

# Spectrophotometric Determination of Dibenzoylmethane by Diazocoupling Reaction in Pharmaceutical Preparations

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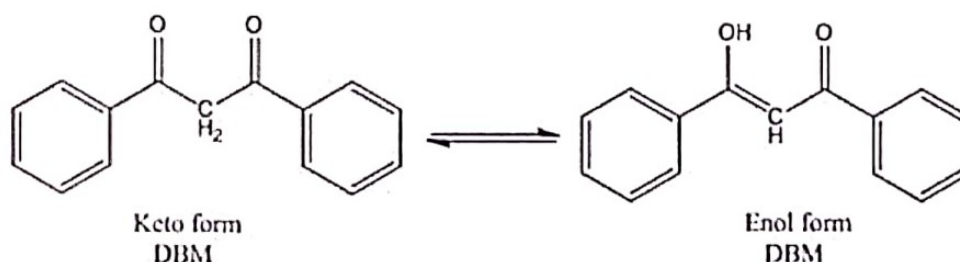
**Abstract**—A simple, sensitive, rapid and new spectrophotometric method for the determination of Dibenzoylmethane (DBM) in aqueous solution was developed. The method was based on the coupling of DBM with diazotized *p*-nitroaniline in basic medium and in the presence of Triton X-100. The orange-red dye formed was water-soluble, stable and shows maximum absorption at 524 nm. Beer's law was obeyed over the range 5-500  $\mu\text{g}/25\text{ml}$ , i.e., 0.2-20 ppm with a molar absorptivity of  $3.04 \times 10^4 \text{ l.mol}^{-1}.\text{cm}^{-1}$  and Sandell's sensitivity index of  $0.0074 \mu\text{g}.\text{cm}^{-2}$ , a relative error of -2.915 to 1.295 % and relative standard deviation of  $\pm 2.215$  to  $\pm 3.848$  %. The study of the interferences showed that the method was selective. The proposed method seemed effective and fast spectrophotometric

approach which has been applied successfully to determine DBM in some water samples, because there were no pharmaceutical preparations for the application of the method.

**Keywords**— Dibenzoylmethane, Spectrophotometry, *P*-nitroaniline, Diazocoupling.

## 1. INTRODUCTION

Dibenzoylmethane (DBM) or 1,3-diphenyl - 1,3-propanedione was the name given to the compound having the following structure (Reichardt, 1988).



The drugs (DBM and Trazodone) were carefully used to treat cancer and depression respectively, it was found that both of these drugs can cross the blood-brain barrier and restore correct protein production and this was great for Alzheimer's disease. (Halliday, et al., 2017). Dibenzoylmethane (DBM) is an important  $\beta$  - diketone which is widely used in polyvinyl chloride (PVC) and acrylonitrile-butadiene styrene (ABS) resin, as new auxiliary stabilizer (Ara and Khan, 2014) .

DBM has the potential to prevent the formation of polycyclic aromatic hydrocarbon in vivo, (MacDonald et al, 2001), (Lin, et al., 2001). DBM forms the list of materials that are globally approved for use especially those for topical application to the skin. It protects almost any surface against damage from UV radiation and in conjugation with UV sunscreen, (Maier, et al., 2001). DBM plays an important role in the preparation of different compounds e.g. the formation of 1,5- diketones by photochemical reaction between DBM and *o*-quinones (Chang et al., 1998). The (DBM) has been shown to exhibit antineoplastic effects in prostate cancer cell lines by induction of cell cycle arrest, (Khor, et al, 2009). (Kockler, et al., 2014), investigated the effect of  $\text{TiO}_2$  particle size on the photo stability of the chemical UV-filters of

butylmethoxydibenzomethane (BMDBM) and octocrylene formulated in a micro emulsion. The dibenzoylmethane derivatives protect dopamenergic neurons, these derivatives displayed neuro protective functions both in cell culture and animal models of Parkinson's disease (Takano, et al., 2007). (Bellucci, et al., 2011) explored that introducing large amounts of alpha synuclein into cell cultures results in the initiation of the un-folded protein response, so there is evidence that (DBM) might be neuro protective for Parkinson's disease. (Julie, et al. 2012) found that a sudden loss of protein associated with the connections between neurons occurred at 9 weeks post infection.

Consequently, it was quite clear that DBM was a very important compound, however, the methods available for its determination were limited. Visual and potentiometric titrations in methanol were used to measure DBM under nitrogen atmosphere (Afrawal, et al. 1975). The spectrophotometric method was used to determine DBM as its metal chelates using several metal ions such as Fe (III) but this method suffer from several disadvantages (Incitti, S. et al., 1966). DBM was determined in carbon tetrachloride as its Cu(II) chelate by measuring the absorbance of the organic