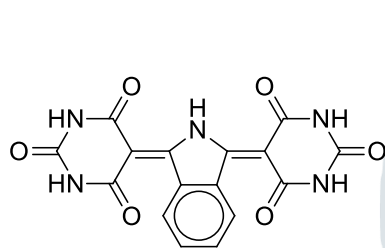


# Isoindolinone as important chemical moieties with diversified functional activities

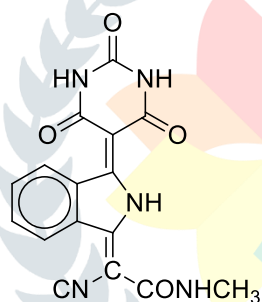
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 School of Chemical Engineering and Physical Sciences  
 Lovely Professional University, Punjab.

## Commercially available isoindolinone and isoindolinone pigments and their applications

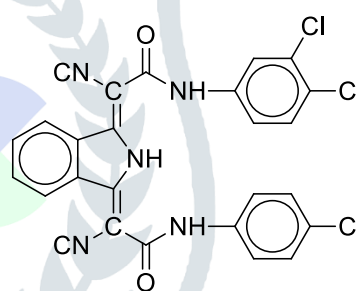
Pigments are chemical substances utilize to impart colour behaviour to substances due to presence of chromophore properties associated with heterocyclic molecules. Coloring imparting pigments of isoindolinone are representatives of yellow pigment obtained as pigment yellow 110, pigment yellow 139 show average tinctorial strength in plastics<sup>1</sup>, pigment yellow 173 pigment yellow 109 utilized in plastics, printing inks and paints and pigment yellow 185, pigment orange 66, pigment orange 61, pigment orange 69 these orange are preferred as a colorant for compounds like unsaturated polyesters, polystyrene, polyurethane, and elastomers.<sup>2</sup>, pigment red 260, and pigment brown 38. Excellent weather-fastness and light-fastness makes it suitable to use in top-class industrial pigment especially in genuine automotive.<sup>3</sup>



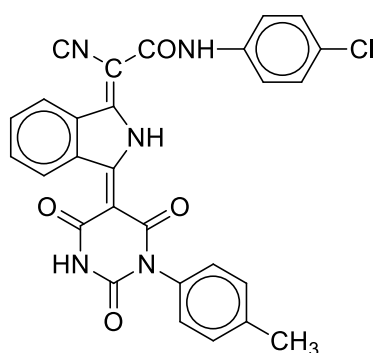
Shade - reddish yellow  
 Pigment yellow 139



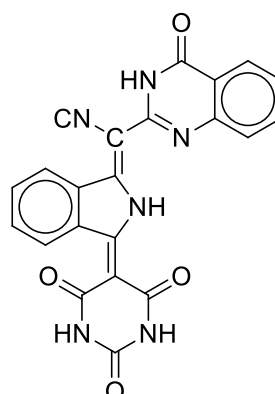
Shade - greenish yellow  
 Pigment yellow 185



Shade - yellowish orange  
 Pigment orange 66



Shade - yellowish orange  
 Pigment orange 69

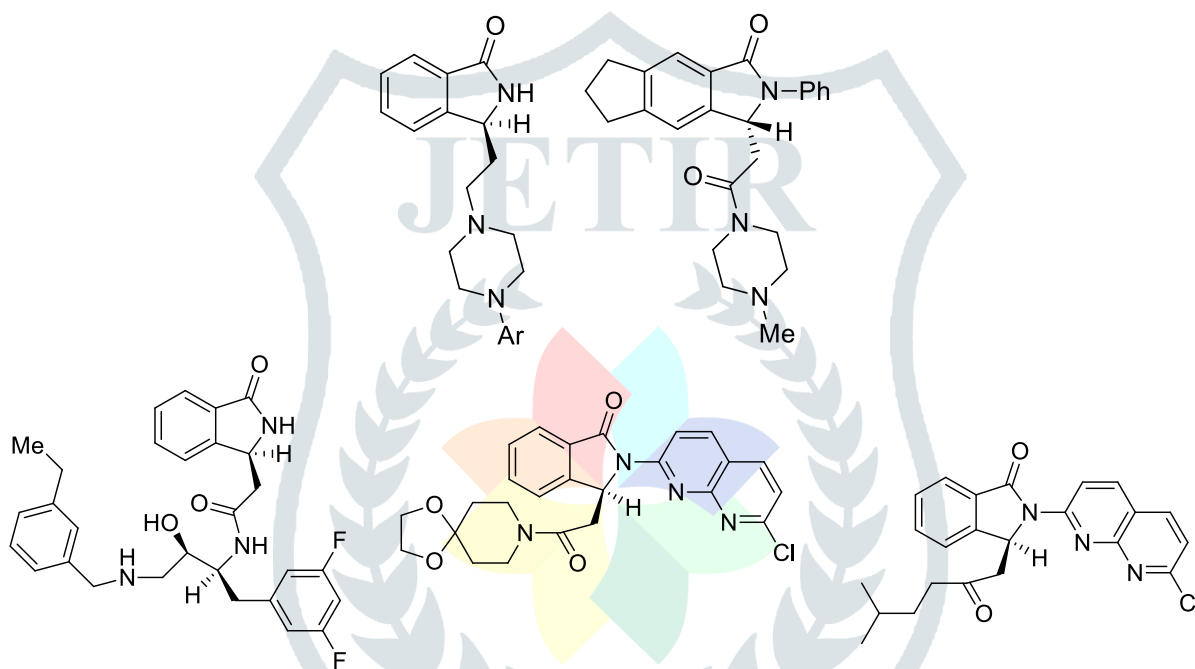


Shade - yellowish red  
 Pigment red 260

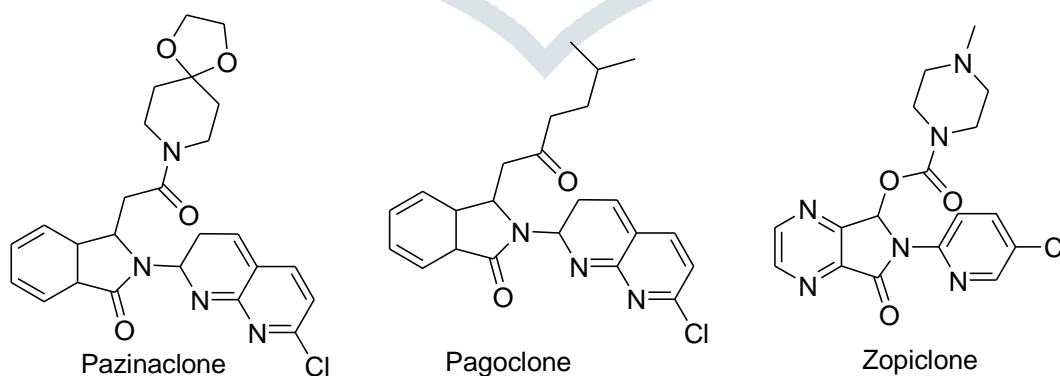
## Bio-active Isoindolinones

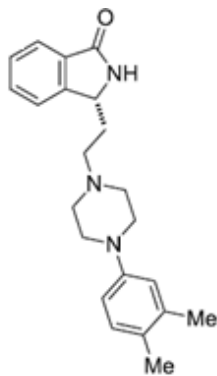
Isoindolinones are compounds having potential biological activities like anti-hypertensive (high blood pressure), anti-psychotic, anti-inflammatory, pain reliever, anti-ulcer, vasodilatory, anti-viral, anti-leukemic properties, and platelet aggregation inhibitory activities.<sup>3</sup> These may cause dose-dependent inhibitory action of CNS activities.

Enantiomers interact of different chemical moieties with the biological system is of great importance, an intense research is carried to create these biologically active isoindolinones in enantio-enriched form. (*S*)-PD 172938 is reported as a strong (brain chemical) D4 ligand, and (*R*)-JM 1232 is a agonists of benzodiazepine receptor for the curing anxiety, whereas is an inhibitor of the  $\beta$ -secretase enzyme for the treatment of Alzheimer's disease.<sup>4</sup>

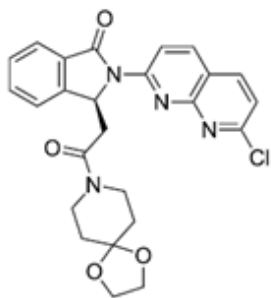


Some substituted isoindolinone possess anxiolytic hypnotics, antihypertensive, antipsychotic, anti-inflammatory, anaesthetic, antiulcer, vasodilatory, antiviral, antileukemic.

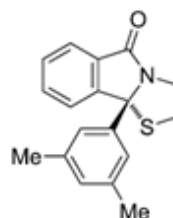




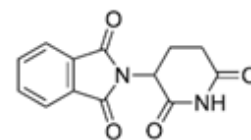
(*R*)-PD 172939  
(dopamine D4 antagonist)



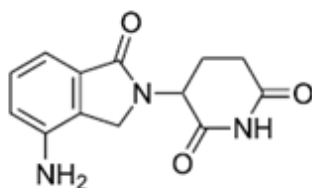
(*S*)-pazinaclone  
(sedative drug)



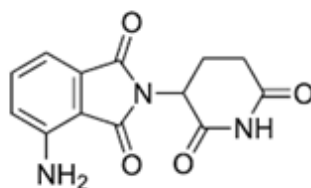
(*R*)-(+)  
(antiretroviral, ARV)



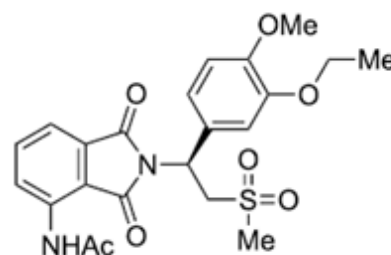
thalidomide  
(teratogen)



lenalidomide  
(anticancer, multiple myeloma)

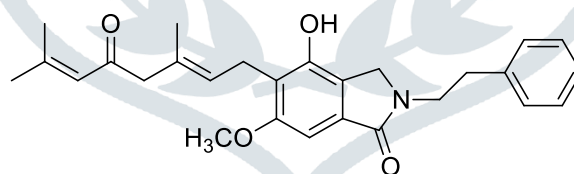


pomalidomide  
(anticancer, multiple myeloma)



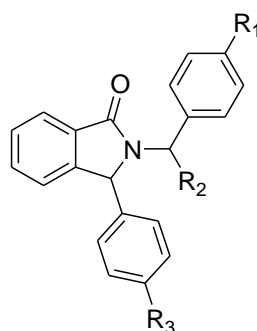
apremilast  
(antiinflammatory)

Isohericenone is also very useful for its activity related to the body function of living things. It is a new anti-cancer isoindolinone alkaloid from Hedgehog Mushroom, extract generated had shown fairly significant anticancer properties against A549, SK-MEI-2 and HCT-15. Problems related to heartburn, gastric ulcers and fatigue were all treated from this mushroom for a long time.<sup>5</sup>



Isohericenone

3-aryl isoindolinone is also related to the body function of living things and this compound is also used for the treatment of many sicknesses and medical problems.<sup>6</sup>

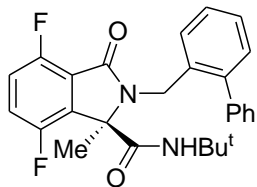


$R_1 = -\text{OMe}, -\text{NO}_2, -\text{NHAc};$

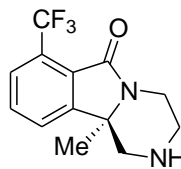
$R_2 = -(\text{CH}_2)_n\text{OH}, -(\text{CH}_2)_n\text{COOMe}, -\text{CH}_2\text{NH}_2, -\text{CH}_2\text{COOH}, -\text{CH}_2\text{CONH}_2;$

$R_3 = -\text{Me}, -\text{OBn}, -\text{OH}, -\text{OPh}, \text{isobutoxy}$

Isoindolinone bearing amine functionality are an important skeleton. These are used in biological active natural products and drugs such as drug for the treatment of cardiac arrhythmias (unsteady heartbeats) and a modulator of serotonin receptors.<sup>7</sup>



treatment of cardiac arrhythmias

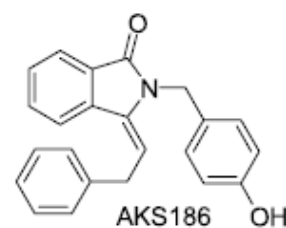
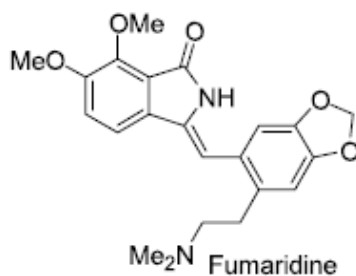
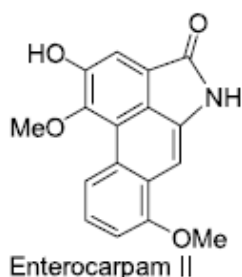


modular of serotin receptors

Isoindolinone also acts as novel metabotropic glutamate receptor 1 adversary which is very helpful in possible treatment for seriously mentally ill problems. Glutamate is a compound which is present in the Central Nervous System (CNS) as one of the major excitatory neurotransmitter. NMDA and non-NMDA receptors which are ionotropic glutamate receptors and the G-protein coupled metabotropic glutamate receptors are influenced by glutamate. These all have very important pharmacological properties. mGluR5 are used as drug targets or to control the transmission of glutamate in the treatment of different nerve-based and psychiatric sicknesses such as dangerous overuse of drugs, schizophrenia (very serious mental disorder), pain, fear and stress and epilepsy. Therefore, as an outcome, a number of isoindolinone derivatives shows single digit mGluR1 antagonistic activity, suitable for oral CNS drugs, has enough selectivity for mGluR5 and also good metabolic stability.

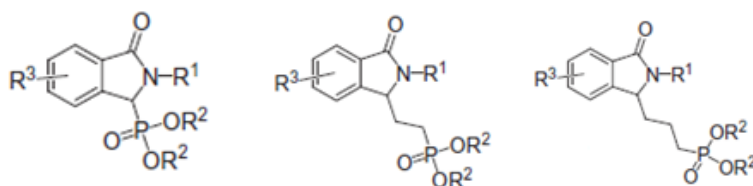
### Naturally occurring bio-active isoindolin-1-ones

3-methyleneisoindolin-1-ones is a substituted derivative of isoindolinone which are very important for their biological use and natural occurrence. It is found in many naturally products for example Enterocarpam, which is the part of aristo lactam alkaloids family. It is also seen in the Fumaridine. This type of derivative of isoindolinone are also found in biological active compounds such as AKS186 which is helpful to display vasorelaxant.<sup>8</sup>



## Phosphorylated Isoindolinone Derivatives

Phosphorylated Isoindolinone derivatives with structural variation in substitution of phosphorylated chain have attracted attention due to their potential biologic activity or as structural blocks for designing bioactive compounds.<sup>9,10</sup>



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