COMPARATIVE STUDIES AND QUALITY EVALUATION OF SOME IMPORTANT UNANI HERBAL DRUGS

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ABSTRACT
Six Unani herbal drugs, viz Darchini (Cinnamomum zeylenicum), Qaranful (Syzygium aromaticum), Ispand (Peganum harmala), Jaiphal/ Jauzbuwa (Myristica fragrans), Kunjad siyah (Sisamum indicum), Javitri/ Bisbasa (Myristica fragrans) were evaluated to access their quality in respect of identity, purity and strength. Evaluation is based on specific parameters and limits developed by standardizing authentic samples of drugs. For the purpose, the parameters studied includes macro and micro-morphological characteristics, Powder studies, Histochemical tests, Micro-chemical tests, physico-chemical constants, chromatographic profile and therapeutic uses.

KEY WORDS: Unani Herbal drug, quality assessment, evaluation, chromatographic profile.

INTRODUCTION
Six Unani herbal drugs, viz Darchini (Cinnamomum zeylenicum), Qaranful (Syzygium aromaticum), Ispand (Peganum harmala), Jaiphal/ Jauzbuwa (Myristica fragrans), Kunjad siyah (Sisamum indicum), Javitri/ Bisbasa (Myristica fragrans) were studied comparatively for their macro and micro-morphologically, powder study, histochemical, micro-chemical, Physico-chemical studies, TLC and their therapeutic uses.

These drugs are used for the treatment of different diseases: Darchini- Oral sepsis, White patch on skin, Sexual disability etc., Qaranful- Tooth ache, Weakness in stomach, Hepatitis, Dypepsia. etc, Ispand- Asthma, Rheumatism, Hysteria, Sciatica etc., Jaiphal- Sexual disability, Stomatitis, Facial paralysis. etc., Kunjad siyah- Polyurea, bed- wetting in children. etc., Javitri- Sexual disability, Facial paralysis, flatulence in stomach etc.

MATERIALS AND METHODS
The samples were resourced from Delhi and Ghaziabad market. All the ingredients were identified by Botanist using pharmacopoeial standards. Parameters of the drug were carried out according UPI.
**OBSERVATION AND RESULTS**

**MACRO MORPHOLOGICAL FEATURES** (Fig-1):

**Darchini:** (*Cinnamomum zeylenicum*) (Fig-1A)

Bark pieces about 0.5 mm thick, brittle, closely packed compound quills, up to a meter or more in length and up to 1 cm in diameter; outer surface dark brown, marked with pale wavy longitudinal lines with small scars; inner surface light brown in colour, odour fragrant; taste- sweet, aromatic with sensation of warmth.
Fig-3A. Darchini powder showing scleried 40 x

**Qaranful** (*Syzygium aromaticum*) (Fig-1B)

10-15 mm long, have a strong fragrant and spicy odor and a pungent aromatic taste. The stalk of clove consists of a cylindrical hypanthium above which is bilocular ovary, containing numerous ovules attached to axile placentae. The ‘Head’ consists of four slightly projecting calyx, four membranous imbricated petals and numerous incurred stamens surrounding a large style.
The seeds are triangular, ovoid, dull brown in color, up to 4 mm long and 1-2 mm broad, difficult to crack with hand but brittle. Taste very bitter with a heavy narcotic odor when crushed.
Fig-3C .Ispand powder shows pieces of seed coat 10 x

Fig-3C.Ispand powder showing endosperm cells with oil droplets 10 x

**Jaiphal** (*Myristica fragrans*) (Fig-1D)
Ellipsoid or ovoid, 20-30 mm long and about 20 mm broad; externally brown sometimes marked with small irregular dark brown patches or minutes dark points and lines slightly furrowed reticulately; a small light-colored area at one end indicating the position of radical; a groove running along the perisperm with infoldings appearing as dark ruminations in the abundant grayish brown endosperm; embryo, in an irregular cavity, small with two widely spreading crumpled cotyledons and a small radicle; odor - strong and aromatic; taste - pungent and aromatic.

Fig-1D .Jaiphal

Fig-2D .Jaiphal T. S. shows cells of perisperm and endosperm 10 x

Fig-2D .Jaiphal L. S.4 x

Fig-3D .Jaiphal powder showing starch grains  40 x

**Kunjad siyah** (*Sisamum indicum*) (Fig-1E)
The seeds are small 2-3 mm long, 1.5 mm wide and 1 mm thick black ovoid laterally compressed. One end is broad which tapers towards the hilum; the seeds are highly oily in nature, albuminous with longitudinal ridges. The seed coat is simple, thin and black; seeds are sweet in taste.

Fig-1E .KunjadSiyah
Javitri/ Bisbasa (*Myristica fragrans*) (Fig. 2F)

It consists of reddish pieces, about 2-4 cm size; they are flat, smooth, irregularly slit, slightly flexible or brittle, some what translucent; they are rich in oil so exude reddish or orange oily colored when pressed; it bears odor and taste.

Darchini: (*Cinnamomum zeylenicum*): (FIG-2A) T.S. shows following characteristics:

- Periclyclic sclarenchyma, 3-4 rows of isodiametric cells, containing starch grains; small group of fibres embedded in sclarenchyma
- Phloem a broad zone having medullary rays and containing starch and calcium oxalate crystals. Phloem fibres are very thick walled and up to 30 µm in diameter. Secreting cells containing volatile oil and mucilage.

Qaranful (*Syzygium aromaticum*): (FIG-2B) T. S. shows following characteristics:

- Hypanthium is covered with cuticularised epidermis. Beneath the epidermis, three layers of schizolysigenous oil glands are present, they are ellipsoidal in shape. Clusters of crystals of Calcium oxalate are distributed in the tissue adjoining the oil glands and prismatic crystals are present in stalk. Inner region made of loosely arranged arehychyma; stamens, each with an oil gland in the apex of connective. Pollen grains triangular in shape and size (15-20µ) in diameter.

Ispand (*Peganum harmala*): (FIG-2C) T. S. shows following characteristics:

- Outer epidermis consisting large cells; these cells are rectangular in shape. Inner epidermis consists of palisade layer containing a yellowish brown content. Cells of endosperm have abundant rounded to oval aleurone grains. Outer layer of cotyledon in T. S. shows single layer of rectangular cells. The cortical region of cotyledon is composed of a layer of radially elongated
cells. The ground cells are parenchymatous. Pith containing small parenchymatous cells arranged with intercellular spaces, all cells contain aleurone grains.

**Jaiphal (Myristica fragrans):** (FIG-2D) T.S. shows following characteristics:
Perisperm comprises three distinct zones: a) single layer of longitudinally elongated fibers. b) Middle zone consists of several layers of flattened cells with pigment and crystals. c) Inner zone is made up of vascular tissue, cells with pigment and large oleoresin cells. Pigment is reddish-brown in color. Vascular strand shows mainly lignified spiral vessels. Endosperm parenchymatous in nature, cells containing oil, large aleurone grains and rounded starch grains. Size of starch grains is 5-20µ in diameter.

**Kunjad siyah (Sisamum indicum):** (FIG-2E) T.S. shows following characteristics:
One cell thick epidermis, with thick walled cells, of seed coat comprises radially elongated palisade cells. These cells contain large cup shaped crystals of Calcium oxalate. The radial walls are wavy and thicker. Rest of testa containing 2-3 layers of crushed cells. Endosperm and cotyledons are made up of usual polygonal parenchymatous cells containing oil globules and aleurone grains. Two cotyledons having palisade like cells, while the remaining cells are iso-diametric in shape.

**Javitri/ Bisbasa (Myristica fragrans):** (FIG-2F) T.S. shows following characteristics:
Outer epidermis of tangentially elongated cells with thick walls and very thick outer cuticle. Parenchyma of thin walled cells containing numerous granules of various shapes. Large oil cells are scattered among parenchyma cells. Two kinds of secretion sacs will be observed. One being rounded containing yellowish oil and another adjacent to tracheae and narrowly elongated with yellowish brown content.

**POWDER STUDY (FIG-3)**
**Darchini:** (FIG-3A) (Cinnamomum zeylenicum):
- Fibers
- Sclerieds (Pitted)
- Starch grains.
**Qaranful (FIG-3B) (Syzygium aromaticum):**
- Pollen grains triangular in shape
- Sclerieds having large lumen
- Oil Cavities
- Epidermis of hypenthium.
- Vessels, crystals.
**Ispand (FIG-3C) (Peganum harmala):**
- Broken pieces of seed coat (Hexagonal).
- Aleurone grains.
- Endosperm cells with oil droplets.
**Jaiphal/ jauzbuwa (Myristica fragrans):**
- Starch grains- Simple and compound type.
**Kunjad siyah (Sisamum indicum):**
- Seeds triangular in shape.
- Creamish white in color.
- When preserved in filter paper shows its oily nature
**Javitri/ bisbasa (Myristica fragrans):**
- Secretion sacs containing yellow oil cells.

**HISTOCHEMICAL TESTS**
**Darchini (Cinnamomum zeylenicum):**
- **Starch:** Gives a blue color reaction with iodine
- **Calcium oxalate Crystals:** The test shows the presence of calcium oxalate in the few cells.
- **Oil:** Red stained cells were observed showing the presence of oil globules when treated with Sudan III.

**Qaranful (Syzygium aromaticum):**
- **Starch:** Gives a blue color reaction with iodine
- **Calcium oxalate Crystals:** The test shows the presence of calcium oxalate in the few cells.
- **Oil:** Abundant cells containing oil globules are present which appear red with Sudan III.

**Ispand (Peganum harmala):**
- **Starch:** Gives a blue color reaction with iodine
- **Tannin:** Section treated with FeCl₃ reveals blue color.
- **Aleurone grains:** The appearance of yellow color shows the presence of aleurone grains.

**Jaiphal/ jauzbuwa (Myristica fragrans):**
- **Starch:** Gives a blue color reaction with iodine
- **Tannin:** Section treated with FeCl₃ shows blue color which marks the presence of tannins.

**Kunjad siyah (Sisamum indicum):**
- **Calcium oxalate Crystals:** The test shows the presence of calcium oxalate in the few cells.
- **Oil:** Red stained cells were observed showing the presence of oil globules when treated with Sudan III.
- **Aleurone grains:** The appearance of yellow color shows the presence of aleurone grains.

**Jaiphal/ jauzbuwa (Myristica fragrans):**
- **Oil:** Red stained cells were observed showing the presence of oil globules when treated with Sudan III.
**MICRO CHEMICAL TESTS:**

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>Acid/chemical Reagent</th>
<th>Darchini: (Cinnamomum zeylenicum)</th>
<th>Qaranful (Syzygium aromaticum)</th>
<th>Ispand (Peganum harmala)</th>
<th>Jaiphal/Jauzbuwa (Myristica fragrans)</th>
<th>Kunjad siyah (Sisamum indicum)</th>
<th>Javitri/Bisbasa (Myristica fragrans)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Conc. Sulphuric Acid</td>
<td>Black</td>
<td>Blackish brown</td>
<td>Black</td>
<td>No change</td>
<td>Niether colour change nor any effervescence</td>
<td>A coffee colour appears</td>
</tr>
<tr>
<td>2.</td>
<td>Conc. Hydrochloric Acid</td>
<td>Coffee brown</td>
<td>Brownish black</td>
<td>No change</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Conc. Nitric Acid</td>
<td>Orange</td>
<td>Dark brown</td>
<td>Yellowish brown</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Glacial Acetic Acid</td>
<td>Red</td>
<td>No change</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Picric Acid</td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>Iodine Solution</td>
<td>Bluish black</td>
<td>Bluish black</td>
<td>Orange yellow</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7.</td>
<td>Ferric chloride Solution (aq.)</td>
<td>Bluish green</td>
<td>Dark brown</td>
<td>No change in color</td>
<td>No change</td>
<td>No change</td>
<td>No change</td>
</tr>
<tr>
<td>8.</td>
<td>Sodium hydroxide Solution (5%)</td>
<td>Dark brown &amp; reaction with fumes</td>
<td>No change</td>
<td>Light brown</td>
<td>Chocolate color</td>
<td>No change in color</td>
<td>Brick red color</td>
</tr>
<tr>
<td>9.</td>
<td>Potassium hydroxide Solution (5%)</td>
<td>Dark brown &amp; reaction with fumes</td>
<td>No change</td>
<td>Light green</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10.</td>
<td>Powder as such</td>
<td>Reddish brown</td>
<td>Brown</td>
<td>Coffee Color</td>
<td>Emulsion formed</td>
<td>Emulsion formed</td>
<td>Emulsion formed</td>
</tr>
</tbody>
</table>

**PHYSICOCHEMICAL TEST:**

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Parameter</th>
<th>Darchini: (Cinnamomum zeylenicum)</th>
<th>Qaranful (Syzygium aromaticum)</th>
<th>Ispand (Peganum harmala)</th>
<th>Jaiphal/Jauzbuwa (Myristica fragrans)</th>
<th>Kunjad siyah (Sisamum indicum)</th>
<th>Javitri/Bisbasa (Myristica fragrans)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ash value (%)</td>
<td>Not more than 3</td>
<td>Not more than 7</td>
<td>Not more than 7</td>
<td>1.69</td>
<td>8.70</td>
<td>Not more than 3</td>
</tr>
<tr>
<td>2.</td>
<td>Acid insoluble Ash(%)</td>
<td>Not more than 2</td>
<td>Not more than 0.75</td>
<td>Not more than 2</td>
<td>Nil</td>
<td>0.12</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Alcohol soluble Ash(%)</td>
<td>Not more than 2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Water soluble Ash(%)</td>
<td>Not more than 3</td>
<td>-</td>
<td>-</td>
<td>0.51</td>
<td>.83</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Volatile oil (%)</td>
<td>Not more than 1</td>
<td>Not more than 15</td>
<td>11.1</td>
<td>6-16</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>Nonvolatile extractive(%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Not less than 25</td>
<td>-</td>
<td>Not less than 20</td>
</tr>
<tr>
<td>7.</td>
<td>Alcohol soluble extractive (%)</td>
<td>-</td>
<td>Not less than 3</td>
<td>Not less than 9</td>
<td>-</td>
<td>40.6</td>
<td>-</td>
</tr>
<tr>
<td>8.</td>
<td>Water soluble extractive (%)</td>
<td>-</td>
<td>Not less than 9</td>
<td>Not less than 19</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
THERAPEUTIC USES:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Common Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darchini</td>
<td>(Cinnamomum zeylenicum)</td>
</tr>
<tr>
<td>Qaranful</td>
<td>(Syzygium aromaticum)</td>
</tr>
<tr>
<td>Ispand</td>
<td>(Peganum harmala)</td>
</tr>
<tr>
<td>Jaiphal/ Jauzbuwa</td>
<td>(Myristica fragrans)</td>
</tr>
<tr>
<td>Kunjad siyah</td>
<td>(Sisamum indicum)</td>
</tr>
<tr>
<td>Javitri/ Bisbasa</td>
<td>(Meristic fragrans)</td>
</tr>
<tr>
<td>Bekhr-ul-Fam</td>
<td>(Oral sepsis), Bahaq (White patch on skin)</td>
</tr>
<tr>
<td>Zof-e-Bah</td>
<td>(Sexual disability), Zeeqin Nafas (Asthma), Sue Hazm (Dypesia), Nafkh-e-Sikam Qalanj (Colic), Zeeqin Nafas (Asthma), Fawaq (Hiccough), Waj-ul-Mafasil (Rheumatism), Ikhtinaqr-e-Rahern (Hysteria), Iq-un-Nisha (Sciatrica), Istimq (Dropsy), Falij (Hemilpegia), Zof-e-Bah (Sexual disability).</td>
</tr>
<tr>
<td>Zof-e-Bah</td>
<td>(Sexual disability), Qula (Stomatitis), Faliz (Hemilpegia), Laqwa (Facial paralysis), Zof-e-Basarat (Astheniopia), Nafkh-e-Shikam (Flatulence in stomach).</td>
</tr>
<tr>
<td>Kasrat-e-Baul</td>
<td>(Polyurea), Zof-e-Kuliya Wa Masana (Weakness in kidney), Bauffilfarah (Bed wetting in children).</td>
</tr>
<tr>
<td>Zof-e-Bah</td>
<td>(Sexual disability), Qula (Stomatitis), Faliz (Hemilpegia), Laqwa (Facial paralysis), Zof-e-Basarat (Astheniopia), Nafkh-e-Shikam (Flatulence in stomach).</td>
</tr>
</tbody>
</table>

**THIN LAYER CHROMATOGRAPHY** (Fig-4):

5 g powdered drug was extracted in 60 ml of absolute alcohol under reflux on water bath for 10 min. Filtered and concentrated the filtrate up to 4 ml. The extract obtained was applied on a pre-coated silica gel plate and developed in Toluene: ethyl acetate (70:30) system in developing chamber. The plate was dried and sprayed with Vanillin Sulphuric acid reagent and again the plate was dried and kept in an oven for heating at 105°C for 10 minutes, Rf values of the spots are:

<table>
<thead>
<tr>
<th>DRUG</th>
<th>RF VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darchini</td>
<td>0.14 (light violet), 0.50 (violet), 0.66 (light pink), 0.75 (brown), 0.82 (brown).</td>
</tr>
<tr>
<td>Qaranful</td>
<td>0.55 (violet), 0.66 &amp; 0.74 (light pink).</td>
</tr>
<tr>
<td>Ispand</td>
<td>0.48 &amp; 0.53 (light violet).</td>
</tr>
<tr>
<td>Jaiphal</td>
<td>0.27 (light pink), 0.36 (light violet), 0.54 (light violet), 0.71 (light pink), 0.90 (light pink).</td>
</tr>
<tr>
<td>Kunjad siyah</td>
<td>0.49(l. pink.),0.56(grey),0.62(light violet.),0.76(brown)</td>
</tr>
<tr>
<td>Javitri</td>
<td>0.14 (light violet), 0.50 (violet), 0.66 (light pink), 0.76 &amp; 0.82 (brown).</td>
</tr>
</tbody>
</table>

**HPTLC Profile:**

![HPTLC Profile Image](image-url)
CONCLUSION

Authentication of ingredients by Macroscopy, Microscopy, Powder study along with physico-chemical parameter, microchemical Tests followed by HPTLC Profile demonstrates the genuineness and purity of the drugs that may helping ensuring the quality of the medicine as well.

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REFERENCES