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Natural Acid Catalysed Synthesis of Novel Azomethine Drug : As Medicinal Chemistry View.

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ABSTRACT:

Schiff bases are synthesized and structurally diverse compounds, by different methods as the condensation between primary aromatic amines and aldehyde or ketones. The reaction of primary aromatic amines with aryl aldehydes is found to be catalysed by various juices like mango, lemon, grapes, as natural acid under solvent-free conditions to give the corresponding Azomethine in good yields. This eco-friendly reaction has many advantages like economical, environmental, mild reaction conditions and simple work-up with high product yield. The naturally available fruit juice as a biocatalyst in synthesis to fulfil almost all the terms and conditions of green chemistry and attracted the interest of researchers. The best thing is that most of fruits are easily available, cheap and can be easily extracted. The purpose of this review is to look out present aspects of fruit juice in organic transformations.
Schiff bases are versatile metal complexing agents and have been known to coordinate all metals to form stable metal complexes with vast therapeutic Applications. The purpose of this review is to look out present aspects of substituted Azomethine drugs in the field of Medicinal chemistry and organic transformations.

KEYWORDS: Azomethine Drugs, Green Synthesis, Magnifera Indica Juice, Medicinal Chemistry.

INDRODUCTION : Schiff bases and their metal complexes have been reported to exhibit a wide range of biological activities such as antibacterial including antimycobacterial, antifungal, antiviral, antimalarial, anti-inflammatory, antioxidant, pesticidal, cytotoxic, enzyme inhibitory, and anticancer including DNA damage.[1]

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Fruit and Lemon Juice of Citrus Limon

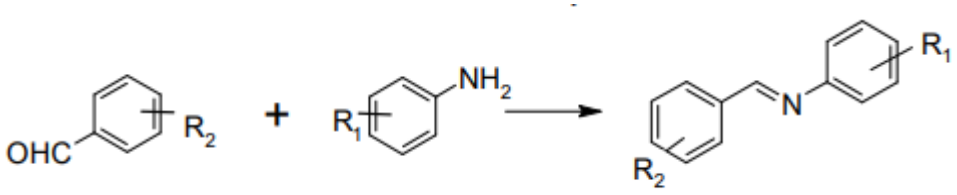


Fruit & Mango juice of Mangifera Indica Fruit & Grape juice of Genus Vitis

Azomethine is a nitrogen analog of an aldehyde or ketone in which the C=O group is replaced by RC=N group. It is usually formed by condensation of an aldehyde or ketone with a primary amine. Azomethine have a large number of synthetic uses in organic chemistry. The research on the chemistry of azomethine has been a focus of attention for chemists for several years; due to their wide spread diversified biological activities. It play an important roles in biological systems. The main aim of this concept is to develop the smooth and non-polluting pathways and to find creative ways to reduce the use of toxic reagents, solvents, harsh reaction conditions and expensive catalysts [2-3].

The experimental trials of new catalyst in an environmentally benign manner have become much more important in recent years [4]. The conventional synthesis of chemicals produces large amount of toxic wastes and by-products [5]. These threats indicate that it must be important to develop methods which satisfy green principles [6-7]. The growing concerns for the environment demands the development of eco-friendly

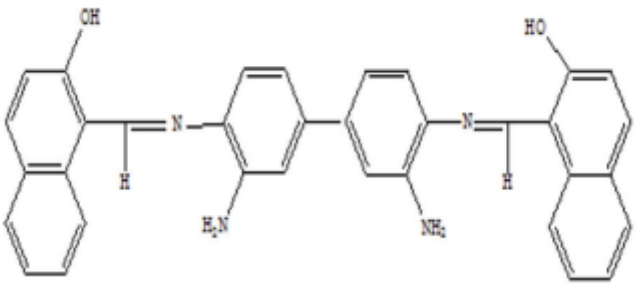
and economic processes where in even less hazardous by products are not desirable. Organic reactions under solvent-free conditions have gained in popularity in recent years [8] .The formation of Schiff bases in this method depends upon the rate of removal of water from reaction mixture.



Schiff Base or Azomethine drug Synthesis

Originally, the classical synthetic route for synthesis of Schiff bases was reported by Schiff [9] which involves condensation of primary amines with carbonyl compounds under azeotropic distillation [10] with the simultaneous removal of water. The formation of carbon–nitrogen double bond plays important role in organic synthesis. This can be achieved by the reaction of aldehydes and amines in acidic medium which leads to synthesis of Schiff bases (imines). Schiff bases have attracted considerable attention of organic chemists due to their significant biological activities like anticancer [11], antitumor[12], insecticidal [13],anti-inflammatory agents [14], antibacterial[15], antituberculosis [16],antimicrobial [17], anticonvulsant[18] activity.

The Schiff bases are also used as versatile components in nucleophilic addition with organometallic reagents[19] and in cycloaddition reactions[20,21]. This review focuses on the medicinal importance of Schiff bases from the last years.



Anti-inflammatory agent

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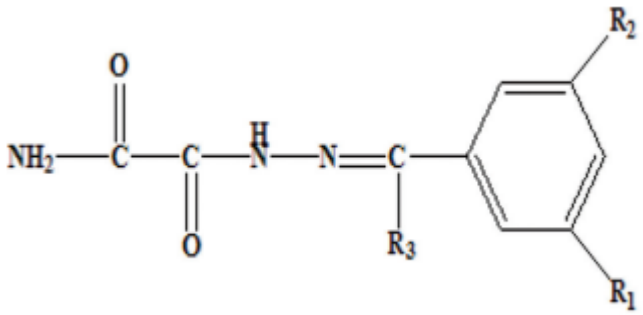
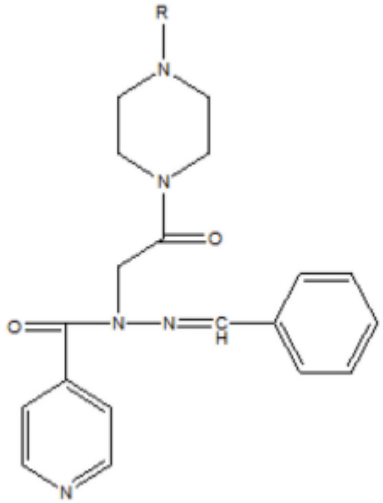
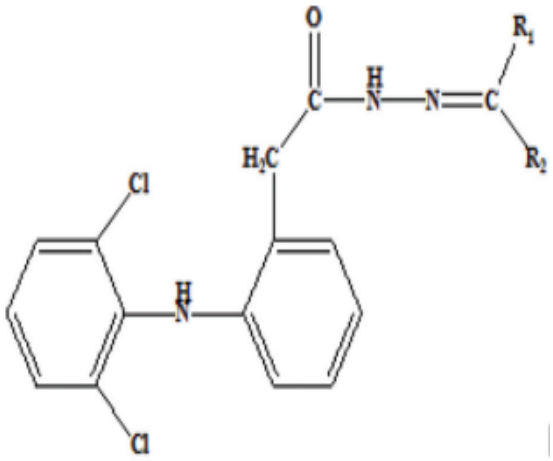


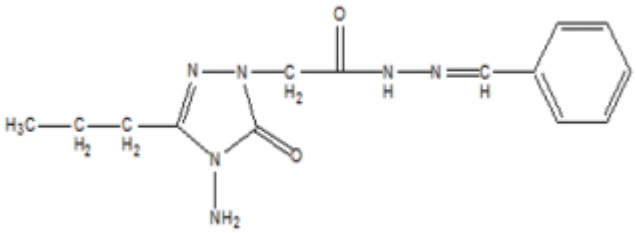
Anti-Convulsant agent



Hydrazide Derivative



Antitubercular Agent



Anti-Cancer agent

The methodologies reported above have some disadvantages such as prolonged reaction time, the high reaction temperatures, an excess of costly dehydrating reagents/catalysts, moisture sensitive catalysts, and special apparatus, etc. Considering these facts, we have decided to synthesize Schiff bases of various substituted aldehydes and

aromatic amines by employing Mango juice,Grape juice,Lemon juice as green catalyst for green approach.[22] Citrus aurantium, Citrus indica, Citrus limonium are some important species of citrus family commonly known as lemon. The lemon is indigenous to the north-west regions of India. It is now widely grown in all tropical and subtropical countries. In India it is also cultivated in home gardens. For the present work, we have used extract of magnifera indica species of mango as natural catalyst for synthesis of Schiff bases.[23]

The synthesis of Schiff Base by using mango juice (Magnifera Indica) as an effective and mild acid catalyst for condensation reaction . This synthesis shows the formation of selective imine by the reaction of aryl aldehyde and aromatic primary amine. This method provides a cost effective idea and benefits from the elimination of production of acidic waste. A green procedure for Knoevenagel condensation was reported .They showed that lemon juice (Citrus limonium) act as environmentally benign acid catalyst for the reaction between aldehydes and malanonitriles. The mixture was stirred at room temperature for 30-60minutes. This is new procedure by mango juice qualifying it is a green method.

APPLICATIONS:

1) Lemon Juice : In Organic Synthesis Most people are familiar with the traditional uses for lemon juice such as medicinal, culinary, and industrial purposes. Now a days the lemon juice has played an important role in organic synthesis. Lemon juice was reported to catalyze Knoevenagel condensation reaction to synthesise arylidene-malononitriles which shows antibacterial and antifungal activity [24].
2) Magnifera Indica : The balance of oxidative stress plays an important role in cancer. While moderately elevated ROS levels can contribute to carcinogenesis, cancer cell survival and metastasis, elevated ROS levels above the toxic threshold can cause cancer cell death usually via apoptosis induction.[25–26] In recent years, oxidative stress-induced apoptosis has attracted attentions as a potential anti-cancer mechanism. M. indica kernel extract was reported to induce both mitochondrial and death receptor pathways of apoptosis in MCF-7 cells via the induction of oxidative stress and the

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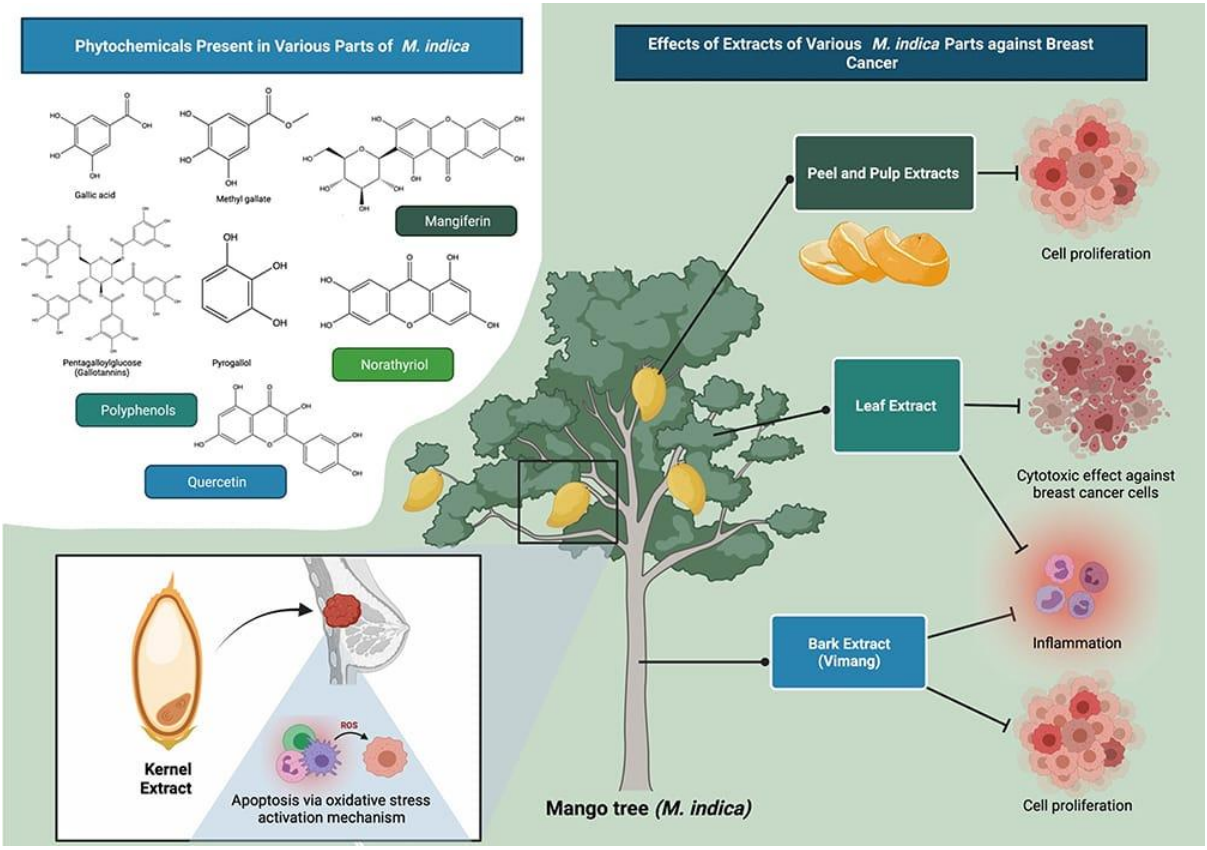
consequent upregulation of p53, as evidenced by the observations of dose- and time-dependent increases in ROS generation and malondialdehyde (MDA;) [27]

3) Grape juice of Genus Vitis : The consumption of grape components could be associated with reduced risk of certain cancers such as colon cancer, breast cancer etc. Grape antioxidants play a major role in their anticancer activity because of their antioxidant, anti-inflammatory and anti-proliferative properties. Antioxidants present in the grape have shown to induce cell cycle arrest and apoptosis in the cancer cells and also prevents carcinogenesis and cancer progression in study models. The mechanism of anti-cancer action is due their effect on multiple cellular events associated with tumour initiation, promotion and progression .[28]



CONCLUSION : This review focuses the importance of fruit juice as a natural and biocatalyst in organic transformations. The growing interest of fruit juice in organic synthesis is mainly due to their acidic properties, enzymatic activity, benign environmental character, inexpensive, and commercial availability. In this article, we are reporting a new eco-friendly route with good yield for the synthesis of Schiff bases by using sweet Mango Juice , Grapes juice and Lemon juice The catalytic activity including the application of fruit juice in various organic transformations such as formation of C-C, C-N bonds and breaking of C-O, C-N bonds in different synthetically important organic compounds have been studied. Although many observations have not received by application of fruit juice in synthesis of natural products or complex structured molecules in details, it is believed that in near future the fruit juice chemistry will continue to attract significant research activity. Therefore, the present review would serve the need of organic chemists in searching new applications of fruit juice for organic synthesis. Compared to Conventional methods, this new method is cleaner, safer and more eco-friendly, prevention or minimization of hazardous products, prevention of by products, minimum incorporation of the reagents in to final product, involving mild reaction conditions such as time, temperature, simple workup. Compare to the Conventional method this Green method was maintaining good yield of product.

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