

Journal of Chemical and Pharmaceutical Research (ISSN : 0975-7384)

Home (<https://www.jocpr.com/>) Editorial Board (<https://www.jocpr.com/editorial-board.html>)

In Press (<https://www.jocpr.com/inpress.html>) Archive (<https://www.jocpr.com/archive.html>)

Instruction to Authors (<https://www.jocpr.com/instruction-to-authors.html>)

Reach Us   +44 1625708989

Abstracted/Indexed (<https://www.jocpr.com/pdf/ABSTRACTED-INDEXED-JOCPR.pdf>)

Downloads (<https://www.jocpr.com/download.html>)

Contact (<https://www.jocpr.com/contact-us.html>)



All submissions of the EM system will be redirected to **Online Manuscript Submission System**.
Authors are requested to submit articles directly to **Online Manuscript Submission System**
(<https://www.scholarscentral.org/submissions/chemical-pharmaceutical-research.html>) of respective journal.

Editorial Board

Editorial Board

Dr. William N Setzer, University of Alabama in Huntsville, Huntsville, USA

Dr. Shaaban K Mohamed, Manchester Metropolitan University, Manchester, UK



Dr Shaili Aggarwal, Department of Pharmacology & Physiology, Drexel University College of Medicine Philadelphia, PA, USA

Dr. Chengyuan Liang, Department of Pharmacy, Shaanxi University of Science & Technology, Xi' an, Shaanxi, P. R. China

Dr. Kiran Vangara, Insys Therapeutics. Inc., Chandler, AZ, USA

Dr. Abdelkader Zarrouk, Laboratory of Applied Chemistry & Environment Department of Chemistry, Faculty of Science, University Mohammed Premier, Oujda, Morocco

Dr. Vijay Gottumukkala, Eckert & Ziegler Eurotope GMBH, Hopkinton, MA, USA

Reach Us   +44 1625708989

Dr. Abhijit Ghosh, Brigham Young University, UT, USA

Dr. Srinivas Nammi, University of Canberra, Australia

Dr. Vamsidhar Akurathi, Division of Nuclear Medicine and Molecular Imaging, Boston Children's Hospital/Harvard Medical School, Boston, MA, USA

Dr. Tanay Kesharwani, New Link Genetics, Ames, IA, USA

Dr. Zhi-Zhong Wang, Ningxia Medical University, Yinchuan, Ningxia, P R China

Dr. Soumik Biswas, Department of Chemistry, Texas A & M University, TX

Dr. Wael Ahmad Abu Dayyih, Department of Pharmaceutical Medicinal Chemistry and Pharmacognosy, Faculty of Science, Petra University, Amman, Jordan

Dr. Mahesh Bhide, Coldstream Labs, Kentucky, USA

Dr. Shivanand Puthli, Tris Pharma Inc., NJ, USA

Dr. Sidney Augusto Vieira Filho, Universidade Federal de Ouro Preto, Ouro Preto, MG, Brazil

Dr. Vibha Yadav, Division of Microbiology, Tulane National Primate Research Center, Covington, LA, USA

Dr. Ahmad F. EL Shahaby, Biotechnology and Genetic Engineering Unit, College of Medicine, Taif University, KSA

Dr. S A Abubshait, University of Damam, Saudia Arabia

G Aranovich, Johns Hopkins University, Baltimore, Maryland, USA

Dr. Hua-Jun Luo, College of Biological and Pharmaceutical Science, China Three Gorges University, Yichang, Hubei province, P. R. China

Dr. Jackson Roberto Guedes da Silva Almeida, Universidade Federal do Vale do São Francisco, Petrolina, Pernambuco, Brazil

Dr. Manoj P Dandekar, McGovern Medical School, The University of Texas Health Science Center at Houston, Texas

Dr. Nora H Al-Shaalan, Princess Nora Bint Abdul Rahman University, Riyadh, Saudi Arabia

Dr. Inna Razdorskaya, Department of Management and Economics of Pharmacy, Kursk State Medical University, Russia

Reach Us   +44 1625708989

Dr. Ahmed O Alnajjar, King Faisal University, Saudi Arabia

Dr. Waleed M Sweileh, An-Najah National University, Nablus, Palestine

Dr. Mahmoud Salman, Taif University, Taif, Kingdom of Saudi Arabia

Dr. G Aranovich, Johns Hopkins University, Baltimore, Maryland, USA

Dr. Jin Quan Wang, Institute of Bioengineering and Nanotechnology, Singapore

Dr. Lucas V B Hoelz, Cidade Universitária, Ilha do Fundão, Rio de Janeiro, RJ, Brazil

Dr. Safwan Fraihat, Department of Chemistry, Faculty of Science, University of Jordan, Jordan

Dr. Dafeng Chu, Department of Pharmaceutical Sciences, School of Pharmacy, Washington State University, Washington

Dr. Dachriyanus, Faculty of Pharmacy, Andalas University, Kampus Limau Manis, Padang, West Sumatra, Indonesia

Dr. Makky E A, University Malaysia Pahang, Kuantan, Pahang, Malaysia

Dr. Jackson Roberto Guedes da Silva Almeida, Universidade Federal do Vale do São Francisco, Petrolina, Pernambuco, Brazil

Dr. Hany A. Omar, Department of Pharmacology, College of Pharmacy, University of Sharjah, UAE

Dr. Omar B Ibrahim, Taif University, Taif, Kingdom of Saudi Arabia

Dr. Nurul Aili Zakaria, Universiti Sains Malaysia, Pulau Pinang, Malaysia

Dr. Mohamed Salama, Faculty of Pharmacy UiTM(Universiti Teknologi Mara), Campus Puncak, Alam, Selangor, Malaysia

Dr. Asep Sukohar, Medical Faculty, Lampung University, Indonesia

Dr. Hanan M Al-Youssef, King Saud University, Riyadh, Saudi Arabia

Dr. Ho Soon Min, Faculty of Applied Sciences, INTI International University, Persiaran Perdana BBN, Putra Nilai, Nilai, Negeri Sembilan, Malaysia

Dr. Alaa E. Ali, Head of Chemistry Department, Faculty of Science, Damanhour University, Damanhour, Egypt

Reach Us   +44 1625708989

Dr. Uhood J AL- Hamdani, University of Basrah, Basrah, Iraq

Dr. Tariq K. Almog, Tripoli University, Tripoli, Libya

Dr. Tarik Chaouche, Tlemcen University, Tlemcen, Algeria

Dr. Aleksandra N Pavlovi?, University of Ni?, Ni?, Serbia

Dr. Ali H. Al-Mowali, University of Basrah, Basrah, Iraq

Dr. Y A El-Badry, Ain Shams University, Cairo, Egypt

Dr. Alireza Garjani, Tabriz University of Medical Sciences, Tabriz, Iran

Dr. Akmal Shawky Gaballa, Faculty of Specific Education, Zagazig University, Zagazig, Egypt

Dr. Adel Kamel Madbouly Ramadan, Faculty of Science University of Ain Shams Cairo, Egypt

Dr. Aman Dekebo, Adama Science and Technology University, Adama

Dr. Amer E A, Cairo University, Egypt

Dr. Soad A Yehia, Cairo University, Cairo, Egypt

Dr. Atul Kumar Singh, CRNTS, IIT Bombay, Bombay, India

Dr. Aytaç Güder, Giresun University, Turkey

Dr. B Boumoud, Université Mentouri de Constantine, Constantine, Algérie

Dr. B M Rao, Johnson & Johnson Ltd, Mumbai, India

Dr. Shameema Oottikka,

Dr. B S Bhoop, UIPS, Punjab University, Chandigarh, India

Dr. Bachir Benarba, Department of Biology, University of Mascara, Algeria

Dr. Brian Henriksena, Creighton University, Omaha, NE

Dr. C Venkata Rao, Sri Venkateswara University, Tirupati, India

Dr. Seyed Mehdi Talebi, Shahid Beheshti University, Iran

Dr. C. Jayakumar, Department of Chemical Engineering, A. C. Technology, Anna University, Chennai, India

Reach Us   +44 1625708989

Dr. C. Sampath, Department of Chemistry, Kwa Dlangezwa, KwaZulu-Natal, University of Zululand, South Africa

Dr. Salem Ashoor, University of Misurata, Libya

Dr. Camilia G Michel, Cairo University, Cairo, Egypt

Dr. S S Sisodia, B N College of Pharmacy, Udaipur, India

Dr. S P Tripathi, Poorvanchal University, Jaunpur, India

Dr. Chinyere Okwelogu, University of Lagos, Nigeria

Dr. S N Meyyanathan, J S S College of Pharmacy, Ooty, India

Dr. Chukwuemeka P C Azubuikwe, University of Lagos, Lagos, Nigeria

Dr. S Lucangioli, Consejo Nacional de Investigaciones Científicas y Tecnológicas, Argentina

Dr. Chukwuma O Agubata, University of Nigeria, Nsukka

Dr. Clement Jackson, University of Uyo, Uyo, Akwa Ibom, Nigeria

Dr. Reza Tayebbe, Sabzevar Tarbiat Moallem University, Sabzevar, Iran

Dr. Craig A Obafemi, Obafemi Awolowo University, Ile-ife, Osun, Nigeria

Dr. Prem Raj, Lucknow University, Lucknow, India

Dr. D J Sen, Shri Sarvajanic Pharmacy College, HN Gujarat University, Mehsana, India

Dr. Prem Prakash Solanki, Banaras Hindu University, Varanasi, India

Dr. D S Ashilenje, Moi University, Eldoret, Kenya,

Dr. D S Salomé Kpoviessi, University of Abomey-Calavi, LaCOPS, Cotonou, Benin

Dr. PF Uzor, University of Nigeria, Nsukka, Enugu State, Nigeria

Dr. Pauline Mounjouenpou, Institut de Recherche Agricole pour le Développement, Yaoundé, Cameroun

Dr. Demiana I Nesseem, National Organization for Drug Control and Research, Cairo, Egypt

Dr. Paul C. Chikezie, Department of Biochemistry, Imo State University, Owerri, Imo State, Nigeria

Reach Us   +44 1625708989

Dr. Dewan Taslima Akhter, Stamford University Bangladesh, Dhaka, Bangladesh

Dr. Patricia A Onocha, University of Ibadan, Nigeria

Dr. Dilipkumar Pal, Bilashpur Institute of Pharmaceutical Sciences, Guru Ghasidas Viswavidyalaya, Koni, Bilashpur

Dr. E J Koranteng-Addo, University of Cape Coast, Cape Coast, Ghana

Dr. P. Selvarajan, Department of Physics, Aditanar College of Arts and Science, Tiruchendur, Tamilnadu

Dr. Edebi N Vaikosen, Niger Delta University, Wilberforce Island, Nigeria

Dr. P Sumanatrakul, Prince of Songkla University, Songkhla, Thailand

Dr. Elsayed T. Helmy, Chemistry Department, Faculty of Science, Mansoura University, Egypt

Dr. F M AL-Jabri, Basrah University, Basrah, Iraq

Dr. P M Kanyonga, Pôle de Compétences Pharmacochimie, Faculté des Sciences-Agdal, Ibn Battouta, Rabat- Maroc

Dr. Gabriel O Egharevba, Obafemi Awolowo University, Ile-ife, Osun State, Nigeria

Dr. P C Sharma, Kurukshetra University, Kurukshetra, India

Dr. Galal H Said, Ain-Shams University, Egypt

Dr. H M Hassan, Al-Azhar University, Nasr City, Cairo, Egypt

Dr. Ola I. A. Salem, Pharm Organic Chemistry Department, Faculty of Pharmacy, Assiut University, Assiut, Egypt

Dr. Haddad Boumediene, Department of Chemistry, Synthesis and Catalysis Laboratory LSCT, Tiaret University, Tiaret, Algeria

Dr. Hanaa H. Ahmed, Head of Hormones Department, Medical Research Division, National Research Centre, Egypt

Dr. Okan Özkaya, Çukurova Üniversitesi, Ziraat Fakültesi Bahçe Bitkileri Bölümü, Balcalı Adana

Dr. O R Omobuwajo, Niger Delta University, Wilberforce Island, Nigeria

Reach Us   +44 1625708989

Dr. Hao Wu, NGM Biopharmaceuticals Inc., 630 Gateway Blvd., South San Francisco, CA

Dr. Hari Kishore Annavarapu, University of Texas Southwestern Medical Center, Dallas, Texas,

Dr. Hassan Ahmadvand, Dept. of Biochemistry, School of Medicine, Lorestan University of Medical Sciences, Khoram Abad, Iran

Dr. Hassan Ali Zamani, Quchan Branch, Islamic Azad University, Quchan, Iran

Dr. Nesreen Nadhum Majeed, Basra University, Basra, Iraq

Dr. Neeta Raj Sharma, Faculty of Biotechnology & Biosciences, Lovely Professional University (LPU), Phagwara, Punjab, India

Dr. Houda Bouchafra, Laboratory of Organic Chemistry Application, Faculty of Sciences and Techniques, FES University Sidi Mohammed Ibn Abdillah, FES, Morocco

Dr. Nasr H El-Hammamy, Alexandria University, Alexandria, Egypt

Dr. Najji A Abood, Basrah University, Basrah, Iraq

Dr. N. Vijayakumar, Department of Biochemistry and Biotechnology, Annamalai University, India

Dr. Murlidhar P. Wadekar, Department of Chemistry, Govt. Vidarbha Institute of Science & Humanities, Amravati, India

Munther Abdul-Jaleel Mohammed-Ali, Basra University, Basra, Iraq

Dr. Mubo A Sonibare, University of Ibadan, Ibadan Nigeria

Dr. Ikotun Adebomi Ayodeji, Bowen University, Iwo, Osun State, Nigeria

Dr. Moynul Hasan, Dhaka International University, Banani, Dhaka, Bangladesh

Dr. Mohammed Y S Abary, Cairo University, Egypt

Dr. J K Koka, University of Cape Coast, Ghana

Dr. J K Tufuor, University of Cape Coast, Cape Coast, Ghana

Dr. Youssef Ramli, Faculty of Medicine and Pharmacy, Mohammed V University- Rabat, Morocco

Dr. J P K, Adotey, University of Cape Coast, Ghana

Dr. Mohammed Rahmatullah, Faculty of Life Sciences, University of Development Alternative, Dhanmondi, Dhaka, Bangladesh

Reach Us   +44 1625708989

Dr. Mohammed Abdelwahab Abdelgawad, Department of Pharmaceutical Organic Chemistry, Faculty of Pharmacy, Beni Suef University, Beni Suef, Egypt

Dr. Jinghua Duan, Department of Pharmaceutics, School of Pharmacy, University of Washington, Seattle, WA, USA

Dr. Jitendra Ramteke, Department of Physics, SMMC, Nagpur, India

Dr. Julianeli Tolentino de Lima, Universidade Federal do Vale do São Francisco, Petrolina, Pernambuco, Brazil

Dr. Mohamed Abdelmanef Abderrabba, The Molecular Materials and Applications Laboratory, IPEST, University of Carthage, La Marsa, Tunisia

Dr. Kabore Adama, Institut de l'Environnement et de Recherches Agricoles, Ouagadougou, Burkina Faso

Dr. Kawkab Ali Hussain, University of Basrah, Iraq

Dr. Menderes Koyuncu, Yuzuncu Y?l University, Van, Turkey

Dr. Ketan C. Parmar, Sir P T Sarvajanik College of Science, Surat, India

Dr. Mellah Ilyas, Department of Chemistry, Uludag University, Turkey

Dr. Khaled Nabih Zaki Rashed, National Research Centre (NRC), Pharmacognosy Department, Pharmaceutical and Drug Industries Research Division, Dokki, Giza, Egypt

Dr. Maryam Niyati, Department of Medical Parasitology & Mycology, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Dr. Majdoulaine Larif, Separation Process Laboratory, Faculty of Science, University Ibn Tofail, Kenitra, Morocco

Dr. Mahmoud Mahyoob Alburyhi, Faculty of Pharmacy, Sanaa University, Yemen

Dr. Kishorbhai R. Desai, Department of Chemistry, Uka Tarsadia University, Bardoli-Mahuva Road, Bardoli, Surat

Dr. Konstantinos M. Kasiotis, Benaki Phytopathological Institute, Department of Pesticides Control and Phytopharmacy, Kifissia, Athens

Dr. Mahmoud Bahmani, University of Medical Sciences, Iran

Reach Us   +44 1625708989

Dr. Lotf Ali Saghatforoush, Payame Noor University, Iran

Dr. Madu P C, Nasarawa State University, Keffi

Dr. Lotfi Baameur, Kasdi Merbah University, Ouargla, Algeria

Dr. M. V. Ramana, Department of Physics, S. R. & B. G. N. R. Government Arts and Science College, Khammam, A.P., India

Dr. M P Kanyonga, UER de biochimie, chimie médicale et pharmacologie, I S T M Kinshasa, R D Congo

Dr. M K Gafar, Kebbi State University of Science and Technology, Aliero, Nigeria

Dr. M O Agwara, University of Yaoundé I, Yaoundé, Cameroon

Dr. Kabore Adama, Institut de l'Environnement et de Recherches Agricoles, Ouagadougou, Burkina Faso

Dr. Jitendra Ramteke, Department of Physics, SMMC, Nagpur, India

Dr. J K Tufuor, University of Cape Coast, Cape Coast, Ghana

Dr. Chinyere Okwelogu, University of Lagos, Nigeria
Dr. Chukwuemeka P C Azubuike, University of Lagos, Lagos, Nigeria

Dr. Bachir Benarba, Department of Biology, University of Mascara, Algeria

Dr. Amer E A, Cairo University, Egypt

Dr. Aleksandra N Pavlovic, University of Nis, Visegradska, Nis, Serbia

Maulin Pramod Shah, Chief Scientist & Head-Industrial Waste Water Research Lab, Division of Applied & Environmental Microbiology Lab, Enviro Technology Limited, Ankleshwar, India

Dr. Abdümelik ARAS, Kafkas university, Kars, Turkey

Dr. Marco Fiore, Department of Anesthesiological, Surgical and Emergency Sciences, Italy

Dr. Shahin Gavanji, Biotechnology, Isfahan university, Iran


Antonio Vassallo, University of Basilicata. Viale dell'Ateneo Lucano, Potenza (ITALY)

Reach Us   +44 1625708989

Select your language of interest to view the total content in your interested language

Pilih Bahasa 

Diberdayakan oleh  **Google Terjemahan** (<https://translate.google.com>)

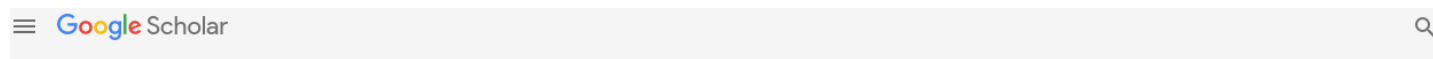
 20+ Million Readerbase (<https://www.jocpr.com/journal-chemical-and-pharmaceutical-research-online-visitors-readers-1.html>)



Google Scholar citation report (https://scholar.google.com/citations?hl=en&view_op=list_works&gmla=AJsN-F6sOxOXqDx10njWEGb4fQcQLt0kl6ylj419XCXZzm8fQAusYDwg45q7D34lx8LcnDfeQoqCm4cQQg10WNb-IEGae2ldgA&user=RwzzGjkAAAAJ)

Citations : 29447

Journal of Chemical and Pharmaceutical Research received 29447 citations as per google scholar report (https://scholar.google.com/citations?hl=en&view_op=list_works&gmla=AJsN-F6sOxOXqDx10njWEGb4fQcQLt0kI6ylj419XCXZzm8fQAusYDwg45q7D34Ix8LcnDfeQoqCm4cQQg10WNb-IEGae2ldgA&user=RwzzGjkAAAAJ)



Journal of Chemical and Pharmaceutical Research



Editor

Verified email at jocpr.com - [Homepage](#)

[Organic Chemistry](#) [Green chemistry](#) [Photochemistry](#) [Inorganic chemistry](#) [Physical chemistry](#)

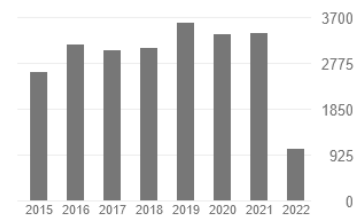
GET MY OWN PROFILE

TITLE	CITED BY	YEAR
Fast dissolving tablet: an overview D Bhowmik, B Chiranjib, P Krishnakanth, RM Chandira Journal of chemical and pharmaceutical research 1 (1), 163-177	476	2009
Antioxidants: a review S Mandal, S Yadav, S Yadav, RK Nema Journal of chemical and pharmaceutical research 1 (1), 102-104	241	2009
Cinnamic acid derivatives: a new chapter of various pharmacological activities. P Sharma Journal of Chemical and Pharmaceutical Research 3 (2), 403-423	221	2011
Study on characteristics and harm of surfactants CL Yuan, ZZ Xu, MX Fan, HY Liu, YH Xie, T Zhu Journal of Chemical and Pharmaceutical Research 6 (7), 2233-2237	166	2014
Saraca asoca (Ashoka): a review P Pradhan, L Joseph, V Gupta, R Chulet, H Arya, R Verma, A Bajpai Journal of chemical and pharmaceutical research 1 (1), 62-71	152	2009
Montmorillonite: An efficient, heterogeneous and green catalyst for organic synthesis N Kaur, D Kishore J. Chem. Pharm. Res 4 (2), 991-1015	149	2012
Herbal remedies of Azadirachta indica and its medicinal application D Bhowmik, YJ Chiranjib, KK Tripathi, KS Kumar J Chem Pharm Res 2 (1), 62-72	143	2010

Cited by

Reach Us +44 1625708989

	All	Since 2017
Citations	29447	17560
h-index	66	49
i10-index	828	521




Co-authors




- Belkheir Hammouti**
Université Mohammed Premier, ... >
- SALGHI RACHID**
National Scol of Applied Scienc... >
- Mahmoud Rafeian Kopaei or Mahmo...**
Professor of Pharmacology, Sha... >


(<https://www.jocpr.com/citations.html>)

Tweets from @jocpr323

Journal of Chemi... 
@jo... · Nov 18, 2021

Recent [#synthesis](#) of [#marine](#)
[#natural](#) products with
[#antihypertensive](#) activity: An
overview
jocpr.com/articles/recen...


  

Journal of Chemi... 
@jo... · Nov 18, 2021

Role of community [#pharmacist](#) in
management and prevention
[#diabetic](#) [#foot](#) [#ulcer](#) and
#...

Reach Us   +44 1625708989

© 2023 JOCPR. All right reserved. Sitemap
(<https://www.jocpr.com/sitemap.html>)

 (<https://www.facebook.com/Journal-of-Chemical-and-Pharmaceutical-Research-413801832431738/>)

 (<https://twitter.com/jocpr323>)



The application of hollow fiber-liquid phase microextraction based on green chemistry to analyze carcinogenic nitrosamines in food samples

Yanuardi Raharjo*, Usreg Sri Handajani and Miratul Khasanah

Department of Chemistry, Faculty of Science and Technology, Universitas Airlangga, Surabaya, Indonesia

ABSTRACT

A hollow fiber-liquid phase microextraction coupled with gas chromatography method has been developed for the determination of carcinogenic nitrosodiethylamine and nitrosodipropylamine in several food samples. In this method, a small amount of toluene as the acceptor phase was introduced to fill-up the channel of a polypropylene hollow fiber using a microsyringe while the hollow fiber was immersed in an aqueous donor solution. After extraction, the acceptor phase was withdrawn and injected for gas chromatographic analysis. Parameters that affect the extraction efficiency were studied including the organic solvent, length of fiber, volume of acceptor and extraction time. The limits of detection for nitrosodiethylamine and nitrosodipropylamine were $330 \mu\text{g L}^{-1}$ and $20 \mu\text{g L}^{-1}$ respectively. This method was applied successfully for the determination of nitrosodiethylamine and nitrosodipropylamine in sausage, corned meat, fresh meat, and salted egg.

Keywords: Sample preparation, Liquid phase microextraction, Nitrosodiethylamine, Nitrosodipropylamine

INTRODUCTION

Membrane can be defined as a semi-permeable thin layer that serves as a specific filter to separate a mixture of components [1]. Application of membrane technology is growing very rapidly, i.e. applications in drinking water treatment and biomedical analysis. The use of membrane separation has many advantages such as less energy needs, does not alter the molecular structure of substances separated, can be operated at room temperature, and does not require additional chemicals during the separation process [2]. Using hollow fiber membrane is more desirable than a flat membrane; this is because the flat membrane has many drawbacks such as the frequent occurrence of membrane fouling causing reduction in its performance.

A hollow fiber membrane has a larger area per unit volume; therefore it is more effective to perform the separation. The surface area of hollow fiber membrane has a density of $3000 \text{ total M}^2/\text{M}^3$ compared to flat membranes which has a density of $400 \text{ total M}^2/\text{M}^3$. Hollow fiber membranes also have a more robust mechanical structure than a flat membrane [3]. Hollow fiber membranes used for the extraction method is nonpolar fiber, so it is effective in extraction of target compounds that have similar polarity like nitrosamine group. Therefore, this membrane is widely used in the extraction process using a particular liquid phase microextraction (LPME) called Hollow Fiber-Liquid Phase Microextraction (HF-LPME). The sample preparation step is very important in the analysis of target compounds, especially for analyte in range parts per million (ppm) to parts per trillion (ppt) for example compounds such as nitrosamines e.g. nitrosodiethylamine (NDEA) and nitrosodipropylamine (NDPA).

Nitrosamine compounds are carcinogenic and very harmful to human health [4]. Nitrosodipropylamine nitrosodiethylamine are often found as food preservatives in several dietary items such as bacon, sausage, corned beef and salted fish [5]. Furthermore, these nitrosoamines are used as refresher material in the preserved meat in order to keep a steady red color during the ripening process. Antibacterial activity of nitrite has been proven and

effective way to prevent the growth of *Clostridium botulinum* bacteria, known as pathogens causing food poisoning. Nitrosamines compounds are nitrite reaction products which can damage to the liver and are carcinogens. Therefore, a reliable, validated and sensitive analytical method for the detection and determination of nitrosamines is essential to establish food safety.

Cancer is one of the biggest killers in the world are caused by environmental factors (90-95%) and genetic factors (5-10%). Knowledge of the cause of cancer is the most important thing that must be recognized in every society. Environmental factors that cause cancer due to the consumption of harmful substances such as tobacco and food additives and preservatives used in food and beverages (25-30%), obesity (30-35%), infections (15-20%), radiation, stress, lack of physical activity and the impact of environmental pollutants [6].

This research investigates application of HF-LPME as efficient samples preparation method which supports the principles of green chemistry for the determination of NDEA and NDPA in various diet samples obtained from the local Indonesian market such as sausage, corned meat, fresh meat and salted egg. Separation and quantification of analytes were performed by Gas Chromatography coupled with Flame Ionization Detector (GC-FID).

EXPERIMENTAL SECTION

2.1 Reagents, chemicals, and materials

Organic solvents (n-hexane, toluene, and carbon tetrachloride) analytical grade were supplied by Fluka (Buchs, Switzerland). Nitrosodiethylamine and nitrosodipropylamine were purchased from Sigma Aldrich (Singapore). Accurel Q3/2 polypropylene hollow fiber membrane (600 μm I.D., 200 μm wall thickness, and 0.2 μm pore size) was purchased from Membrane (Wuppertal, Germany). Stock standard solutions (1000 mg L^{-1}) of each analytes were prepared in methanol and water and were stored in the freezer at about $-18\text{ }^{\circ}\text{C}$.

2.2 Instrumentation

The GC system used Agilent 6890 Series with flame ionization detector (FID). The column used HP-5 non polar (30m x 0,25 mm i.d, 0.25 μm film thickness) was purchased from Berca (Jakarta, Indonesia) which is composed of 5% diphenyl and 95% dimethylpolysiloxane was used in the analysis of the nitrosoamines under study. Nitrogen was used as the carrier gas at a flow rate 0.4 mL min^{-1} .

2.3 Liquid-phase microextraction procedure

The LPME device is shown in Fig. 1.

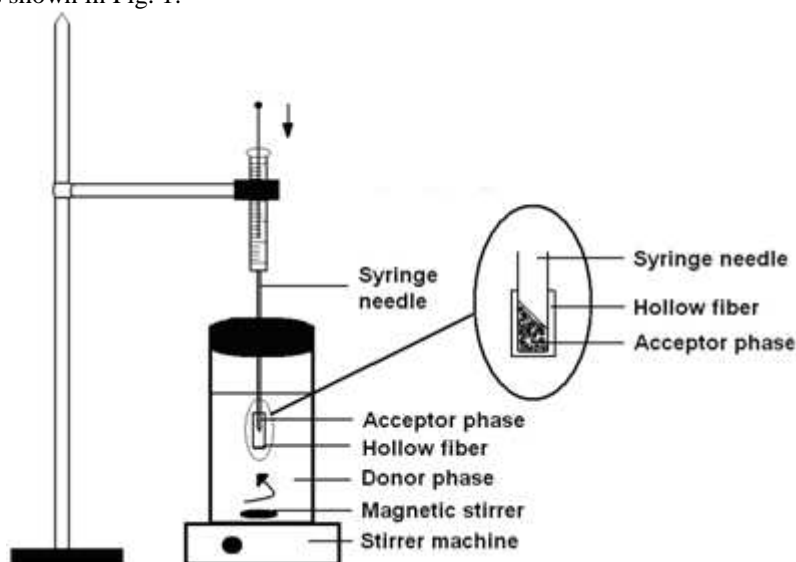


Fig.1. Device of HF-LPME

A 10 μL microsyringe with a pointed blunt tip was used to introduce acceptor phase into the polypropylene hollow fiber membrane. The hollow fiber was cut manually to short piece 1.5 cm. A new piece of hollow fiber was used for each extraction to prevent the carry over effect. The polypropylene hollow fiber membrane was sealed on one edge by sealer machine, and then dipped into acceptor phase (e.g. toluene) for 10 seconds to impregnate the pores of the fiber with the acceptor phase. The needle of microsyringe that contained acceptor phase (3 μL) was then inserted

into the hollow fiber segment and the assembly was immersed in the 20 mL sample solution. The sample was stirred using a magnetic stirrer during the extraction process.

Liquid phase microextraction was developed as an alternative sample preparation method of the conventional methods of liquid - liquid extraction [7]. LPME technique is one of the sample preparation techniques, in which a single organic solvent microdrop can be used at the end of single microdrop microsyringe or placed in a hydrophobic porous membrane that separate single microdrop of donor phase through the membrane interface [8]. Pedersen and Rasmussen [9] used the perforated membrane to protect the organic solvent. Extraction method which stabilizes the organic solvent droplets with perforated membrane is called the HF - LPME technique. HF - LPME extraction method has the following advantages i) the use of the organic solvent in a very small amount which is placed in the hollow fiber enabling stable organic solvent as the extractor, and ii) the hollow fiber can also act as a filter. Accordingly, the HF - LPME technique is considered a simple, efficient and inexpensive technique for analytes extraction [5]. LPME method provides good recovery for the analytes present in a complex matrix selectively, which is ready for analysis without further treatment [10]. Liquid-phase microextraction represents a mean of green chemistry. It can reduce the consumption of hazardous organic solvents used. Furthermore, it is an efficient technique in sample preparation since it eliminates unwanted matrix components. Liquid-phase microextraction involves the distribution of an analyte between two immiscible liquid phases (donor and acceptor phase).

Polypropylene fiber has been widely used as mediator to transfer analyte from donor phase to acceptor phase [11]. Polypropylene has many advantages such as highly compatible with a broad range of organic solvents and with a pore size of approximately 0.2 μm , it strongly immobilizes in organic solvents [12].

RESULTS AND DISCUSSION

3.1 Gas Chromatography

Separations and quantification of analytes were achieved by GC coupled with flame ionization detector (FID). Helium and air as the carrier gas for FID and nitrogen as carrier gas through the column with total flow is 0.4 $\text{mL}\cdot\text{min}^{-1}$. An injection volume of 1 μL with split less mode was used. The oven temperature program was as follows: 60 $^{\circ}\text{C}$ held for 2 min then raised to 120 $^{\circ}\text{C}$ at a rate 20 $^{\circ}\text{C}/\text{min}$, then 200 $^{\circ}\text{C}$ was held for 2 min. The setting parameters were 250 $^{\circ}\text{C}$ for the injector and 300 $^{\circ}\text{C}$ for the detector. The analytes were completely separated within 6 min (Fig. 2).

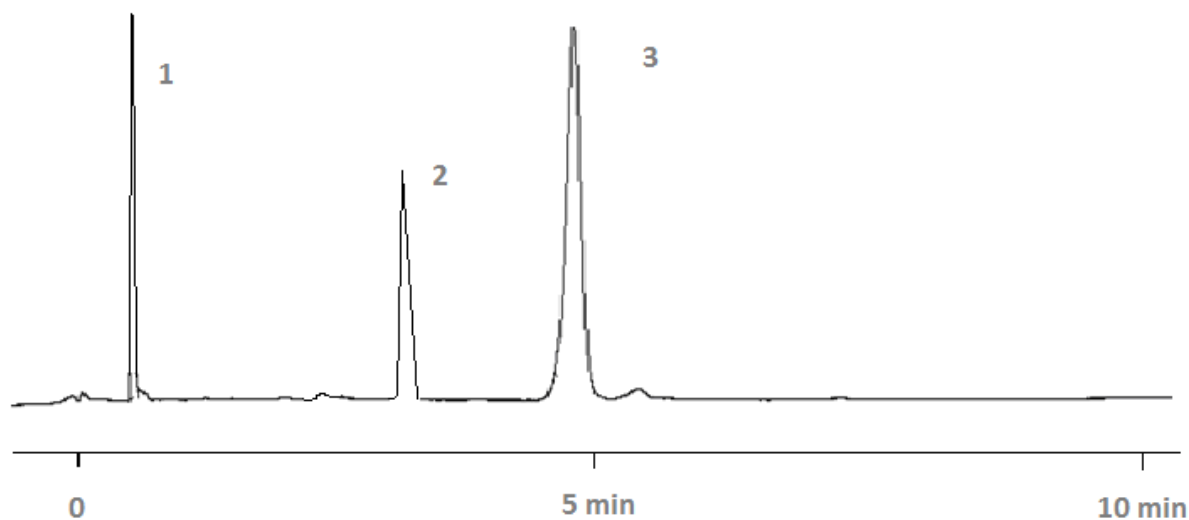


Fig.2. Chromatogram of 1) methanol; 2) NDEA; and 3) NDPA
Conditions: Concentration of NDEA and NDPA mixture 20 mg L^{-1} ; carrier gas: nitrogen; column flow: 40 mL min^{-1}

3.2 Optimization of HF-LPME parameters

Liquid phase microextraction is emerging as powerful sample preparation method prior to instrumental analysis. Optimization of analytical parameters are investigated to determine the optimum extraction conditions using HF-LPME which include extraction solvent, the volume of extraction solvent, length of hollow fiber and extraction time. By applying the HF-LPME procedure, the presence of acceptor phase in the hollow fiber is maintained which can be withdrawn for further analysis using GC-FID.

3.2.1 Extraction solvent

The choice of organic solvent as acceptor phase or extraction solvent is essential in LPME to achieve the highest enrichment factor. A successful extraction is dependent on the extraction solvent. Basically, extraction solvent must have good affinity for target compounds, have low solubility in water to prevent dissolution into the aqueous phase, and have low volatility which will restrict solvent evaporation during extraction [13,14]. On the basis of these considerations, n-hexane, carbon tetrachloride and toluene were tested in preliminary experiments. Their physicochemical characteristics are shown in Table 1 and considered to be appropriate acceptor phases,

The results of this optimization indicate that toluene can extract the analytes more efficiently than n-hexane and carbon tetrachloride as shown in Figure 3. Therefore, toluene was used for subsequent extractions.

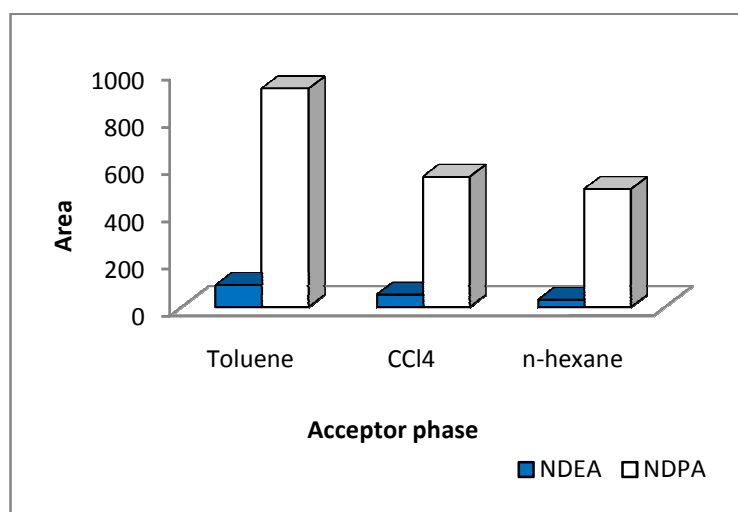


Fig.3. Acceptor solvent effect for the NDEA and NDPA used in this study

Conditions: Length of fiber: 2 cm; volume of extraction solvent: 3 μ L; sample volume: 20 mL; stirring rate: 300 rpm; extraction time: 15 min; concentration of NDEA and NDPA: 30 ppm.

Table 1 Characteristics of organic solvents [3]

Organic solvents	Log $K_{o/w}$	Boiling point ($^{\circ}$ C)
n-hexane	3.90 – 4.11	69
toluene	2.69	110.6
CCl ₄	2.04	76.72

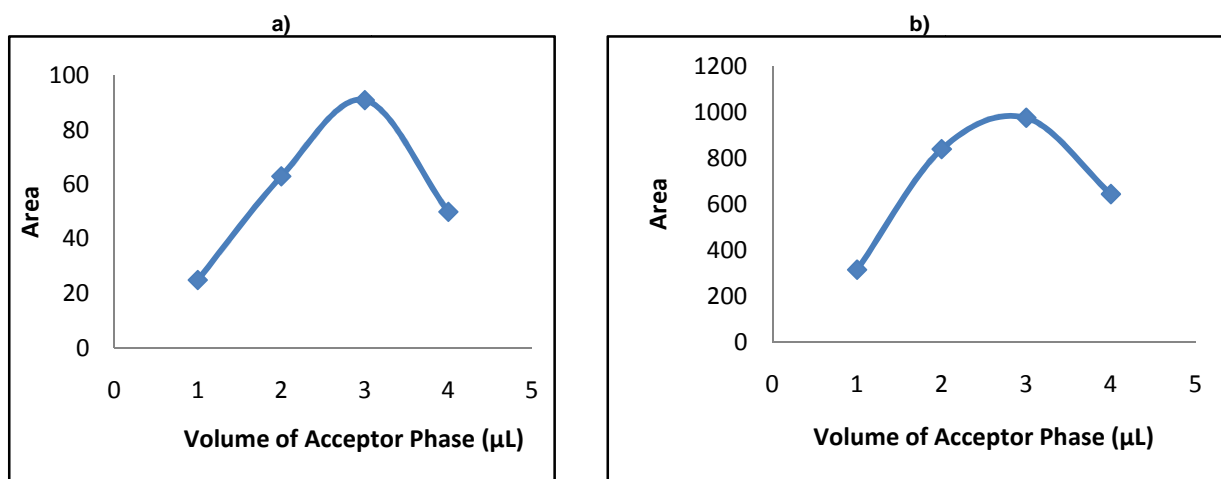


Fig.4. Volume of acceptor phase effect for the a) NDEA and b) NDPA used in this study

Conditions: Length of fiber: 2 cm; acceptor phase: toluene; sample volume: 20 mL; stirring rate: 300 rpm; extraction time: 15 min; concentration of NDEA and NDPA: 30 ppm

3.2.2 Volume of extraction solvent

Enrichment factor value is dependent on the volume of acceptor and donor phase. Volumes of the donor and acceptor phases should be selected by taking into account several considerations. The combination of small acceptor phase volume and large donor phase volume will result in a high enrichment factor of the extraction. In this work, 1 to 4 μL of acceptor phase were tested. The peak areas of the analytes were found to vary with donor phase and acceptor phase volume (Fig. 4).

3.2.3 Length of fiber

The dispersion of acceptor phase is dependent on the length of fiber. Therefore, different lengths of fiber (1, 1.5, 2 and 2.5 cm) were tested. It was found that the best length of fiber was 1.5 cm (Fig. 5) because it gave the highest response factors. This length was used in subsequent extractions.

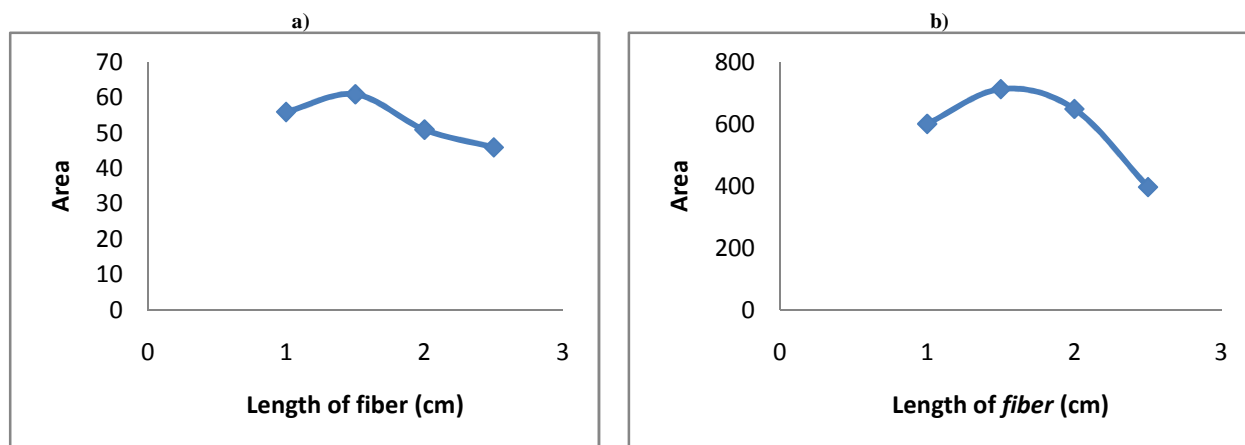


Fig.5. Length of fiber effect for the a) NDEA and b) NDPA used in this study

Conditions: extracting solvent volume: 3 μL ; acceptor phase: toluene; sample volume: 20 mL; stirring rate: 300 rpm; extraction time: 15 min; concentration of NDEA and NDPA: 30 ppm

3.2.4 Extraction time

A series of experiments were carried out to determine the effect of extraction time on extraction efficiency using the previously determined optimized conditions. The results show that the response for the analytes increased significantly with increase of extraction time of up to 10 minutes as shown in Fig.6. Extraction times of more than 10 min showed slight instability in analyte response probably because the organic phase as acceptor phase was saturated by the analyte and has reached equilibrium. Similar results have been reported by Shen and Lee [15] who noted that although longer exposure times to the acceptor solution generally result in increased extraction efficiency, it is not always practical to apply extended extraction times. As sampling times shorter than the total chromatographic time are often chosen in order to ensure high sample throughput, 10 min was chosen as optimum extraction time and used for subsequent extractions.

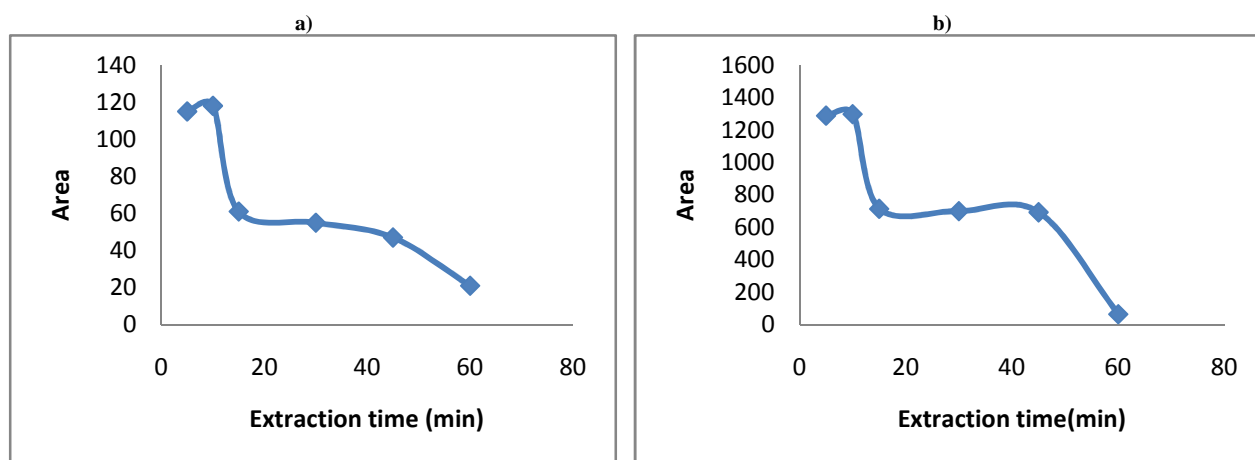


Fig.6. Effect of extraction time for the a) NDEA and b) NDPA used in this study

Conditions: extracting solvent volume: 3 μL ; acceptor phase: toluene; sample volume: 20 mL; stirring rate: 300 rpm; concentration of NDEA and NDPA: 30 ppm

3.3 Validation method

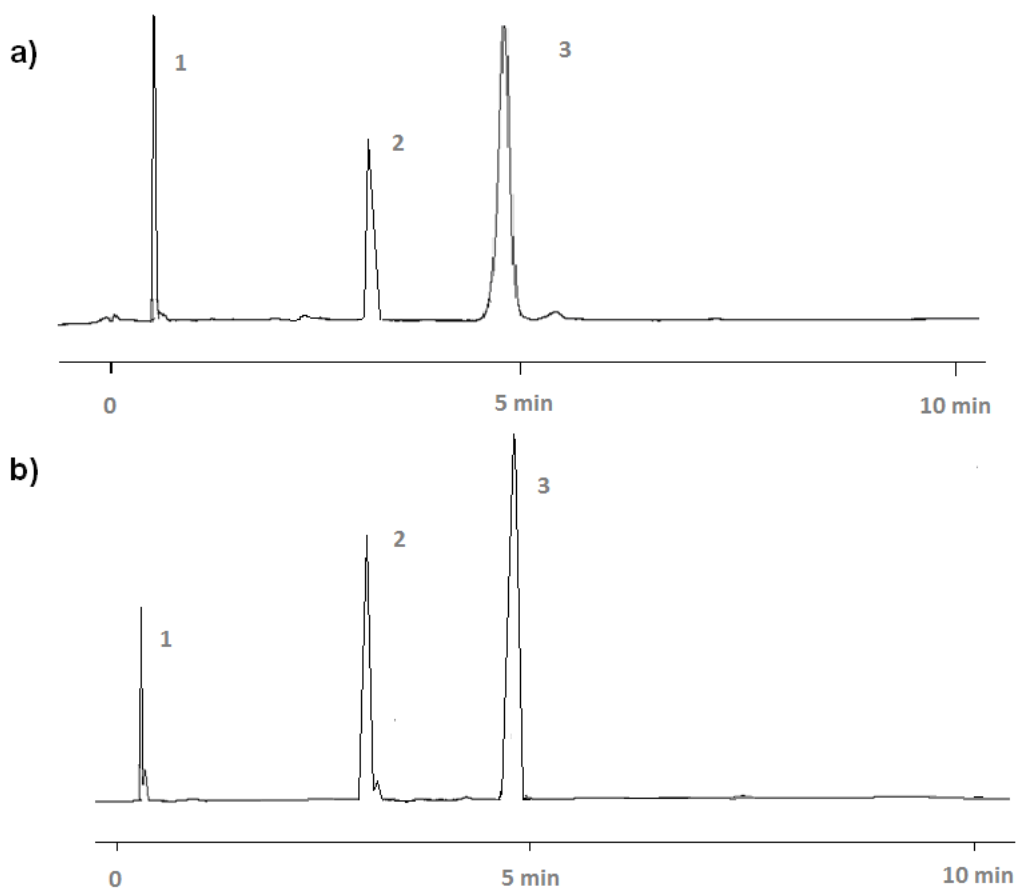
The optimal LPME parameters finally selected were as follows: toluene as extraction solvent, 1.5 cm for fiber length, 3 μL for volume of acceptor phase, and 10 min for extraction time. The recovery, detection limits, linear dynamic range and the calibration curves are listed in Table 2. Each measurement was performed in triplicate.

Table 2. Analytical performance of HF-LPME

Analyte	Recovery (%)	Enrichment factor (EF)	Linearity range (mg L^{-1})	Correlation coefficient (r^2)	LOD ($\mu\text{g L}^{-1}$)	RSD (%)
NDEA	101	20,000	5; 10; 15; 20 and 25	0.999	330	0.81
NDPA	100	20,000	5; 10; 15; 20 and 25	1.000	20	0.06

3.4 Real sample analysis

The developed extraction method was applied for the extraction of NDEA and NDPA from several food items e.g, sausage, corned meat, fresh meat, and salted egg. This method was successfully applied to the determination of NDEA and NDPA and the results indicated the presence of these hazardous NDEA and NDPA in sausage (3.25 and 0.06 ppm), corned meat (2.90 and 0.40 ppm), fresh meat (5.00 and 0.03 ppm) and salted egg (2.55 and 0.25 ppm) respectively. Spiked samples or standard addition method has been performed to verify the NDEA and NPDA peaks in the chromatograms.



Peak
 1 : Methanol
 2 : Nitrosodiethylamine
 3 : Nitrosodipropylamine

Fig.7: Chromatograms of: a) original real sample and b) spiked samples

CONCLUSION

Hollow fiber liquid phase microextraction technique coupled with GC-FID provides an efficient and simple cost effective and environmentally friendly method for the identification and determination of NDEA and NDPA in various dietary food samples. High extraction efficiency was achieved. The low LOD and low RSD indicate that the technique is efficient for analysis of nitrosoamines

Acknowledgements

The authors are grateful to Indonesia Ministry of Education for financial support, Faculty of Science and Technology and Faculty of Pharmacy, Universitas Airlangga for the facilities.

REFERENCES

- [1] J Mulder. Basic Principles of Membrane Technology, Kluwer, Academic Publishers ,USA, **1996**
- [2] ZF Cui, and HS Muralidhara. Membrane Technology First Edition. A Practical Guide to Membrane Technology and Applications in Food and Bioprocessing, Elsevier, The Netherlands, **2010**
- [3] N Peng; N Widjoyo; P Sukitpaneenit; MM Teoh; GG Lipscomb; T Chung; J Lai, *Prog. Polym Sci.* **2012** (37), 1401-1424.
- [4] G Drabi-Markiewicz; B Dejaegher; ED Mey; S Impens; T Kowalska; H Paelinck; YV Heyden, *Anal. Chim. Acta*, **2010** (657),123-130.
- [5] S Yurchenko; U Molder, *Food Chem.*, **2007** (100), 1713-1721.
- [6] P Anand; AB Kunnumaraka; C Sandaram; KB Harikumar; ST Tharakan; OS Lai; B Sung; BB Aggarwal, *Pharm. Res.*, **2008**, (25), 2097-2116.
- [7] Y He; HK Lee, *Anal. Chim. Acta*, **1997**, (69), 4634-4640.
- [8] AS Yazdi; A Amiri, *Trends Anal. Chem.*, **2010**, (29), 1-14.
- [9] S Pedersen-Biergaard; KE Rasmussen, *Anal. Chem.* **1999**, (71), 2650-2656
- [10] JP Hsin; WH Ho, *Anal. Chim. Acta*, **2004**, (527), 61-67
- [11] Y Raharjo; MM Sanagi; WAW Ibrahim; AA Naim; HY Aboul-Enein, *J. Sep. Sci.* **2009**, (32), 623-629
- [12] KE Rasmussen; S Pedersen-Bjerggaard, *TrAC- Trends Anal. Chem.* **2004**, (23), 1-10.
- [13] E Psillakis; N Kalogerakis, *J. Chromatogr. A* **2001**,(938),117-122.
- [14] A Tor and M Aydin, *Anal. Chim. Acta* **2006** , (575), 138-143.
- [15] G Shen and HK Lee, *Anal. Chem.* **2002** , (74), 648-654.



Scimago Journal & Country Rank

Enter Journal Title, ISSN or Publisher Name

- Home
- Journal Rankings
- Country Rankings
- Viz Tools
- Help
- About Us

Shock & Vibration Open Acce

Journal of Chemical and Pharmaceutical Research

Discontinued in Scopus as of 2016

COUNTRY

India



Universities and research institutions in India

SUBJECT AREA AND CATEGORY

Pharmacology, Toxicology and
Pharmaceutics
Pharmaceutical Science

PUBLISHER

JOCPR

H-INDEX

39



Media Ranking in India



PUBLICATION TYPE

ISSN

COVERAGE

Journals

09757384

2004, 2011-2016

Submit paper for publication

How to Publish Paper, free cost
publication, ugc care journal policy
follow

SCOPE

Information not localized

 Join the conversation about this journal

Impact factor 7.97, low cost

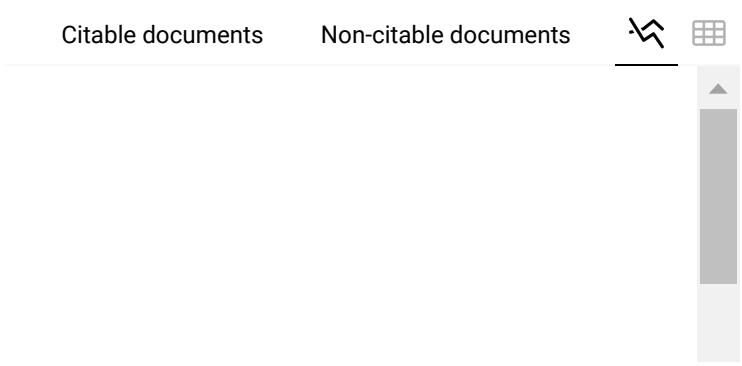
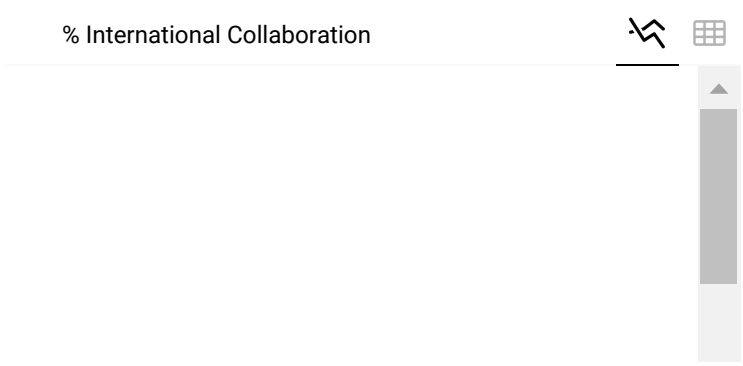
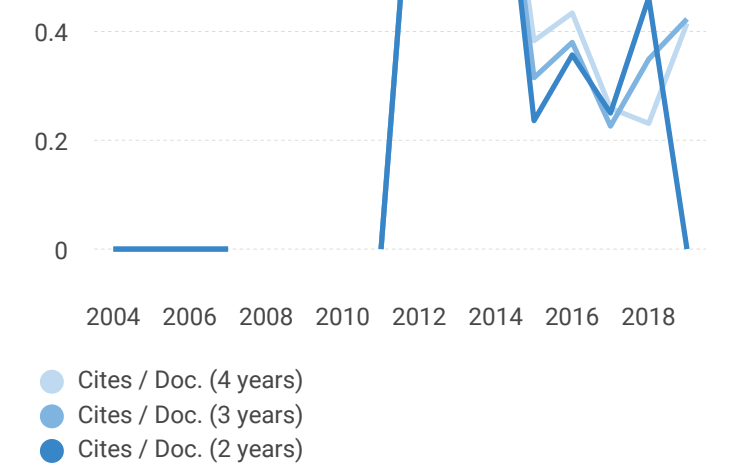
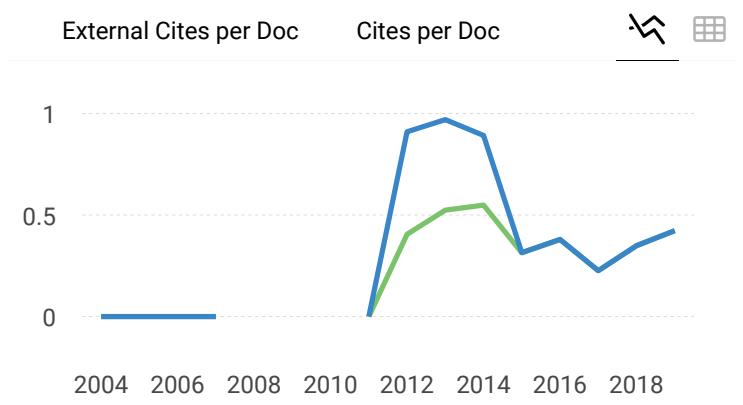
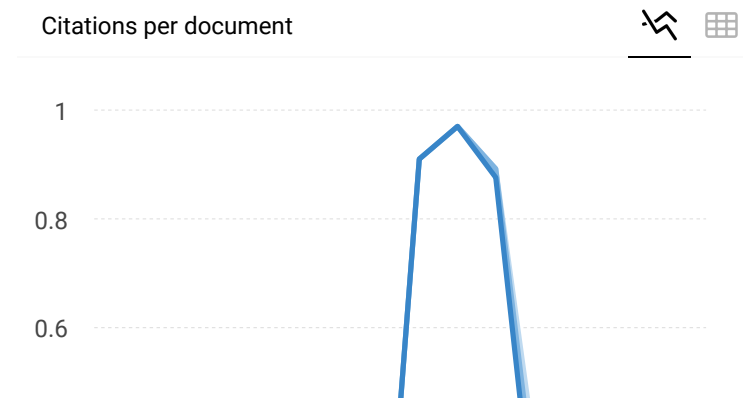
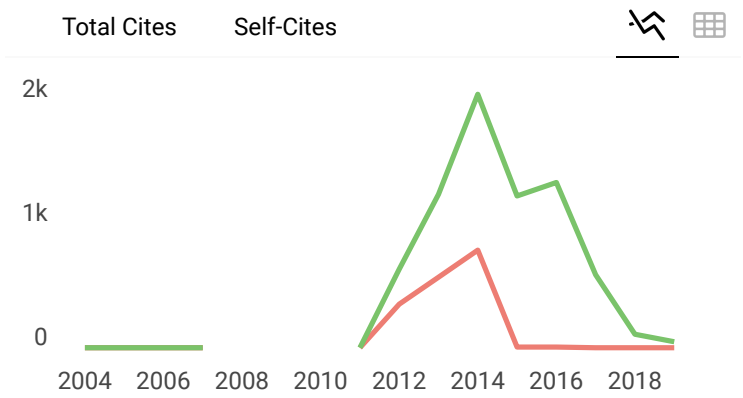
↕ Quartiles
☰

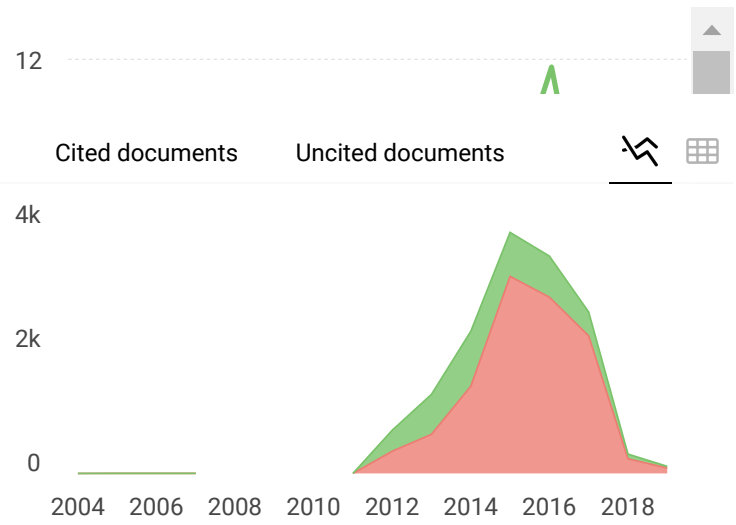
SJR



Total Documents







Journal of Chemical and Pharmaceutical Research

4k

← Show this widget in your own website

Not yet assigned quartile

SJR 2021
0

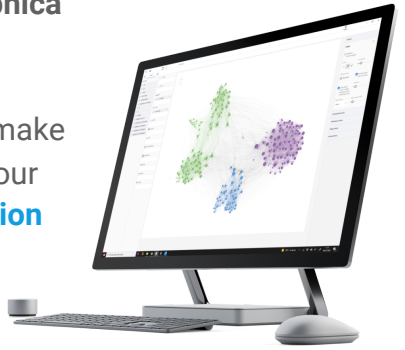
powered by scimagojr.com

Just copy the code below and paste within your html code:

```
<a href="https://www.scimaç
```

SCImago Graphica

Explore, visually communicate and make sense of data with our **new data visualization tool.**



Strengthen Your Writing Tone

Ensure your message comes across as personable, constructive, and confident every time.

Grammarly

[Learn More](#)

Metrics based on Scopus® data as of April 2022

J Justin Masih 2 years ago

Sir/Madam,

This is in regards to the Journal of Chemical and Pharmaceutical Research.

I am in need of the editor's email address/Phone number or publisher's email address/phone number regarding some important information which I need to ask. Can you please help. The editors email address doesn't seem to be responding. Thanks and awaiting your reply.

reply



Melanie Ortiz 2 years ago

Dear Justin,
Thank you for contacting us.
Unfortunately, we cannot help you with your request.
Best Regards, SCImago Team

D **Dr.Salim Jasim Mohammed** 2 years ago

Dear
Is the journal (Journal of Chemical and Pharmaceutical Research)
Currently indexed within Scopes

reply



Melanie Ortiz 2 years ago

Dear Dr. Salim,
Thank you very much for your comment.
All the metadata have been provided by Scopus /Elsevier in their last update sent to SCImago, including the Coverage's period data. The SJR for 2019 was released on 11 June 2020. We suggest you consult the Scopus database directly to see the current index status as SJR is a static image of Scopus, which is changing every day.
Best Regards, SCImago Team

S **saphiaali aitte** 2 years ago

Is my published in your journal in Scopus database

reply



Melanie Ortiz 2 years ago

SCImago Team

Dear Saphiaali, thank you very much for your comment. We suggest you consult the Scopus database directly. Keep in mind that the SJR is a static image (the update is made one time per year) of a database (Scopus) which is changing every day.

Best Regards, SCImago Team

D **DR SEEMA PARVEEN** 2 years ago

i need the ugc approved journal screenshot or proof of JOCPR for the year 2016-2017. plz email it to me urgently

reply



Melanie Ortiz 2 years ago

SCImago Team

Dear Dr. Seema, thank you very much for your comment. Unfortunately, we cannot help you with your request, we suggest you contact the journal's editorial staff so they could inform you more deeply. Best Regards, SCImago Team

S **saphia** 2 years ago

why don't tell me about predator journal

reply



Melanie Ortiz 2 years ago

SCImago Team

Dear Saphia,

Thank you for contacting us.

SJR is a portal with scientometric indicators of journals indexed in Scopus. All the data have been provided by Scopus /Elsevier and SCImago doesn't have the authority over this data. For more information about predatory journals or publishers, you can check the link below:

<https://beallslist.weebly.com/>

<https://predatory-publishing.com/three-quick-ways-to-spot-a-predatory-journal/>

<https://www2.cabells.com/about-predatory>

Best Regards, SCImago Team

R **Rafatunisa Nahri** 2 years ago

Kinkdly respond to my reasearch paper sent to u titled " Assessment of Physico- chemical parameters of Sanjul lake, Phulambri,Dist Aurangabad(m.s) India.

reply



Melanie Ortiz 2 years ago

SCImago Team

Dear Rafatunisa,
thank you for contacting us.

We are sorry to tell you that SCImago Journal & Country Rank is not a journal. SJR is a portal with scientometric indicators of journals indexed in Elsevier/Scopus.

Unfortunately, we cannot help you with your request, we suggest you contact the journal's editorial staff , so they could inform you more deeply.

Best Regards, SCImago Team



Dr. Rajesh Kumar Singh 3 years ago

You should remove the journal from your website once it is out of SCOPUS coverage or remove their data. If you cannot remove than atleast display with bold letters that JOURNAL IS REMOVED FROM THIS INDEXING Otherwise new researchers are mistakenly send their papers to these journals thinking that this is still SCOPUS indexed.

Reason for removal from indexing can also be provided for giving lesson to other emerging but predatory journals to be more careful.

reply



Melanie Ortiz 3 years ago

SCImago Team

Dear Dr. Rajesh,

Thank you for contacting us. The Coverage's data indicates the period in which this journal has been indexed in Scopus. All the journal's data have been provided by Scopus/Elsevier and SCImago has no authority to include or exclude SJR journals. We just show the data provided in the latest update by Scopus.

Keep in mind that the SJR is a static image (the update is made one time per year) of a database (Scopus) which is changing every day. For this reason, we always recommend our users to consult the Scopus database to see the current index status in Scopus.

Best Regards, SCImago Team

M Majolagbe 3 years ago

What is the processing/publication fee of this journal?

reply

M Majolagbe 3 years ago

What id the processing /publication charges of this journal?

reply

S **SUNARTI** 3 years ago

Dear SCImago Team

I the SJR in tour data evaluating the journal till 2017 is 0.12, and in the same time 2011-2014 (cancelled)

Is this means that my research article will not included in Scopus/Elsevier evaluation record of my account because My article was published in 2017???

thanks

reply



Melanie Ortiz 3 years ago

SCImago Team

Dear Sunarti,

Our data comes from Scopus/Elsevier, which offers an annual copy of their database. We understand that since the date indicated by Scopus/Elsevier (See Coverage) the journal is no longer indexed in its database.

Unfortunately we cannot help you with your request. We suggest you to contact Scopus for further information about your research article:

https://service.elsevier.com/app/answers/detail/a_id/14883/kw/scimago/supporthub/scopus/

Best Regards, SCImago Team

Y **Yen** 3 years ago

I have written to email of Journal many times but i did not receive any answer. How do i contact with Editor, Please help me!

reply

S **Sayed** 3 years ago

Whatsup

44 1625 708989



Melanie Ortiz 3 years ago

SCImago Team

Dear Yen,

thank you for contacting us.

Sorry to tell you that SCImago Journal & Country Rank is not a journal. SJR is a portal with scientometric indicators of journals indexed in Elsevier/Scopus.

Unfortunately, we cannot help you with your request, we suggest you to contact the journal's editorial staff (maybe they have a support contact) , so they could inform you more deeply. Best Regards, SCImago Team

V **Vijendra Kumar** 5 years ago

Coverage 2011-2014 (cancelled)

what is the meaning of this?

reply



Elena Corera 5 years ago

SCImago Team

Dear user, our data come from Scopus/Elsevier, which offers an annual copy of your database. We understand that since the date indicated by Scopus/Elsevier the journal is no longer indexed in its database. Best Regards, SCImago Team

F **FOUDJO MELACHEU GERTRUDE LAURA** 5 years ago

Any submossion charges

reply

H **heyam saed** 5 years ago

Dear Elena,

I the SJR in tour data evaluating the journal till 2017 is 0.12, and in the same time 2011-2014 (cancelled)

Is this means that my research article will not included in Scopus/Elsevier evaluation record of my account???

thanks



Elena Corera 5 years ago

SCImago Team

Dear Foudjo, in the link below you will find the information corresponding to the author's instructions of this journal. Best regards, SCImago Team

<http://www.jocpr.com/instruction-to-authors.html>

F **FOUDJO MELACHEU GERTRUDE LAURA** 5 years ago

GREETINGS

please i wish to know the impact factor of this journal

reply

SCImago Team



Elena Corera 5 years ago

Dear Foudjo, SJR uses Scopus data, our impact indicator is the SJR. Check our page to locate the journal. We suggest you consult the Journal Citation Report for other indicators with a Web of Science data source. Best Regards, SCImago Team



Elena Corera 5 years ago

Thanks for your participation!

SCImago Team

Leave a comment

Name

Email

(will not be published)

Saya bukan robot
reCAPTCHA
Privasi - Persyaratan

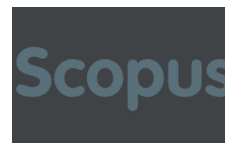
Submit

The users of Scimago Journal & Country Rank have the possibility to dialogue through comments linked to a specific journal. The purpose is to have a forum in which general doubts about the processes of publication in the journal, experiences and other issues derived from the publication of papers are resolved. For topics on particular articles, maintain the dialogue through the usual channels with your editor.

Developed by:



Powered by:



Follow us on @ScimagoJR

Scimago Lab, Copyright 2007-2022. Data Source: Scopus®

EST MODUS IN REBUS

Horatio (Satire 1,1,106)

[Cookie settings](#)

[Cookie policy](#)
