

INGREDIENTS IDENTIFICATION AND QUALITY CONTROL EVALUATION OF SHWADANSHTRADI TAILA: AN AYURVEDIC FORMULATION

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Abstract

Quality control and the standardization of herbal medicines involve several steps like source and quality of raw materials, good manufacturing practices and adequate analytical screening. These practices play a pivotal role in guaranteeing the quality and stability of herbal preparations. Shwadanshtradi Taila (ST) is a commonly used and prescribed Ayurvedic polyherbal formulation in all types of Vatvyadhi. Prime ingredient of ST is Shwadanshtra which is commonly known as Gokshura (*Tribulus terrestris* Linn.). However, till date no published data is available on its analytical profile. The main aims and objectives of this study are to develop the pharmacognostical and phytochemical profile of ST. Three batches of ST were prepared by adopting classical method and its analytical findings were systematically recorded. The samples were subjected to organoleptic analysis (colour, odour, taste, touch), physicochemical analysis (loss on drying at 110°C, specific gravity at 25°C, viscosity, refractive index, iodine value, acid value, saponification value and rancidity tests) and High performance Thin Layer Chromatography (HPTLC) examination by optimizing the solvent systems. Pharmacognostical profile of Panchanga of Gokshura and Aardraka was established. Average values of all prepared batches of ST viz. Loss on drying, Specific gravity, Viscosity, Refractive index, Iodine value, Acid value and Saponification value were noted as 2.2%, 0.91225, 0.08449, 1.474, 51.86%, 0.33851, 147.10 respectively which were found within prescribed limits. HPTLC fingerprinting profile of ST revealed 6 spots at 254 nm and 2 spots at 366nm. Two spots were merging in both the long and short UV, showing common characters in both the wavelengths.

Key words: Pharmacognosy; Physico-chemical; Shwadanshtradi Taila; Quality control.

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INTRODUCTION

Herbal medicine is a triumph of popular therapeutic diversity and it plays a vital role by constituting the backbone of traditional system of medicine. In order to make sure the safe use of these medicines, a necessary first step is the establishment of standards of authentication and quality. Herbal drugs, singularly and in combinations, contain numerous compounds in complex matrices in which no single active constituent is responsible for the overall efficacy. Polyherbal formulations should not be dismissed only on the basis that they do not withstand modern research. Therefore, proper identification of raw materials at the basic level with the help of microscopic and morphological characteristics is essential to maintain the 'quality control' of multi-ingredient formulations. Along with developing pharmacognostic standards, adequate analytical methods are essential to ensure the quality and standardize the prepared medicine.

Shwadanshtradi Taila (ST) is a commonly used and prescribed Ayurvedic poly herbal formulation in all types of Vatvyadhi.^[1] Prime ingredient of ST is Shwadanshra which is commonly known as Gokshura (*Tribulus terrestris* Linn.). In spite of its numerous medicinal attributes, till date no published data is available on its analytical profile. Keeping these facts in consideration, present study has been undertaken to develop the pharmacognostical and phytochemical profile of ST.

MATERIALS AND METHODS

Collection of raw materials

Raw drugs of ST were procured from local herbal market and were identified and authenticated at Pharmacognosy laboratory in the month of November-December.

Preparation of Shwadanshtradi Taila

Total 3 batches of ST were prepared as per classical method. Reference of ST is available in Charaka Samhita,^[1] however, its method of preparation is not available. Therefore Taila Paka (pharmaceutical processing) and assessment of Siddhi lakshana (chief desired characters of final product) was done according to general guidelines of Taila Paka mentioned in Sharangdhara Samhita.^[2] All ingredients were taken in prescribed ratio. (Table 1) Taila was poured in a large stainless steel container; heated for ten minutes in mild heat, and subsequently subjected to moderate flame after adding rest of ingredients. Finally prepared Taila was filtered slowly through muslin cloth and stored in airtight glass jars under hygienic conditions. Two more batches were prepared to ensure Standard Manufacturing Procedure by following similar process.

Analytical study

Raw materials (Panchanga of Gokshura and Aardraka) and prepared final product (ST) were analyzed by employing various analytical parameters. Physicochemical analysis was carried out on all three batches. Organoleptic characteristics (colour, odour, taste, touch)^[3] and physicochemical analysis such as loss on drying at 110°C, specific gravity at 25°C, viscosity, refractive index, iodine value, acid value, saponification value and rancidity tests were carried out.^[4] ST was further subjected to High Performance Thin Layer Chromatography (HPTLC) study. Powder microscopy of individual coarse powders of Panchanga of Gokshura and Aardraka was also carried out; and microphotographs were taken under the Carl-zeiss trinocular light microscope attached with camera. Both stained and unstained images were visualized.

HPTLC Profile

Instrument used was CAMAG make HPTLC with WINCATS 1.4.3 software and Linomat 5 sample applicator. The stationary phase used was HPTLC plates silica gel 60 F₂₅₄ and mobile phase was Toluene: Et. Acetate (8:2). The sample was prepared in methanol, and 2 μ l sample was applied as 8mm band for each spot. The plate was visualized under short and long ultraviolet (UV) radiations and density of the separated spots was recorded using scanner III. The plate was sprayed with vaniline-sulphuric acid reagent and observed in daylight. The R_f values were recorded. (Figure 5) HPTLC and Peak display densitogram of ST at 254 and 366 nm is placed in Figure 5 and 6.^[5]

RESULTS AND DISCUSSION

Raw herbs were authenticated and analyzed before processing because good quality products mainly depend upon genuine raw materials. External characters of Gokshura Panchanga and Aardraka are depicted in Figure 1 and 2. Organoleptic evaluation was performed at two stages of preparation viz. for coarse powders (Gokshura Panchanga and Aardraka) and finished product (ST). Observations of organoleptic analysis are tabulated in Table 2.

Results of physicochemical analysis of ST are detailed in Table 3. The material gains moisture during storage, which eventually may affect the quality of product. Here, average value of Loss on drying (LOD) was found within normal limits (2.2% w/w), which indicates prompt care taken during packaging and storage of product. Specific gravity, Viscosity and Refractive index, Iodine value, Acid value and Saponification value of all three batches showed no significant difference, which indicates uniformity and standard of manufacturing procedure followed in the pharmaceutical work. If Saponification value is more than normal range it indicates

lower molecular saturated fatty acids. Higher the iodine value, the less stable will be the oil and the more vulnerable it is to oxidation and free radical production. High iodine value oils are prone to oxidation and polymerization and the sample becomes rancid thus decreasing the shelf life of product. If acid value is more, then chances of photo-oxidation and rancidity are more. The obtained values of these tests were found within normal limits in ST, which indicate good quality of product. In addition, no rancidity was found in finished product.

Powder microscopy characters of individual coarse powders of Panchanga of Gokshura and Aardraka observed under the microscope are detailed in Figure 3 and 4.

In Panchanga of Gokshura: Border pitted vessel and simple starch grain with hilum from Root. Long simple trichome, mesocarp cells, rosette crystal, stratified lignified fibre, short simple trichomes in fruit. Anocytic cell and ciliated cells from Leaf. Pitted vessel, prismatic crystals, tannin content in stem. Spool cells, aleurone grain with oil globule were found in seed. The ingredients after mixing properly and once again the compound powder subjected to microscopy to confirm the ingredients and cross verified.

In Aardraka: Annular vessels and simple starch grains were found. No more cellular masses were observed.

Chromatographic study (HPTLC) was carried out under 254 and 366 nm UV to establish fingerprinting profile. It showed 6 of spots at 254 nm and 2 spots at 366nm and phyto-components with R_f values 0.5, 0.53, 0.61, 0.86, 0.94, 0.99 were recorded, which may be responsible for expression of its pharmacological and clinical actions. HPTLC shows that 2 spots were merging in both the long and short UV. This shows common characters in both the wavelength and it reflects presence of steroidal components in product.

Table 1: Composition of Shwadanshtradi Taila

Sr. No.	Ingredients	Part Used	Classical ratio	Quantity taken
1	Tilataila (<i>Sesamum indicum</i> Linn.)	Seed oil	1 Prastha	770 ml
2	Ksheera (cow milk)	Milk	2 Prastha	1540 ml
3	Shwadanshtra swarasa (<i>Tribulus terrestris</i> Linn.)	Panchanga*Juice	2 Prastha	1540 ml
4	Guda (Jaggery)	-	8 Pala	384 g
5	Aardraka kalka (<i>Zingiber officinale</i> Rosc.)	Tuber paste	6 Pala	288 g

*Panchanga: Five part of Gokshura viz. Fruit, Seed, Leaf, Stem and Root.

Table 2: Organoleptic analysis of ingredients and final product

Herb/Product	Part	Parameter				
		Roopa (colour)	Rasa (taste)	Gandha (odour)	Sparsha (touch)	
Raw drugs (coarse powder)	Gokshura	Fruit	Yellowish Brown	Slight bitter, mucilaginous	Slight bitter	Dry, coarse
		Seed	Creamish yellow	Slight bitter	Oily	sticky
		Leaf	Dull green	Bitter, mucilaginous	Astringent	Dry, coarse
		Stem	Yellowish green	Slight bitter	Slight bitter	Dry, coarse
		Root	Light yellowish brown	Slight bitter, mucilaginous	Slight Astringent	Dry, coarse
Finished Product	Aardraka Shwadanshtradi Taila	Tuber	Yellowish Brown	Astringent	Aromatic	Fine
		Taila	Yellowish golden	Slight Astringent taste of Aardraka	Aromatic	Oily

Table 3: Physicochemical assay of 3 batches of Shwadanshtradi Taila

Parameter	Batches			Mean
	B-1	B-2	B-3	
Loss on drying	2.2%	2.1%	2.2%	2.2%
Specific gravity at 25°C	0.91223	0.91227	0.91224	0.91225
Viscosity	0.08224	0.08546	0.08578	0.08449
Refractive index	1.472	1.477	1.475	1.474
Iodine value	52.33%	51.80%	51.46%	51.86%
Acid value	0.32514	0.33922	0.35117	0.33851
Saponification value	147.13	147.76	146.40	147.10
Rancidity	-	-	-	-

Table 4: HPTLC profile of Shwadanshtradi Taila

Under 254 nm		Under 366 nm	
No. of peaks (spots)	R _f values	No. of peaks (spots)	R _f values
06	0.5	02	0.5
	0.53		
	0.61		
	0.86		
	0.94		
	0.99		

Figure 1: External morphology of Gokshura panchanga

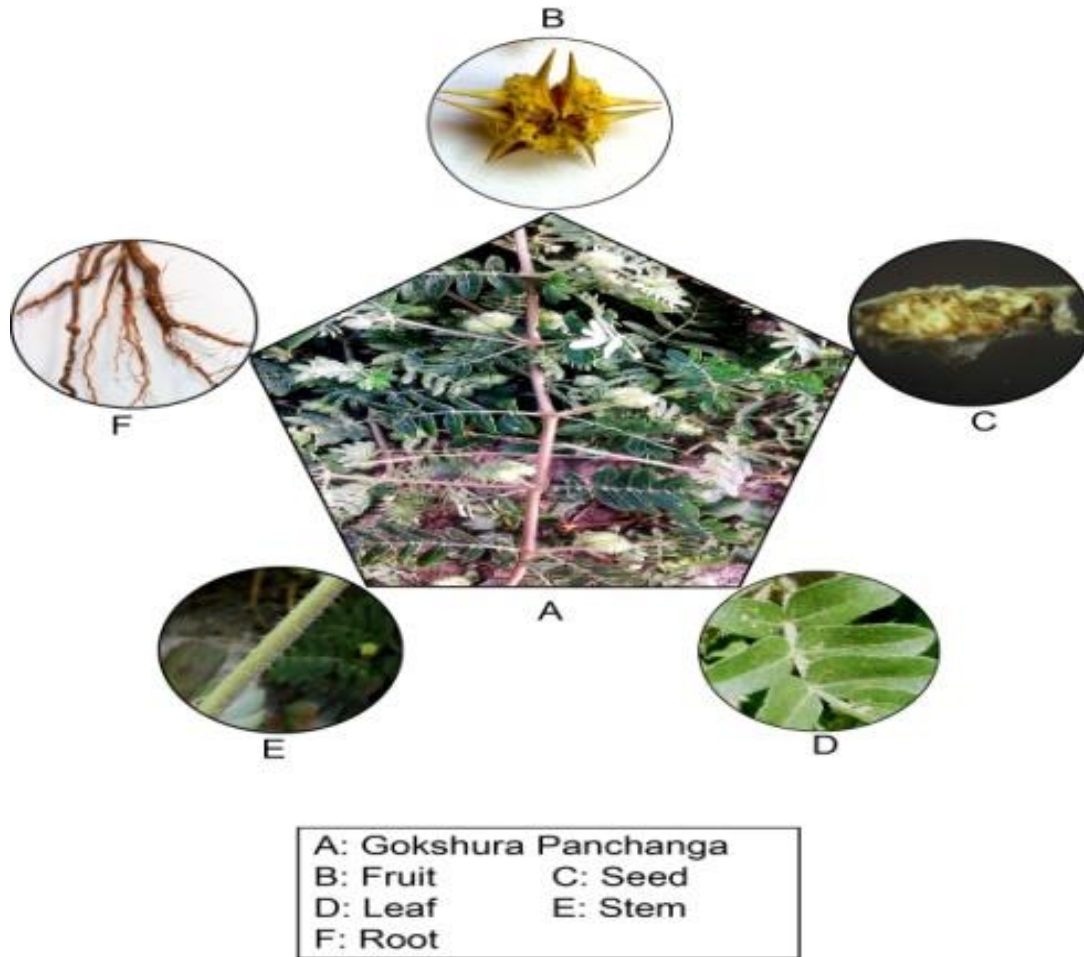
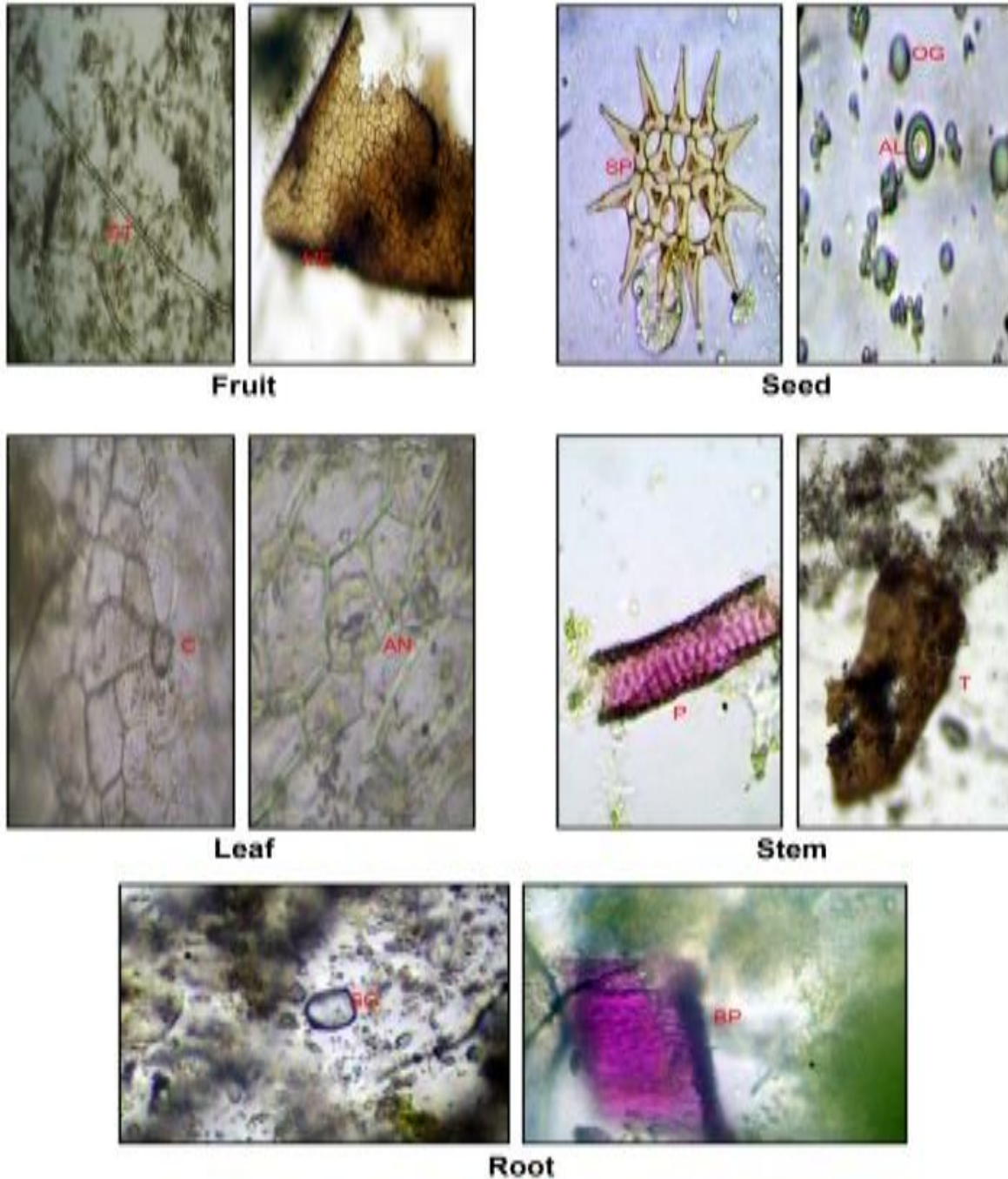


Figure 2: External morphology of Aardraka tuber



Figure 3: Microscopical characters of Gokshura panchanga



ST : long simple trichome,	ME : Mesocarp Cell,
SP : Spool Cell,	AL : Aleuron Grain,
OG : Oil Granule,	C : Cicatricial Cell,
AN : Anocytic stomata,	P : Pitted Vessel,
T : Tannin content,	SG : Simple starch grain with hilum,
BP ; Border pitted vessel	

Figure 4: Microscopical characters of Aardraka



SG : Starch Grain
AN: Annular Vessel

Figure 5: Visualisation of ST at 254, 366 nm and in daylight

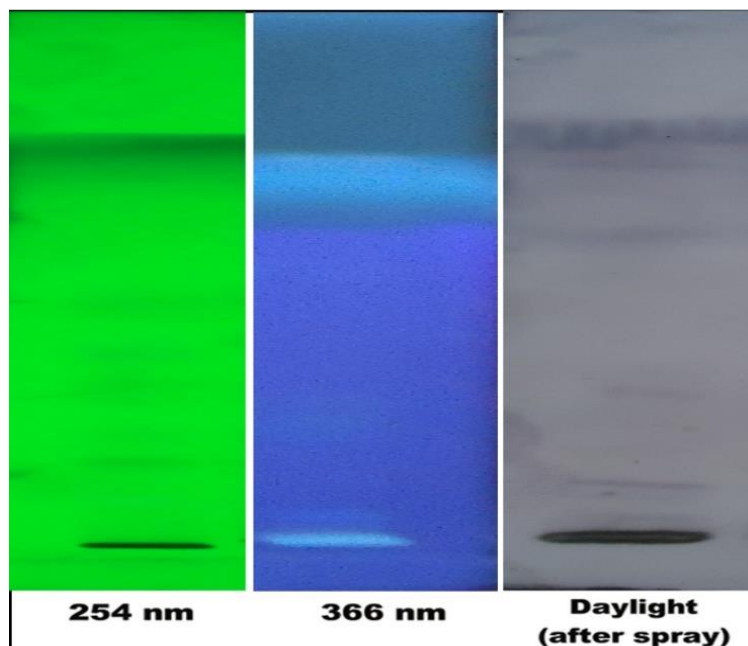
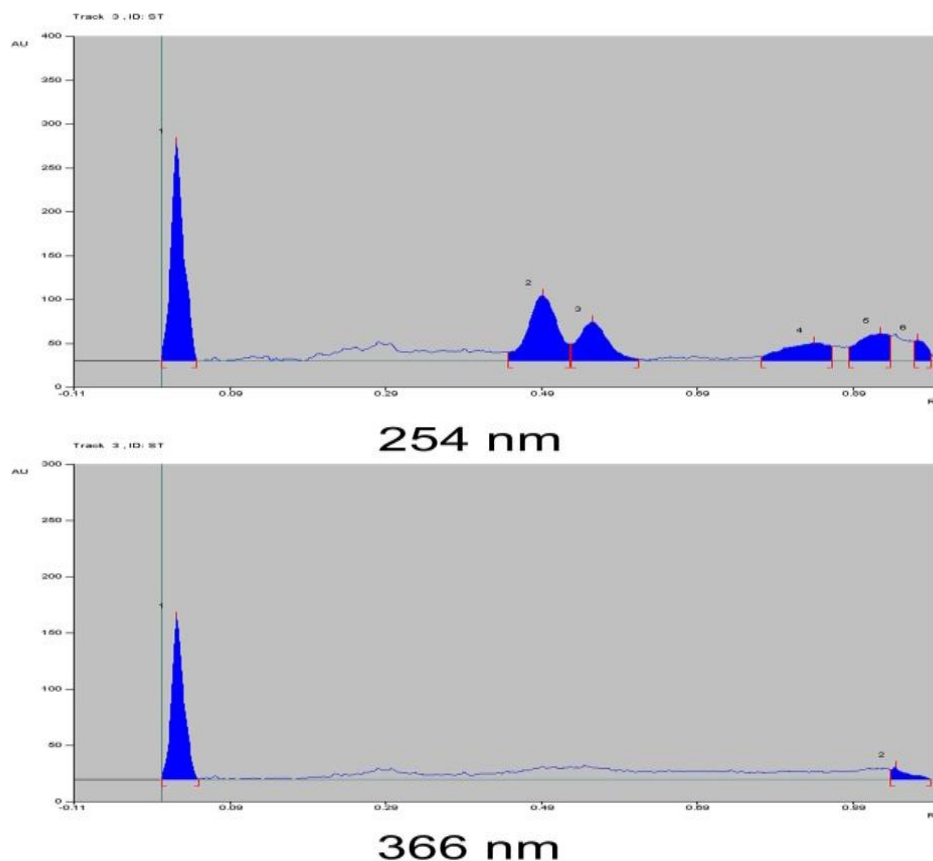


Figure 6: Peak display densitogram of ST at 254 and 366 nm



CONCLUSION

Pharmacognostical and phyto-chemical evaluation of Shwadanshtradi Taila illustrated the specific characters of ingredients which were used in the preparation. Physico-chemical profile is an essential parameter for quality assurance; in present work the obtained results were found within prescribed limits. For the first time, pharmaceutical and analytical profile of Shwadanshtradi Taila was established. On the basis of observations and experimental results, this study may be used as reference standard in the further quality control researches.

REFERENCES

1. Charaka. Charaka Samhita. Acharya YT, editor. 1st ed. Varanasi: Chaukhamba Orientalia; 2011. Chikitsa Sthana, 28/146-47. p. 802.
2. Sharangadhara. Sharangadhara Samhita. Shastri P, editor. 6th ed. Varanasi: Chaukhamba Orientalia; 2005. Madhyama Khanda, 9/6. p. 216.
3. Khandelwal KR. Practical pharmacognosy techniques and experiments. 16th ed. Pune: Nirali Prakashan; 2006. p. 149-156.
4. Anonymous. The Ayurvedic Pharmacopoeia of India, Part 1, Vol. 8. 1st ed. New Delhi: Govt. of India, Ministry of Health and Family Welfare; 1999. p. 190-222.
5. Stahl E. Thin layer chromatography a laboratory hand book. 1st ed. Berlin: Springer-Verlag; 1969. p. 124-241.

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