

# Ingredient Identification in Unani formulation Aksir-e-Riyah - A Leading Step Towards Quality Assurance

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## Abstract

Quality Assurance is the sum of the productive process/ steps performed with the objective of ensuring that products will be of quality, required as per WHO, GMP norms. Ingredient identification is a leading step to ensure the quality of herbal drugs by controlling all aspects of manufacturing process. In view of this present communication reports ingredient identification in Aksir-e-Riyah, a Unani compound formulation, which is considered as Kasir-e-Riyah (carminative) in Unani system of medicine. The drug is recommended by Unani physicians in cases of Qulanj (colic), Nafakh-e-Shikan (flatulence in the stomach) and Waj-ul-Kulya (nephralgia). All the ingredients that are required in the preparation are examined separately (both macroscopically as well as microscopically) followed by the microscopic examination of the formulation as a whole. This provides a set of diagnostic histological characters that serve a leading step in preparing a quality drug with maximum therapeutic potential and hence beneficial for the mankind.

**Keywords:** Ingredient identification, Quality assurance, Unani formulation.

## Introduction

The prime objective of anyone, working in a herbal industry, is to ensure that products are constantly manufactured to quality, appropriate to their intended use and at the lowest possible cost. The attitude of general public towards quality is vastly different from what it was few years ago. There seems to be feeling that all marketed items are completely safe and are of good quality. Virtually every country in the world is conscious for herbal drugs, that is why quality is the main criterion of product license application.

Early attempt to control the quality of products were by the end product testing i.e. quality control approach. The pharmaceutical industry lead the change from quality control to quality assurance approach. Quality assurance is the sum of the production process/ steps performed with the object of ensuring that products will be of quality, required as per WHO, GMP norms. Ingredient identification is a leading step to ensure the quality of a herbal drug by controlling all aspects of manufacturing process. In view of this present communication reports ingredient identification in Aksir-e-Riyah, a Unani compound formulation, which is considered as Kasir-e-Riyah (carminative) in Unani system of medicine and is recommended by the Unani physicians in case of Qulanj (colic), Nafakh-e-Shikan (flatulence in the stomach) and Waj-ul-Kulya (nephralgia) (Kirtikar and Basu, 1988; Nadkarni,

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1986). All the ingredients that are required in the preparation are examined separately (both macroscopically as well as microscopically) followed by the microscopic examination of the formulation as a whole (Johansen, 1940; Trease and Evans, 1983). This will provide a set of diagnostic histological characters that serves a leading step in preparing a quality drug with maximum therapeutic potential and hence beneficial for the mankind.

## Methodology

All the ingredients were procured from the local raw drug dealers, New Delhi. Each ingredient was authenticated (by examining both macroscopically and microscopically) and powdered separately. Aksir-e-Riyah was prepared as per formulation composition (Anonymous, 2007; Kirtikar and Basu, 1988; Nadkarni, 1986).

Formulation Composition:

S.No.	Ingredients	Scientific Name	Part used	Quantity
1.	Hilteet khalis	<i>Ferula foetida</i> Regel	Oleo-resin	8 kg.
2.	Kafoor khalis	<i>Cinnamomum camphora</i> Nees & Bem	Crystal	8 kg.
3.	Zanjabeel	<i>Zingiber officinale</i> Rosc	Rhizome	16 kg.
4.	Ajwayin khursani	<i>Hyoscyamus niger</i> Linn.	Seed	16 kg.
5.	Filfil siyah	<i>Piper nigrum</i> Linn.	Berries	16 kg.
6.	Gul-e-Aak	<i>Calotropis procera</i> (Ait.) R. Br.	Flower	16 kg.
7.	Zarambad	<i>Hedychium spicatum</i> Ham ex. Smith	Rhizome	16 kg.
8.	Soda khurdani	Sodium bicarbonate	Powder	24 kg.
9.	Namak siyah	Black salt	Crystal	16 kg.
10.	Namak-e-Turb	<i>Raphanus sativus</i> Linn.	Powder	16 kg.
11.	Naushadar	Ammonium chloride	Crystal	16 kg.

## Observations

### Ingredients

#### 1. Hilteet Khalis

Part used: Oleo resin

Macroscopy: rounded, flattened or masses of agglutinated tears, grayish whit to dull yellow, approx. 12 – 25 mm. in diameter, opaque, odour – characteristic, strong; taste -bitter and acrid.

#### 2. Zanjabeel (*Zingiber officinale* Rosc.)

Part used: Rhizome

Macroscopy: Rhizome irregularly branched (sympodial), laterally compressed, different sizes, externally pale yellowish-buff, longitudinally striate, ends of branches with depressed stem scars, fracture short, mealy, uneven with projecting fibres, odour agreeably aromatic with characteristic pungent taste.

Microscopy: A cross section of rhizome shows:

Phellem or outer cork few layered, dark brown, irregular parenchyma cells.

Phellogen or inner cork few layered, colourless parenchyma cells, radially arranged in regular rows.

Phelloderm or cortex several layered, thin walled, round- polygonal, parenchyma cells with intercellular spaces containing abundant starch grains which are mostly simple, fairly large, flattened, oblong or sub-rectangular to oval or sac shaped with terminal beak like projection in which eccentric hilum is situated. Numerous oleo- resin cells and vascular bundles present.

Endodermis single layered with radial walls thickened, starch grains absent.

Stele broad central zone, thin walled, round- polygonal, parenchyma cells with intercellular spaces (same as cortex) just inside the endodermis i.e. to the periphery of the ground tissue a ring or narrow zone of vascular bundle present. Scattered irregularly throughout the remainder of the stele are larger, closed, collateral, fibro-vascular bundles.

#### 3. Ajwayin khursani (*Hyosyamus niger* Linn.)

Part used: Seed

Macroscopy: Dark grey seeds, approx. 1mm, reniform or sub-quadrate; odour – pleasantly aromatic; taste – pungent, bitter and mucilaginous.

Microscopy: T.S. of seed shows that testa consists of an outer layer of osteosclereids covered by thick cuticle; inner layer consists of crushed parenchyma cells; endosperm thin walled parenchymatous containing aleurone grains and oil globules.

#### 4. Filfil siyah (*Piper nigrum* Linn.)

Part used: Berries

Macroscopy: Fruits globular, hard, dark brown to black, 3- 5mm. in diameter with a characteristic coat of deep set wrinkles; odour aromatic, taste pungent.

Microscopy: T.S. of fruit shows:

Epicarp: Single layered epidermis covered by cuticle; epidermal cells polygonal (tabular) containing dark brown- blackish content followed by 2- 3 layers of thin walled parenchyma cells intermingled with thick walled isodiametric to radially elongated lignified stone cells.

Mesocarp: Broad zone of tangentially elongated parenchyma cells having larger secretion sacs with sub-erised walls and oil or resin contents. Cells in the inner mesocarpic region are compressed having few fibro vascular bundles.

Endocarp: Single row of beaker shaped stone cells (cells whose radial and inner walls are more strongly lignified than the outer ones).

Testa: Single layer of yellow coloured cells.

Perisperm: Broad zone of thin walled, radially elongated parenchyma cells filled with abundant starch grains, aleurone grains, oleoresin cells containing oil globules and masses of resin.

#### 5. Gul-e-Aak (*Calotropis procera* (Ait.) Bru.)

Part used: Flower

Macroscopy: Pentamerous flower, calyx divided to the base, sepal ovate, acute, glabrous, corolla whitish outside and violet inside, lobes of corona compressed equaling the staminal column, stigma fused with androceium forming gynostagium, all pollen grains of each lobe aggregate together to form pollinium with a stalk called caudicle and sticky base called disc of corpusculum.

Microscopy: T.S. of pedicle shows single layered epidermis covered by cuticle, trichomes present; cortex several layered, parenchymatous having abundant branchy sclereids of varying size, vascular bundle present at the centre.

Cross section of sepal and petal shows an upper and lower epidermis having numerous hairs and several layers of thin walled parenchyma cells in between. Cells of petals contain violet pigments.

Carpel shows bicarpellary ovary containing numerous ovules.

#### 6. Zarambad (*Hedychium spicatum* Ham. ex Smith.)

Part used: Rhizome

Macroscopy: Rhizome dry, dark brown, various sizes showing rudiments of root-lets, surface marked with numerous scars and circular rings, taste bitter, odour camphoraceous.

Microscopy: T.S. of rhizome shows: -

Phellem or outer cork few layered, dark brown, irregular parenchyma cells.

Phellogen or inner cork few layered, light brown parenchyma cells, radially arranged in regular rows.

Phelloderm or cortex several layered, thin walled, round- polygonal, parenchyma cells with intercellular spaces containing abundant starch grains which are mostly simple, oval – oblong. Numerous oleo-resin cells filled with greenish yellow oil globules.

Endodermis consisting of single layered, parenchymatous.

Vascular bundles closed, collateral, scattered irregularly throughout the ground tissue.

Test Sample (Formulation):

Microscopic examination of Aksir-e-Riyah shows following components of diagnostic characteristics: -

Epidermal cells: Fragments of epidermal cells in surface view showing stomata and non-glandular, unicellular trichomes.

Fibers: Pieces of fibres of different size, present either single or associated with vessels.

Palisade cells: Fragment of testa showing columnar palisade cells.

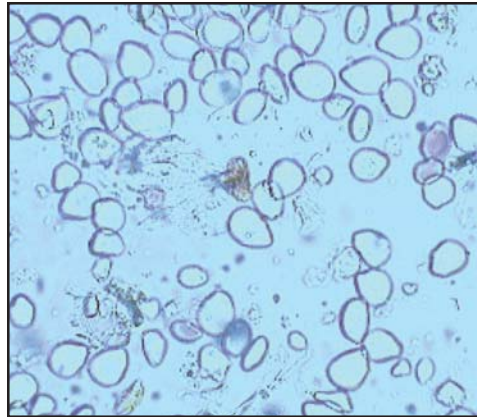
Parenchyma cells: Numerous, different size and shape, present either single or in groups, mostly filled with starch grains, some contains oil globules.

Starch grains: Abundant, present either scattered or within the parenchyma cells, various size and shape, some are simple, fairly large, flattened, oblong with a small pointed hilum situated at the narrower end, some are irregularly ovoid – ellipsoidal, showing tuberosities,

Stone cells: Present either single or in groups, nearly isodiametric.

Trichomes: Unicellular, non glandular, unseptate.

## Histological Studies of Ingredients of Aksir-e-Riyah



**Fig. 1** x40 Starch grains of Zanjabeel



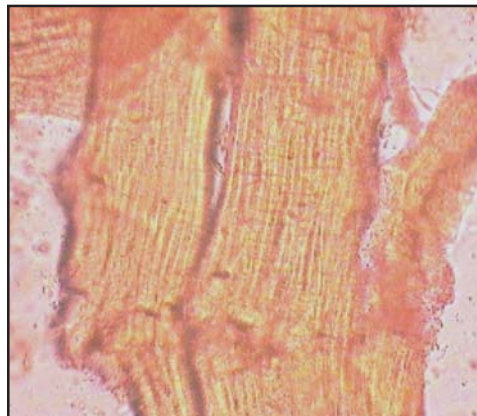
**Fig. 2** x40 Fibre of Zanjabeel



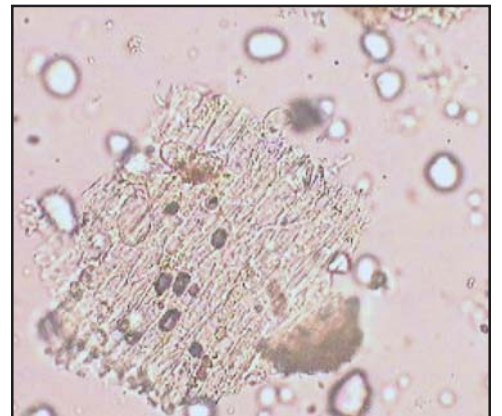
**Fig. 3** x40 Piece of vessel showing reticulate thickening of Zanjabeel



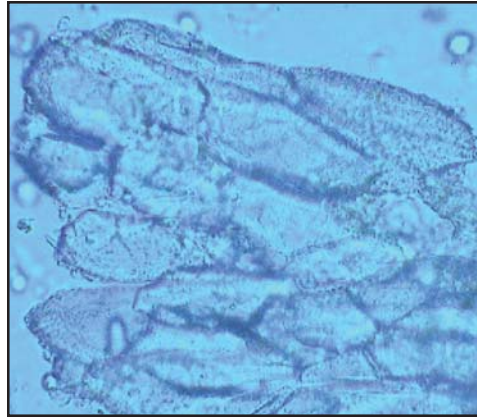
**Fig. 4** x100 Vascular elements of Zanjabeel



**Fig. 5** x40 Fragment of testa of Ajwayin khurasani



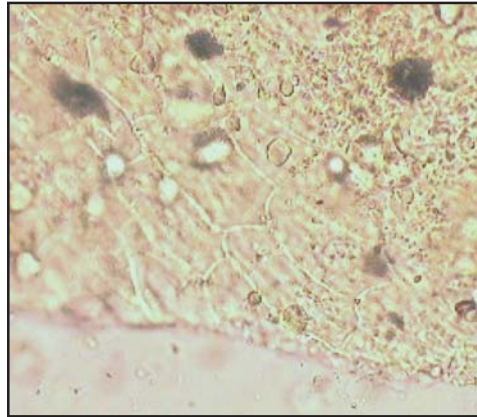
**Fig. 6** x40 Parenchyma cells of Ajwayin khurasani



**Fig. 7** x40 Parenchyma cells filled with starch grains of Filfil Siyah



**Fig. 8** x40 Sclereid of Filfil Siyah



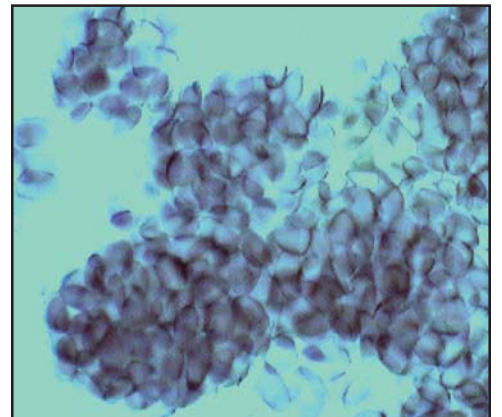
**Fig. 9** x40 Epidermal cells of Gul-e-Aak



**Fig.10** x40 Trichome of Gul-e-Aak



**Fig.11** x40 Epidermal cell showing stomata in Gul-e-Aak



**Fig. 12** x40 Parenchyma cells filled with starch grains in Zarambad

## Results and Conclusion

Aksir-e-Riyah is yellowish brown powder with salty taste and pungent odour. On the basis of above mentioned histological characters, presence of following ingredients was established in Aksir-e-Riyah: -

- Abundant starch granules which are simple, fairly large, flattened, oblong with a small pointed hilum situated at the narrower end, pieces of fibres either single or found associated with vessels, pieces of vessels which are reticulately thickened (Zanjabeel) - fig. 1-4.
- Fragment of testa showing columnar palisade cells, thin walled parenchyma cells containing oil globules (Ajwayin khursani) fig. 5,6.
- isodiametric stone cells and parenchyma cells filled with abundant minute starch grains
- (Filfil siyh) fig. 7,8.
- fragment of epidermal cells showing stomata and non glandular, unicellular trichomes
- (Gul-e-Aak) fig. 9-11
- parenchyma cells filled with numerous starch granules which are single, irregularly ovoid-ellipsoidal, occasionally showing tuberosities (Zarambad) fig. 12.

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## References

- Anonymous, 2007. National Formulary of Unani Medicine, Part VI, Vol. I. Department of AYUSH, Ministry of Health & Family Welfare, Government of India.
- Johansen, D.A., 1940. Plant Micro-techniques. Mc. Grew Hill Book Company, New York.
- Kirtikar, K.R. and Basu, B.D., 1988. Indian Medicinal Plants, Vol. I-IV. Periodical Experts Book Agency D-42, Vivek Vihar, Delhi – 32.
- Nadkarni, A.K., 1986. Indian Materia Medica, Vol. I. Popular Prakashan, Bombay.
- Trease and Evans, W.C., 1983. Pharmacognosy, 12<sup>th</sup> Ed. Bailliere Tindall, London.

