

# Syntheses and evaluation of 2,5-disubstituted 4-thiazolidinone analogues as antimicrobial agents

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**Abstract** Two novel series of 4-thiazolidinone derivatives, bearing 2-nitrophenyl imino and 4-nitrophenyl imino groups at position-2 and substituted arylidene groups at position-5, have been synthesized and evaluated for antimicrobial activity against four bacterial and one fungal strain. The success of the synthesis of compounds was confirmed on the basis of spectral analysis. All the newly synthesized compounds were obtained in high yields and exhibited good antibacterial activity; however, the antifungal potential was limited to a few agents.

**Keywords** 4-Thiazolidinones · Arylidene · Spectral analysis · Antimicrobial

## Introduction

Diseases caused by microbial infections are very common worldwide. In the past few decades, the development of microbial resistance has led to an increase in the number and severity of infections. Hence, there is a continuous need to

explore broad spectrum antimicrobials (Chugh, 2008). Structure–activity relationship between pharmacophore and heterocyclic backbone also need to be emphasized. Novel potent antimicrobial agents with different modes of action have to be developed so as to avoid problems of cross resistance (Williams, 1996; Khan *et al.*, 2005). Researchers across the world are synthesizing new drugs against pathogenic microorganisms. The 4-thiazolidinones are well-known heterocyclic compounds with tremendous structural as well as pharmacological importance. The wonder nucleus is well reputed for a spectrum of biological activities, such as antimicrobial (Ronad *et al.*, 2010; Omar *et al.*, 2010; Mehta *et al.*, 2006; Sattigeri *et al.*, 2005; Liu *et al.*, 2000; Sharma and Kumar, 2000), antitubercular (Kukukguzel *et al.*, 2002), anthelmintic (Choudhari *et al.*, 1995), anti-inflammatory (Goel *et al.*, 1999), etc. Some researchers have reported that 2-arylimino-4-thiazolidinone derivatives possess diverse pharmacological activities (Ottana *et al.*, 2005, 2007, 2009; Chavan and Rai, 2007; Vicini *et al.*, 2008; Geronikaki *et al.*, 2008). Halogenated and nitro substituents can affect the biological activity of the basic nucleus. Thus, an attempt was made to synthesize 2-substituted arylimino-5-substituted arylidene thiazolidine-4-one derivatives with 2-nitroimino and 4-nitroimino groups at position-2 and substituted arylidene groups at position-5 of 4-thiazolidinone, and evaluate them against bacterial and fungal strains.

## Experimental section

### General

Synthetic starting material, reagents, and solvents were procured from Aldrich, Himedia and SD Fine Chemicals. The reacting materials were used as received. Melting points were

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