Department of Pharmaceutics, KLE College of Pharmacy, Hubballi, Karnataka, India 580031
kamaladevikshatriya02@gmail.com

Halloysite nanotube (HNT)-derived mesoporous silica nanoparticles (MSNs) were synthesized using a modified sol-gel process with cetyltrimethylammonium bromide (CTAB) as a soft template and tetraethyl orthosilicate (TEOS) as the silica precursor. The synthesis involved pre-calcination to remove impurities and final calcination to eliminate the surfactant and develop mesoporous structure. Fourier-transform infrared spectroscopy (FTIR) confirmed the formation of Si–O–Si bonds and reduction in Al–OH groups, indicating successful silica deposition. X-ray diffraction (XRD) revealed the disappearance of crystalline HNT peaks, confirming the transition to amorphous silica. Scanning electron microscopy (SEM) demonstrated a transformation from tubular HNT morphology to partially coated mesoporous surfaces, while transmission electron microscopy (TEM) visualized ordered mesopore arrangements along the nanotube structure. BET analysis recorded a specific surface area of 977 $m^2/kg$ with a pore diameter of 2–4 nm, indicating effective template removal and mesoporosity generation. Zeta potential shifted from –20.6 mV (HNT) to –30.9 mV (MSN), suggesting improved surface charge and dispersion stability. These findings confirm the successful conversion of HNT into MSNs with high surface area, controlled pore size, and enhanced stability, making them promising candidates for drug delivery and biomedical applications.

**Keywords:** Mesoporous silica nanoparticles, Halloysite nanotubes, Sol-gel synthesis, BET surface area, Zeta potential

**CH-139**

## SYNTHESIS AND BIOLOGICAL EVALUATION 1, 5-BENZOTHIAZEPINES AS POTENTIAL ANTICONVULSANT AGENTS

Vutla Venkata Rao[1], Adusumalli Chakravarthy[2], Suryadevara Vidyadhara[3]
[1,2]Department of Pharmaceutical Chemistry, Chebrolu Hanumaiah Institute of Pharmaceutical Sciences, Chandramoulipuram, Chowdavaram, Guntur – 522019, Andhra Pradesh, India
[3]Department of Pharmaceutics, Chebrolu Hanumaiah Institute of Pharmaceutical Sciences, Chandramoulipuram, Chowdavaram, Guntur – 522019, Andhra Pradesh, India
venkataraovutla@gmail.com

1,5-Dihydrobenzothiazepines have gained considerable attention in drug research due to their clinical relevance in both cardiovascular and central nervous system disorders. The first clinically used molecule in this class was diltiazem, followed by clentiazem for cardiovascular applications, and thiazesim, clothiapine, and quetiapine for CNS-related conditions. This has led to the development of numerous synthetic approaches for these compounds. In the present study, chalcones derived from p-fluoroacetophenone and o-amino thiophenol were used to synthesize benzothiazepines. The reaction was carried out in methanol using piperidine as a base, followed by the addition of glacial acetic acid and overnight incubation at 25°C, leading to the formation of yellow benzothiazepine crystals, which were recrystallized in methanol. The synthesized compounds, labeled Bp-1 to Bp-15, were evaluated for their anticonvulsant activity using the Maximal Electroshock Seizure Test (MES) at a dose of 200 mg/kg body weight intraperitoneally. Several compounds demonstrated significant anticonvulsant activity, notably Bp-3 (4-chlorophenyl substitution), Bp-5 (2,4-difluorophenyl), Bp-14 (3,2-bromofurfuryl), and Bp-15 (4-dimethylaminophenyl), all of which showed complete protection with 0% mortality. These findings suggest that 1,5-dihydrobenzothiazepines, particularly those with specific substitutions at the second and fourth positions, hold promise as potential anticonvulsant agents.

**Keywords:** 1,5-dihydrobenzothiazepines, Maximal Electroshock Seizure Test, anticonvulsant activity

**CH-140**

## DESIGN AND SYNTHESIS OF NEW THIAZOLO[3,2-A] PYRIMIDINE DERIVATIVES AS SSRIS FOR ANTIDEPRESSANTS

Nikhil M. Bisen, Alpana J. Asnani
Department of Pharmaceutical Chemistry,
Priyadarshini J. L. College of Pharmacy, Electronic Zone Building, MIDC, Hingna Road, Nagpur, Maharashtra, India - 440016
nikhilbisen2309@gmail.com

Depression is a chronic mental health disorder with a significant global burden. Selective serotonin reuptake inhibitors (SSRIs) are first-line therapies but have limitations such as delayed onset and side effects. The thiazolo[3,2-a] pyrimidine scaffold has shown promising biological activities, including affinity for the selective serotonin reuptake inhibitors (SSRIs). This work integrates AI-driven drug design with chemical synthesis to develop novel thiazolo[3,2-a] pyrimidine derivatives with potential antidepressant properties. Computational tools such as molecular docking, predictive ADME-Tox models, and AI-based lead optimization were employed to identify promising candidates. The optimized derivatives were synthesized, structurally characterized, and evaluated for antidepressant activity. Results indicate strong predicted binding affinities, good drug-likeness, and favorable pharmacokinetic profiles. This approach demonstrates the synergy between synthetic medicinal chemistry and artificial intelligence in novel antidepressant development. The synthesized derivatives showed significance antidepressant activity as compare to standard drug Fluoxetine.

**Keywords:** Antidepressant, Selective serotonin reuptake inhibitors (SSRIs), Fluoxetine, Thiazolo[3,2-a] pyrimidine Derivatives, CADD, etc.

**CH-141**

## QBD-DRIVEN ANALYTICAL METHOD DEVELOPMENT FOR HPTLC QUANTIFICATION OF SPIRONOLACTONE AND HYDROCHLOROTHIAZIDE IN PHARMACEUTICAL DOSAGE FORM

Tummala Pruithviraj, T.Sudha
Department of Pharmaceutical Chemistry and Analysis, Vels Institute of Science, Technology, and Advanced Studies,
Pallavaram, Chennai, Tamil Nadu, India.
tsudha.sps@vistas.ac.in

The present study examines simultaneous multiple response optimization using Derringer's desirability function for the development of an HPTLC method to detect sprinolactone and hydrochlorothiazide in pharmaceutical dosage form. Central composite design (CCD) was used to optimize the chromatographic conditions for HPTLC. The independent variables used for the optimization were the acetone content in the mobile phase, the wavelength, and the distance travelled. HPTLC separation was performed on aluminium plates pre-coated with silica gel 60 F254 as the stationary phase using toluene: methyl acetate: acetone (5:3:2% v/v/v) as the mobile phase. Quantification was achieved based on a densitometric analysis of spironolactone and hydrochlorothiazide over the concentration range of 50–175 µg/ml for both analytes, at 229 nm. The method yielded compact and well-resolved bands at Rf of 0.71 ± 0.03 and 0.41 ± 0.02 for spironolactone and hydrochlorothiazide, respectively. The linear regression analysis for the calibration plots produced r2 = 0.9994 and r2 = 0.9991 for spironolactone and hydrochlorothiazide, respectively. The precision, accuracy, robustness, specificity, limit of detection, and limit of quantitation of the method were validated according to the ICH guidelines. The factors evaluated in the robustness test were determined to have an insignificant effect on the selected responses. The results indicate that the method is suitable for the routine quality control testing of marketed tablet formulations.

**Keywords:** Spironolactone, Hydrochlorothiazide, Central composite design, Validation.

**CH-142**

## QBD-DRIVEN CENTRAL COMPOSITE DESIGN IN DUAL ANALYTICAL METHOD DEVELOPMENT: SIMULTANEOUS ESTIMATION OF OLANZAPINE AND SAMIDORPHAN BY HPLC AND HPTLC

T.Sudha
Department of Pharmaceutical Chemistry and Analysis, Vels Institute of Science, Technology, and Advanced Studies,
Pallavaram, Chennai, Tamil Nadu, India.
tsudha@sps.vistas.ac.in

The current study represents the development and validation of HPLC and HPTLC methods for the simultaneous estimation of Olanzapine and Samidorphan in their combined formulation by using the design of experiments (DoE). In the RP-HPLC method, three independent factors, like Organic solvent composition, flow rate, and wavelength, were


ISBN: 978-81-980623-8-3