



ISSN
2148-6840

www.cjoscience.com

Caucasian Journal of Science

Open Access Journal

DECEMBER 2025 VOLUME: 12 ISSUE:2

AIM & SCOPE

Caucasian Journal of Science Journal is an international journal published since 2014. In this journal, research articles, short reports, case reports, compilation articles and editorial letters in the field of science and technology, health and science education are written in English or Turkish. The publishing principles of the magazine are based on the principles of independent, prejudiced and double-blind arbitration. Caucasian Journal of Science is published twice a year (June and December). All submitted articles are evaluated by the relevant editor and at least two referees. The ICMJE standards are observed in the evaluation of the manuscripts. Access to full texts of published articles is free.

You can access our EndNote style from the link below.

<https://researchsoftware.com/>

Due to the ethical policy of our era, plagiarism can not be tolerated. The contents of all articles submitted for publication to our journal are checked against the extensive database of plagiarism control software and current academic publications. Despite these checks, the responsibility for the plagiarism transactions that may be mentioned belongs to the authors.

Caucasian Journal of Science Journal is an international journal published since 2014. In this journal, research articles, short reports, case reports, compilation articles and editorial letters in the field of science and technology, health and science education are written in English or Turkish. The publishing principles of the magazine are based on the principles of independent, prejudiced and double-blind arbitration. Caucasian Journal of Science is published twice a year (June and December). All submitted articles are evaluated by the relevant editor and at least two referees. The ICMJE standards are observed in the evaluation of the manuscripts. Access to full texts of published articles is free.

You can access our EndNote style from the link below.

<https://researchsoftware.com/>

Due to the ethical policy of our era, plagiarism can not be tolerated. The contents of all articles submitted for publication to our journal are checked against the extensive database of plagiarism control software and current academic publications. Despite these checks, the responsibility for the plagiarism transactions that may be mentioned belongs to the authors.

EDİTÖR BOARD

Prof. Dr. Muzaffer ALKAN	Editor	Kafkas University
Assoc. Prof. Dr. Murat BEYTUR	Assistant Editor	Kafkas University
Assoc. Prof. Tufan İNALTEKİN	Assistant Editor	Kafkas University
Asst. Prof. Dr. Gülname FINDIK GÜVENDİ	Assistant Editor	Recep Tayyip Erdoğan University
Assoc. Prof. Mustafa SERTÇELİK	Chemistry Field Editor	Kafkas University
Asst. Prof. Dr. Barbaros DİNÇER	Chemistry Field Editor	Recep Tayyip Erdoğan University
Assoc. Prof. Dr. Canan GÜLMEZ SAMSA	Chemistry Field Editor	Iğdır University
Assoc. Prof. Dr. Onur AKYILDIRIM	Chemistry Field Editor	Kafkas University
Prof. Dr. Yaşar NUHOĞLU	Engineering Field Editor	Yıldız Teknik University
Prof. Dr. Mustafa YÜKSEK	Engineering Field Editor	İskenderun Teknik University
Prof. Dr. Ataman KARAÇÖP	Statistics Field Editor	Kafkas University
Prof. Dr. Sündüs YERDELEN	Statistics Field Editor	Kafkas University
Prof. Dr. Nigar YILDIRIM AKSOY	Mathematics Field Editor	Kafkas University
Prof. Dr. Murat ÇAĞLAR	Mathematics Field Editor	Erzurum Teknik University
Prof. Dr. Özlem KARABULUTLU	Health Sciences Field Editor	Kafkas University
Dr. Canan TOPCUOGLU	Health Sciences Field Editor	Etlik City Hospital
Assoc. Prof. Dr. Volkan GÖKSU	Science Education Field Editor	Kafkas University
Assoc. Prof. Dr. Faik Özgür KARATAŞ	Science Education Field Editor	Trabzon University
Assoc. Prof. Dr. Fatih ÜNAL	Physics Field Editor	Giresun University
Assoc. Prof. Dr. Güventürk UĞURLU	Physics Field Editor	Kafkas University
Asst. Prof. Dr. Gül GÖRMEZ	Biology Field Editor	Yüzüncü Yıl University
Prof. Dr. Özkan ÖZDEN	Biology Field Editor	Kafkas University
Asst. Prof. Dr. Hasan ASKER	Biology Field Editor	Uşak University
Assoc. Prof. Dr. Evren KOÇ	Biology Field Editor	Kafkas University
Assoc. Prof. Dr. Zeynep TURHAN	Applied Chemistry Field Editor	Iğdır University
Assoc. Prof. Dr. Yeliz ULAŞ	Applied Chemistry Field Editor	Uludağ University
Lecturer Catherine AKÇA	Language Editor	Kafkas University
Res. Assist. Merve BAŞKUTLU	Language Editor	Kafkas University
Res. Assist. Mükremin DURMUŞ	Technical Editor	Kafkas University

REFEREE BOARD

Prof. Dr. Ahmet ÇOLAK	Karadeniz Technical University Faculty of Science
Prof. Dr. Ahmet Zeki SAKA	Trabzon University Fatih Education Faculty
Prof. Dr. Anahit COŞKUN	Haliç University Health Sciences Faculty
Prof. Dr. Ayda ÇELEBİOĞLU	Mersin University Nursing Faculty
Prof. Dr. Ayfer TEZEL	Ankara University Nursing Faculty
Prof. Dr. Ayşe OKANLI	İstanbul Medeniyet University Health Sciences Faculty
Prof. Dr. Behice ERÇİ	İnönü University Nursing Faculty
Prof. Dr. Bülent ŞAHİN	Trabzon University Fatih Education Faculty
Prof. Dr. Duygu ARIKAN	Atatürk University Nursing Faculty
Prof. Dr. Elanur YILMAZ KARABULUTLU	Atatürk University Nursing Faculty
Prof. Dr. Emel EGE	Necmettin Erbakan University Nursing Faculty
Prof. Dr. Emine KIYAK	Atatürk University Nursing Faculty
Prof. Dr. Ergül ASLAN	İstanbul Univ. Florence Nightingale Nursing Faculty
Prof. Dr. Evşen NAZİK	Çukurova University Health Sciences Faculty
Prof. Dr. Evşen NAZİK	Çukurova University Health Sciences Faculty
Prof. Dr. F. Deniz SAYINER	Eskişehir Osmangazi University Health Sciences Faculty
Prof. Dr. Fatma ŞAHİN	Marmara University Atatürk Education Faculty
Prof. Dr. Gabil YAGUB	Kafkas University Science and Literature Faculty
Prof. Dr. Gökhan DEMİRCİOĞLU	Trabzon University Fatih Education Faculty
Prof. Dr. Haluk ÖZMEN	Trabzon University Fatih Education Faculty
Prof. Dr. Haydar YÜKSEK	Kafkas University Science and Literature Faculty
Prof. Dr. Hümeysra BATI	Ondokuz Mayıs University Science and Literature Faculty
Prof. Dr. Lale CERRAH ÖZSEVGİÇ	Trabzon University Fatih Education Faculty
Prof. Dr. Mağfiret KAŞIKÇI	Atatürk University Nursing Faculty
Prof. Dr. Mehmet KÜÇÜK	Recep Tayyip Erdoğan University Education Faculty
Prof. Dr. Melek Nihal ESİN	İstanbul University Florence Nightingale Nursing Faculty
Prof. Dr. Mevlüt KARABULUT	Gebze Technical University Faculty of Basic Sciences
Prof. Dr. Miraç OCAK	KTU Science and Literature Faculty
Prof. Dr. Miraç OCAK	Karadeniz Technical University Science Faculty
Prof. Dr. Muhittin YILMAZ	Sinop University Health Services Vocational School
Prof. Dr. Mustafa EROL	Dokuz Eylül University Buca Education Faculty
Prof. Dr. Mustafa KANDEMİR	Amasya University Education Faculty
Prof. Dr. Nadiye ÖZER	Atatürk University Nursing Faculty
Prof. Dr. Nejla YÜRÜK	Gazi University Gazi Education Faculty
Prof. Dr. Nevin ŞAHİN	İstanbul University Florence Nightingale Nursing Faculty
Prof. Dr. Neziha KARABULUT	Atatürk University Nursing Faculty
Prof. Dr. Onur ATAĞIŞI	Kafkas University Science and Literature Faculty
Prof. Dr. Orhan KARAMUSTAFAOĞLU	Amasya University Education Faculty
Prof. Dr. Öznur ERGEN AKÇİN	Ordu University Science and Literature Faculty
Prof. Dr. Öznur ERGEN AKÇİN	Ordu University Science and Literature Faculty
Prof. Dr. Papatya KARAKURT	Erzincan Binali Yıldırım University Health Sciences Faculty
Prof. Dr. Reva BALCI AKPINAR	Atatürk University Nursing Faculty
Prof. Dr. Selçuk GÜMÜŞ	Yüzüncü Yıl University Faculty of Science
Prof. Dr. Serap ALTUNTAŞ	Bandırma Onyedil Eylül University Health Sciences Faculty
Prof. Dr. Sevban ARSLAN	Çukurova University Health Sciences Faculty
Prof. Dr. Sevilay KARAMUSTAFAOĞLU	Amasya University Education Faculty
Prof. Dr. Tülay YAVAN	İzmir University of Economics Health Sciences Faculty
Prof. Dr. Türkan PASİNLİOĞLU	Sanko University Health Sciences Faculty
Prof. Dr. Yaşar AKKAN	Trabzon University Fatih Education Faculty
Assoc. Prof. Arzu ÖNEL	Kafkas University Education Faculty



ISSN
2148-6840

www.cjoscience.com

Caucasian Journal of Science

Open Access Journal

DECEMBER 2025 VOLUME: 12 ISSUE:2

Assoc. Prof. Aslı SİS ÇELİK	Ataturk University Nursing Faculty
Assoc. Prof. Dilek GÜRÇAYIR	Atatürk University Nursing Faculty
Assoc. Prof. Zeynep TURHAN	Iğdır University Engineering Faculty
Assoc. Prof. Elif KARAHAN	Bartın University Health Sciences Faculty
Assoc. Prof. Emine HATUN DİKEN	Kafkas University Education Faculty
Assoc. Prof. Funda ÇETİNKAYA	Aksaray University Health Sciences Faculty
Assoc. Prof. Funda ÖZDEMİR	Ankara University Nursing Faculty
Assoc. Prof. Gökhan BİLİR	Kafkas University Science and Literature Faculty
Assoc. Prof. Gülay İPEK ÇOBAN	Atatürk University Nursing Faculty
Assoc. Prof. Gülçin AVŞAR	Atatürk University Health Sciences Faculty
Assoc. Prof. Gülçin BİLGİCİ	Kafkas University Science and Literature
Assoc. Prof. Hacı Ahmet DEVECİ	Gaziantep University Health Sciences Faculty
Assoc. Prof. Hava ÖZKAN	Atatürk University Health Sciences Faculty
Assoc. Prof. Hüseyin ERTAP	Kafkas University Science and Literature Faculty
Assoc. Prof. Kerime Derya BEYDAĞ	İstanbul Okan University Faculty of Health Sciences
Assoc. Prof. Mehtap KAVURMACI	Atatürk University Nursing Faculty
Assoc. Prof. Metin ÖĞÜN	Kafkas University Medicine Faculty
Assoc. Prof. Murat KURT	Amasya University Education Faculty
Assoc. Prof. Nazlı HACIALİOĞLU	Atatürk University Nursing Faculty
Assoc. Prof. Nur AKCANCA	Çanakkale Onsekiz Mart University Education Faculty
Assoc. Prof. Nuray DAYAPOĞLU	Ataturk University Nursing Faculty
Assoc. Prof. Serdar SARITAŞ	İnönü University Nursing Faculty
Assoc. Prof. Seyhan ÇİTLİK SARITAŞ	İnönü University Nursing Faculty
Assoc. Prof. Sibel ASİ KARAKAŞ	Atatürk University Nursing Faculty
Assoc. Prof. Şeyda GÜL	Atatürk University Kazım Karabekir Education Faculty
Assoc. Prof. Taha Yasin ÖZTÜRK	Kafkas University Science and Literature Faculty
Assoc. Prof. Uğur AKBABA	Kafkas University Education Faculty
Assoc. Prof. Yeşim YAMAN AKTAŞ	Giresun University Health Sciences Faculty
Assoc. Prof. Zeynep YÜCE	Kafkas University Dede Korkut Education Faculty
Assist. Prof. Ahmet HARMANKAYA	Kafkas University Science and Literature Faculty
Assist. Prof. Ayşe AYDIN	Atatürk University Nursing Faculty
Assist. Prof. Ayşegül YAYLA	Atatürk University Nursing Faculty
Assist. Prof. Betül AKTAŞ	İzmir Katip Çelebi University Health Sciences Faculty
Assist. Prof. Eray ATALAY	Kafkas University Medicine Faculty
Assist. Prof. Fatma GENÇ	Giresun University Health Sciences Faculty
Assist. Prof. Fatma TOYOĞLU	Erzincan Binali Yıldırım Univ. Science and Literature Faculty
Assist. Prof. Gülname GÜVENDİ	Recep Tayyip Erdoğan University Medicine Faculty
Assist. Prof. Güventürk UĞURLU	Kafkas University Science and Literature Faculty
Assist. Prof. Hatice DURMAZ	Atatürk University Health Sciences Faculty
Assist. Prof. Hilal MEDETALİBEYOĞLU	Kafkas University Science and Literature
Assist. Prof. Julianne A. WENNER	Boise State University Faculty of Staff
Assist. Prof. Kıymet YEŞİLÇİÇEK ÇALIK	Karadeniz Technical University Health Sciences Faculty
Assist. Prof. Mine EKİNCİ	Ataturk University Nursing Faculty
Assist. Prof. Özlem DEMİREL BOZKURT	Ege University Nursing Faculty
Assist. Prof. Ryan NIXON	Brigham Young University Department of Teacher Education
Assist. Prof. Sara P. RAVEN	Texas A&M Univ. Department Teaching Learning and Culture
Assist. Prof. Serap SÖKMEN	Erzincan Binali Yıldırım University Health Sciences Faculty
Assist. Prof. Shannon SUNG	Spelmann College Institute for Future Intelligence
Assist. Prof. Sibel ÖZTÜRK	Ataturk University Health Sciences Faculty
Assist. Prof. Sonay BİLGİN	Ataturk University Nursing Faculty
Assist. Prof. Vanessa KLEİN	Montclair State University Science Education
Assist. Prof. Vembu ANANTHASWAMY	Madura College Department of Mathematics
Assist. Prof. Zafer OCAK	Kafkas University Dede Korkut Education Faculty
Assist. Prof. Zehra DEMET ÜS	Atatürk University Health Sciences Faculty

REFEREES OF THIS ISSUE

Prof. Dr. Sevilay KARAMUSTAFAOĞLU	Amasya University
Prof. Dr. Yelda YALÇIN GÜRKAN	Tekirdağ Namık Kemal University
Assoc. Prof. Muhammed YAYLA	Selçuk University
Assoc. Prof. Gamze YAYLA ESKİCİ	Sivas Cumhuriyet University
Assoc. Prof. Büşra BAKİOĞLU	Karamanoğlu Mehmetbey University
Assist. Prof. Ayşe AYDOĞAN	Necmettin Erbakan University
Assist. Prof. Erhan Öztürk	Iğdır University
Assist. Prof. Pınar BOZBEYOĞLU	Gümüşhane University
Assist. Prof. Muaz KÖROĞLU	Hatay Mustafa Kemal University
Lect. Muhammet Meriç ATAN	Hitit University

İLETİŞİM

Yazışma Adresi/Adress Kafkas Üniversitesi Dede Korkut Eğitim Fakültesi 36040-KARS	Tel/Phone 0 474 225 12 59/1350 web: www.cjoscience.com
EDİTÖR / EDITOR Prof. Dr. Muzaffer ALKAN E-mail: muzafferalkan61@gmail.com Telefon/Phone: 05053454561	Teknik İletişim / Technical Contact Assoc. Prof. Dr. Murat BEYTUR E-mail: muratbeytur83@gmail.com Telefon/Phone: 05062790686

CONTENTS

No	Article	Article Type	Field	Pages
1	Cytotoxicity in HUVEC Cells Exposed to Methanol Extracts of Four Medicinal Plants Combined with and without Boron	Research Article	Biochemistry and Cell Biology	85-99
	Ramazan DEMİREL, Hanife ARDAHANLI, Meryem İÇEN, Celal Şahin ERMUTLU, Özkan ÖZDEN			
2	Investigation of Biopesticide Properties of Garlic Extract Compounds Suitable for Sustainable Agriculture and Food Safety against White Mold Disease in Sunflower Production	Research Article	Chemistry	100-122
	Yasemin KEŞKEK KARABULUT			
3	An Examination of Secondary School Students' Science Anxiety Regarding to Their Demographic Characteristics	Research Article	Science Education	123-138
	Hüseyin Şansal AYVAZ, Orhan KARAMUSTAFAOĞLU			
4	Literature Review on Evidence Collection and Sample Management Processes in KBRN Incidents	Review	Chemistry	139-171
	Abdullah ÖZKAN, Ali Uğur SAKAR. Vildan ÖZKAN, Gökhan NUR			