuriyet University
Dr. M. Hakan CEVHER, Ege University
Dr. Arzu KALAFAT ÇAT, Bolu Abant İzzet Baysal University
Dr. Yunus Doğan, Fırat University
Dr. Nezihe Şentürk, Gazi University
Dr. Nevzat Tetik, Inönü University
Dr. Yasemin KÜÇÜKÖZKAN, Osmaniye State Hospital
Dr. Kerem ASMAZ, Yıldız Technical University
Dr. Ayşe Feyda NURSAL, Hitit Universiti
Dr. Emel ASLANKARAYİĞİT UĞURLU, Marmara University
Dr. Kevser KÖKLÜ, Yıldız Technical University
Dr. Sema İŞİSAĞ ÜÇÜNCÜ, Ege University
Dr. Mustafa ÖZKAN, Trakya University
Dr. Yasemin KÜÇÜKÖZKAN, Osmaniye State Hospital
Dr. Berkan ZÖHRA, Amasya University
Dr. Hülya ÇİÇEK, Gaziantep University
Dr. Aybike Ayfer KARADAĞ, Düzce University
Dr. Nurhan KESKİN, Van Yüzüncü Yıl University
Dr. Mehmet Fırat BARAN, Siirt University
Dr. Arzu ALTUNTAŞ, Siirt University
Dr. Görkem ÖRÜK, Siirt University
Dr. Ahmet TERZİOĞLU, Harran University
Dr. Tuba Özge YAŞAR, Tekirdağ Namık Kemal University
Dr. Hisamettin Durmaz, Harran University
Dr. Serap Kılıç Altun, Harran University
Dr. Ismail Şah Harem, Harran University
Dr. Deniz Korkmaz, Harran University
Dr. Birten Emre, Harran University
Dr. Nilgün Paksoy, Harran University
Dr. Ali İNAN, Van 100 Yıl University
Dr. Şeyma AYDEMİR, Hitit University
Dr. Rıdvan KALAÇ, Van 100 Yıl University
Dr. Mazhar DÜNDAR, MEB

PHOTO GALLERY




Zoom Meeting - Hall-4
You are viewing benmeziane Farida session 2 Ha...'s screen
View Options
Observer-Aygul...
Hall-4, Prof Dr Morakeng ...
Vinita Singh
benmeziane Far...
Manirathinam T...
h4: manirathinam
Materials & Methods
Unmute
Start Video
Participants
Chat
Share Screen
Pause/Stop Recording
Breakout Rooms
Reactions
Leave Room
16°C Çok bulutlu


Zoom Meeting - Hall-4
Recording...
Observer-Aygul...
Hall-4, Prof Dr Morakeng Lebaka
Observer-AygulA H-4
Vinita Singh
benmeziane Far...
benmeziane Farida session 2 Hall4
Manirathinam T...
Manirathinam Thangaraj
Unmute
Start Video
Participants
Chat
Share Screen
Pause/Stop Recording
Breakout Rooms
Reactions
Leave Room
16°C Çok bulutlu

5th International GAP FOOD, AGRICULTURE AND VETERINARY SCIENCES Congress

1-2 November 2021
Şanlıurfa, Türkiye

CONGRESS VENUE: *Harran University Campus*

CONGRESS PROGRAM

Meeting ID: 832 1332 5818
Passcode: 070707

Join Zoom Meeting:
https://us02web.zoom.us/j/83213325818?pwd=aHJ1WWpaV211Ymc1MXVvYmI4NGxvUT09

PARTICIPANT COUNTRIES (7):
Turkey, India, Algeria, Bulgaria, Romania, South Africa, Ethiopia

TOTAL NUMBER OF PAPERS: 13
THE NUMBER OF PAPERS FROM TURKEY: 5
OTHER COUNTRIES: 8

Önemli, Dikkatle Okuyunuz Lütfen

- Kongremizde Yazım Kurallarına uygun gönderilmiş ve bilim kurulundan geçen bildiriler için online (video konferans sistemi üzerinden) sunum imkanı sağlanmıştır.
- Online sunum yapabilmek için **https://zoom.us/join** sitesi üzerinden giriş yaparak "Meeting ID or Personal Link Name" yerine ID numarasını girerek oturuma katılabilirsiniz.
- Zoom uygulaması ücretsizdir ve hesap oluşturmaya gerek yoktur.
- Zoom uygulaması kaydolmadan kullanılabilir.
- Uygulama tablet, telefon ve PC'lerde çalışıyor.
- Her oturumdaki sunucular, sunum saatinden 5 dk öncesinde oturuma bağlanmış olmaları gerekmektedir.
- Tüm kongre katılımcıları canlı bağlanarak tüm oturumları dinleyebilir.
- Moderatör – oturumdaki sunum ve bilimsel tartışma (soru-cevap) kısmından sorumludur.

Dikkat Edilmesi Gerekenler- TEKNİK BİLGİLER

- Bilgisayarınızda mikrofon olduğuna ve çalıştığına emin olun.
- Zoom'da ekran paylaşma özelliğine kullanabilmelisiniz.
- Kabul edilen bildiri sahiplerinin mail adreslerine Zoom uygulamasında oluşturduğumuz oturuma ait ID numarası gönderilecektir.
- Katılım belgeleri kongre sonunda tarafınıza pdf olarak gönderilecektir
- Kongre programında yer ve saat değişikliği gibi talepler dikkate alınmayacaktır

IMPORTANT, PLEASE READ CAREFULLY

- To be able to attend a meeting online, login via **https://zoom.us/join** site, enter ID "Meeting ID or Personal Link Name" and solidify the session.
- The Zoom application is free and no need to create an account.
- The Zoom application can be used without registration.
- The application works on tablets, phones and PCs.
- The participant must be connected to the session 5 minutes before the presentation time.
- All congress participants can connect live and listen to all sessions.
- Moderator is responsible for the presentation and scientific discussion (question-answer) section of the session.

Points to Take into Consideration - TECHNICAL INFORMATION

- Make sure your computer has a microphone and is working.
- You should be able to use screen sharing feature in Zoom.
- Attendance certificates will be sent to you as pdf at the end of the congress.
- Requests such as change of place and time will not be taken into consideration in the congress program.

Meeting ID: 832 1332 5818
Passcode: 070707

01.11.2021, MONDEY
ANKARA LOCAL TIME: 10:00-12:30

SESSION - 1, HALL - 4
MODERATOR: Assist. Prof. Dr. Muhammed Yaşar DÖRTBUDAK
Meeting ID: 832 1332 5818
Passcode: 070707

BİLDİRİ BAŞLIĞI	YAZARLAR	ÜNİVERSİTE
EFFECT OF SALINITY AND DROUGHT STRESS FACTORS ON MUNGBEAN	Res. Ass. Dr. Ruziye KARAMAN	Isparta University of Applied Sciences, Agriculture Faculty, Department of Field Crops, Isparta
	M.Sc. Cengiz TÜRKAY	Isparta University of Applied Sciences, Agriculture Faculty, Department of Field Crops, Isparta
INHIBITORY EFFECTS OF ETHANOLIC YARROW EXTRACTS AGAINST Bacillus cereus ATCC 11778	Assist. Prof. Dr. Sabire YERLİKAYA	Karamanoğlu Mehmetbey University, Karaman
	Gülşah PINAR KARAARSLAN	Karamanoğlu Mehmetbey University, Karaman
	Res. Ass. Hülya ŞEN ARSLAN	Karamanoğlu Mehmetbey University, Karaman
THE EFFECT OF NON-GENETIC FACTORS ON SOME REPRODUCTIVE TRAITS IN HOLSTEINS OF ESTONIAN AND USA ORIGIN BRED IN TURKEY	Dr. Kürşat ALKOYAK	Tarım ve Orman Bakanlığı, Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü, Hayvancılık ve Su Ürünleri Daire Başkanlığı, Ankara
	Dr. Bülent BÜLBÜL	Dokuz Eylul University, İzmir.
CLINICAL, PATHOLOGICAL AND IMMUNOHISTOCHEMICAL EVALUATION OF PERINEAL TUMORS IN DAMASCUS GOATS	Assist. Prof. Dr. Ünal YAVUZ	Harran University
	Doç. Dr. Rahşan YILMAZ	Harran Üniversitesi Veteriner Fakültesi, Patoloji Anabilim Dalı, Eyyübiye Yerleşkesi, Eyyübiye/ŞANLIURFA
THE LENGTH-WEIGHT RELATIONSHIP AND CONDITION FACTOR OF BROND – SNOUT (Chondrostoma regium (Heckel, 1843)) POPULATION IN THE DICLE RIVER	Muhammed Yaşar DÖRTBUDAK	Harran University, Faculty of Veterinary, Şanlıurfa, Turkey
	Gülnaz ÖZCAN	İskenderun Technical University, Faculty of Marine Sciences and Technology, Iskenderun, Hatay, Turkey

01.11.2021, MONDEY
ANKARA LOCAL TIME: 13:00-15:30

SESSION - 2, HALL - 4
MODERATOR: Prof. Dr. Morakeng Edward Kenneth Lebaka
Meeting ID: 832 1332 5818
Passcode: 070707

BİLDİRİ BAŞLIĞI	YAZARLAR	ÜNİVERSİTE
THE RITUALISTIC AND MEDICINAL USE OF THE BARKS, ROOTS AND LEAVES OF GARDEN AND FARM PLANTS TO ELIMINATE SEVERAL HEALTH-RELATED PROBLEMS OR AILMENTS IN THE PROCESS OF TRADITIONAL HEALING PRACTICE IN THE BAPEDI SOCIETY	Prof. Dr. Morakeng Edward Kenneth Lebaka	University of Zululand – KwaDlangezwa Campus; Faculty of Arts, Department of Creative Arts
PROPHYLACTIC EFFECTS OF JUNIPERUS OXYCEDRUS EXTRACT ADMINISTRATION IN WISTAR RATS CO-EXPOSED TO LEAD AND MANGANESE. BIOCHEMICAL, HEMATOLOGICAL AND NEUROBEHAVIORAL STUDY	Mostapha Brahmi	Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (LBPVBP), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria
	Djallal Eddine Houari Adli	Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (LBPVBP), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria
	Wafaa Arabi	Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (LBPVBP), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria
	Kadda Hachem	Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (LBPVBP), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria
	Khaled Kahloula	Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (LBPVBP), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria
	Miloud Slimani	Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (LBPVBP), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria

CLINICAL SIGNS AND HAEMATOLOGICAL CHANGES ASSOCIATED WITH INFECTION OF ONCORHYNCHUS MYKISS REARED IN RECIRCULATING AQUACULTURE SYSTEMS	Angelica DOCAN	Faculty of Food Science and Engineering, "Dunarea de Jos" University of Galati, Domnească Street 800008, Romania
	Lorena DEDIU	Faculty of Food Science and Engineering, "Dunarea de Jos" University of Galati, Domnească Street 800008, Romania
	Iulia GRECU	Faculty of Food Science and Engineering, "Dunarea de Jos" University of Galati, Domnească Street 800008, Romania
	Mirela CREȚU	Faculty of Food Science and Engineering, "Dunarea de Jos" University of Galati, Domnească Street 800008, Romania
REFINED SOYBEAN AND CORN OIL: IMPACT OF REPEATED FRYING ON ACIDITY, DENSITY AND COLOR	Benmeziane – Derradji Farida	Department of Agronomic Sciences, Faculty of Natural and Life Sciences, Chadli Bendjedid University of El-Tarf. PB 73. El-Tarf 36000, Algeria. Laboratory of Biomathematics, Biophysics, Biochemistry, and Scientometry (L3BS), Faculty of Nature and Life Sciences, University of Bejaia, 06000 Bejaia, Algeria
	Araba Khawla	Department of Agronomic Sciences, Faculty of Natural and Life Sciences, Chadli Bendjedid University of El-Tarf. PB 73. El-Tarf 36000, Algeria
	Belahcene Amina	Department of Agronomic Sciences, Faculty of Natural and Life Sciences, Chadli Bendjedid University of El-Tarf. PB 73. El-Tarf 36000, Algeria
	Djermoune – Arkoub Lynda	Department of Process Engineering, Faculty of Technology, University of Bejaia, Bejaia, Algeria Laboratory of Biomathematics, Biophysics, Biochemistry, and Scientometry (L3BS), Faculty of Nature and Life Sciences, University of Bejaia, 06000 Bejaia, Algeria
POLLEN MORPHOLOGY AND POLLEN PRODUCTION OF INVASIVE AND NATIVE IMPATIENS SPECIES GROWING IN BULGARIA	Dolja K. Pavlova	University of Sofia, Faculty of Biology, Department of Botany, Blvd. Dragan Tzankov 8, 1164 Sofia, BULGARIA
	Plamen S. Glogov	Forest Research Institute – Bulgarian Academy of Sciences, Blvd. Kliment Ohridski 132, Sofia, BULGARIA
ANTIBACTERIAL POTENTIAL OF SYNTHESIZED SILVER NANOPARTICLES USING BIOACTIVE METABOLITES OF ACTINOBACTERIA AGAINST BACTERIAL MENINGITIS	Naushin Bano	Protein research Laboratory, Department of Bioengineering, Integral University, Lucknow, India
	Saba Siddiqui	Integral Institute of Agricultural Science and Technology, Integral University, Lucknow, India
	Roohi	Protein research Laboratory, Department of Bioengineering, Integral University, Lucknow, India

SUSTAINABLE BALANCED DIET: A PROMISING APPROACH TO COMBAT MICRONUTRIENT MALNUTRITION IN INDIA	Vinita Singh	Research scholar, AIFT, Amity University Uttar Pradesh, Noida, UP - 201303, India
	Monika Thakur	Faculty, AIFT, Amity University Uttar Pradesh, Noida, UP - 201303, India
	Shashi Sharma	Associate Prof., Ch BRG Govt. College, Sriganganagar, Rajasthan, India
COMPARATIVE STUDY ON THE SUPPLEMENTATION EFFECT OF ALFALFA AND MORINGA STENOPETALA LEAVES ON FEED INTAKE, GROWTH AND CARCASS TRAITS OF BROILER CHICKENS	Kunfu Guta	Department of Animal Sciences, Alage Agricultural Technical Vocational Education and Training College, Ethiopia
	Aberra Melesse	School of Animal and Range Sciences, Hawassa University, Hawassa, Ethiopia

CONTENT

CONGRESS ID	1
SCIENTIFIC COMMITTEE	2
PHOTO GALLERY	3
PROGRAM	4
CONTENT	5

PROCEEDINGS BOOK

Ruziye KARAMAN & Cengiz TÜRKAY *EFFECT OF SALINITY AND DROUGHT STRESS FACTORS ON MUNGBEAN*	1
Sabire YERLİKAYA, Gülşah PINAR KARAARSLAN & Hülya ŞEN ARSLAN *INHIBITORY EFFECTS OF ETHANOLIC YARROW EXTRACTS AGAINST Bacillus cereus ATCC 11778*	13
Kürşat ALKOYAK & Bülent BÜLBÜL *THE EFFECT OF NON-GENETIC FACTORS ON SOME REPRODUCTIVE TRAITS IN HOLSTEINS OF ESTONIAN AND USA ORIGIN BRED IN TURKEY*	18
Ünal YAVUZ & Rahşan YILMAZ *CLINICAL, PATHOLOGICAL AND IMMUNOHISTOCHEMICAL EVALUATION OF PERINEAL TUMORS IN DAMASCUS GOATS*	20
Morakeng Edward Kenneth Lebaka *THE RITUALISTIC AND MEDICINAL USE OF THE BARKS, ROOTS AND LEAVES OF GARDEN AND FARM PLANTS TO ELIMINATE SEVERAL HEALTH RELATED PROBLEMS OR AILMENTS IN THE PROCESS OF TRADITIONAL HEALING PRACTICE IN THE BAPEDI SOCIETY*	22
Muhammed Yaşar DÖRTBUDAK & Gülnaz ÖZCAN *THE LENGTH-WEIGHT RELATIONSHIP AND CONDITION FACTOR OF BROND – SNOUT (Chondrostoma regium (Heckel, 1843)) POPULATION IN THE DICLE RIVER*	23
Mostapha Brahmi, Djallal Eddine Houari Adli, Mokhtar Benreguieg, Wafaa Arabi & Wafaa Arabi, Khaled Kahloula, Miloud Slimani *PROPHYLACTIC EFFECTS OF JUNIPERUS OXYCEDRUS EXTRACT ADMINISTRATION IN WISTAR RATS CO-EXPOSED TO LEAD AND MANGANESE. BIOCHEMICAL, HEMATOLOGICAL AND NEUROBEHAVIORAL STUDY*	24
Angelica DOCAN, Lorena DEDIU & Iulia GRECU, Mirela CREȚU *CLINICAL SIGNS AND HAEMATOLOGICAL CHANGES ASSOCIATED WITH INFECTION OF ONCORHYNCHUS MYKISS REARED IN RECIRCULATING AQUACULTURE SYSTEMS*	26
Benmeziane – Derradji Farida, Araba Khawla & Belahcene Amina, Djermoune - Arkoub Lynda *REFINED SOYBEAN AND CORN OIL: IMPACT OF REPEATED FRYING ON ACIDITY, DENSITY AND COLOR*	27

Dolja K. Pavlova & Plamen S. Glogov ***POLLEN MORPHOLOGY AND POLLEN PRODUCTION OF INVASIVE AND NATIVE IMPATIENS SPECIES GROWING IN BULGARIA***	**28**
Naushin Bano, Saba Siddiqui & Roohi ***ANTIBACTERIAL POTENTIAL OF SYNTHESIZED SILVER NANOPARTICLES USING BIOACTIVE METABOLITES OF ACTINOBACTERIA AGAINST BACTERIAL MENINGITIS***	**29**
Vinita Singh, Monika Thakur & Shashi Sharma ***SUSTAINABLE BALANCED DIET: A PROMISING APPROACH TO COMBAT MICRONUTRIENT MALNUTRITION IN INDIA***	**30**
1Kunfu Guta & Aberra Melesse ***COMPARATIVE STUDY ON THE SUPPLEMENTATION EFFECT OF ALFALFA AND MORINGA STENOPETALA LEAVES ON FEED INTAKE, GROWTH AND CARCASS TRAITS OF BROILER CHICKENS***	**31**

EFFECT OF SALINITY AND DROUGHT STRESS FACTORS ON MUNGBEAN

Assist. Prof. Dr. Ruziye KARAMAN
Isparta University of Applied Sciences, Agriculture Faculty,
Department of Field Crops, Turkey
ORCID NO: 0000-0001-5088-8253
M.Sc. Cengiz TÜRKAY
Isparta University of Applied Sciences, Agriculture Faculty,
Department of Field Crops, Turkey
ORCID NO: 0000-0003-3857-0140

ABSTRACT

The aim of the study is to determine the effects of different salt and drought doses on germination and seedling development in mung bean genotypes. In the study, 0, 5, 10, 15, 20, 25 and 30 dS m^{-1} doses of NaCl were used as salt, and 0, -2, -4 and -6 bar doses of PEG 6000 as drought. Genotypes 02 G 03 and 27 S 08 were used as seed material. The study was set up in a randomized plot design with three replications. According to NaCl doses, germination rate is 50.00 - 99.17%, germination index is 4.38 - 19.14, mean germination time is 0.73-2.13 days, shoot length is 0.27 - 13.76 cm, root length is 0.44 -7.37 cm, fresh weight is 0.59-3.54 g, dry weight is 0.17 - 0.35 g; According to PEG doses, germination rate is 90.83-100.00%, germination index is 7.96 - 19.14, mean germination time is 1.03 - 2.67 days, shoot length is 3.00 - 8.50 cm, root length is 2.39 - 8.79 cm, fresh weight is 1.36 - 3.54 g, dry weight is 0.35 - 0.41 varied between them. As a result of the study, it was determined that the 02 G 03 genotype was more tolerant to salinity and drought than the other genotype. If mung beans are to be grown in salinity and drought conditions in the coming days, 02 G 03 genotype can be recommended.

Keywords: Mungbean, Drought, Salinity, Germination, Seedling Properties

INTRODUCTION

One of the most important factors limiting crop production worldwide is abiotic stresses. Abiotic stresses, which represent unfavorable growth conditions for plants, include high and low temperatures, water restriction, salinity, nutrient deficiency and high light intensity (Esmaeili et al., 2021). Salinity and drought are one of the most important stresses affecting the growth and development of plants in the world. There are physical, biochemical and molecular changes in plants that are faced with drought and salinity problems (Munns and Tester, 2008), and it can cause many losses such as inhibition of plant growth, metabolic damage, and decrease in yield and quality (Yetişir and Uygur, 2009; Kıran et al., 2017). For this reason, it is important to develop species and varieties that are resistant to stress conditions, which cause great damage in the agricultural sector, in order to meet the increasing food demand in the world.

Mung bean [Vigna radiata (L.) Wilczek] is one of the most valuable and popular crops in the world, as well as a rich source of protein, vitamins and minerals (Sharma and Dhanda, 2014; Jhanji and Dhingra, 2020). Mung bean is superior to other plant species with its short vegetation period and nitrogen fixation ability, soil reinforcement, prevention of soil erosion and being grown as a second crop (Allahmoradi et al., 2011). Mung bean is a drought tolerant

legume plant that does not need high amounts of irrigation (600 - 1000 mm/year rainfall) thanks to its well-developed root system (Lambrides and Godwin, 2006; Mogotsi, 2006). Indeed, Ahmad et al. (2015) stated that drought stress had no effect on mung beans. Some researchers stated that drought stress has negative effects on growth, physiology, yield and yield components of mung bean (Shirvan and Asgharipur, 2009; Ranawake et al., 2011; Ahmad et al., 2015). On the other hand, salt stress in mung beans decreases seed germination, root and shoot lengths, fresh weight, seedling viability and yield (Saha et al., 2010), although it varies according to genotypes (Promila and Kumar, 2000; Misra and Dwivedi, 2004). During germination, most mung bean varieties can tolerate salt from the normal salt concentration of 5 - 6 mhos cm^{-1} to 9 - 18 mhos cm^{-1} (HanumanthaRao et al., 2016). For these reasons, it is of great importance to determine the resistance of mung bean to abiotic stress factors such as increasing drought and salinity. As a matter of fact, in this study, it was aimed to determine the germination and some seedling characteristics of mung bean genotypes at different salt (NaCl) and drought (PEG) doses.

MATERIAL AND METHODS

Material

In the study, two different mung bean seeds obtained from Gaziantep/Şahinbey (27 S 08) and Adıyaman/Gerger (02 G 05) obtained from Turkey were used. The seeds of the 27 S 08 mung bean genotype are light green and coarse-grained. 100 grains weight 5.69 g, early in terms of maturation, pod shape is medium in size and brown. The seeds of the 02 G 05 mung bean genotype are very dark green and small grained. 100 grains weight 2.74 g, late maturation, pod shape is small and brown (Karaman, 2019). In the study, NaCl was used to create salt stress and polyethylene glycol (PEG) chemicals were used for drought stress.

Methods

The study was established in Isparta University of Applied Sciences, Faculty of Agriculture, Field Crops Laboratories. In the experiment, salt concentrations were adjusted to 0 (distilled water), 5, 10, 15, 20, 25 and 30 dS m^{-1} electrical conductivity (EC) with the help of an EC meter. For drought stress, 0, -2, -4 and -6 bar osmotic pressure was adjusted with PEG 6000. Germination trials were carried out between three 21 x 21 cm germination papers and in a completely dark germination cabinet at 25±1°C. The research was established according to a completely randomized plot design with 3 replications and 20 seeds in each replication. In each replication, 10 ml of the appropriate test solution was added for each germination paper and the roll papers were placed in ziplock bags to prevent evaporation. The experiment was conducted according to ISTA rules for 7 days and the papers were changed and 10 ml of test solution was added again every two days to avoid salt accumulation. In the daily counts, seeds with a rootlet length of 1 mm were counted as germinated. According to the germination results obtained at the end of the 7th day, the germination tests and the root and seedling characteristics of 10 randomly selected plants from each replication of the germinated seeds were examined (Kaya et al., 2005).

Germination rate in germination trials, germinated seeds at the end of the 7th day were counted and the germination rate was calculated as % with the formula (number of germinated seeds/total number of seeds) x 100 (Akıncı and Çalışkan, 2010). Germination index was found by dividing the rate of germinated seeds per day by count days, according to the formula $GI=\sum(Gi/Tt)$ (Wang et al., 2004). GI in the formula: Germination index; G: i. rate of germinated seeds per day; Tt: Represents the counting day. Mean germination time (MGT) was calculated according to the formula $MGT=\sum(fx)/\sum f$ (Ellis and Robert, 1980). MGT: Mean germination

time; f: Number of germinated seeds; x represents the germination day. Seedling and root length of randomly selected plants were measured in cm with a millimetric ruler. The fresh and dry weights of randomly selected plants was determined in by weighing on a 0.01 sensitive precision balance detected in g.

With the data obtained regarding the properties examined in the experiment, variance analysis was performed with the Minitab statistical package program according to the Random Plots Trial Design and the difference groupings were made with the Tukey test at the 0.05 level.

RESULTS AND DISCUSSION

The F values and significance levels of the investigated properties of different salt and PEG applications applied to mung bean genotypes are given in Table 1. In the study, the genotypes, NaCl doses and interaction of genotype x NaCl dose was found to be significant at the 0.01 level in all properties examined in mung bean genotypes, which were applied different salt doses. In the study, as a result of PEG application of mung bean, the differences between PEG doses in terms of germination rate were found to be statistically significant at 0.01 level, and between genotypes and interaction of genotype x PEG dose was found to be insignificant. Germination index, shoot and root length genotypes, PEG doses and genotype x PEG dose interactions were found to be statistically significant at the 0.01 level. Differences between genotypes and PEG doses in terms of mean germination time were statistically significant, while the interaction of genotype x PEG dose was insignificant. Differences between genotypes were statistically insignificant in fresh weight trait, the interaction of genotype x PEG dose with PEG doses was significant at the 0.01 level. Genotypes and PEG doses were found to be significant in the dry weight trait, while the interaction of genotype x PEG dose was insignificant.

Tablo 1. The F values and significance levels of the investigated properties of different salt and PEG applications applied to mung bean genotypes

Salinity Stress							
VS	**GR**	**GI**	**MGT**	**SL**	**RL**	**FW**	**DW**
G	36.57**	9.06**	1464.05**	1508.90**	166.24**	9.65**	135.58**
A	121.81**	190.47**	624.36**	695.70**	201.47**	425.78**	23.14**
G x A	44.41**	6.51**	308.03**	384.25**	29.54**	8.16**	9.38**
CV(%)	5.12	7.16	4.02	9.68	12.73	7.27	11.19
Drought Stress							
G	2.50 ns	28.40**	6.28*	42.02**	56.66**	0.25ns	271.22**
A	10.50**	165.40**	31.43**	197.22**	101.48**	333.98**	4.71*
G x A	1.43ns	7.51**	1.37ns	49.45**	1.60**	18.10**	1.31ns
CV(%)	3.38	6.95	15.57	9.12	12.61	5.49	7.44

VS: Variation Source, G: Genotype, A: Application, CV: Coefficient of Variation, **:P≤0.01, *P≤0.05, ns: insignificant, GR: Germination rate, GI: Germination Index, MGT: Mean germination time, SL: Shoot length, RL: Root length, FW: Fresh weigth, DW: Dry weight

In the study, the germination rate varied between 50.00-99.17% according to the salt doses, and the germination rate decreased with the increase in the salt doses. 02 G 03 genotype (83.57%) had higher germination rate than 27 S 08 genotype (75.95%). In the 02 G 03 genotype, the highest germination rate was determined in the control application, and the lowest in 25 and 30 dS m^{-1} NaCl application. In 27 S 08 genotype, the highest germination rate was determined in control, 5 and 10 dS m^{-1} NaCl application, and the lowest in 30 dS m^{-1} NaCl application

(Table 2). Although there was no statistical difference between the mung bean genotypes in which PEG doses were applied in the study, 02 G 03 genotype (96.67%) had the highest germination rate. While the highest germination rate was determined in the control application according to the PEG doses, the control application and the -2 bar PEG dose were in the same group with the same statistics. The lowest germination rate was determined at -6 bar PEG dose, and there was no statistical difference between -4 bar PEG dose and 6 bar PEG dose (Table 2).

Seed germination is one of the most important stages in the life cycle of plants and is very sensitive to environmental conditions (Sanadhya et al., 2012). However, it is reported that various environmental factors such as drought, salinity, temperature stresses reduce the germination rate of seeds (Singh and Sing, 2011). There are many variations in the tolerance of mung bean genotypes to drought and salt stress (Promila and Kumar, 2000; Misra and Dwivedi, 2004; Ratnasekera and Tharanganıe, 2015). Paliwal and Maliwal (1980), reported that mung bean seeds can tolerate 6 mmhos cm^{-1} salinity. It has been reported in many studies that the germination rate decreased with the increase in the doses of drought and salt stress on mung beans (Sanadhya et al., 2012; Sehrawat et al., 2014; Ghanbari et al., 2016; Zhang et al., 2018) and is in agreement with the findings.

Tablo 2. Means of germination rate and germination index in mung bean genotypes applied with different doses of NaCl and PEG

	Germination rate (%)			Germination index		
NaCl doses	**02 G 03**	**27 S 08**	**Mean**	**02 G 03**	**27 S 08**	**Mean**
Control	98.33 a	100.00 a	**99.17 A**	19.50 a	18.78 a	**19.14 A**
5 ds m^{-1}	90.00 b	98.33 a	**94.17 B**	17.75 b	18.67 a	**18.21 A**
10 ds m^{-1}	85.00 bc	93.33 ab	**89.17 C**	17.67 b	17.67 a	**17.67 A**
15 ds m^{-1}	83.33 bc	90.00 b	**86.67 C**	17.61 b	17.67 a	**17.64 A**
20 ds m^{-1}	80.00 cd	80.00 c	**80.00 D**	14.00 c	14.83 b	**14.42 B**
25 ds m^{-1}	75.00 d	43.33 d	**59.17 E**	10.50 d	5.78 c	**8.14 C**
30 ds m^{-1}	73.33 d	26.67 e	**50.00 F**	5.87 e	2.89 d	**4.38 D**
Mean	***83.57 A***	***75.95 B***		***14.70 A***	***13.75 B***	
PEG doses	**02 G 03**	**27 S 08**	**Mean**	**02 G 03**	**27 S 08**	**Mean**
Control	100.00	100.00	**100.00 A**	19.50 a	18.78 a	**19.14 A**
-2 bar	98.33	98.33	**98.33 A**	15.42 b	10.61 b	**13.01 B**
-4 bar	96.67	90.00	**93.33 B**	12.17 c	10.36 b	**11.26 C**
-6 bar	91.67	90.00	**90.83 B**	8.18 d	7.74 c	**7.96 D**
Mean	***96.67***	***94.58***		***13.82 A***	***11.87 B***	

*The difference between the averages given with different letters in the same column is important.

In the study, the germination index values decreased in general depending on the increase in the doses of NaCl and PEG applied to the mung bean genotypes. Although the highest germination index was determined in the control (19.14) application in the NaCl salt application, the response of the control application was similar with the 5, 10 and 15 dS m^{-1} NaCl doses. The lowest germination index was determined in 30 dS m^{-1} (4.38) NaCl application. 02 G 03 genotype (14.70) had higher germination index than 27 S 08 genotype (4.38). While the highest germination index value of 27 S 08 genotype was determined in the control application, there was no statistical difference between 5 dS m^{-1}, 10 dS m^{-1} and 15 dS m^{-1} NaCl doses. In the 02 G 03 genotype, the highest germination index was determined in the control application. The lowest germination index values in both mung bean genotypes were determined in 30 dS m^{-1} NaCl application. On the other hand, decreases in germination index means were observed with increasing PEG doses. As a matter of fact, the highest germination

index value was found in the control application, and the lowest in the -6 bar PEG application. 02 G 03 genotype (13.82) had the highest germination index (Table 1).

Germination index is related to seed vigor, and a high germination index indicates a high seed vigor (Maguire, 1962). However, the change in germination index according to control treatment is a measure of tolerance to stress conditions (Bilgili et al., 2018). In addition, the decrease in the germination index shows that both the germination ability of the seeds decreases proportionally and the germination period is prolonged (Yılmaz and Kısakürek, 2021). In studies conducted with different plant species and varieties, it has been reported that as the salt and PEG concentration increases, the germination index decreases (Ertekin et al., 2017; Bilgili et al., 2018; Ertekin Pinar et al., 2018; Yılmaz and Kısakürek, 2021).

Mean germination time increased with increasing doses of NaCl and PEG applied to mung bean genotypes. As a matter of fact, the average of the NaCl doses varied between 0.73-2.13 days, the shortest mean germination time was determined in the control application, and the longest at the dose of 30 dS m^{-1}. The 27 S 08 genotype (0.91 days) had a shorter mean germination time than the 02 G 03 genotype (1.48 days). In 27 S 08 and 02 G 03 genotypes, the shortest mean germination time was determined in the control application, and the longest mean germination time was determined in 30 dS m^{-1} NaCl application. In the 02 G 03 genotype, 5, 10 and 15 dS m^{-1} NaCl applications were statistically in the same group as the control application. Mean germination time varied between 1.03-2.67 days according to PEG doses applied to mung bean genotypes at different doses, the shortest mean germination time was determined in the control application, and the longest at -6 bar PEG dose. The 02 G 03 genotype (1.73 days) had a shorter germination time than the 27 S 08 genotype (2.03 days) (Table 3).

Tablo 3. Averages of mean germination time in mung bean genotypes applied with different doses of NaCl and PEG

	Mean germination time (day)		
NaCl doses	**02 G 03**	**27 S 08**	**Mean**
Control	0.93 d	0.53 e	**0.73 F**
5 ds m^{-1}	0.95 d	0.73 d	**0.84 E**
10 ds m^{-1}	0.95 d	0.92 c	**0.93 D**
15 ds m^{-1}	1.00 d	0.93 c	**0.97 D**
20 ds m^{-1}	1.41 c	1.03 b	**1.22 C**
25 ds m^{-1}	1.97 b	1.08 ab	**1.53 B**
30 ds m^{-1}	3.12 a	1.13 a	**2.13 A**
Mean	***1.48 A***	***0.91 B***	
PEG doses	**02 G 03**	**27 S 08**	**Mean**
Control	0.93	1.13	**1.03 C**
-2 bar	1.67	2.00	**1.83 B**
-4 bar	2.00	2.00	**2.00 B**
-6 bar	2.33	3.00	**2.67 A**
Mean	***1.73 B***	***2.03 A***	

*The difference between the averages given with different letters in the same column is important.

Mean germination time is an expression of seed strength, and seeds with a rapid germination potential, especially under stress conditions, are important in increasing yield in plant production and in terms of plant health. Mean germination time is an expression of seed strength, and seeds with a rapid germination potential, especially under stress conditions, are important in increasing yield in plant production and in terms of plant health. On the other hand, Okçu et al. (2005), in their study of salinity on pea varieties, found that increasing salt levels

extended the mean germination time and that these times varied even among species. However, many studies have reported that the mean germination time increases in parallel with the increase in salt and PEG doses (Day et al., 2008; Uyanık et al., 2014; Day and Uzun 2016; Ertekin et al., 2017) and is in agreement with the findings of our study.

In the study, shoot length decreased in parallel with the increase in NaCl doses. The shoot length of 02 G 03 (8.29 cm) genotype was longer than that of the 27 S 08 (2.21 cm) genotype. The highest shoot length was determined in the control application in 02 G 03 and 27 S 08 genotypes. However, seedling growth did not occur at 25 and 30 dS m^{-1} NaCl doses in the 02 G 03 genotype, and at 30 dS m^{-1} NaCl doses in the 27 S 08 genotype. On the other hand, shoot lengths varied between 3.00-8.50 cm according to the averages of PEG doses, and the highest shoot length was determined in the control application. The shortest shoot length was determined at -6 bar (3.00 cm) and -4 bar (3.33 cm) PEG doses, respectively. The shoot length of the 02 G 03 (5.42 cm) genotype was longer than the 27 S 08 (4.25 cm) genotype. In both mung beans, the highest shoot length was determined in the control application. In the 02 G 03 genotype, the shortest shoot length was determined at the -6 bar PEG dose, and there was no statistical difference between the -2 and -4 bar PEG doses. In 27 S 08 genotype, the shortest shoot length was determined at -6 bar PEG dose. In line with these results, it can be said that the 02 G 03 genotype can better tolerate NaCl and PEG stress conditions (Table 4).

Sprout length is significantly affected under salt and drought stress conditions. In addition, Elkoca (1997) stated that the effect of salinity differs according to plant species and varieties. Yokoi and Bresson (2002), on the other hand, reported that the seedling length decreased due to the increase in salinity. Most mung bean genotypes can tolerate salt up to 9-18 mmhos cm^{-1} (Singh and Singh, 2011). Many researchers have stated that sprout length decreases under salt and drought stress of mung bean (Promila ve Kumar, 2000; Misra and Dwivedi, 2004; Kumari et al., 2016; Benlioğlu ve Özkan, 2020).

Tablo 4. Mean of shoot and root length in mung bean genotypes applied with different doses of NaCl and PEG

	Shoot length (cm)			**Root lentgh (cm)**		
NaCl doses	**02 G 03**	**27 S 08**	**Mean**	**02 G 03**	**27 S 08**	**Mean**
Control	23.00 a	4.52 a	**13.76 A**	10.03 a	4.54 ab	**7.28 A**
5 ds m^{-1}	19.36 b	3.25 b	**11.31 B**	9.39 ab	5.35 a	**7.37 A**
10 ds m^{-1}	10.08 c	2.85 b	**6.47 C**	8.70 b	4.75 ab	**6.72 A**
15 ds m^{-1}	4.14 d	2.45 bc	**3.29 D**	5.64 c	3.94 b	**4.79 B**
20 ds m^{-1}	1.49 e	1.82 c	**1.66 E**	1.92 d	1.96 c	**1.94 C**
25 ds m^{-1}	-	0.54 d	**0.27 F**	0.67 e	0.89 d	**0.77 D**
30 ds m^{-1}	-	-	-	0.40 e	0.48 d	**0.44 D**
Mean	***8.29 A***	***2.21 B***		***5.25 A***	***3.13 B***	
PEG doses	**02 G 03**	**27 S 08**	**Mean**	**02 G 03**	**27 S 08**	**Mean**
Control	7.33 a	9.67 a	**8.50 A**	10.03	7.56	**8.79 A**
-2 bar	5.00 b	4.00 b	**4.50 B**	6.90	4.54	**5.72 B**
-4 bar	4.67 b	2.00 c	**3.33 C**	5.25	2.96	**4.11 C**
-6 bar	4.67 b	1.33 d	**3.00 C**	2.90	1.88	**2.39 D**
Mean	***5.42 A***	***4.25 B***		***6.27 A***	***4.24 B***	

*The difference between the averages given with different letters in the same column is important.

Among the mung bean genotypes, 02 G 03 genotype (5.25 cm) had the highest root length. According to NaCl applications, the mean root length varied between 0.44-7.28 cm. The longest root length was determined at 5 dS m^{-1}, control and 10 dS m^{-1} NaCl doses, respectively.

While the shortest root length was determined at 30 dS m^{-1} NaCl dose, there was no statistical difference with 25 dS m^{-1} NaCl dose. The highest root length of the 02 G 03 genotype was determined control with 5 dS m^{-1} NaCl doses, and the lowest at 25 and 30 dS m^{-1} NaCl doses. In 27 S 08 genotype, the highest root length was determined at 5, control and 10 dS m^{-1} NaCl doses, respectively, and the smallest root length was determined at 30 and 25 dS m^{-1} NaCl doses, respectively. On the other hand, it was determined that 02 G 03 genotype (6.27 cm) had the highest root length in PEG stress as well as in salt stress. According to PEG applications, the mean root length was determined the highest in the control application (8.79 cm), and the lowest in the PEG dose of -6 bar (2.39 cm). In the study, it was determined that the root length decreased depending on the increase in the doses of NaCl and PEG. In addition, 02 G 03 genotype was found to be more tolerant to NaCl and PEG applications than 27 S 08 genotype (Table 4).

Root length is an indicator of the resistance of plants to salt and drought stress (Muhammed and Majid, 2013; HanumanthaRao et al., 2016). Salt stress significantly affects root growth and has a more detrimental effect on roots than shoots (Friedman et al., 2006; Saha et al., 2010). With increasing NaCl concentration in mung beans, both root and shoot lengths decreased, but the roots were more damaged with the increase in the number and thickness of lateral roots compared to shoots (Misra et al., 1996). In parallel with the findings, many researchers (Kökten et al., 2010; Asgharipour and Rafiei, 2011; Asfaw and Blair, 2012; Sofi et al., 2018) reported that root length decreased in parallel with the increase in salt and PEG doses.

According to the NaCl doses applied to the mung bean genotypes, the highest fresh weight was determined in the control (3.54 g) application, and the lowest in the 30 dS m^{-1} (0.59 g) NaCl dose. According to the mung bean genotypes, the highest fresh weight value was determined in the 02 G 03 (2.01 g) genotype. In the 02 G 03 genotype, the highest fresh weight was determined in the control (3.88 g) application, and the lowest fresh weight was determined at 30 dS m^{-1} (0.74 g) and 25 dS m^{-1} (0.80 g) NaCl doses. In 27 S 08 genotype, the highest fresh weight was determined at control (3.20 g) and 5 dS m^{-1} (3.08 g) NaCl doses, and the lowest fresh weight was determined at 30 dS m^{-1} (0.44 g) NaCl doses. On the other hand, although there was no statistical difference between mung bean genotypes as a result of PEG application, 02 G 03 genotype had a higher fresh weight value. According to the PEG doses, the mean fresh weight varied between 1.36-3.54 g, the highest in the control application and the lowest in the 30 dS m^{-1} NaCl dose. In mung bean genotypes, the highest fresh weight was determined in control application, and the lowest wet weight was determined at 30 dS m^{-1} NaCl dose. In line with these results, fresh weight values decreased in parallel with the increase in NaCl and PEG doses. On the other hand, it was determined that the fresh weight values of the 02 G 03 genotype with high shoot and root length were also high in both stress conditions (Table 5).

In the study, the 02 G 03 genotype (0.33 g) had a higher dry weight value than the 27 S 08 genotype (0.22 g). According to the NaCl applications, the highest mean dry weight was determined in the control application, while the NaCl doses of 5 dS m^{-1}, 10 dS m^{-1}, 15 dS m^{-1} and 20 dS m^{-1} were in the statistical group with the control application. The lowest dry weight was determined at 30 dS m^{-1} NaCl dose. In the 02 G 03 and 27 S 08 genotypes, the highest dry weight was determined in the control application, while the NaCl doses of 5, 10, 15 and 20 dS m^{-1} were in the same statistical group with the control application. While the lowest dry weight was determined at 30 dS m^{-1} NaCl dose in 02 G 03 and 27 S 08 genotypes, 25 dS m^{-1} NaCl dose applied to 27 S 08 genotypes and 30 dS m^{-1} NaCl dose had the same values. According to the PEG doses, the mean dry weight was determined at the highest control with -2 bar PEG dose, and the lowest at -6 bar and -4 bar PEG doses. According to mung bean genotypes, 02 G 03 genotype (0.47 g) had higher dry weight than 27 S 08 genotype (0.28 g). With these results, it

was determined that the dry weight of the 02 G 03 genotype with a high fresh weight was also higher than the 27 S 08 genotype in both applications (Table 5).

Table 5. Mean of fresh and dry weight in mung bean genotypes applied with different doses of NaCl and PEG

	Fresh weight (g)			Dry weight (g)		
NaCl doses	**02 G 03**	**27 S 08**	**Mean**	**02 G 03**	**27 S 08**	**Mean**
Control	3.88 a	3.20 a	**3.54 A**	0.44 a	0.26 a	**0.35 A**
5 ds m^{-1}	3.35 b	3.08 a	**3.22 B**	0.39 ab	0.23 ab	**0.31 A**
10 ds m^{-1}	2.74 c	2.52 b	**2.63 C**	0.37 ab	0.23 ab	**0.30 A**
15 ds m^{-1}	1.57 d	1.75 c	**1.66 D**	0.36 ab	0.22 ab	**0.29 A**
20 ds m^{-1}	0.96 e	1.13 d	**1.04 E**	0.36 b	0.22 ab	**0.29 A**
25 ds m^{-1}	0.80 e	0.99 d	**0.89 E**	0.25 c	0.19 b	**0.22 B**
30 ds m^{-1}	0.74 e	0.44 e	**0.59 F**	0.15 d	0.19 b	**0.17 C**
Mean	***2.01 A***	***1.87 B***		***0.33 A***	***0.22 B***	
PEG doses	**02 G 03**	**27 S 08**	**Mean**	**02 G 03**	**27 S 08**	**Mean**
Control	3.88 a	3.20 a	**3.54 A**	0.51	0.30	**0.41 A**
-2 bar	2.79 b	2.85 b	**2.82 B**	0.47	0.28	**0.38 AB**
-4 bar	1.76 c	1.91 c	**1.83 C**	0.47	0.27	**0.37 B**
-6 bar	1.18 d	1.54 d	**1.36 D**	0.42	0.27	**0.35 B**
Mean	***2.40***	***2.38***		***0.47 A***	***0.28 B***	

*The difference between the averages given with different letters in the same column is important.

In the study, fresh and dry weight values decreased with the increase of NaCl and PEG doses applied to mung bean genotypes. It has been suggested that fresh weight of plants decreases under stress conditions (Itai et al., 1973), which is due to an increase in the rate of dry matter or a decrease in water content (Smit-Spinks et al., 1984). As a matter of fact, Ercan (2008), in his study on lentils, stated that there were significant decreases in seedling fresh and dry weights under salt stress, and this decrease was a sign that lentils were sensitive to salt. Manivannan et al. (2007) reported that drought stress in sunflower reduces the whole plant fresh and dry weight and this decrease varies according to the cultivars. It has been reported by many researchers that the fresh and dry weight values of plants decrease in drought and salt stress (Mohammed, 2007; Munir and Aftab, 2009; Baloğlu et al., 2012; Aslan and Atış, 2018) and it is similar to the findings of the study.

CONCLUSION

According to the results of the research, germination characteristics and seedling growth were significantly affected by the concentration of NaCl and PEG in the medium. However, the fact that the germination rate of both mung beans is over 80% at 20 dS m^{-1} NaCl concentration and over 90% at -6 bar PEG concentration indicates that they can germinate at high NaCl and PEG doses. As a result of the study, it was determined that the 02 G 03 genotype was more tolerant to salinity and drought than the other genotype. If mung beans are to be grown in salinity and drought conditions in the coming days, 02 G 03 genotype can be recommended.

REFERENCES

Ahmad, A., Selim, M. M., Alderfasi, A. A. & Afzal, M. 2015. Effect of drought stress on mung bean (Vigna radiata L.) under arid climatic conditions of Saudi Arabia. WIT Transactions on Ecology and the Environment, 192, 185-193.

Akıncı, I. E. & Çalışkan, Ü. 2010. Effect of lead on seed germination and tolerance levels in some summer vegetables. Ecology, 19(74), 164-172.

Allahmoradi, P., Ghobadi, M., Taherabadi, S. & Taherabadi, S. 2011. Physiological aspects of mungbean (Vigna radiata L.) in response to drought stress. In International conference on food engineering and biotechnology, IPCBEE, 9, 272-275.

Asfaw, A. & Blair, M. W. 2012. Quantitative trait loci for rooting pattern traits of common beans grown under drought stress versus non-stress conditions. Molecular Breeding, 30(2), 681-695.

Asgharipour, M. R. & Rafiei, M. 2011. Effect of Salinity on Germination and Seedling Growth of Lentils. Australian Journal of Basic and Applied Sciences, 5(11), 2002-2004.

Aslan, H. & Atış. İ. 2018. Effect of drought stress on germination and seedling growth of some grass pea cultivars. Journal of Mustafa Kemal University Faculty of Agriculture, 23(2), 218-231.

Baloğlu, M. C., Kavas, M., Aydın, G., Öktem, H. A. & Yücel, A. M. 2012. Antioxidative and physiological responses of two sunflower (Helianthus annuus) cultivars under PEG-mediated drought stress. Turkish Journal of Botany, 36(6), 707-714.

Benlioğlu, B. & Özkan, U. 2020. Germination and Early Growth Performances of Mung Bean (Vigna radiata (L.) Wilczek) Genotypes Under Salinity Stress. Journal of Tekirdag Faculty of Agriculture, 17(3), 318-328.

Bilgili, D., Atak. M., Mavi, K. 2018. Effect of NaCI stress on germination and seedling growth of some bread wheat genotypes. Journal of Mustafa Kemal University Faculty of Agriculture, 23(1), 85-96.

Day, S. & Uzun, S. 2016. Impact of different NaCl doses on germination and early seedling growth of common vetch cultivars (Vicia sativa L.). Turkish Journal Of Agriculture - Food Science And Technology, 4(8), 636-641.

Day, S., Kaya, M. D. & Kolsarıcı, Ö. 2008. Effects of NaCI levels on germination of some confectionary sunflower (Helianthus annuus L.) genotypes. Journal of Agricultural Sciences, 14 (3), 230-236.

Elkoca, E., 1997. A study on salt resistance in beans (Phaseolus vulgaris L). Master Thesis, Ataturk University, Institute of Science and Technology, Erzurum.

Ellis, R. H. & Roberts, E. H. 1980. Towards a rational basis for testing seed quality. In Seed Production (Ed: P.D. Hebblethwaite), 605-635, Butterworths, London.

Ercan, O. 2008. Effect of drought and salt stresses on antioxidant defense system and physiology of lentil (Lens culinaris M.) seedlings. Middle East Technical University, Institute of Science and Technology, Department of Biology, Master Thesis, pp.107, Ankara.

Ertekin, İ., Yılmaz, Ş., Atak. M., Can, E. & Çeliktaş, N. 2017. Effects of salt stress on germination of some common vetch (Vicia sativa L.) cultivars. Journal of Mustafa Kemal University Faculty of Agriculture, 22(2), 10-18.

Ertekin Pinar, S., Duran Aksoy, O., Daglar, G., Yurtsal, Z. B. & Cesur, B. 2018. Effect of stress management training on depression, stress and coping strategies in pregnant women: a randomised controlled trial. Journal of Psychosomatic Obstetrics & Gynecology, 39(3), 203-210.

Esmaeili, N., Cai, Y., Tang, F., Zhu, X., Smith, J., Mishra, N. & Zhang, H. 2021. Towards doubling fibre yield for cotton in the semiarid agricultural area by increasing tolerance to drought, heat and salinity simultaneously. Plant Biotechnology Journal, 19(3), 462.

Friedman, M., Vidyasagar, R. & Joseph, N. 2006. A randomized, prospective, double blind study on the efficacy of dead sea salt nasal irrigations. The Laryngoscope, 116(6), 878-882.

Ghanbari, M., Mansour Ghanaei Pashaki, K., Safaei Abdolmanaf, S. & Aziz Ali Abadi, K. 2016. Effect of salt stress and hydropriming on germination characteristics of Mungbean (Vigna radiata (L.) Wilczek). Iranian Journal Pulses Research, 7(1), 65-80.

HanumanthaRao, B., Nair, R. M. & Nayyar, H. 2016. Salinity and high temperature tolerance in mungbean [Vigna radiata (L.) Wilczek] from a physiological perspective. Frontiers in Plant Science, 7, 957.

Itai, C., Ben-Zioni, A. & Ordin, L. 1973. Correlative changes in endogenous hormone levels and shoot growth ınduced by short heat treatments to the root. Physiol. Plant., 29, 355.

Jhanji, S. & Dhingra, M. 2020. Ameliorative effect of thiourea priming on germination characteristics of mungbean (Vigna radiata L.) under water and salinity stress. Legume Research-An International Journal, 43(3), 353-358.

Karaman, R. 2019. Characterızatıon in terms of phenological, morphological, agronomic and some technological properties of mung bean (Vigna radiata Wilczek) genotypes/ local populatıons ın Isparta condıtıons. Doctoral dissertation, Suleyman Demirel University, Graduate School of Natural and Applied Sciences, Isparta.

Kaya, M. D., Kaya, G. & Kolsarıcı, Ö. 2005. Effects of NaCl concentration on germination and emergence of some brassica species. Journal of Agricultural Sciences, 11 (4), 448-452.

Kıran, S., Ateş, Ç., Kuşvuran, Ş., Sönmez, K. & Elliatlıoğlu, Ş. 2017. Investigation of changes on some morphological characteristics in different eggplant scion/rootstock combinations under salt and drought stresses. Journal of the Institute of Science and Technology, 7(2), 43-54.

Kökten, K., Karaköy, T., Bakoğlu, A. & Akçura, M. 2010. Determination of salinity tolerance of some lentil (Lens culinaris M.) varieties. Journal of Food, Agriculture & Environment, 8(1), 140-143.

Kumari, S., Vaishnav, A., Jain, S., Varma, A. & Choudhary, D. K. 2016. Induced drought tolerance through wild and mutant bacterial strain Pseudomonas simiae in mung bean (Vigna radiata L.). World Journal of Microbiology and Biotechnology, 32(1), 1-10.

Lambrides, C. J. & Godwin, I. D. 2006. Mungbean. In: Chittarajan. Genome Mapping and Molecular Breeding in Plants, 3, pp. 69–90,

Maguire, J. D. 1962. Speed of germination-Aid in selection and evaluation for seedling emergence and vigor 1. Crop science, 2(2), 176-177.

Manivannan, P., Jaleel, C. A., Sankar, B., Kishorekumar, A., Somasundaram, R., Lakshmanan, G. A. & Panneerselvam, R. 2007. Growth, biochemical modifications and proline

metabolism in Helianthus annuus L. as induced by drought stress. Colloids and Surfaces B: Biointerfaces, 59(2), 141-149.

Misra, A. N., Murmu, B., Singh, P. & Misra, M. 1996. Growth and proline accumulation in mungbean seedlings as affected by sodium chloride. Biologia Plantarum, 38(4), 531.

Misra, N. & Dwivedi, U. N. 2004. Genotypic difference in salinity tolerance of green gram cultivars. Plant Science, 166(5), 1135-1142.

Mogotsi, K. K. 2006. In: Brink, M. & Belay, G. (Editors). PROTA 1: Cereals and pulses/Céréalesetlégumessecs. PROTA, Wageningen, Netherlands.

Mohammed, A. H. M. A. 2007. Physiological aspects of mungbean plant (Vigna radiata L. Wilczek) in response to salt stress and gibberellic acid treatment. Res J Agr Biol Sci, 3, 200-213.

Muhammad, A. & Majid, R. F. 2013. Crop breeding for salt tolerance in the era of molecular markers and marker-assisted selection. Plant Breeding. 132, 10–20.

Munir, N. & Aftab, F. 2009. The role of polyethylene glycol (PEG) pretreatment in improving sugarcane's salt (NaCl) tolerance. Turkish Journal of Botany, 33(6), 407-415.

Munns, R. & Tester, M. (2008). Mechanisms of salinity tolerance. Annu. Rev. Plant Biol., 59, 651-681.

Okçu, G., Kaya, M. D. & Atak, M. 2004. Effects of salt and drought stresses on germination and seedling growth of pea (Pisum sativum L.). Turk J. Agric. For., 29, 237-242.

Paliwal, K. V. & Maliwal, G. L. 1980. Growth and nutrient uptake relationship of some crops in saline substrate. Annals of the Arid Zone, 19, 251-253.

Promila, K. & Kumar, S. 2000. Vigna radiata seed germination under salinity. Biologia Plantarum, 43, 423–426.

Ranawake, A. L., Dahanayaka, N., Amarasingha, U. G. S., Rodrigo, W. D. R. J. & Rodrigo, U. G. T. 2011. Effect of water stress on growth and yield of mung bean (Vigna radiata L.). Tropical Agricultural Research & Extension, 14(4).

Ratnasekera, D. P. & Tharanganıe, A. P. S. 2015. Morpho-physiological response of selected Sri Lankan mungbean (Vigna radiata L.) genotypes to drought stress. Journal of AgriSearch, 2(3), 162-166.

Saha, P., Chatterjee, P. & Biswas, A. K. 2010. NaCl pretreatment alleviates salt stress by enhancement of antioxidant defense and osmolyte accumulation in mungbean (Vigna radiata L. Wilczek). Indian Journal of Experimental Biology, 48, 593-600.

Sanadhya, D., Kathuria, E. & Malik, C. P. 2012. Effect of drought stress and its interaction with two phytohormones on Vigna radiata seed germination and seedling growth. LS: International Journal of Life Sciences, 1(3), 201-207.

Sehrawat, N., Yadav, M., Bhat, K. V., Sairam, R. K. & Jaiwal, P. K. 2014. Evaluation of mungbean genotypes for salt tolerance at early seedling growth stage. Biocatalysis and Agricultural Biotechnology, 3(4), 108-113.

Sharma, A. & Dhanda, S. 2014. Abiotic stress response in Vigna radiata L. (Mungbean). International Journal of Life Sciences Biotechnology and Pharma Research, 3(4), 14.

Shirvan, M. R. & Asgharipur, M. R. 2009. Yield reaction and morphological characteristics of some mungbean genotypes to drought stress. Journal of Modern Agriculture Knowledge, 5 (15), 67–76.

Singh, D. P. & Singh, B. B. 2011. Breeding for tolerance to abiotic stresses in mungbean. Food Legumes, 24(2), 83-90.

Smit-Spinks, B., Swanson, B. T. & Markhart, A. H., 1984. Changes in water relations, water flux and root exudate abscisic acid content with cold acclimation of Pinus sylvestris L. Aust. J. Plant Physiol., 11, 431.

Sofi, P. A., Djanaguiraman, M., Siddique, K. H. M. & Prasad, P. V. V. 2018. Reproductive fitness in common bean (Phaseolus vulgaris L.) under drought stress is associated with root length and volume. Indian Journal of Plant Physiology, 23(4), 796-809.

Uyanık, M., Kara, Ş. M. & Korkmaz, K. 2014. Determination of responses of some winter canola (Brassica napus L.) cultivars to salt stress at germination period. Journal of Agricultural Sciences, 20, 368-375.

Wang, W., Vinocur, B., Shoseyov, O. & Altman, A. 2004. Role of plant heat-shock proteins and molecular chaperones in the abiotic stress response. Trends in Plant Science, 9(5), 244-252.

Yetişir, H. & Uygur, V. 2009. Plant growth and mineral element content of different gourd species and watermelon under salinity stress. Turkish Journal of Agriculture and Forestry, 33(1), 65-77.

Yılmaz, M. B. & Kısakürek, Ş. 2021. Lolium perenne L. çeşitlerinde kuraklık stresinin çimlenme ve erken fide gelişimi üzerine etkisi. Kahramanmaraş Sutcu Imam University Journal of Agriculture and Nature, 24(3), 529-538.

Yokoi, S., Bressan, R. A. & Hasegawa, P. M. 2002. Salt stress tolerance of plants. JIRCAS Working Report, 23(1), 25-33.

Zhang, Y., Su, J., Cheng, D., Wang, R., Mei, Y., Hu, H. & Zhang, Y. 2018. Nitric oxide contributes to methane-induced osmotic stress tolerance in mung bean. BMC Plant Biology, 18(1), 1-12.

CİVANPERÇEMİ ETANOLÜK EKSTRAKTININ Bacillus cereus ATCC 11778 ÜZERİNDEKİ İNHİBİTÖR ETKİSİ

INHIBITORY EFFECTS OF ETHANOLIC YARROW EXTRACTS AGAINST Bacillus cereus ATCC 11778

Dr. Öğr. Ü. Sabire YERLİKAYA
Karamanoğlu Mehmetbey Üniversitesi, Mühendislik Fakültesi,
Gıda Mühendisliği Bölümü, Karaman
ORCID NO: 0000-0001-9842-5848
Gülşah PINAR KARAARSLAN
Karamanoğlu Mehmetbey Üniversitesi, Mühendislik Fakültesi,
Gıda Mühendisliği Bölümü, Karaman
ORCID NO: 0000-0002-1591-5444
Arş. Gör. Hülya ŞEN ARSLAN
Karamanoğlu Mehmetbey Üniversitesi, Mühendislik Fakültesi,
Gıda Mühendisliği Bölümü, Karaman
ORCID NO: 0000-0002-1662-2942

ÖZET

Bu çalışmada etanolik civanperçemi ekstraktının (EEY) tavuk suyunda canlı Bacillus cereus ATCC 11778 üzerindeki inhibitör etkisi araştırılmıştır. Tavuk suyu analize başlamadan önce toplam mezofilik aerobik bakteri (TMAB) sayısının arttırılması amacıyla 25ºC ‘de 48 saat bekletilmiştir. Literatür verilerine göre EEY’nin Bacillus cereus üzerinde yüksek bir inhibitör etkisi mevcuttur. Yapılan çalışmanın amacı patojenin içinde bulunduğu gıdanın TMAB sayısı arttırıldığında, EEY’nin göstereceği inhibitör etkiyi gözlemlemektir. Bu amaçla örnekler üç gruba ayrılmış olup; birinci grup kontrol numunelerini (ekstrakt ve patojen içermeyen), ikinci grup ayrı ayrı %5 ve %10 EEY (patojen içermeyen) içeren örnekleri; üçüncü grup ise ayrı ayrı 2 log kob/ml ve 3 log kob/ml konsantrasyonunda Bacillus cereus ATCC 11778 içeren örnekleri göstermektedir. Tavuk suyuna ayrı ayrı %5 ve %10 konsantrasyonunda EEY ilave edilip, 4ºC'de 2 saat inkübe edilmiştir. Süre sonunda örneklere Bacillus cereus ATCC 11778 inoküle edilip, tekrar 4ºC'de 2 saat inkübe edilmiştir. İnkübasyon süresi bittiğinde numunelerden TMAB sayımı için Plate Count Agara; Bacillus cereus ATCC 11778 için Mannitol Egg Yolk Polymyxine (MYP) Agara yayma plak yöntemiyle ekim yapılıp; 37ºC'de 24 saat inkübasyona bırakılmıştır. Tüm muameleler, kontrol örneğine kıyasla tavuk suyunda TMAB ve Bacillus cereus ATCC 11778 sayısını önemli ölçüde azaltmıştır ($P< 0.05$). Kontrol numunelerinde 9,5 log kob/ml TMAB tespit edilmiştir. %10 EEY ‘nin (8,54 log kob/ml), TMAB üzerinde %5 EEY'den (8,63 log kob/ml) daha fazla antimikrobiyal etkiye sahip olduğu bulunmuştur. EEY, tüm muamelelerde Bacillus cereus ATCC 11778 sayısını azaltmıştır. En yüksek inhibisyon etki %10 EEY'e (7.38 log kob/ml) sahip tavuk suyunda görülmüştür. Literatürdeki çalışmalara göre EEY'nin inhibitör etkisinin düşük olduğu bulunmuştur. Bunun nedeni, analiz materyali olarak kullanılan tavuk suyunun TMAB'sinin yüksek olmasıdır. Tavuk suyunun başlangıçtaki mikrobiyal yükü yüksek olduğundan, EEY'nin inhibitör aktivitesi patojen konsantrasyonunu azaltmak için yeterli olamamıştır. Bu çalışmadan elde edilen sonuçlar, doğal bir gıda

koruyucusu olarak etanolik civanperçemi ekstraktının, 4ºC'de depolanan tavuk suyunda TMAB sayısını ve Bacillus cereus ATCC 11778'i azaltmak için kullanılabileceğini göstermektedir.

Anahtar Kelimeler: Tavuk suyu, Toplam mezofilik aerofilik bakteri, Patojen

ABSTRACT

In this study, the inhibitory effects of ethanolic yarrow extract (EEY) on the survival Bacillus cereus ATCC 11778 in chicken broth was investigated. Chicken broth was kept at 25ºC for 48 hours, before starting the analysis, in order to increase the total number of mesophilic aerobic bacteria (TMAB). According to literature, EEY has a high inhibitory effect on Bacillus cereus. The aim of this study is to observe the inhibitory effect of EEY when the TMAB count of food is increased. Samples were divided into three groups. First group was the control samples (without extract and pathogen), the second group has 5% and 10% EEY (without pathogen) separetly, third group was inoculated with 2 log cfu/ml and 3 log cfu/ml Bacillus cereus ATCC 11778, separetly. 5% and 10% concentrations of EEY were added to the chicken broth separately and incubated for 2 hours at 4ºC. At the end of the period, the samples were inoculated with Bacillus cereus ATCC 11778 and incubated again at 4ºC for 2 hours. After incubation, Plate Count Agar was used for TMAB; Mannitol Egg Yolk Polymyxine (MYP) Agar was used for Bacillus cereus ATCC 11778. Samples were inoculated by spreading plate method, then they were incubated for 24 hours at 37ºC. All samples significantly ($P< 0.05$) reduced the count of TMAB and Bacillus cereus ATCC 11778 in chicken broth compared with the control samples. It was calculated 9.5 log cfu/ml TMAB in control samples. 10% EEY has more antimicrobial effect (8.54 log cfu/ml) than 5% EEY (8.63 log cfu/ml) on TMAB. EEY reduced the numbers of Bacillus cereus ATCC 11778 in all treatments. The most inhibition effects was seen in chicken broth has 10% EEY (7.38 log cfu/ml). It is found inhibitory effect of EEY was low, according to the studies in the literature. The reason is high TMAB of the chicken broth used as the analysis material. Since the initial microbial count of chicken broth was high, the inhibitory activity of EEY could not reduce the pathogen concentration. The results of this study indicate that ethanolic yarrow extract as a natural food preservative may be used to reduce TMAB and Bacillus cereus ATCC 11778 in chicken broth at 4ºC.

Keywords: Chicken broth, Total Mezofilic Aerobic Bacteria, Pathogen

1. INTRODUCTION

Yarrow (Achillea millefolium) is a plant with a wide distribution in the northern hemisphere and Turkey. Some Achilea species have been found to have antispasmodic, anti-inflammatory, antimicrobial properties. These properties are believed to be due to flavonoid and phenolcarbonic acid complexes (Benedek et al., 2007). The antimicrobial effect of yarrow on Bacillus cereus, Enterococcus faecalis, Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Proteus mirabilis, Salmonella typhimurium, Citrobacter freundii, Candida albicans and Aspergillus fumigatus has been found by many researchers (Kazemi, 2015).

B.cereus was found as a common food contaminant in the second half of the 20th century (Bottone, 2010; Ehling-Schulz et al., 2011). Bacillus cereus is Gram-positive and spore-former bacteria. It can be widely grown in soil and plants. It is highly stable in acidic pH, because of its spore-forming characteristics, It can also colonize different environments such as various foods (Zulkhairi Amin et al., 2009; Sabaté et al., 2009).

Chicken broth is highly appreciated as a savory dish due to its desirable and typical flavor and taste profile. Chicken broth contains much nutrients so it is highly nutritious food. (Carter et al., 2011). In this study, the inhibitory effects of ethanolic yarrow extract (EEY) on the survival Bacillus cereus ATCC 11778 in chicken broth was investigated.

MATERIALS AND METHODS

Materials

Yarrow used in the research was brought from an organic products company in Konya and brought to laboratory of Karamanoğlu Mehmetbey University, Department of Food Engineering under aseptic conditions.

Methods

Yarrow dissolves well in organic solvents. For this reason, ethanol was chosen as organic solvent. The analyzes in the study were carried out in two parallel with two repetitions.

Ethanolic yarrow (Achillea millefolium) extracts

For 5% ethanolic yarrow extract, 10 g of yarrow was incubated in 95 ml ethanol; for 10% ethanolic yarrow extract, 20 g of yarrow was incubated in 90 ml of ethanol in a shaking water bath at 65°C for 1 hour by shaking. The extracts from the water bath were filtered through a coarse filter paper and collected into a flask. The part remaining on the filter paper was re-placed in voluminous bottles and 95 ml ethanol for 5%; 90 ml ethanol for 10% was added and it was extracted at 65°C for 1 hour. Each sample was filtered and transferred to extracts previously collected in a flask. The extracts obtained were stored at -18ºC until they were used in experiments (Şen Arslan, 2017).

B.cereus ATCC 11778 inhibition

Chicken broth was kept at 25ºC for 48 hours, before starting the analysis, in order to increase the total number of mesophilic aerobic bacteria (TMAB). Samples were divided into three groups. First group was the control samples (without extract and pathogen), the second group has 5% and 10% EEY (without pathogen) separetly, third group was inoculated with 2 log cfu/ml and 3 log cfu/ml Bacillus cereus ATCC 11778, separetly. 5% and 10% concentrations of EEY were added to the chicken broth separately and incubated for 2 hours at 4ºC. At the end of the period, the samples were inoculated with Bacillus cereus ATCC 11778 and incubated again at 4ºC for 2 hours. After incubation, Plate Count Agar was used for TMAB; Mannitol Egg Yolk Polymyxine (MYP) Agar was used for Bacillus cereus ATCC 11778. Samples were inoculated by spreading plate method, then they were incubated for 24 hours at 37ºC. (AOAC, 2000).

Statistical analysis

The results were analyzed statistically using SPSS 22 (IBM Corp., Armonk, New York, USA) program. Sample means were compared using One Way ANOVA and were evaluated with Duncan test from Post Hoc Test (Şen Arslan, 2017).

RESULTS and DISCUSSION

The effects of different concentration of yarrow ethanolic extract on B.cereus ATCC 11778 inhibition were statistically significant ($p<0.05$). Figure 1 shows the results of the Duncan Test for B.cereus inhibition values.

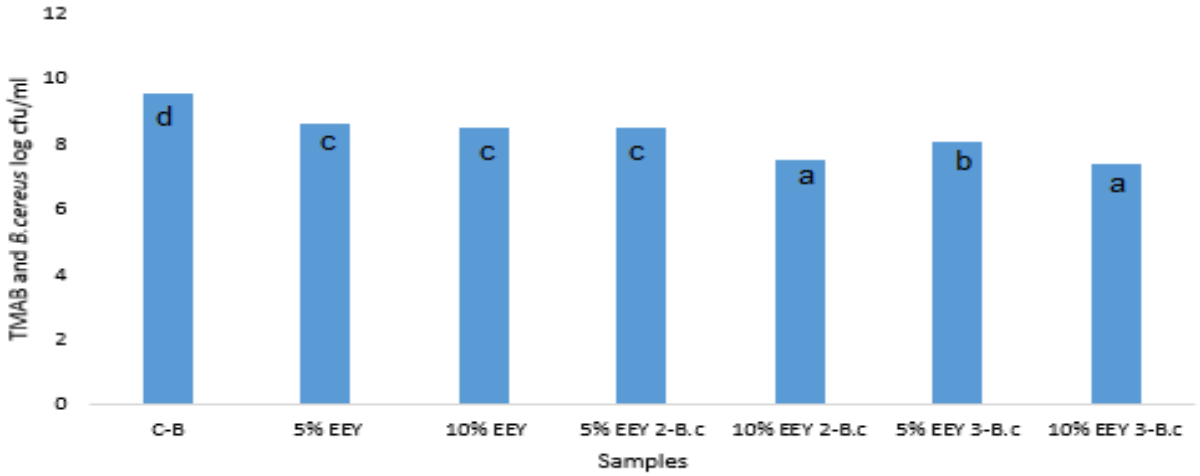


Figure 1. Effect of yarrow extracts on inhibition levels of B.cereus

(C-B: chicken broth; 5% EEY: chicken broth+ 5% EEY; 10% EEY: chicken broth+ 10% EEY; 5% EEY 2-B.c: chicken broth+ 5% EEY+ 2 log cfu/ml B.cereus; 10% EEY 2-B.c: chicken broth+ 10% EEY+ 2 log cfu/ml B.cereus; 5% EEY 3-B.c: chicken broth+ 5% EEY+ 3 log cfu/ml B.cereus; 10% EEY 3-B.c: chicken broth+ 10% EEY+ 3 log cfu/ml B.cereus)

As seen in Figure 1, all extracts showed inhibitory effect on TMAB and B.cereus. It was observed TMAB as 9,55±0,27 log cfu/ml in chicken broth. 10% EEY (8,54±0,13 log cfu/ml) has more antimicrobial effect than 5% EEY (8,63±0,19 log cfu/ml).

10% EEY (7,55±0,13 log cfu/ml and 7,38±0,04 log cfu/ml) has more antimicrobial effect than 5% EEY (8,53±0,05 log cfu/ml and 8,08±0,32 log cfu/ml) on B.cereus at 2.0 log cfu/ml and 3.0 log cfu/ml concentration, respectively. Number of B. cereus detected at the end of the incubation was higher than the level inoculated. It is thought the reason for this situation, chicken broth may have been contaminated with B. cereus from the environment.

Researchers reported, yarrow essential oil has antimicrobial effect on many bacteria. B. cereus is one of them (Bezić et al., 2003; Issabeaglov et al., 2012). It is stated yarrow has inhibtory effect against Pseudomonas marginalis, Bacillus spp., Ervinia, Xanthomonas (Vasinauskiene et al., 2006).

CONCLISION

According to this study, it is seen that the inhibitory effect of 10% yarrow extract on Bacillus cereus ATCC 11778 is more than 5%yarrow extract at 4°C. The high initial TMAB of chicken broth decreased the inhibitory power of EEY. It is known that EEY is more effective on pathogen bacteria when the initial microbial count of the material is removed or decreased. Nowadays, consumers prefer natural preservatives instead of chemical substances. Different concentrations of EEY can be used to prevent the growth of Bacillus cereus ATCC 11778 in chicken broth stored at 4°C.

REFERENCES

AOAC 2000. Official Methods of Analysis (18th ed.). Arlington, VA, Association of Official Analytical Chemists.

Bezić, N., Skocibusić, M., Dunkić, V., Radonić, A. (2003). Composition and antimicrobial activity of Achillea clavennae L. essential oil. Phytother. Res. 17(9):1037-40

Benedek, B., Gjoncaj, N., Saukel, J., Kopp, B. (2007). Distribution of phenolic compounds in middleeuropean taxa of the Achillea millefolium L. aggregate. Chemistry and Biodiversity, 2007, 4: 849-857.

Bottone, E., (2010). Bacillus cereus, a volatile human pathogen. Clinical Microbiology Reviews, vol 23, no 2

Carter, B.E., Monsivais, P., Perrigue, M., Drewnowski, A., (2011). Supplementing chicken broth with monosodium glutamate reduces hunger and desire to snack but does not affect energy intake in women, British Journal of Nutrition , Volume 106 , Issue 9 , 14 pp. 1441 - 1448

Ehling-Schulz, M., Knutsson, R., Scherer, S. (2011). Bacillus cereus, p 147–164. In Kathariou S, Fratamico P, Lui Y (ed), Genomes of Food- and Water-Borne Pathogens. ASM Press,

Issabeaglov, E., Taghizadieh, M., Abri, B., (2012). Antimicrobial effects of yarrow (Achillea millefolium) essential oils against Staphylococcus species. African Journal of Pharmacy and Pharmacology Vol. 6(41), pp. 2895-2899

Kazemi, M., (2015). Chemical composition and antimicrobial, antioxidant activities and anti-inflammatory potential of Achillea millefolium L., Anethum graveolens L., and Carum copticum L. essential oils. Journal of Herbal Medicine 5, 217–222

Sabaté, D.C., Carrillo, L., Audisio, M.C. (2009). Inhibition of Paenibacillus larvae and Ascosphaera apis by Bacillus subtilis isolated from honeybee gut and honey samples. Res. Microbiol, 160, 193–199.

Şen Arslan, H. (2017). Bazı Tıbbi Aromatik Bitki Ekstraktlarının Fenolik Madde içerikleriyle Amilaz, Glukozidaz Ve Lipaz Enzimleri Üzerine Etkileri (Master thesis). Erciyes University, Kayseri.

Vasinauskiene, M., Radusiene, J., Zitikaite, I. & Surviliene, E., (2006). Antibacterial activities of essantial oils from aromatic and medicinal plants against growth of phytopathogenic bacteria. Agronomy Research, 4, 437-440

Zulkhairi Amin., F.A., Sabri, S., Ismail, M., Chan, K.W., Ismail, N., Mohd Esa, N. Mohd Lila, M.A., Zawawi, N. (2020). Probiotic Properties of Bacillus Strains Isolated from Stingless Bee (Heterotrigona itama) Honey Collected across Malaysia. Int. J. Environ. Res. Public Health, 17, 278. https://doi.org/10.3390/ijerph17010278

TÜRKİYE'DE YETİŞTİRİLEN ESTONYA VE USA ORİJİNLİ HOLŞTAYNLAR'DA NON-GENETİK FAKTÖRLERİN BAZI DÖL VERİMİ ÖZELLİKLERİ ÜZERİNE ETKİSİ

THE EFFECT OF NON-GENETIC FACTORS ON SOME REPRODUCTIVE TRAITS IN HOLSTEINS OF ESTONIAN AND USA ORIGIN BRED IN TURKEY.

Dr. Kürşat ALKOYAK

Tarım ve Orman Bakanlığı, Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü, Hayvancılık ve Su Ürünleri Daire Başkanlığı, Ankara.

ORCID NO: 0000-0001-6621-6136

Dr. Bülent BÜLBÜL

Dokuz Eylül Üniversitesi, Veteriner Fakültesi,

Dölerme ve Suni Tohumlama Anabilim Dalı, Kiraz, İzmir.

ORCID NO: 0000-0002-7130-8796

ÖZET

Bu araştırma, Kırşehir'de özel bir çiftlikte aynı koşullarda yetiştirilen değişik orijinli (Estonya ve USA) Holştaynların döl verimi özelliklerinden servis sayısı ve buzağılama - ilk tohumlama aralığı üzerine genetik olmayan faktörlerden buzağılama yılı, buzağılama mevsimi ve buzağılama yaşının etkilerinin belirlenmesi amacıyla yapıldı.

Çalışmada, Estonya ve USA orijinli Holştayn sığırlara ait toplam 500 adet döl verim kaydı kullanıldı. Verilerin analizlerinde, non-genetik faktörlerin etki paylarının belirlenmesinde en küçük minimum kareler metodu ve bunların karşılaştırılmasında Tukey çoklu karşılaştırma testi kullanıldı. Çalışmada Estonya orijinli Holştaynların 2011, 2012, 2013 ve 2014 yıllarında servis sayısı ortalamaları sırasıyla 1.99±0.540, 2.94±0.340, 4.20±0.463 ve 2.58±0.958, buzağılama - ilk tohumlama aralığı ortalamaları 65.10±14.2, 90.59±8.94, 107.6±12.2 ve 86.30±25.2 gün olarak belirlenirken, USA orijinli Holştaynların 2012, 2013 ve 2014 yıllarında servis sayısı ortalamaları sırasıyla 2.06±0.362, 2.26±0.366 ve 2.13±0.651, buzağılama ilk tohumlama aralığı ortalamaları 80.13±5.27, 84.77±5.35 ve 69.51±8.86 gün olarak hesaplandı. Estonya orijinli Holştaynlarda buzağılama yılı ve buzağılama mevsiminin servis sayısı üzerine etkisi istatistiki olarak önemli ($p<0.05$) bulunurken, incelenen non-genetik faktörlerin tümünün buzağılama - ilk tohumlama aralığı üzerine etkisi önemli olarak bulunmadı. USA orijinli Holştaynlarda non-genetik faktörlerden sadece buzağılama mevsiminin buzağılama - ilk tohumlama aralığı üzerine etkisi istatistiki olarak önemli ($p<0.001$) bulunurken, diğer tüm non-genetik faktörlerin (buzağılama yılı, buzağılama mevsimi ve buzağılama yaşı) incelenen özellikler üzerine etkisi önemli olarak bulunmadı.

Sonuç olarak bu çalışma ile Kırşehir ilinde yetiştirilen Estonya ve USA orijinli Holştayn sığırların bazı döl verim özelliklerinden servis sayısı ve buzağılama - ilk tohumlama aralığı belirlendi. Ayrıca bu çalışmada elde edilen döl verim özelliklerinin bölgedeki Holştayn yetiştiriciliğine katkı sağlayacağı düşünülmektedir.

Anahtar Kelimeler: Holştayn, servis sayısı, buzağılama-ilk tohumlama aralığı, non-genetik faktörler

ABSTRACT

This study was carried out to determine the effects of non-genetic factors such as calving year, calving season and calving age on fertility characteristics, number of services per conception and calving-first insemination interval of Holsteins of different origin (Estonia and USA) bred under the same conditions in a private farm in Kırşehir.

In the study, a total of 500 reproduction records of Holstein cattle of Estonian and USA origin were used. In the analysis of the data, the least minimum squares method was used to determine the effects of non-genetic factors and the Tukey multiple comparison test was used to compare them. In the study, the mean number of services for Holsteins of Estonian origin were 1.99±0.540, 2.94±0.340, 4.20±0.463 and 2.58±0.958, the mean calving-first insemination intervals were 65.10±14.2, 90.59±8.94, 107.6±12.2 and 86.30±25.2 days in 2011, 2012, 2013 and 2014, respectively, while the mean number of services for Holsteins of USA origin were 2.06±0.362, 2.26±0.366 and 2.13±0.651, the mean calving-first insemination intervals were 80.13±5.27, 84.77±5.35 and 69.51±8.86 days in 2012, 2013 and 2014, respectively. While the effect of calving year and calving season on the number of services were statistically significant ($p<0.05$), the effect of all non-genetic factors on calving-first insemination interval was not significant in Holsteins of Estonian origin. Among the non-genetic factors, only the effect of the calving season on the calving-first insemination interval was statistically significant ($p<0.001$), while the effect of all other non-genetic factors (calving year, calving season and calving age) on the examined traits was not significant in the USA origin Holsteins.

As a result, with this study, some of the fertility characteristics such as the number of services and calving-first insemination interval we re determined in Estonian and USA origin Holstein cattle raised in Kırşehir province. In addition, it is thought that the reproductive traits obtained in this study will contribute to Holstein breeding in the region.

Keywords: Holstein, number of services, calving-first insemination interval, non-genetic factors

CLINICAL, PATHOLOGICAL AND IMMUNOHISTOCHEMICAL EVALUATION OF PERINEAL TUMORS IN DAMASCUS GOATS

HALEP KEÇİLERİNDE PERİNEAL TÜMÖRLERİN KLİNİK, PATOLOJİK VE İMMÜNOHİSTOKİMYASAL DEĞERLENDİRİLMESİ

Dr. Öğr. Üyesi Ünal YAVUZ

Harran Üniversitesi Veteriner Fakültesi, Cerrahi Anabilim Dalı, Eyyübiye Yerleşkesi, Eyyübiye/ŞANLIURFA

ORCID ID: 0000-0002-4981-2355

Doç. Dr. Rahşan YILMAZ

Harran Üniversitesi Veteriner Fakültesi, Patoloji Anabilim Dalı, Eyyübiye Yerleşkesi, Eyyübiye/ŞANLIURFA

ORCID ID: 0000-0002-0944-2230

ABSTRACT

The incidence of skin tumors in goats is low, and squamous cell carcinoma (SCC) is the most common skin tumor. In this study, it was aimed to evaluate the clinical, pathological and immunohistochemical characteristics of tumors encountered in the perineal region in 8 Damascus goats aged 2-5 years who were brought to the Harran University Veterinary Faculty Surgery Clinic with the complaint of a mass in the perineal region. In clinical examination; There were cauliflower-like, raised and thickened ulcerative masses on the ventral part of the tail and around the anus. It was noted that there was a bad odor around the anus in two cases. Surgically excised masses are macroscopically 4x1.8x06 cm, 2.5x1x0.5cm and 3.2x2.5x0.7 cm, solid, rough surface, slightly hard consistency, cross-sectional face is cream colored; Dimensions of 4.2x 4x3 cm, 3.5x1.7x0.9 cm and 2.7x1.2x0.6 cm, solid, rough surface, slightly hard consistency, thick layer on the outside of the section face, black inside, cream colored inside; They were 0.8x0.6x0.8 cm and 3.5x3.2x1 cm in size, with a solid, medium-hard consistency, and a cream-colored cross-section. After the masses were fixed in 10% buffered formaldehyde solution, they were turned into paraffin blocks by routine tissue follow-up. Sections of 4 µm thickness were taken from paraffin blocks. Hematoxylin&Eosin (H&E) and Melan A, HMB45 and S100 immunohistochemical (IHC) stainings were performed on the sections. In the histopathological examination, 3 masses were diagnosed as amelanotic melanoma, 3 masses were diagnosed as melanotic melanoma, and 2 masses were diagnosed as SCC. It was observed that 2 of the affected goats were male, 6 were female and the mean age range was 4,13. While Melan A, HMB45 and S100 were positive in amelanotic melanoma and melanotic melanoma cases in IHC stainings, only S100 showed positive results in SCC cases. It was thought that the common occurrence of tumors in the perianal region in Damascus goats was due to the high and short tail structure of the goats that exposed the perianal region, the lack of pigmentation in the perianal region and the intense ultraviolet radiation exposure of the perianal region due to the extremely hot climate. As a result, it was evaluated that perianal tumors can be encountered in young Damascus goats and melanomas can be seen at a higher rate than SCCs.

Keywords: Damascus goat, melanoma, squamous cell carcinoma

ÖZET

Keçilerde deri tümörleri insidansı düşük olup squamous hücre karsinomu (SHK) en yaygın karşılaşılan deri tümörüdür. Bu çalışmada perineal bölgede kitle şikayetiyle Harran

Üniversitesi Veteriner Fakültesi Cerrahi kliniğine getirilen yaşları 2-5 aralığındaki 8 Halep keçisinde perineal bölgede karşılaşılan tümörlerin klinik, patolojik ve immünohistokimyasal özelliklerinin değerlendirilmesi amaçlandı. Klinik muayenede; kuyruğun ventral kısmında ve anüs çevresinde karnabahar benzeri, kabarık ve kalınlaşmış, ülseratif kitleler bulunmaktaydı. Vakaların ikisinde anüs çevresinde kötü koku olduğu dikkat çekti. Cerrahi yöntemle eksize kitleler makroskobik olarak 4x1,8x06 cm, 2,5x1x0,5cm ve 3,2x2,5x0,7 cm boyutlarında, solid, yüzeyi pürüzlü, hafif sert kıvamlı, kesit yüzü krem renkte; 4,2x 4x3 cm, 3,5x1,7x0,9 cm ve2,7x1,2x0,6 cm boyutlarında, solid, yüzeyi pürüzlü, hafif sert kıvamlı, kesit yüzü dışı kalın tabaka halinde siyah, içi krem renkte; 0,8x0,6x0,8 cm ve 3,5x3,2x1 cm boyutlarında, solid, orta sert kıvamda, kesit yüzü krem renkte görüntüye sahiplerdi. Kitleler %10'luk tamponlu formaldehit solüsyonunda tespit edildikten sonra rutin doku takibinden geçirilerek parafin bloklar haline getirildi. Parafin bloklardan 4 µ kalınlığında kesitler alındı. Kesitlere Hematoksilen&Eozin (H&E) ve Melan A, HMB45 ve S100 immunohistokimyasal (IHK) boyamaları yapıldı. Histopatolojik incelemede 3 kitleye amelanotik melanoma, 3 kitleye melanotik melanoma ve 2 kitleye SHK tanısı konuldu. Etkilenen keçilerin 2'sinin erkek, 6'sının dişi ve ortalama yaş aralığının 4.13 olduğu gözlendi. IHK boyamalarda amelanotik melanoma ve melanotik melanoma olgularında Melan A, HMB45 ve S100 pozitif sonuç verirken SHK olgularında sadece S100 pozitif sonuç verdi. Halep keçilerinde perianal bölgede tümörle yaygın olarak karşılaşılmasının, keçilerin perianal bölgeyi açıkta bırakan yüksek ve kısa kuyruk yapısına sahip olması, perianal bölgedeki pigmentasyon eksikliği ve aşırı sıcak iklimden dolayı perianal bölgenin yoğun ultraviyole radyasyona maruz kalmasından kaynaklandığı düşünüldü. Sonuç olarak genç Halep keçilerinde de perianal tümörler ile karşılaşılabileceği ve SHK'lerden daha yüksek oranda melanomların görülebileceği değerlendirildi.

Anahtar Kelimeler: Halep keçisi, melanom, squamous hücre karsinomu

THE RITUALISTIC AND MEDICINAL USE OF THE BARKS, ROOTS AND LEAVES OF GARDEN AND FARM PLANTS TO ELIMINATE SEVERAL HEALTH-RELATED PROBLEMS OR AILMENTS IN THE PROCESS OF TRADITIONAL HEALING PRACTICE IN THE BAPEDI SOCIETY

Prof. Dr. Morakeng Edward Kenneth Lebaka

University of Zululand – KwaDlangezwa Campus; Faculty of Arts, Department of Creative Arts

ORCID NO: 0000-0002-4652-9490

ABSTRACT

In the Bapedi society, barks, roots and leaves of both garden and farm plants, play a vital role in eliminating several health-related problems or ailments. In the process of traditional healing practice, traditional healers create traditional medicines from these plants for the benefit of Bapedi people. The purpose of this study was to investigate the cultural relevance of traditional healing in contemporary Bapedi society and the philosophical thought behind the germane wisdom practiced by Bapedi traditional healers to create traditional medicines from these plants for survival and good health. Oral interviews were used as the primary source for collecting data. Secondary sources included observations, records and publications. The following research question therefore guided this study: Are traditional medicines effective and functional in eliminating several health-related problems or ailments? The results have revealed that traditional medicines benefit both traditional healers and Bapedi people by encompassing their way of life and living environment. The results have also shown that a large percentage of Bapedi people in contemporary Bapedi society tend not to be interested in modern healing system, but prefer to consult with dingaka (traditional healers), especially when problems seem particularly difficult to surmount.

Keywords: Bapedi culture, leaves, barks, roots, ritual, medicinal, health-related problems, ailments.

THE LENGTH-WEIGHT RELATIONSHIP AND CONDITION FACTOR OF BROND – SNOUT (Chondrostoma regium (Heckel, 1843)) POPULATION IN THE DICLE RIVER

Muhammed Yaşar DÖRTBUDAK

Harran University, Faculty of Veterinary, Şanlıurfa, Turkey

Gülnaz ÖZCAN

İskenderun Technical University, Faculty of Marine Sciences and Technology, Iskenderun, Hatay, Turkey

ABSTRACT

Our study subject, Chondrostoma regium, was caught by fishermen from the Tigris River in Güçlükonak and Cizre region of Şırnak province between January 2015 and December 2015. Length-weight relationship and condition factor of C.regium samples were studied. Of the 379 C. regium samples taken in this study, 290 (76.52%) were females and 89 (23.48%) were males. In the calculations, the relationship between height and weight of individuals was W=0.0055TL3.0593 (R2=0.8092) in females, as W=0.0089TL2.9026 (R2=0.8712) in males and W=0.0060TL3.0309 (R2=0.8186) in all individuals.

In terms of growth pattern, it was calculated that there was isometric growth ($p>0.05$) in males, females and all individuals. The mean condition factor, which expresses the body shape and fattening status of a fish, was found to be 0.670±0.0049 for females and 0.665±0.0080 for males.

Keywords: Length-Weight Relationship, Condition Factor, Chondrostoma regium, Tigris River

PROPHYLACTIC EFFECTS OF JUNIPERUS OXYCEDRUS EXTRACT ADMINISTRATION IN WISTAR RATS CO-EXPOSED TO LEAD AND MANGANESE. BIOCHEMICAL, HEMATOLOGICAL AND NEUROBEHAVIORAL STUDY

Mostapha Brahmi

Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (**LBPVBP**), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria

ORCID ID: 0000-0003-4131-5802

Djallal Eddine Houari Adli

Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (**LBPVBP**), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria

Mokhtar Benreguieg

Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (**LBPVBP**), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria

Wafaa Arabi

Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (**LBPVBP**), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria

Kadda Hachem

Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (**LBPVBP**), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria

Khaled Kahloula

Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (**LBPVBP**), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria

Miloud Slimani

Laboratory of Biotoxicology, Pharmacognosy and Biological recovery of plants (**LBPVBP**), Department of Biology, Faculty of Sciences, University of Dr MoulayTahar, Saida, Algeria

ABSTRACT

The objective of this study is to evaluate the modifications induced by lead and manganese using the approach: biochemical, hematological and neurobehavioral in young rats during the gestation and lactation period. As well as tested the efficacy of the essential oil of Juniperus oxycedrus, to restore or not these effects by treating previously intoxicated rats with a daily dose of intraperitoneal injection of 0.1 ml HE/kg during a period of 21 days. However, extraction by hydrodistillation, resulted in an EO with a yield of 1.30%. Chronic exposure to lead at a concentration of 0.2% and manganese at a concentration of 4.79g/l during the

developmental period, resulted in a decrease in body weight of the young rats (D21) and a reduction in brain weight compared to controls. However, the results of biochemical assays showed that lead and Mn induced hypocalcemia, hypomagnesemia, hypoalbuminemia, hypercholesterolemia, a decrease in total iron and an increase in ALP activity, as well as hematological disturbances with variable signs; leukopenia, lymphocytosis and reversal of the leukocyte formula in 50% of cases, an increase or decrease in the hemoglobin level and mild polyglobulia. On the other hand, the use of different techniques related to behavioral tests: the forced swimming test (FST), the elevated cross maze (EPM) and the open field clearly reveal that MnCl2-Pb intoxication causes a depressive state, a significant anxiety as well as a locomotor hypoactivity accompanied by an exploratory incapacity in young rats from intoxicated females during the developmental period compared to controls. This is explained by the deleterious effects of Pb and Mn on dopaminergic and serotonergic transmission. Moreover, the administration of Juniperus oxycedrus essential oil led to a good improvement of biochemical and hematological parameters, a regulation of neurobehavioral disturbances and different biochemical parameters which justifies the great importance of cade in traditional medicine and its therapeutic virtues.

Key words: Brain, Juniperus oxycedrus, Manganese, Lead, Blood, Neurobehavioral tests

CLINICAL SIGNS AND HAEMATOLOGICAL CHANGES ASSOCIATED WITH INFECTION OF ONCORHYNCHUS MYKISS REARED IN RECIRCULATING AQUACULTURE SYSTEMS

Angelica DOCAN, Lorena DEDIU, Iulia GRECU, Mirela CREȚU

Faculty of Food Science and Engineering

"Dunarea de Jos" University of Galati, Domnească Street 800008, Romania

Romania

ABSTRACT

Recirculating systems create unique environments for fish culture which may provide favorable conditions for disease occurrence or the reproduction of opportunistic microorganisms. Bacterial diseases are among the most important causes of economic losses in cultured fish species. Using haematological parameters for monitoring physiological status of fish under stress conditions has been adopted as a minimal invasive method especially when working with economically valuable salmonid species in aquaculture. Hematology is an indicator effectively and sensitively used to monitor the physiological and pathological changes in fish. This study evaluated the haematological changes in Oncorhynchus mykiss infected with Aeromonas salmonicida bacteria, under effect of the influence of pathogenic bacteria compared to healthy fish. 1 ml of blood was sampling from each fish by caudal venous puncture. Blood was analysed with routine method used in fish hematology and was determined the following haematological parameters: red blood cell counts (RBCc, x 10^6/µl), the hematocrit (PCV, %) and hemoglobin concentrations (gl/dl), white blood cell counts (WBCc x 10^3/µl), number of total thrombocytes, and differential counting of WBC (lymphocytes, monocytes, neutrophils, eosinophils and basophils). Using standard formulas the red blood indices were computed: the mean corpuscular volume (MCV), the mean corpuscular haemoglobin (MCH) and the mean corpuscular haemoglobin concentration (MCHC). Data were subjected to statistical analysis using the SPSS software ver. 18. The results were submitted to the variance analysis (ANOVA) ($p<0,05$) and Turkey test used to determine the significant differences between hematological parameters ($p<0,05$). Infected fish reveal gross lesions on the skin, pale gills, scale erosion and hemoragic ulcers, modifications at the internal organs level (with evident degenerative processes) sign of a bacterial invasion. Physiological stress, induced by the action of pathogenic bacteria was reflected in the hematological indices: degease of RBCc, hematocrit, hemoglobin content and increase of WBCc. These results indicate that haematopoiesis may be severely affected in bacterial diseases. Therefore the bacteriosis resulted in impaired homeostasis and consequently dynamic balance between production and destruction of erythrocytes which favored the installation of anemia with negative consequences. The hematological changes in infected fish reported in this paper will be helpful in the identification of this bacteriosis.

Key words: Oncorhynchus mykiss, pathogenic bacteria, hematological parameters

REFINED SOYBEAN AND CORN OIL: IMPACT OF REPEATED FRYING ON ACIDITY, DENSITY AND COLOR

Benmeziane – Derradji Farida[1,3], Araba Khawla[1], Belahcene Amina[1], Djermoune – Arkoub Lynda[2,3]

[1]Department of Agronomic Sciences, Faculty of Natural and Life Sciences, Chadli Bendjedid University of El-Tarf. PB 73. El-Tarf 36000, Algeria

[2] Department of Process Engineering, Faculty of Technology, University of Bejaia, Bejaia, Algeria

[3]Laboratory of Biomathematics, Biophysics, Biochemistry, and Scientometry (L3BS), Faculty of Nature and Life Sciences, University of Bejaia, 06000 Bejaia, Algeria.

* ORCID ID: 0000-0003-4513-3467

ABSTRACT

Vegetable oils containing unsaturated fatty acids are liable to undergo oxidation reactions when subjected to a thermo-oxidative treatment, especially fried foods. This deterioration relates to the ratio of the quantity of potato and the volume of oil used in cooking as well as to the number of frying cycles. This study aims to assess the effect of quantitative ratios of fries / volume of oil (1/5 and 1/8) on the physicochemical characteristics of oil from baths resulting from repeated frying in oil widely marketed in Algeria "Afia" (100% soya - 5% corn). The results obtained showed that the acidity of the oils for the two ratios was within the standards (<0.20%); the change in the yellow color is detectable from the oil bath resulting from the 3rd frying for the two ratios tested, while the deterioration of the red color appears at the 6th frying and rather at the 4th frying for ratios 1/5 and 1/8, respectively. As for the density, this increased during frying compared to the standard of the Codex Alimentarius for all the oil baths resulting from the eight repeated frying operations. In conclusion, repeated frying had an effect on the color of the oils and the density, while the acidity was not influenced. Studies are in progress to determine the effect on the degree of oxidation of oils during frying, in particular by determining the peroxide index.

Keywords: Refined soybean and corn oil, frying, physicochemical quality

POLLEN MORPHOLOGY AND POLLEN PRODUCTION OF INVASIVE AND NATIVE IMPATIENS SPECIES GROWING IN BULGARIA

Dolja K. Pavlova[1] and Plamen S. Glogov[2]*

[1] University of Sofia, Faculty of Biology, Department of Botany, Blvd. Dragan Tzankov 8, 1164 Sofia, BULGARIA

[2] Forest Research Institute – Bulgarian Academy of Sciences, Blvd. Kliment Ohridski 132, Sofia, BULGARIA

ABSTRACT

The purpose of this study was to establish baseline data concerning certain aspects of pollen biology of the invasive alien species Impatiens balfourii and I. glandulifera, and the native I. noli-tangere to the flora of Lozenska Mt. The aims of this study were: 1. To evaluate variation in pollen morphology, pollen production and fertility/sterility in the populations of I. glandulifera in order to obtain data for its invasive success and compare with the other two species; 2. To analyze differences in pollen biology in two flower color forms (pink and violet). The pollen morphology was investigated with light microscope and the pollen grains are 4(5)-zonocolpate oblate or peroblate in equatorial view, and rectangular-obtuse or suborbicular in most 4-zonocolpate grains in polar view, with a reticulate ornamentation. The mean pollen production per flower and stamen was very high in all three species comparable with anemophilous plants. The sterile pollen was between 8.9% and 17.54%. The variations in pollen biology can be related to different evolutionary adaptations of the flowers to be more attractive for pollinators and successful in reproduction and distribution. The results are of importance for taking measures to reduce the invasiveness of these alien species.

Key words: Bulgaria, invasive plant, Impatiens, pollen, reproduction

ANTIBACTERIAL POTENTIAL OF SYNTHESIZED SILVER NANOPARTICLES USING BIOACTIVE METABOLITES OF ACTINOBACTERIA AGAINST BACTERIAL MENINGITIS

Naushin Bano[1], Saba Siddiqui[2] and Roohi[1]*

[1]Protein research Laboratory, Department of Bioengineering, Integral University, Lucknow, India. [2]Integral Institute of Agricultural Science and Technology, Integral University, Lucknow, India.

ORCID ID: 0000-0003-4296-6105

ABSTRACT

Bacterial meningitis is an infectious disease that causes significant morbidity and mortality globally. Bacterial meningitis is caused by microorganisms such as Neisseria meningitis, Haemophilus influenzae and Streptococcus pneumoniae. These bacteria are often treatment resistant, making the condition more deadly. Multidrug-resistant bacteria pose a serious threat to humanity, prompting research into new weapons to battle the problem. Researchers are now focusing on secondary metabolites produced by bacteria to address these concerns. Actinobacteria are being investigated as a possible solution to this problem due to their exceptional antibacterial properties. Actinobacteria silver nanoparticles are also green, eco-friendly, and cost-effective, with antibacterial and antifungal capabilities and the potential to be used in pharmaceuticals. The present work aimed to identify and isolate actinobacteria and evaluate their resistance to meningitis-causing bacteria. Twelve prominent isolates were obtained from soil, and after the primary and secondary screening, isolates LA2(R) and LA2(O) were found most significant in producing the bioactive compound. Its identity was confirmed as Microbacterium sp., (NCBI accession no. MN560041) and Streptomyces rochei by 16S rRNA sequencing. Microbacterium is the least explored species of actinobacteria, as per the literature reports. The antibacterial potential of secondary metabolites produced by actinobacteria has been demonstrated by the well diffusion method. GC-MS was used to detect compounds in bioactive metabolites. The most abundant compound found in metabolites was n-hexadecanoic acid. The extracellular synthesis of actinobacteria silver nanoparticles was determined by UV-Vis spectroscopy, while TEM and FTIR examined their morphological appearances, stability, crystalline structure, and coating. Actinobacteria silver nanoparticles and pure metabolites are tested against bacteria that cause bacterial meningitis, and they are showing significant antibacterial activity, which has been demonstrated by the well diffusion method on nutrient agar. Actinobacteria silver nanoparticles, in particular, have more tremendous potential for antibacterial activity than actinobacteria and their secondary metabolites. The results suggest that isolated actinobacteria may serve as a prominent source against bacterial meningitis and have immense applications in the medical sector.

Keywords: Actinobacteria, Bioactive compound, silver nanoparticles, Bacterial meningitis, Multi drug resistant bacteria.

SUSTAINABLE BALANCED DIET: A PROMISING APPROACH TO COMBAT MICRONUTRIENT MALNUTRITION IN INDIA

Vinita Singh[1] Monika Thakur[2] and Shashi Sharma[3]

Research scholar[1], AIFT, Amity University Uttar Pradesh, Noida, UP - 201303, India

Faculty[2], AIFT, Amity University Uttar Pradesh, Noida, UP - 201303, India

Associate Prof.[3], Ch BRG Govt. College, Sriganganagar, Rajasthan, India

ABSTRACT

Agriculture is the foundation of all food systems which are linked to the nutritional wellbeing and health of individuals and populations through the nutrients and other bioactive components contained in foods they supply. The current global food system generates enough foodstuff to feed the globe, but it is difficult to obtain and consume culturally acceptable, affordable, and sustainable and nutritionally balanced food. India is one of the leading nations in vegetable production but the setback of micronutrient deficiencies are very common among the rural households. Micronutrient deficiencies are a determining and aggravating factor for health status and quality of life of the person . It's manifestations are less visible in the beginning and start to show only when the condition is severe and has already led to serious health burdens, justifying the name “hidden hunger". Micronutrient malnutrition develops when intake of bioavailable micronutrients are too low to meet requirements may be due to lack of access to foods rich in vitamins and minerals such as fresh fruits, vegetables, animal products, and fortified foods. The World Health Organization (WHO) estimates that more than two billion people are deficient in key vitamins and minerals and affects one-third to half of the world population. Consequences of micronutrient malnutrition include increased vulnerability or exacerbation of various diseases, mortality rates, especially in women and children, poor pregnancy outcomes, increased morbidity, impaired mental and physical development in children, reduced work productivity and potential losses in adults. Anaemia, the most common form of micronutrient deficiency disproportionately affects almost 50-60% pre-school children, adolescents and women of reproductive age. Nutrition inadequacy during crucial period of adolescence may have serious health related consequences during adolescence as well as throughout life. Anaemia in adolescent girls contributes to maternal and foetal mortality and morbidity in future. So, compound strategies are required to address the issue of providing uninterrupted availability, accessibility and affordability of sustainable balanced diet, which are important for achieving optimal micronutrient status. Nutritional gardening is one of the important, innovative and supplemental solution contributing in decreasing micronutrient deficiency by providing food and nutritional security in rural areas.

Key words: Hidden-hunger, micronutrient, bioavailability, adolescent, anemia

COMPARATIVE STUDY ON THE SUPPLEMENTATION EFFECT OF ALFALFA AND MORINGA STENOPETALA LEAVES ON FEED INTAKE, GROWTH AND CARCASS TRAITS OF BROILER CHICKENS

[1]Kunfu Guta and [2#]Aberra Melesse

[1]Department of Animal Sciences, Alage Agricultural Technical Vocational Education and Training College, Ethiopia

[2#] School of Animal and Range Sciences, Hawassa University, Hawassa, Ethiopia

ABSTRACT

The study was conducted to determine the supplementation effect of Alfalfa and Moringa stenopetala leaf meals on feed intake, growth and carcass traits of Cobb 500 broiler chickens. Two hundred twenty unsexed day old chickens were randomly divided into 5 treatments of 60 chickens per treatment with 4 replications and 11 chickens per replicate. Five treatment diets were formulated to contain 0% (no supplementation, T1), 5% dried alfalfa leaf (T2), 10% dried Moringa leaf (T3), 5% dried Moringa leaf (T4) and 10% dried alfalfa leaf (T5) to partially substitute the soybean meal of the control diet. The experimental rations were formulated to be iso-caloric and iso-nitrogenous to meet the nutrient requirements of the broiler chicks. The actual experiment lasted 42 days. Feed offered and refusal were recorded and determined on daily basis while body weight was recorded on weekly basis. Feed intake, body weight gain and feed conversion ratio (FCR) were calculated. At the end of the experiment, two chickens (1 male and 1 female) per replicate were slaughtered for carcass analysis. The results indicated that the final body weight and total weight gain significantly differed between treatment diets being higher ($p<0.05$) for chickens fed with T2 and T3 than those of T1. No significance difference was observed in these parameters between chickens reared in T2, T3, T4 and T5 diets. Chickens fed with T3 ration had higher ($p<0.05$) daily feed intake (g/chicken/day) than T1. However, chickens fed with T1, T2, T4 and T5 diets had intermediate values for daily feed intake with no significant difference between them. The result further indicated that FCR did not differ among treatment diets. Chickens fed with T3 diets had significantly higher ($p<0.05$) values for slaughter and dressed carcass weights than those fed with the rest of the diets. No significance difference in slaughter weight was observed among chickens fed with T1, T2, T4 and T5 diets. However, chickens fed with T2 diet had higher ($p<0.05$) dressed carcass than those fed on T1. The values of dressing percentage, thighs, breast meat, keel bone meat, neck and skin were similar among treatment diets. The value of drumstick weight was higher ($p<0.05$) in chickens fed with the T3 than that of T1, T4 and T5 diets; but was similar to those of T2. Moreover, the drumstick weight was similar between T4 and T5 diets; but was higher than those fed with T1. In conclusion, the Moringa leaf meal supplementation up to 10% has considerably improved the feed intake. Chickens fed with diets containing 5% alfalfa leaf had better feed intake, body weight gain and most part of carcass weights than that those fed on the control diet.

Keywords: alfalfa leaf; Moringa stenopetala leaf; broiler chickens; growth performance; carcass components; feed consumption