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Thin Layer Chromatography of *Solanum Xanthocarpum* Schard. Wendl. (Ethanolic, Hydroalcoholic and aqueous extracts)

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ABSTRACT

Medicinal plants include a wide range of bioactive compounds that are beneficial to individual and community health. These chemicals have pharmacological effects on the human body. The goals of this study are to look at the content of steroidal alkaloids in species from the genus Solanum, which has a large distribution in India. This plant's therapeutic benefits are well-known. The extracts were thin-layer chromatographed using several solvent systems. Continuous heat extraction was used to extract alkaloids such as solasodine. The yield of alkaloids was found to be higher at three hours when dependable solvents such as hydroalcoholic, methanolic, and aqueous were used.
Thin layer Chromatography shows the presence of preliminary phytochemical analysis of whole plant extract showed the presence of Alkaloids, Flavonoids, Carbohydrates, Glycosides, Phenols, Steroids, Tannins, Resins and Proteins and show different Rf value.

Keywords
Alkaloids, *Solanum Xanthocarpum* Schard & Wendl, Solanum Species

Introduction

The constituents of solanum plant species are the largest, most diverse, complex genus in the Solanaceae family.(Gouvêa et al., 2018) Secondary metabolite produced by the plant includes steroidal alkaloids such as solanocarpine, solanocarpidine, solamargine, solasonine, and steroidal glycosides. These bioactive compounds, among other things, have anti-inflammatory, Anti-cancer, antibacterial, antidiabetic, and antihypertensive activities. The most important include alkaloids, flavonoids, tannins, phenolic compounds, and other bioactive plant components.(Tyagi & Kumar Verma, 2019) TLC densitometric methods for the determination of active constituents of several Solanum species.(Sharma et al., 2014)
Thin-layer chromatography is a collection of systematic procedures used to separate mixtures from the extracts. A stationary phase made of a solid or a liquid form) and a mobile phase in a form of a liquid or a gas). For thin-layer chromatography, the adsorbent, such as alumina, or cellulose, silica gel, is used as a substrate. The advantage of chromatography it is faster runs for the separations.(Rashid et al., 2017)
Thin-layer chromatography (TLC) is a quick and easy way to find and quantify secondary metabolites in herbal medicines. It is a reaction with ninhydrin reagent that produces a new chemical detection system for identifying bioactive in plants. Plants are considered a powerful source of medication in the conventional medical system. The effectiveness and safety of herbal medicine have prompted major pharmaceutical firms to develop in medicinal plant research. Alkaloids are one of the most important families of secondary metabolites due to the enormous number of isolated products and their pharmacological effect.(Molla et al., 2011)

Methods

Thin layer Chromatography: The hydroalcoholic, methanolic and aqueous, extracts obtained from Solanum xanthocarpum stayed purified using chromatographic techniques. TLC was created to detect distinct compounds in a combination as well as testing for purity or separation of mixtures.

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TLC (thin layer chromatography) is a simple and inexpensive analytical technique for separating quantities of less than ten micrograms of material quickly and efficiently. After the separation process is complete, the separate components of the mixture emerge as spots on the plates at different levels. Their nature and characteristics are determined by appropriate identification procedures.

Spotting a plate:

All extracted samples were dissolved in a solvent mixture of ethanol, and a small amount of sample solution was applied to the plate with a glass capillary tube, containing the sample in as small an area as possible. Spots with a diameter of about 1 to 2 mm were created with measurement. Each extract was spotted on TLC paper, then eluted with a mobile phase of Toluene: Diethylamine: Ethyl acetate (7:2:1) Chloroform: Diethylamine: Acetone (5:4:1) Butanol: Diethylamine: Chloroform (7:2:1) Chloroform: Ethanol (9: 1) Toluene: Formic acid: Ethyl acetate (5:4:1)

Developing a plate:

To develop the chromatogram, a piece of filter paper was put around the walls of the developing chamber, which contained a shallow layer of the appropriate solvent. To prevent the sample from dissolving into the eluent layer, the spotted TLC paper was put in the chamber with the origin marked on the plate higher than the eluent.

Compound Visualization:

After development, successful separation of colored compounds will show distinct spots, indicating that the combined components are separate. The spots are handled in some way to make them visible to make isolated colorless components visible; this process is known as visualization. The solvent system is Toluene: Diethylamine: Ethyl acetate (7:2:1) Chloroform: Diethylamine: Acetone (5:4:1) Butanol: Diethylamine: Chloroform (7:2:1) Chloroform: Ethanol (9: 1) Toluene: Formic acid: Ethyl acetate (5:4:1)

Results

Result and Discussion:

Several components were discovered during the TLC. Before determining the optimal solvent solution, several systems were used. Several solvent systems were used to investigate the hydroalcoholic crude extract for thin-layer chromatography (TLC).

Solvent systems used to detect phytochemicals:

Detection for alkaloids:

Toluene: Diethylamine: Ethyl acetate (7:2:1)
Chloroform: Diethylamine: Acetone (5:4:1)
Butanol: Diethylamine: Chloroform (7:2:1)
Chloroform: Ethanol (9: 1)
Toluene: Formic acid: Ethyl acetate (5:4:1)

Solvent System	Ratio	Rf value of Hydroalcoholic extract	Rf value of alcoholic extract	Rf value of Aqueous extract
Toluene: Ethyl acetate: Diethyl amine	(7:2:1)	0.61, 0.63,066	0.68, 0.71, 0.73	0.63, 0.65, 0.68
Chloroform: Acetone: Diethyl amine	(5:4:1)	0.63, 0.65,0.68, 0.70	0.62, 0.63, 0.64, 66,72	0.64, 0.68, 0.70, 0.74
Butanol: Chloroform: Diethyl amine	(7:2:1)	0.62, 0.65,0.66, 0.70, 0.71	0.66, 0.69, 0.71	0.67, 0.69,
Chloroform: Ethanol	(9: 1)	0.61, 0.63, 0.65, 0.71,0.72	0.63, 0.64,0.66 0.70, 0.71	0.65, 0.68, 0.71

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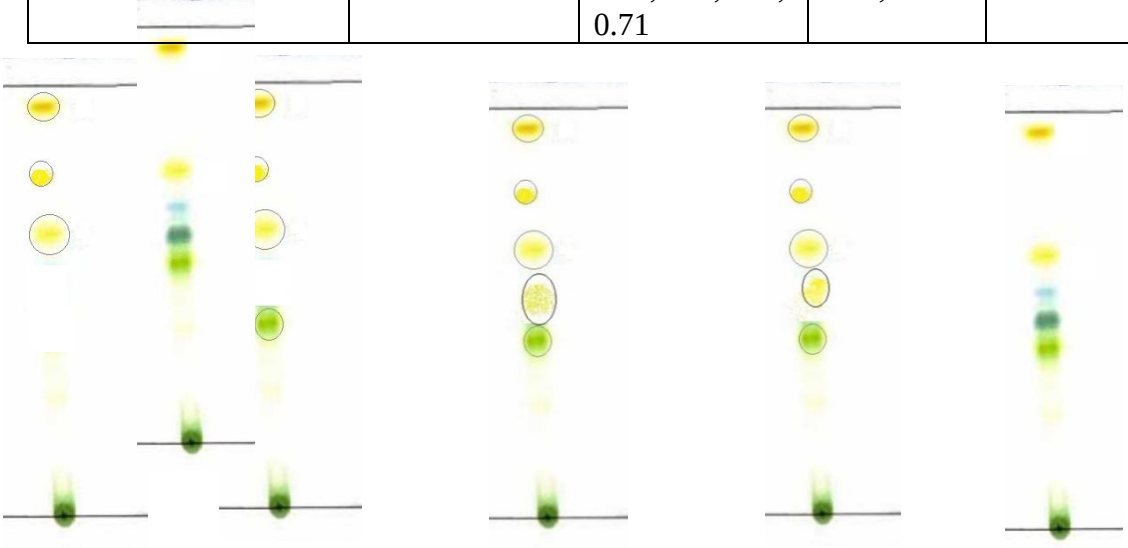
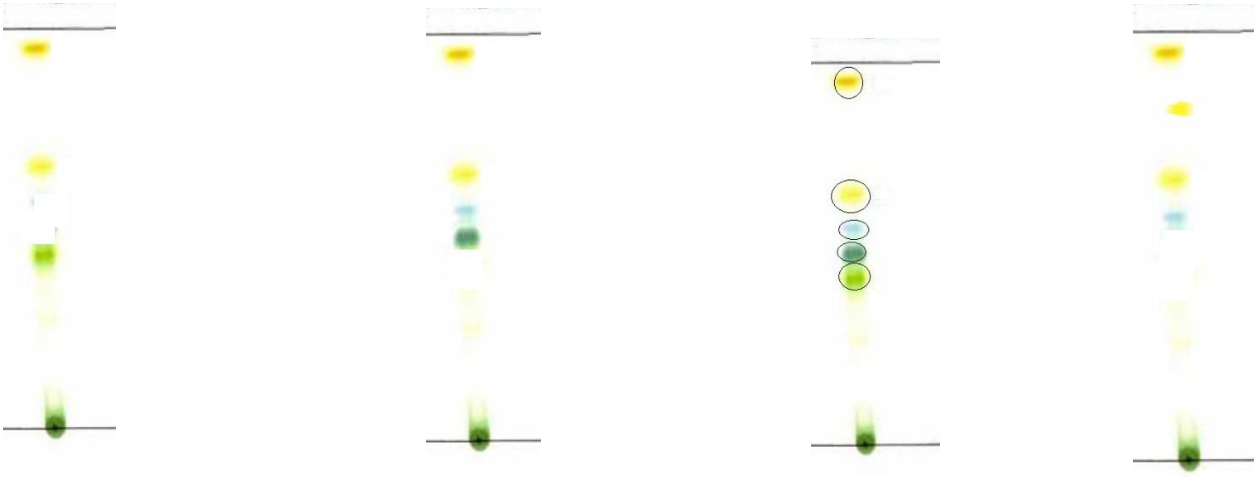
Toluene: Ethyl acetate: Formic acid	(5:4:1)	0.61, 0.62,0.63,0.65, 0.71	0.64, 0.66, 0.73, 0.72	0.67, 0.70, 0.72



R f value of Hydroalcoholic extract



R f value of Ethanolic extract

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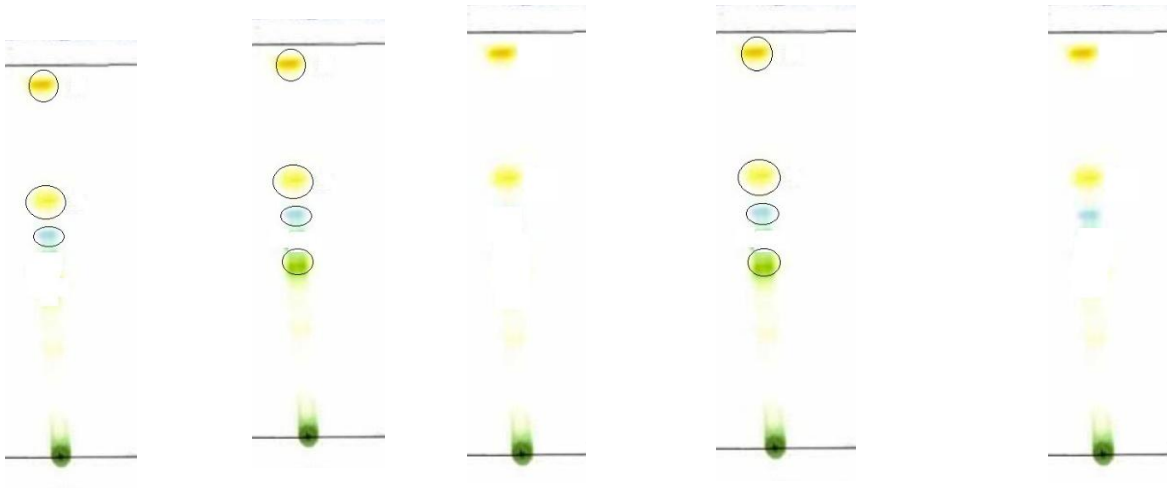

R f value of aqueous extract

Discussions

Conclusion

Conclusion: Novel Pharmaceuticals and various types of formulations derived from medicinal plants, thin layer chromatography is a simple, cost-effective, and convenient technique in phytochemistry with different applications. Education and research need more detailed information.

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