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Pharmacological Screening of Polyherbal Formulation for Diabetic Associated Hyperlipidemia

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Abstract

Plant parts such as seeds, berries, roots, leaves, bark, or flowers can be used medicinally. This practise is known as herbal medicine, botanical medicine, or phytomedicine. Outside of mainstream treatment, herbalists have long used herbalism for conventional medicine. Grewia subinaequalisDC in the family Tiliaceae, only one genus, Grewia, yields edible fruit. Saccharum officinarum is a species of grass belonging to the genus Saccharum that is characterised by its robust growth and size. Neisosperma oppositifolium is a tree that typically exhibits a height range of 6 to 25 metres, although it has been observed to vary from as low as 2.5 metres to extraordinarily high heights of 45 metres, and in rare cases, even up to 60 metres. The presence of moisture in crude pharmaceuticals is an unavoidable factor that should be minimised to the greatest extent possible[9,10]. The process of drying significantly influences both the quality and purity of the material.

Key Words: *Hyperlipidemia, Phytomedicine, HPTLC, Polyherbal formulation, Antidiabetic.*

Introduction

The method of making medicinal use of plant parts such as seeds, berries, roots, leaves, bark, or flowers is known as herbal medicine, botanical medicine, or phytomedicine. [1, 2] There is a long history of herbal medicine being used in contexts outside of mainstream medicine. [3,4,5] There are many different ailments that can be prevented and treated with herbal medicine, which is often referred to as alternative medicine. [6]Herbal remedies offer a number of benefits that cannot be found in modern synthetic or chemical compounds. [7] Today, people all around the world are becoming more and more aware of the significance of returning to nature as a means of combating a variety of health issues[8]. Natural treatments derived from herbs are absolutely free of any adverse effects and can be found in nature[9].

Grewia subinaequalis DC.

Among the Tiliaceae family, only one of the genera, Grewia, produces fruit that can be consumed. G. subinaequalis, which has been referred to in literature for a long time as G. asiatica, is the only species that of any significance [10]. In a country like India, where there are many different dialects of names, the vernacular name that is most commonly used is L. Phalsa. In Pakistan, the plant is specifically referred to as Phalsa.

Saccharum officinarum

*Saccharum officinaru*m refers to a specific species of sugarcane. The Poaceae family consists of a vast and robust species of grass belonging to the *Saccharum* genus[11]. The sturdy stems of this plant contain a high concentration of sucrose, a type of sugar that builds up in the sections between the stalks.

Neisosperma oppositifolium (Lam.)

The scientific name for *Ochrosia oppositifolia* is the Apocynaceae family consists of trees that typically reach heights ranging from 6 to 25 metres, although they can vary in size from as small as 2.5 metres to as tall as 45 metres, and in unusual cases, up to 60 metres[12,13].

HPTLC FINGERPRINTING ANALYSIS

HPTLC is a method employed to separate and identify various constituents. The separation process relies on the disparity in adsorption coefficients between the distinct constituents of a mixture, whereas identification is determined by comparing the Rf values[14,15]. Compounds that have a higher degree of adsorption to the stationary phase will have a slower upward movement compared to compounds with lower adsorption, resulting in the separation of the compounds. Chromatographic investigations were conducted in accordance with references[16].

Fig: 1. HPTLC chromatogram of Aqueous extract of *Grewia subinaequalis DC.* Heartwood

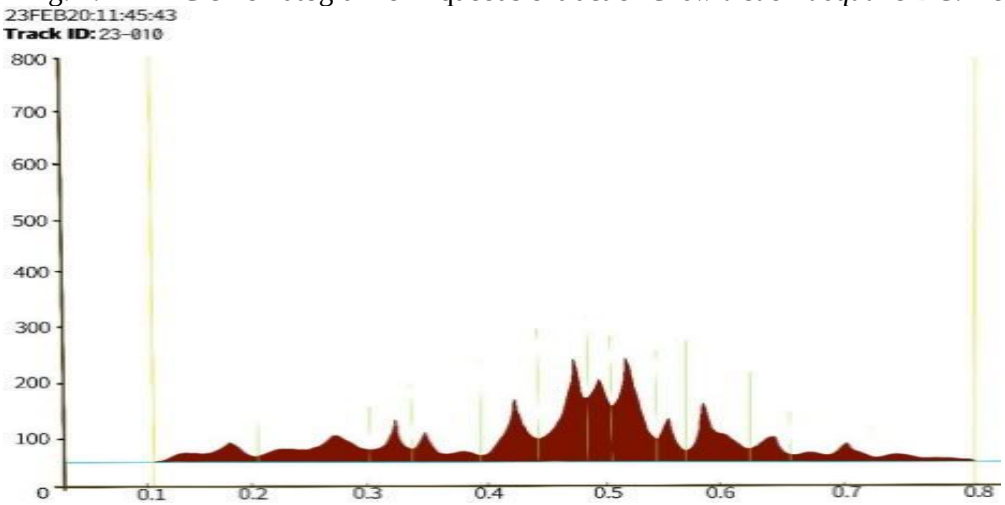

Table 1. HPTLC chromatogram of Aqueous extract of *Grewia subinaequalis DC.* Heartwood

Peak	Start point	Maximum Rf	End point	Peak height (AU)	Area (AU)	Percentage area (%)
1	0.15	0.18	0.21	91.5	549	7.81
2	0.26	0.27	0.3	109.3	437.2	6.22
3	0.3	0.32	0.33	130.7	392.1	5.58
4	0.33	0.35	0.36	112.4	337.2	4.8
5	0.39	0.42	0.44	184.2	921	13.11
6	0.44	0.47	0.48	243.5	974	13.86
7	0.48	0.49	0.5	207.1	414.2	5.89
8	0.5	0.51	0.54	249.6	998.4	14.21

Fig: 2. HPTLC chromatogram of Aqueous extract of *Saccharum officinarum* L. Leaves

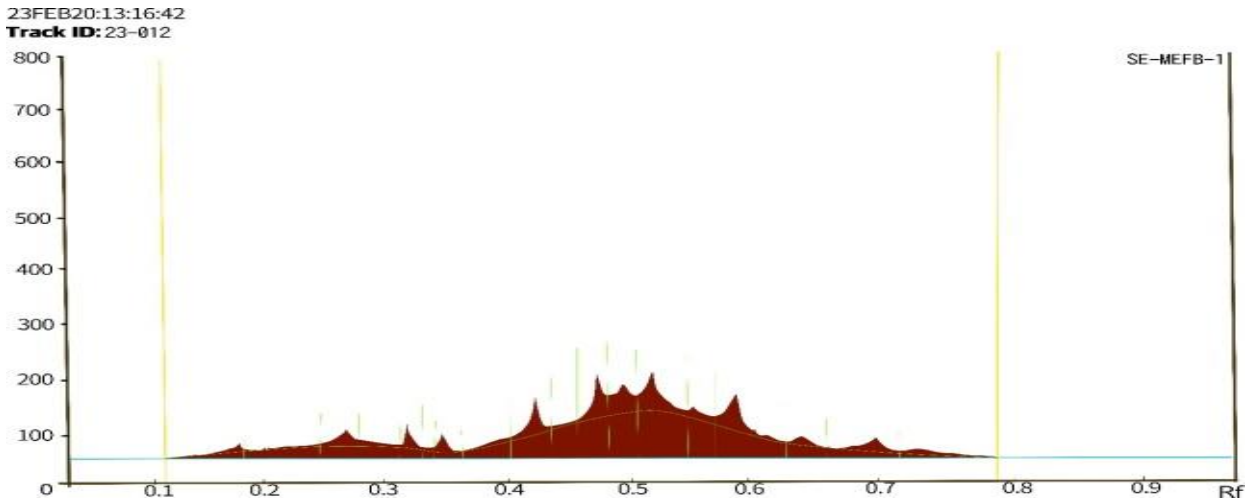

Table: 2. HPTLC chromatogram of Aqueous extract of *Saccharum officinarum* L. leaves

Peak	Start point	Maximum Rf	End point	Peak height (AU)	Area (AU)	Percentage area (%)
1	0.17	0.18	0.2	100.5	301.5	3.902
2	0.26	0.28	0.3	109.8	439.2	5.68
3	0.3	0.2	0.33	124.1	372.3	4.81
4	0.33	0.35	0.36	153.7	461.1	5.96
5	0.38	0.39	0.39	92.3	92.3	1.19
6	0.39	0.42	0.44	238.4	1192	15.42
7	0.45	0.47	0.48	316.2	948.6	12.27
8	0.48	0.49	0.5	256.9	513.8	6.65

Fig: 3. HPTLC chromatogram of Aqueous extract of *Neisosperma oppositifolium* (Lam.) Fosb Bark

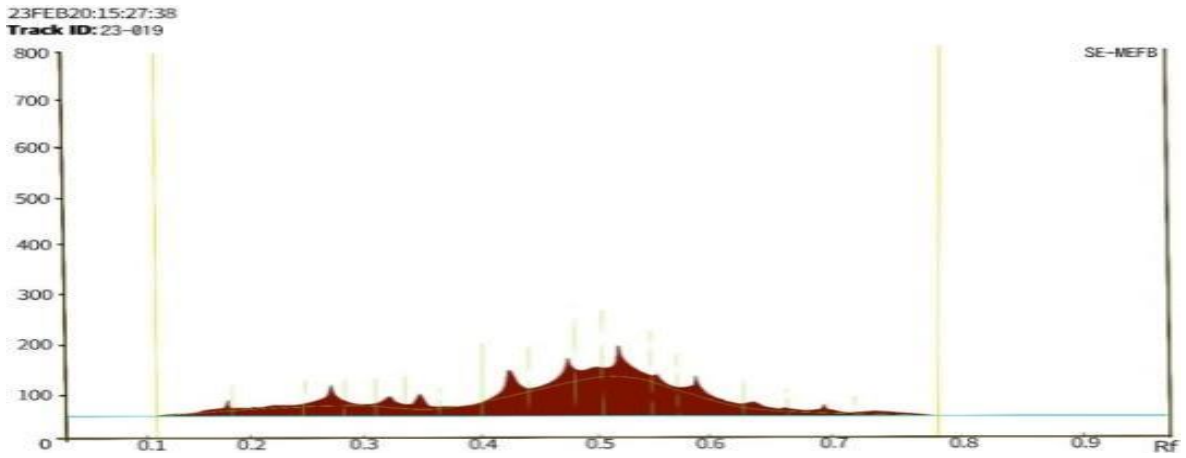

Table 3. HPTLC chromatogram of Aqueous extract of *Neisosperma oppositifolium* (Lam.) Fosb Bark

Peak	Start point	Maximum Rf	End point	Peak height (AU)	Area (AU)	Percentage area (%)
1	0.14	0.17	0.18	91.2	364.8	6.81
2	0.24	0.26	0.28	108.6	434.4	8.11

3	0.31	0.32	0.33	117.4	234.8	4.38
4	0.34	0.35	0.36	101.2	202.4	3.78
5	0.4	0.42	0.43	177.1	531.3	9.92
6	0.46	0.47	0.48	209.8	419.6	7.84
7	0.48	0.49	0.5	193.9	387.8	7.24
8	0.5	0.51	0.54	212.4	849.6	15.87

Fig: 4. HPTLC chromatogram of Aqueous extract of polyherbal tablet

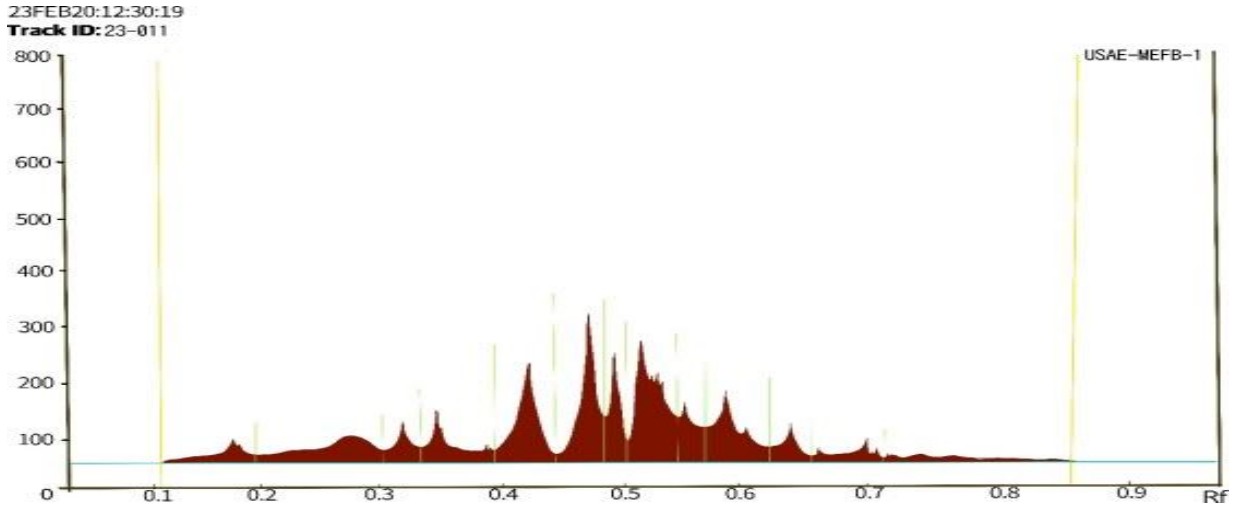

Table 4. HPTLC chromatogram of Aqueous extract of polyherbal tablet

Peak	Start point	Maximum Rf	End point	Peak height (AU)	Area (AU)	Percentage area (%)
1	0.16	0.17	0.18	95.7	191.4	4.60
2	0.25	0.27	0.28	114.4	343.2	8.25
3	0.31	0.32	0.33	98.2	196.4	4.72
4	0.34	0.35	0.37	101.6	304.8	7.33
5	0.4	0.42	0.44	150.4	601.6	14.47
6	0.45	0.47	0.48	178.2	534.6	12.86
7	0.5	0.52	0.54	199.4	797.6	19.18
8	0.54	0.55	0.57	132.2	396.6	9.54

Results and Discussion

Acute oral toxicity studies of aqueous extracts

The body weight of the rats was measured both before and after the medication was given, and it was found that there were no changes in the respiratory, circulatory, autonomic, central nervous system, eyes, mucous membranes, skin and fur, motor activity, or behaviour patterns. There were also no signs of tremors, convulsions, salivation, diarrhoea, lethargy, sleep, or coma. There was also no observation of the beginning or indicators of toxicity. Further investigation revealed that these amounts did not cause any toxicity or fatalities.

Table: 5. Acute Toxicity test studies of AEGS

Sl. No	Groups	Dose/kg (body weight) p.o	Weight of Rats		Signs of Toxicity	Onset of Toxicity	Duration of Study
			Before Test (g)	After Test (g)			

1.	AEGS	2000 mg	176	178	No signs of Toxicity	Nil	14 days
2.	AEGS	2000 mg	172	173	No signs of Toxicity	Nil	14 days
3.	AEGS	2000 mg	221	220	No signs of Toxicity	Nil	14 days

AEGS- Water Extract of *Grewia subinaequalis DC.* Heartwood

Table: 6. Acute toxicity studies of AESO

Sl. No	Groups	Dose/kg (body weight) p.o	Weight of Rats		Signs of Toxicity	Onset of Toxicity	Duration of Study
			Before Test (g)	After Test (g)			
1.	AESO	2000 mg	175	174	No signs of Toxicity	Nil	14 days
2.	AESO	2000 mg	150	148	No signs of Toxicity	Nil	14 days
3.	AESO	2000 mg	190	194	No signs of Toxicity	Nil	14 days

AESO- Aqueous Extract of *Saccharum officinarum* L. leaves

Table: 7. Acute toxicity studies of AENO

Sl. No	Groups	Dose/kg (body weight) p.o	Weight of Rats		Signs of Toxicity	Onset of Toxicity	Duration of Study
			Before Test (g)	After Test (g)			
1.	AENO	2000 mg	176	178	No signs of Toxicity	Nil	14 days
2.	AENO	2000 mg	179	175	No signs of Toxicity	Nil	14 days
3.	AENO	2000 mg	185	183	No signs of Toxicity	Nil	14 days

AENO- Aqueous Extract of *Neisosperma oppositifolium* (Lam.) Fosb Bark

Conclusion

Weight gain and hypoglycemia are two conditions that can occur as a result of taking sulfonylureas, which are both for oral anti-diabetic drugs that are currently in using in the medication. In order to bring the increased glucose levels back down to normal, the extracts and the prescription that was taken on a regular basis were helpful. [17-20] As compared to the usual group of rats, the water extracts at a dosage of 250mg/kg revealed a glucose level of 193mg/dL, which is not that important[21-23]. When rats were given AESO at a dosage of 250 mg/kg, their glucose levels dropped to 130 mg/dL, which is not statistically important when compared to normal rats. Water extracts AENO, on the other hand, demonstrated a substantial reduction in glucose levels to 120 mg/dL when given at a dosage of 250 mg/kg. In the other hand, the Herbal tablet at 250mg/kg resulted in a substantial reduction in glucose to normal levels. The same outcomes were observed in the groups given the regular synthetic medication. This group performed higher than any extract in terms of lowering blood glucose levels. The extracts, on the other hand, were professional enough to illustrate comparable behavior. In contrast to the diabetic control group, the overall lipid profile in serum (TG, TC, HDL, LDL, and VLDL) of STZ mediated diabetes animals treated with Polyherbal tablets was significantly increased. These findings indicate that PHT can inhibit the cholesterol synthesis pathway, and that the increased HDL/LDL ratio is due to the activation of LDL receptors in hepatocytes, which are responsible for absorbing LDL into the liver and lowering serum LDL levels.

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