Carbazole and its derivatives are an important type of nitrogen containing aromatic heterocyclic compounds, which have attracted considerable attention of medicinal chemist due to their wide therapeutic properties. A literature survey indicate that substituted carbazole derivatives possess different pharmacological activities, of which the most potent is, antimicrobial and anti inflammatory activities. Hence we plan to synthesize some novel carbazole derivatives containing Heterocyclic ring attached to it via chalcones by Claisen Schmidt condensation reaction to get more potent carbazole derivatives.

The conventional methodology was adopted to synthesize the title compounds. The synthesis of titled compounds from starting material i.e 9-acetyl carbazole (1) was prepared by reacting carbazole with acetic anhydride and Glacial acetic acid in single step. Condensation of (1) with various substituted aromatic/Heterocyclic aldehydes in the presence of KOH gives respective chalcones (1a-1j). Using these starting compounds the carbazole derivatives containing Pyrazoline, Isoxazoline and pyrimidine moieties were prepared by the following scheme. The starting compounds (1a-1j) were subjected for cyclization by reacting with Phenyl hydrazine hydrochloride, Hydroxylamine hydrochloride and urea in presence of 90% ethanol to get 9-(5-phenyl-1H-pyrazoline-3-yl)-9H-carbazole (2a-2j), 9-(5-phenyl-1H-Isoxazoline-3-yl)-9H-carbazole. (3a-3j) and 9-(5-phenyl-1H-pyrimidine-3-yl)-9H-carbazole (4a-4j) respectively.

The purity of compounds was checked by TLC on silica gel-G plates using n-Hexane and ethyl acetate (1:1) and Methanol and n-Hexane (1:9) solvent system and iodine chamber was used as a visualizing agent. Melting point were determined by using precision melting point apparatus in capillaries and are uncorrected.

IR spectra were recorded using KBr pellets on SHEMAAZU FT-IR 8400S series spectrophotometer. The $^1$H NMR spectra of the compounds were recorded on Bruker AMX 400 MHz NMR spetrophotometer using TMS as an internal standard and the
values are expressed in δ ppm. The Mass spectra of the compounds were recorded on Agilent 1100 ESI-Mass (Turbo Spray) Spectrophotometer using positive mode ionization method. Elemental analyses were carried out with a Perkin-Elmer model 2400 series II apparatus. The results of elemental analyses (C, H, N) were within ± 0.4 % of the calculated values.

The synthesized compounds were screened for antimicrobial activity using DMSO as a solvent against the Gram positive and Gram negative bacteria, *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa* respectively by disc plate method using nutrient agar media. The standard drug Ampicillin was used for anti bacterial. Some of the synthesized compounds showed good and moderate activity against the above mentioned microbes may be due to different functional groups attached to it, however the activities shown by all the compounds tested were less than that of the standard. The synthesized compounds were also screened for anti-inflammatory activity by carrageenan induced rat paw oedema model employing Plethysmograph apparatus to measure the paw thickness and Analgesic activity by Hot plate method. Among the compounds tested. Some of the compounds shown highest anti-inflammatory and analgesic activity and is comparable to that produced by the standard drug Diclofenac sodium for anti inflammatory activity and Pentazocine for analgesic activity, but not at an identical dose level since the compounds were tested at 200 mg/kg, where as the drug tested at 30 mg /kg body weight. The SAR studies revealed the importance of electron releasing substituents such as methoxy, dimethylamino and nitro groups on the ring. Compounds with number of such substituent at different positions can be synthesized to have significant anti-inflammatory and analgesic activity.