

E-ISSN: 2148-6247



# Turkish Journal of PHARMACEUTICAL SCIENCES

An Official Journal of the Turkish Pharmacists' Association, Academy of Pharmacy

Volume: **19** Issue: **2** April **2022**



[www.turkjps.org](http://www.turkjps.org)

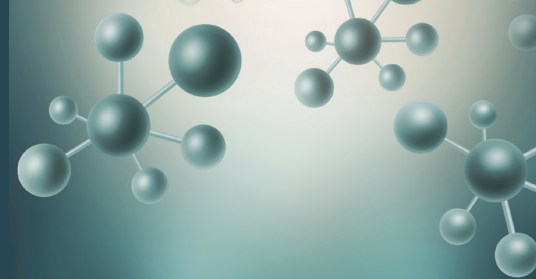


PubMed  
Central

PublMed

Scopus

TRDIZIN



# Turkish Journal of PHARMACEUTICAL SCIENCES

## Editor-in-Chief

**Prof. İlkay Erdoğan Orhan, Ph.D.**

ORCID: <https://orcid.org/0000-0002-7379-5436>

Gazi University, Faculty of Pharmacy,  
Department of Pharmacognosy, Ankara, TURKEY  
[iorhan@gazi.edu.tr](mailto:iorhan@gazi.edu.tr)

## Associate Editors

**Prof. Bensu Karahalil, Ph.D.**

ORCID: <https://orcid.org/0000-0003-1625-6337>

Gazi University, Faculty of Pharmacy,  
Department of Pharmaceutical Toxicology, Ankara, TURKEY  
[bensu@gazi.edu.tr](mailto:bensu@gazi.edu.tr)

**Assoc. Prof. Sinem Aslan Erdem, Ph.D.**

ORCID: <https://orcid.org/0000-0003-1504-1916>

Ankara University, Faculty of Pharmacy, Department of  
Pharmacognosy, Ankara, TURKEY  
[saslan@pharmacy.ankara.edu.tr](mailto:saslan@pharmacy.ankara.edu.tr)

## Editorial Board

**MPharm, MSc, Afonso Miguel CAVACO, Ph.D.**

ORCID: [orcid.org/0000-0001-8466-0484](https://orcid.org/0000-0001-8466-0484)

Lisbon University, Faculty of Pharmacy, Lisboa,  
PORTUGAL  
[acavaco@campus.ul.pt](mailto:acavaco@campus.ul.pt)

**Prof. Bezhan CHANKVETADZE, Ph.D.**

ORCID: [orcid.org/0000-0003-2379-9815](https://orcid.org/0000-0003-2379-9815)

Ivane Javakhishvili Tbilisi State University, Institute of  
Physical and Analytical Chemistry, Tbilisi, GEORGIA  
[jpba\\_bezhan@yahoo.com](mailto:jpba_bezhan@yahoo.com)

**Prof. Blanca LAFFON, Ph.D.**

ORCID: [orcid.org/0000-0001-7649-2599](https://orcid.org/0000-0001-7649-2599)

DICOMOSA group, Advanced Scientific Research  
Center (CICA), Department of Psychology, Area  
Psychobiology, University of A Coruña, Central  
Services of Research Building (ESCI), Campus Elviña  
s/n, A Coruña, SPAIN  
[blanca.laffon@udc.es](mailto:blanca.laffon@udc.es)

**Prof. Christine LAFFORGUE, Ph.D.**

ORCID: [orcid.org/0000-0001-7798-2565](https://orcid.org/0000-0001-7798-2565)

Paris Saclay University, Faculty of Pharmacy,  
Department of Dermopharmacology and  
Cosmetology, Paris, FRANCE  
[christine.lafforgue@universite-paris-saclay.fr](mailto:christine.lafforgue@universite-paris-saclay.fr)

**Prof. Dietmar FUCHS, Ph.D.**

ORCID: [orcid.org/0000-0003-1627-9563](https://orcid.org/0000-0003-1627-9563)

Innsbruck Medical University, Center for Chemistry  
and Biomedicine, Institute of Biological Chemistry,  
Biocenter, Innsbruck, AUSTRIA  
[dietmar.fuchs@i-med.ac.at](mailto:dietmar.fuchs@i-med.ac.at)

**Prof. Francesco EPIFANO, Ph.D.**

ORCID: [0000-0002-0381-7812](https://orcid.org/0000-0002-0381-7812)

Università degli Studi G. d'Annunzio Chieti e Pescara,  
Chieti CH, Italy  
[francesco.epifano@unich.it](mailto:francesco.epifano@unich.it)

**Prof. Fernanda BORGES, Ph.D.**

ORCID: [orcid.org/0000-0003-1050-2402](https://orcid.org/0000-0003-1050-2402)

Porto University, Faculty of Sciences, Department of  
Chemistry and Biochemistry, Porto, PORTUGAL  
[fborges@fc.up.pt](mailto:fborges@fc.up.pt)

**Prof. Göksel ŞENER, Ph.D.**

ORCID: [orcid.org/0000-0001-7444-6193](https://orcid.org/0000-0001-7444-6193)

Fenerbahçe University, Faculty of Pharmacy,  
Department of Pharmacology, İstanbul, TURKEY  
[gseiner@marmara.edu.tr](mailto:gseiner@marmara.edu.tr)

**Prof. Gülbin ÖZÇELİKAY, Ph.D.**

ORCID: [orcid.org/0000-0002-1580-5050](https://orcid.org/0000-0002-1580-5050)

Ankara University, Faculty of Pharmacy, Department  
of Pharmacy Management, Ankara, TURKEY  
[gozcelikay@ankara.edu.tr](mailto:gozcelikay@ankara.edu.tr)

**Prof. Hermann BOLT, Ph.D.**

ORCID: [orcid.org/0000-0002-5271-5871](https://orcid.org/0000-0002-5271-5871)

Dortmund University, Leibniz Research Centre,  
Institute of Occupational Physiology, Dortmund,  
GERMANY  
[bolt@ifado.de](mailto:bolt@ifado.de)

**Prof. Hildebert WAGNER, Ph.D.**

Ludwig-Maximilians University, Center for  
Pharmaceutical Research, Institute of Pharmacy,  
Munich, GERMANY  
[H.Wagner@cup.uni-muenchen.de](mailto:H.Wagner@cup.uni-muenchen.de)

**Prof. İ. İrem ÇANKAYA, Ph.D.**

ORCID: [orcid.org/0000-0001-8531-9130](https://orcid.org/0000-0001-8531-9130)

Hacettepe University, Faculty of Pharmacy, Department  
of Pharmaceutical Botany, Ankara, TURKEY  
[itatli@hacettepe.edu.tr](mailto:itatli@hacettepe.edu.tr)

**Prof. K. Arzum ERDEM GÜRSAN, Ph.D.**

ORCID: [orcid.org/0000-0002-4375-8386](https://orcid.org/0000-0002-4375-8386)

Ege University, Faculty of Pharmacy, Department of  
Analytical Chemistry, İzmir, TURKEY  
[arzum.erdem@ege.edu.tr](mailto:arzum.erdem@ege.edu.tr)

**Prof. Bambang KUSWANDI, Ph.D.**

ORCID: [0000-0002-1983-6110](https://orcid.org/0000-0002-1983-6110)

Chemo and Biosensors Group, Faculty of Pharmacy  
University of Jember, East Java, Indonesia  
[b\\_kuswandi.farmasi@unej.ac.id](mailto:b_kuswandi.farmasi@unej.ac.id)

**Prof. Luciano SASO, Ph.D.**

ORCID: [orcid.org/0000-0003-4530-8706](https://orcid.org/0000-0003-4530-8706)

Sapienze University, Faculty of Pharmacy  
and Medicine, Department of Physiology and  
Pharmacology "Vittorio Erspamer", Rome, ITALY  
[luciano.saso@uniroma1.it](mailto:luciano.saso@uniroma1.it)

**Prof. Maarten J. POSTMA, Ph.D.**

ORCID: [orcid.org/0000-0002-6306-3653](https://orcid.org/0000-0002-6306-3653)

University of Groningen (Netherlands), Department  
of Pharmacy, Unit of Pharmacoepidemiology &  
Pharmacoeconomics, Groningen, HOLLAND  
[m.j.postma@rug.nl](mailto:m.j.postma@rug.nl)

**Prof. Meriç KÖKSAL AKKOÇ, Ph.D.**

ORCID: [orcid.org/0000-0001-7662-9364](https://orcid.org/0000-0001-7662-9364)

Yeditepe University, Faculty of Pharmacy,  
Department of Pharmaceutical Chemistry, İstanbul,  
TURKEY  
[merickoksal@yeditepe.edu.tr](mailto:merickoksal@yeditepe.edu.tr)

**Prof. Mesut SANCAR, Ph.D.**

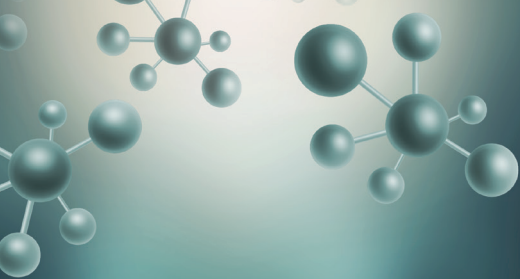
ORCID: [orcid.org/0000-0002-7445-3235](https://orcid.org/0000-0002-7445-3235)

Marmara University, Faculty of Pharmacy,  
Department of Clinical Pharmacy, İstanbul, TURKEY  
[mesut.sancar@marmara.edu.tr](mailto:mesut.sancar@marmara.edu.tr)

**Assoc. Prof. Nadja Cristhina de SOUZA PINTO, Ph.D.**

ORCID: [orcid.org/0000-0003-4206-964X](https://orcid.org/0000-0003-4206-964X)

University of São Paulo, Institute of Chemistry, São  
Paulo, BRAZIL  
[nadja@iq.usp.br](mailto:nadja@iq.usp.br)



# Turkish Journal of PHARMACEUTICAL SCIENCES

**Assoc. Prof. Neslihan AYGÜN KOCABAŞ, Ph.D. E.R.T.**

ORCID: orcid.org/0000-0000-0000-0000  
Total Research & Technology Feluy Zone  
Industrielle Feluy, Refining & Chemicals, Strategy  
– Development - Research, Toxicology Manager,  
Seneffe, BELGIUM  
neslihan.aygun.kocabas@total.com

**Prof. Rob VERPOORTE, Ph.D.**

ORCID: orcid.org/0000-0001-6180-1424  
Leiden University, Natural Products Laboratory,  
Leiden, NETHERLANDS  
verpoort@chem.leidenuniv.nl

**Prof. Robert RAPOPORT, Ph.D.**

ORCID: orcid.org/0000-0001-8554-1014  
Cincinnati University, Faculty of Pharmacy,  
Department of Pharmacology and Cell Biophysics,  
Cincinnati, USA  
robertrapoport@gmail.com

**Prof. Satyajit D. SARKER, Ph.D.**

ORCID: orcid.org/0000-0003-4038-0514  
Liverpool John Moores University, Liverpool,  
UNITED KINGDOM  
S.Sarker@ljmu.ac.uk

**Prof. Tayfun UZBAY, Ph.D.**

ORCID: orcid.org/0000-0002-9784-5637  
Üsküdar University, Faculty of Medicine,  
Department of Medical Pharmacology, Istanbul,  
TURKEY  
tayfun.uzbay@uskudar.edu.tr

**Prof. Wolfgang SADEE, Ph.D.**

ORCID: orcid.org/0000-0003-1894-6374 Ohio State  
University, Center for Pharmacogenomics, Ohio,  
USA  
wolfgang.sadee@osumc.edu

## Advisory Board

**Prof. Yusuf ÖZTÜRK, Ph.D.**

Anadolu University, Faculty of Pharmacy,  
Department of Pharmacology, Eskişehir, TURKEY  
ORCID: 0000-0002-9488-0891

**Prof. Tayfun UZBAY, Ph.D.**

Üsküdar University, Faculty of Medicine,  
Department of Medical Pharmacology, Istanbul,  
TURKEY  
ORCID: orcid.org/0000-0002-9784-5637

**Prof. K. Hüsnü Can BAŞER, Ph.D.**

Anadolu University, Faculty of Pharmacy,  
Department of Pharmacognosy, Eskişehir, TURKEY  
ORCID: 0000-0003-2710-0231

**Prof. Erdem YEŞİLADA, Ph.D.**

Yeditepe University, Faculty of Pharmacy,  
Department of Pharmacognosy, Istanbul, TURKEY  
ORCID: 0000-0002-1348-6033

**Prof. Yılmaz ÇAPAN, Ph.D.**

Hacettepe University, Faculty of Pharmacy,  
Department of Pharmaceutical Technology, Ankara,  
TURKEY  
ORCID: 0000-0003-1234-9018

**Prof. Sibel A. ÖZKAN, Ph.D.**

Ankara University, Faculty of Pharmacy,  
Department of Analytical Chemistry, Ankara,  
TURKEY  
ORCID: 0000-0001-7494-3077

**Prof. Ekrem SEZİK, Ph.D.**

Istanbul Health and Technology University, Faculty  
of Pharmacy, Department of Pharmacognosy,  
Istanbul, TURKEY  
ORCID: 0000-0002-8284-0948

**Prof. Gönül ŞAHİN, Ph.D.**

Eastern Mediterranean University, Faculty of  
Pharmacy, Department of Pharmaceutical  
Toxicology, Famagusta, CYPRUS  
ORCID: 0000-0003-3742-6841

**Prof. Sevda ŞENEL, Ph.D.**

Hacettepe University, Faculty of Pharmacy,

Department of Pharmaceutical Technology, Ankara,  
TURKEY

ORCID: 0000-0002-1467-3471

**Prof. Sevim ROLLAS, Ph.D.**

Marmara University, Faculty of Pharmacy,  
Department of Pharmaceutical Chemistry, Istanbul,  
TURKEY  
ORCID: 0000-0002-4144-6952

**Prof. Göksel ŞENER, Ph.D.**

Fenerbahçe University, Faculty of Pharmacy,  
Department of Pharmacology, Istanbul, TURKEY  
ORCID: 0000-0001-7444-6193

**Prof. Erdal BEDİR, Ph.D.**

İzmir Institute of Technology, Department of  
Bioengineering, İzmir, TURKEY  
ORCID: 0000-0003-1262-063X

**Prof. Nurşen BAŞARAN, Ph.D.**

Hacettepe University, Faculty of Pharmacy,  
Department of Pharmaceutical Toxicology, Ankara,  
TURKEY  
ORCID: 0000-0001-8581-8933

**Prof. Bensu KARAHALİL, Ph.D.**

Gazi University, Faculty of Pharmacy, Department  
of Pharmaceutical Toxicology, Ankara, TURKEY  
ORCID: 0000-0003-1625-6337

**Prof. Betül DEMİRCİ, Ph.D.**

Anadolu University, Faculty of Pharmacy,  
Department of Pharmacognosy, Eskişehir, TURKEY  
ORCID: 0000-0003-2343-746X

**Prof. Bengi USLU, Ph.D.**

Ankara University, Faculty of Pharmacy,  
Department of Analytical Chemistry, Ankara,  
TURKEY  
ORCID: 0000-0002-7327-4913

**Prof. Ahmet AYDIN, Ph.D.**

Yeditepe University, Faculty of Pharmacy,  
Department of Pharmaceutical Toxicology, Istanbul,  
TURKEY  
ORCID: 0000-0003-3499-6435

**Prof. İlkay ERDOĞAN ORHAN, Ph.D.**

Gazi University, Faculty of Pharmacy, Department  
of Pharmacognosy, Ankara, TURKEY  
ORCID: 0000-0002-7379-5436

**Prof. Ş. Güniz KÜÇÜKGÜZEL, Ph.D.**

Fenerbahçe University Faculty of Pharmacy,  
Department of Pharmaceutical Chemistry, Istanbul,  
TURKEY  
ORCID: 0000-0001-9405-8905

**Prof. Engin Umut AKKAYA, Ph.D.**

Dalian University of Technology, Department of  
Chemistry, Dalian, CHINA  
ORCID: 0000-0003-4720-7554

**Prof. Esra AKKOL, Ph.D.**

Gazi University, Faculty of Pharmacy, Department  
of Pharmacognosy, Ankara, TURKEY  
ORCID: 0000-0002-5829-7869

**Prof. Erem BİLENSOY, Ph.D.**

Hacettepe University, Faculty of Pharmacy,  
Department of Pharmaceutical Technology, Ankara,  
TURKEY  
ORCID: 0000-0003-3911-6388

**Prof. Uğur TAMER, Ph.D.**

Gazi University, Faculty of Pharmacy, Department  
of Analytical Chemistry, Ankara, TURKEY  
ORCID: 0000-0001-9989-6123

**Prof. Gülaçtı TOPÇU, Ph.D.**

Bezmialem Vakıf University, Faculty of Pharmacy,  
Department of Pharmacognosy, Istanbul, TURKEY  
ORCID: 0000-0002-7946-6545

**Prof. Hasan KIRMIZİBEKMEZ, Ph.D.**

Yeditepe University, Faculty of Pharmacy,  
Department of Pharmacognosy, Istanbul, TURKEY  
ORCID: 0000-0002-6118-8225

*\*Members of the Advisory Board consist of the scientists  
who received Science Award presented by TEB Academy  
of Pharmacy in chronological order.*





# Turkish Journal of PHARMACEUTICAL SCIENCES

## AIMS AND SCOPE

The Turkish Journal of Pharmaceutical Sciences is the only scientific periodical publication of the Turkish Pharmacists' Association and has been published since April 2004.

Turkish Journal of Pharmaceutical Sciences journal is regularly published 6 times in a year (February, April, June, August, October, December). The issuing body of the journal is Galenos Yayınevi/Publishing House level. The aim of Turkish Journal of Pharmaceutical Sciences is to publish original research papers of the highest scientific and clinical value at an international level. The target audience includes specialists and professionals in all fields of pharmaceutical sciences.

The editorial policies are based on the "Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals (ICMJE Recommendations)" by the International Committee of Medical Journal Editors (20, archived at <http://www.icmje.org/>) rules.

### Editorial Independence

Turkish Journal of Pharmaceutical Sciences is an independent journal with independent editors and principles and has no commercial relationship with the commercial product, drug or pharmaceutical company regarding decisions and review processes upon articles.

### ABSTRACTED/INDEXED IN

PubMed  
PubMed Central  
Web of Science-Emerging Sources Citation Index (ESCI)  
SCOPUS SJR  
TÜBİTAK/ULAKBİM TR Dizin  
ProQuest  
Chemical Abstracts Service (CAS)  
EBSCO  
EMBASE  
GALE  
Index Copernicus  
Analytical Abstracts  
International Pharmaceutical Abstracts (IPA)  
Medicinal & Aromatic Plants Abstracts (MAPA)  
British Library  
CSIR INDIA  
GOALI  
Hinari  
OARE  
ARDI  
AGORA  
Türkiye Atıf Dizini  
Türk Medline  
UDL-EDGE  
J- Gate  
Idealonline  
CABI

### OPEN ACCESS POLICY

This journal provides immediate open access to its content on the principle that making research freely available to the public supports a greater global exchange of knowledge.

Open Access Policy is based on the rules of the Budapest Open Access Initiative (BOAI) <http://www.budapestopenaccessinitiative.org/>. By "open access" to peer-reviewed research literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.

### CORRESPONDENCE ADDRESS

All correspondence should be directed to the Turkish Journal of Pharmaceutical Sciences Editorial Board

Post Address: Turkish Pharmacists' Association, Mustafa Kemal Mah 2147.Sok No:3 06510 Çankaya/Ankara, TURKEY  
Phone: +90 (312) 409 81 00  
Fax: +90 (312) 409 81 09  
Web Page: <http://turkjps.org>  
E-mail: [turkjps@gmail.com](mailto:turkjps@gmail.com)

### PERMISSIONS

Requests for permission to reproduce published material should be sent to the publisher.

Publisher: Erkan Mor  
Address: Molla Gürani Mah. Kaçamak Sok. 21/1 Fındıkzade, Fatih, İstanbul, Turkey  
Telephone: +90 212 621 99 25  
Fax: +90 212 621 99 27  
Web page: <http://www.galenos.com.tr/en>  
E-mail: [info@galenos.com.tr](mailto:info@galenos.com.tr)

### ISSUING BODY CORRESPONDING ADDRESS

Issuing Body : Galenos Yayınevi  
Address: Molla Gürani Mah. Kaçamak Sk. No: 21/, 34093 İstanbul, Turkey  
Phone: +90 212 621 99 25 Fax: +90 212 621 99 27  
E-mail: [info@galenos.com.tr](mailto:info@galenos.com.tr)

### MATERIAL DISCLAIMER

The author(s) is (are) responsible for the articles published in the JOURNAL. The editors, editorial board and publisher do not accept any responsibility for the articles. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

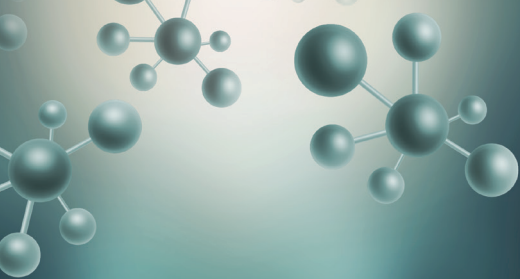


Galenos Publishing House  
Owner and Publisher  
Derya Mor  
Erkan Mor  
Publication Coordinator  
Burak Sever  
Web Coordinators  
Fuat Hocalar  
Turgay Akpınar  
Graphics Department  
Ayda Alaca  
Çiğdem Birinci  
Gülşah Özgül  
Finance Coordinator  
Sevinç Çakmak  
Emre Kurtulmuş

Project Coordinators  
Aysel Balta  
Duygu Yıldırım  
Gamze Aksoy  
Gülşah Akın  
Hatice Sever  
Melike Eren  
Özlem Çelik Çekil  
Pınar Akpınar  
Rabia Palazoğlu  
Sümeyye Karadağ

Research&Development  
Melisa Yiğitoğlu  
Nihan Karamanlı  
Digital Marketing Specialist  
Ümit Topluoğlu

Publisher Contact  
Address: Molla Gürani Mah. Kaçamak Sk. No: 21/1  
34093 İstanbul, Turkey  
Phone: +90 (212) 621 99 25 Fax: +90 (212) 621 99 27  
E-mail: [info@galenos.com.tr](mailto:info@galenos.com.tr) | [yayin@galenos.com.tr](mailto:yayin@galenos.com.tr)  
Web: [www.galenos.com.tr](http://www.galenos.com.tr) | Publisher Certificate Number: 14521  
Publication Date: April 2022  
E-ISSN: 2148-6247  
International scientific journal published bimonthly.



# Turkish Journal of PHARMACEUTICAL SCIENCES

## INSTRUCTIONS TO AUTHORS

Turkish Journal of Pharmaceutical Sciences journal is published 6 times (February, April, June, August, October, December) per year and publishes the following articles:

- Research articles
- Reviews (only upon the request or consent of the Editorial Board)
- Preliminary results/Short communications/Technical notes/Letters to the Editor in every field of pharmaceutical sciences.

The publication language of the journal is English.

The Turkish Journal of Pharmaceutical Sciences does not charge any article submission or processing charges.

A manuscript will be considered only with the understanding that it is an original contribution that has not been published elsewhere.

The Journal should be abbreviated as "Turk J Pharm Sci" when referenced.

The scientific and ethical liability of the manuscripts belongs to the authors and the copyright of the manuscripts belongs to the Journal. Authors are responsible for the contents of the manuscript and accuracy of the references. All manuscripts submitted for publication must be accompanied by the Copyright Transfer Form [copyright transfer]. Once this form, signed by all the authors, has been submitted, it is understood that neither the manuscript nor the data it contains have been submitted elsewhere or previously published and authors declare the statement of scientific contributions and responsibilities of all authors.

Experimental, clinical and drug studies requiring approval by an ethics committee must be submitted to the JOURNAL with an ethics committee approval report including approval number confirming that the study was conducted in accordance with international agreements and the Declaration of Helsinki (revised 2013) (<http://www.wma.net/en/30publications/10policies/b3/>). The approval of the ethics committee and the fact that informed consent was given by the patients should be indicated in the Materials and Methods section. In experimental animal studies, the authors should indicate that the procedures followed were in accordance with animal rights as per the Guide for the Care and Use of Laboratory Animals (<http://oacu.od.nih.gov/regs/guide/guide.pdf>) and they should obtain animal ethics committee approval.

Authors must provide disclosure/acknowledgment of financial or material support, if any was received, for the current study.

If the article includes any direct or indirect commercial links or if any institution provided material support to the study, authors must state in the cover letter that they have no relationship with the commercial product, drug, pharmaceutical company, etc. concerned; or specify the type of relationship (consultant, other agreements), if any.

Authors must provide a statement on the absence of conflicts of interest among the authors and provide authorship contributions.

All manuscripts submitted to the journal are screened for plagiarism using the 'iThenticate' software. Results indicating plagiarism may result in manuscripts being returned or rejected.

The Review Process

This is an independent international journal based on double-blind peer-review principles. The manuscript is assigned to the Editor-

in-Chief, who reviews the manuscript and makes an initial decision based on manuscript quality and editorial priorities. Manuscripts that pass initial evaluation are sent for external peer review, and the Editor-in-Chief assigns an Associate Editor. The Associate Editor sends the manuscript to at least two reviewers (internal and/or external reviewers). The Associate Editor recommends a decision based on the reviewers' recommendations and returns the manuscript to the Editor-in-Chief. The Editor-in-Chief makes a final decision based on editorial priorities, manuscript quality, and reviewer recommendations. If there are any conflicting recommendations from reviewers, the Editor-in-Chief can assign a new reviewer.

The scientific board guiding the selection of the papers to be published in the Journal consists of elected experts of the Journal and if necessary, selected from national and international authorities. The Editor-in-Chief, Associate Editors may make minor corrections to accepted manuscripts that do not change the main text of the paper.

In case of any suspicion or claim regarding scientific shortcomings or ethical infringement, the Journal reserves the right to submit the manuscript to the supporting institutions or other authorities for investigation. The Journal accepts the responsibility of initiating action but does not undertake any responsibility for an actual investigation or any power of decision.

The Editorial Policies and General Guidelines for manuscript preparation specified below are based on "Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals (ICMJE Recommendations)" by the International Committee of Medical Journal Editors (20, archived at <http://www.icmje.org/>).

Preparation of research articles, systematic reviews and meta-analyses must comply with study design guidelines:

CONSORT statement for randomized controlled trials (Moher D, Schultz KF, Altman D, for the CONSORT Group. The CONSORT statement revised recommendations for improving the quality of reports of parallel group randomized trials. JAMA 2001; 285: 1987-91) (<http://www.consort-statement.org/>);

PRISMA statement of preferred reporting items for systematic reviews and meta-analyses (Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 2009; 6(7): e1000097.) (<http://www.prisma-statement.org/>);

STARD checklist for the reporting of studies of diagnostic accuracy (Bossuyt PM, Reitsma JB, Bruns DE, Gatsonis CA, Glasziou PP, Irwig LM, et al., for the STARD Group. Towards complete and accurate reporting of studies of diagnostic accuracy: the STARD initiative. Ann Intern Med 2003;138:40-4.) (<http://www.stard-statement.org/>);

STROBE statement, a checklist of items that should be included in reports of observational studies (<http://www.strobe-statement.org/>);

MOOSE guidelines for meta-analysis and systemic reviews of observational studies (Stroup DF, Berlin JA, Morton SC, et al. Meta-analysis of observational studies in epidemiology: a proposal for reporting Meta-analysis of observational Studies in Epidemiology (MOOSE) group. JAMA 2000; 283: 2008-12).



# Turkish Journal of PHARMACEUTICAL SCIENCES

## INSTRUCTIONS TO AUTHORS

### GENERAL GUIDELINES

Manuscripts can only be submitted electronically through the Journal Agent website (<http://journalagent.com/tjps/>) after creating an account. This system allows online submission and review.

**Format:** Manuscripts should be prepared using Microsoft Word, size A4 with 2.5 cm margins on all sides, 12 pt Arial font and 1.5 line spacing.

**Abbreviations:** Abbreviations should be defined at first mention and used consistently thereafter. Internationally accepted abbreviations should be used; refer to scientific writing guides as necessary.

**Cover letter:** The cover letter should include statements about manuscript type, single-Journal submission affirmation, conflict of interest statement, sources of outside funding, equipment (if applicable), for original research articles.

### ETHICS COMMITTEE APPROVAL

The editorial board and our reviewers systematically ask for ethics committee approval from every research manuscript submitted to the Turkish Journal of Pharmaceutical Sciences. If a submitted manuscript does not have ethical approval, which is necessary for every human or animal experiment as stated in international ethical guidelines, it must be rejected on the first evaluation.

Research involving animals should be conducted with the same rigor as research in humans; the Turkish Journal of Pharmaceutical Sciences asks original approval document to show implements the 3Rs principles. If a study does not have ethics committee approval or authors claim that their study does not need approval, the study is consulted to and evaluated by the editorial board for approval.

### SIMILARITY

The Turkish Journal of Pharmaceutical Sciences is routinely looking for similarity index score from every manuscript submitted before evaluation by the editorial board and reviewers. The journal uses iThenticate plagiarism checker software to verify the originality of written work. There is no acceptable similarity index; but, exceptions are made for similarities less than 15 %.

### REFERENCES

Authors are solely responsible for the accuracy of all references.

**In-text citations:** References should be indicated as a superscript immediately after the period/full stop of the relevant sentence. If the author(s) of a reference is/are indicated at the beginning of the sentence, this reference should be written as a superscript immediately after the author's name. If relevant research has been conducted in Turkey or by Turkish investigators, these studies should be given priority while citing the literature.

Presentations presented in congresses, unpublished manuscripts, theses, Internet addresses, and personal interviews or experiences should not be indicated as references. If such references are used, they should be indicated in parentheses at the end of the relevant sentence in the text, without reference number and written in full, in order to clarify their nature.

**References section:** References should be numbered consecutively in the order in which they are first mentioned in the text. All authors should be listed regardless of number. The titles of Journals should be abbreviated according to the style used in the Index Medicus.

#### Reference Format

**Journal:** Last name(s) of the author(s) and initials, article title, publication title and its original abbreviation, publication date, volume, the inclusive page numbers. Example: Collin JR, Rathbun JE. Involitional entropion: a review with evaluation of a procedure. Arch Ophthalmol. 1978;96:1058-1064.

**Book:** Last name(s) of the author(s) and initials, book title, edition, place of publication, date of publication and inclusive page numbers of the extract cited.

**Example:** Herbert L. The Infectious Diseases (1st ed). Philadelphia; Mosby Harcourt; 1999:11;1-8.

**Book Chapter:** Last name(s) of the author(s) and initials, chapter title, book editors, book title, edition, place of publication, date of publication and inclusive page numbers of the cited piece.

**Example:** O'Brien TP, Green WR. Periocular Infections. In: Feigin RD, Cherry JD, eds. Textbook of Pediatric Infectious Diseases (4th ed). Philadelphia; W.B. Saunders Company; 1998:1273-1278.

Books in which the editor and author are the same person: Last name(s) of the author(s) and initials, chapter title, book editors, book title, edition, place of publication, date of publication and inclusive page numbers of the cited piece. Example: Solcia E, Capella C, Kloppel G. Tumors of the exocrine pancreas. In: Solcia E, Capella C, Kloppel G, eds. Tumors of the Pancreas. 2nd ed. Washington: Armed Forces Institute of Pathology; 1997:145-210.

### TABLES, GRAPHICS, FIGURES, AND IMAGES

All visual materials together with their legends should be located on separate pages that follow the main text.

**Images:** Images (pictures) should be numbered and include a brief title. Permission to reproduce pictures that were published elsewhere must be included. All pictures should be of the highest quality possible, in JPEG format, and at a minimum resolution of 300 dpi.

**Tables, Graphics, Figures:** All tables, graphics or figures should be enumerated according to their sequence within the text and a brief descriptive caption should be written. Any abbreviations used should be defined in the accompanying legend. Tables in particular should be explanatory and facilitate readers' understanding of the manuscript, and should not repeat data presented in the main text.

### MANUSCRIPT TYPES

#### Original Articles

Clinical research should comprise clinical observation, new techniques or laboratories studies. Original research articles should include title, structured abstract, key words relevant to the content of the article, introduction, materials and methods, results, discussion, study limitations, conclusion references, tables/figures/images and



# Turkish Journal of PHARMACEUTICAL SCIENCES

## INSTRUCTIONS TO AUTHORS

acknowledgement sections. Title, abstract and key words should be written in both Turkish and English. The manuscript should be formatted in accordance with the above-mentioned guidelines and should not exceed 16 A4 pages.

**Title Page:** This page should include the title of the manuscript, short title, name(s) of the authors and author information. The following descriptions should be stated in the given order:

1. Title of the manuscript (Turkish and English), as concise and explanatory as possible, including no abbreviations, up to 135 characters
2. Short title (Turkish and English), up to 60 characters
3. Name(s) and surname(s) of the author(s) (without abbreviations and academic titles) and affiliations
4. Name, address, e-mail, phone and fax number of the corresponding author
5. The place and date of scientific meeting in which the manuscript was presented and its abstract published in the abstract book, if applicable

**Abstract:** A summary of the manuscript should be written in both Turkish and English. References should not be cited in the abstract. Use of abbreviations should be avoided as much as possible; if any abbreviations are used, they must be taken into consideration independently of the abbreviations used in the text. For original articles, the structured abstract should include the following sub-headings:

**Objectives:** The aim of the study should be clearly stated.

**Materials and Methods:** The study and standard criteria used should be defined; it should also be indicated whether the study is randomized or not, whether it is retrospective or prospective, and the statistical methods applied should be indicated, if applicable.

**Results:** The detailed results of the study should be given and the statistical significance level should be indicated.

**Conclusion:** Should summarize the results of the study, the clinical applicability of the results should be defined, and the favorable and unfavorable aspects should be declared.

**Keywords:** A list of minimum , but no more than 5 key words must follow the abstract. Key words in English should be consistent with "Medical Subject Headings (MESH)" ([www.nlm.nih.gov/mesh/MBrowser.html](http://www.nlm.nih.gov/mesh/MBrowser.html)). Turkish key words should be direct translations of the terms in MESH.

**Original research articles should have the following sections:**

**Introduction:** Should consist of a brief explanation of the topic and indicate the objective of the study, supported by information from the literature.

**Materials and Methods:** The study plan should be clearly described, indicating whether the study is randomized or not, whether it is retrospective or prospective, the number of trials, the characteristics, and the statistical methods used.

**Results:** The results of the study should be stated, with tables/figures given in numerical order; the results should be evaluated according to the statistical analysis methods applied. See General Guidelines for details about the preparation of visual material.

**Discussion:** The study results should be discussed in terms of their favorable and unfavorable aspects and they should be compared with the literature. The conclusion of the study should be highlighted.

**Study Limitations:** Limitations of the study should be discussed. In addition, an evaluation of the implications of the obtained findings/ results for future research should be outlined.

**Conclusion:** The conclusion of the study should be highlighted.

**Acknowledgements:** Any technical or financial support or editorial contributions (statistical analysis, English/Turkish evaluation) towards the study should appear at the end of the article.

**References:** Authors are responsible for the accuracy of the references. See General Guidelines for details about the usage and formatting required.

### Review Articles

Review articles can address any aspect of clinical or laboratory pharmaceuticals. Review articles must provide critical analyses of contemporary evidence and provide directions of or future research. Most review articles are commissioned, but other review submissions are also welcome. Before sending a review, discussion with the editor is recommended.

Reviews articles analyze topics in depth, independently and objectively. The first chapter should include the title in Turkish and English, an unstructured summary and key words. Source of all citations should be indicated. The entire text should not exceed 25 pages (A, formatted as specified above).





## CONTENTS

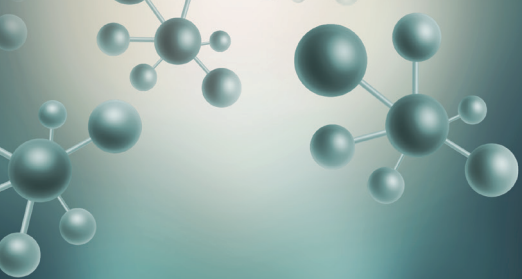
### Original Articles

- 116 Ameliorative Effect of Marine Macroalgae on Carbon Tetrachloride-Induced Hepatic Fibrosis and Associated Complications in Rats  
Maria AZAM, Khan HIRA, Shamim A. QURESHI, Nasira KHATOON, Jehan ARA, Syed EHTESHAMUL-HAQUE
- 125 Design, Development, Optimization and Evaluation of Ranolazine Extended Release Tablets  
Raghavendra Kumar GUNDA, Prasada Rao MANCHINENI, Dhachinamoorthi DURAISWAMY, Koteswara Rao GSN
- 132 Protective Role of *Diospyros lotus* L. in Cisplatin-Induced Cardiotoxicity: Cardiac Damage and Oxidative Stress in Rats  
Neşe BAŞAK TÜRKMEN, Dilan AŞKIN ÖZEK, Aslı TAŞLIDERE, Osman ÇİFTÇİ, Özlem SARAL, Cemile Ceren GÜL
- 138 A Combination of Virgin Coconut Oil and Extra Virgin Olive Oil Elicits Superior Protection Against Doxorubicin Cardiotoxicity in Rats  
Andi Ulfiana UTARI, Yulia Yusrini DJABIR, Bogie Putra PALINGGI
- 145 Phytochemical, Histochemical and *In Vitro* Antimicrobial Study of Various Solvent Extracts of *Costus speciosus* (J. Koenig) Sm. and *Costus pictus* D. Don  
Sana Saffiruddin SHAIKH, Abubakar Salam BAWAZIR, Barrawaz Aateka YAHYA
- 153 Formulation and Development of Aqueous Film Coating for Moisture Protection of Hygroscopic *Herniaria glabra* L. Tablets  
Hakim EL MABROUKI, Irina Evgenievna KAUKHOVA
- 161 Vitamin D with Calcium Supplementation Managing Glycemic Control with HbA1c and Improve Quality of Life in Patients with Diabetes  
Sanjana MEHTA, Parminder NAIN, Bimal K. AGRAWAL, Rajinder Pal SINGH
- 168 Preparation and Characterization of Orlistat Bionanocomposites Using Natural Carriers  
Santosh PAYGHAN, Vaishali PAYGHAN, Kavita NANGARE, Lalita DAHIWADE, Karna KHAVANE, Ram PHALKE
- 180 13, 14-Epoxyoleanan-3-ol-acetate: A Male Fertility-Enhancing Constituent from Hexane Fraction of *Momordica charantia* L. (Cucurbitaceae)  
Oluwasegun ADEDOKUN, Adebayo GBOLADE, Bunyaminu AYINDE
- 187 Chitosan-Based Microparticle Encapsulated *Acinetobacter baumannii* Phage Cocktail in Hydrogel Matrix for the Management of Multidrug Resistant Chronic Wound Infection  
Margaret O. ILOMUANYA, Nkechi V. ENWURU, Emmanuella ADENOKUN, Abigail FATUNMBI, Adebawale ADELUOLA, Cecilia I. IGWILLO
- 196 Creatine and Alpha-Lipoic Acid Antidepressant-Like Effect Following Cyclosporine A Administration  
Mehdi ALIOMRANI, Azadeh MESRIPOUR, Abolfazl Saleki MEHRJARDI
- 202 Potential Inhibitors of SARS-CoV-2 from *Neocarya macrophylla* (Sabine) Prance ex F. White: Chemoinformatic and Molecular Modeling Studies for Three Key Targets  
Amina Jega YUSUF, Musa Ismail ABDULLAHI, Aliyu Muhammad MUSA, Hassan ABUBAKAR, Abubakar Muhammad AMALI, Asma'u Hamza NASIR

### Short Communication

- 213 Simple and Sensitive RP-HPLC and UV Spectroscopic Methods for the Determination of Remogliflozin Etabonate in Pure and Pharmaceutical Formulations  
Nandeeshia ITIGIMATHA, Kailash S. CHADCHAN, Basappa C. YALLUR, Manjunatha D. HADAGALI





# Turkish Journal of PHARMACEUTICAL SCIENCES

## CONTENTS

---

### *Reviews*

- 220 A Brief Discussion of Multi-Component Organic Solids: Key Emphasis on Co-Crystallization  
Braham DUTT, Manjusha CHOUDHARY, Vikas BUDHWAR
- 232 Challenges Faced by Hospital Pharmacists in Low-Income Countries Before COVID-19 Vaccine Roll-Out:  
Handling Approaches and Implications for Future Pandemic Roles  
Rajeev SHRESTHA, Sunil SHRESTHA, Binaya SAPKOTA, Saval KHANAL, Bhuvan KC