ABSTRACT

The main objectives of the present study was to develop a formulation with increase in therapeutic efficacy, reduce frequency of administration and improve patient compliance, by developing controlled release matrix tablets and matrix type transdermal patches of Glipizide, Glimepiride with synthetic and natural polymers.

This work aims at investigating and formulating controlled release matrix tablets and matrix type transdermal patches of anti-diabetic drugs (Glipizide and Glimepiride) using easily available and economical polymers.

The matrix tablets were prepared with various ratios of synthetic (Povidone) and natural (Aloe barbadensis miller leaf mucilage and Guar gum) polymers.

The matrix transdermal patches were prepared with various ratios of synthetic (Povidone) and natural (fruit mucilage of Ficus bengalensis, Ficus carica and Ficus glomerata) polymers.

Since scarce attempts has been made on Aloe barbadensis miller leaf mucilage as controlled releasing polymer for developing matrix tablets. So, physicochemical characterization of Aloe barbadensis miller has made for reproducibility of results.

Since no attempts has been made on Ficus bengalensis, Ficus carica and Ficus glomerata fruit mucilages as controlled releasing polymer for developing transdermal patches. So, physicochemical characterization of Ficus bengalensis, Ficus carica and Ficus glomerata has made for reproducibility of results.
These natural polymers (*Aloe barbadensis miller* leaf mucilage, *Ficus bengalensis*, *Ficus carica* and *Ficus glomerata* fruit mucilage) in addition to controlled releasing properties have proven anti-diabetic properties. Hence the author has selected these in his research.

All above formulations were evaluated for drug polymer interactions using Ultra Violet spectroscopy, Differential Scanning Colorimetry, Infrared Spectroscopy and Scanning Electron microscopic methods.

These matrix tablets were evaluated for their physical properties like general appearance, thickness, hardness, Friability, weight Variation and uniformity of drug content and pre formulations studies, post formulation studies. All the prepared matrix tablets were found to have good physicochemical properties, pre formulation and post formulation properties with low Standard Deviation values. The swelling behaviour and kinetic release characteristics of the formulations were studied and they were satisfactory.

The combination of both *Aloe barbadensis miller* leaf mucilage and Povidone forms a stable and efficient matrix tablet

The matrix transdermal patches were evaluated for their physical properties like general appearance, thickness, uniformity of weight, moisture content, elongation break, moisture uptake, tensile strength and pre formulation studies, post formulation studies. All the prepared matrix type transdermal patches were found to have good physicochemical properties, pre formulation and post formulation properties with low Standard Deviation values.
The combination of both *Ficus glomerata* fruit mucilage and Povidone forms a stable and efficient transdermal patch.

The *in vitro* drug release studies were carried out and kinetic data was obtained from formulated matrix tablets. The best formulations were selected and compared with marketed tablets and further allowed for *in vivo* evaluation in rabbits.

The *in vitro* drug release studies were carried out and kinetic data was obtained from formulated matrix transdermal patches. The best formulations were further allowed for *in vivo* evaluation in rabbits.

The release rate of Glipizide from optimized GPAP-5 matrix tablets was compared with Glipizide marketed tablet. Among the matrix tablets GPAP-5 (Glipizide with leaf mucilage of *Aloe barbadensis miller* and Povidone in combination) was shown good profiles both *in vitro* and *in vivo*.

On the other hand GPFGP-5 (Glipizide with fruit mucilage of *Ficus glomerata* and Povidone in combination) transdermal patch has shown good profiles both *in vitro* and *in vivo*.

It was concluded that *Aloe barbadensis miller* leaf mucilage in can be used as a polymer for making controlled release matrix tablets. On the other hand fruit mucilage of *Ficus glomerata* has shown better properties as polymer for making Transdermal Patches.

Inclusion of Povidone in above matrix tablets and transdermal Patches gives a stable and promising controlled release formulation.