



Review Article

CONCEPTUAL AND LITERARY ANALYSIS ON *BHURJAH (BETULA UTILIS D. DON)*

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ABSTRACT

**Aim:** To review comprehensive literature on *Bhurjah (Betula utilis D. Don)* w.s.r. to its therapeutic activity. **Background:** *Bhurjah (Betula utilis D. Don)* is a very ancient traditional medicine, commonly known as *Bhojpatra* in Hindi and Himalayan birch in English. Bark of *Betula utilis* was used in ancient times for writing Sanskrit literature and texts. Ancient sages used *Bhojpatra* to write down manuscripts and those literature remains unaffected by microbes, environmental and biological factors. From immemorial time *Bhurjah* has been used in *Yagya karma* by the sages. **Material And Methods:** The literature review was compiled from distinctive available Ayurvedic literatures and various published literature relevant to *Bhurjah*. **Conclusion:** *Bhurjah* widely used in Ayurvedic system of medicine in the treatment of various diseases like *Kustha* (various skin diseases), *Karnashoola* (otalgia), *Visarpa* (erysipelas), *Medovishahara* (anti-obesity and anti-toxic), *Vranashodhana* (wound purification) and *Tridoshashamana (Vata, Pitta, Kapha)* alleviation). It has studied for various therapeutic activities like, anti-microbial activity, anti-oxidant activity, anti-inflammatory activity, mild anti hyperglycemic activity, anticancer activity, anti-HIV activity. An effort has been done to explore the evidence based pharmacological activities of *Bhurjah*.

INTRODUCTION

Worldwide, about 85% of the traditional medicines used for prime healthcare which is derived from plants. India has got 10th position among the plant rich countries of the world and 4th position among the Asian countries. World Health Organization has listed 21,000 plant species used around the world for remedy purposes. In India, about 2,500 plant species which belonging to more than 1000 genera are being used in Indigenous systems of Medicine.<sup>[1]</sup>

In era of Covid 19 pandemic traditional medicines, herbal medicines regain its popularity among individuals because of its proven efficacy as preventive and immunomodulator effect.

WHO with collaboration of the Govt. of India established Global Centre of Traditional Medicine

(GCTM) in Jamnagar, Gujarat aiming its solid evidence based policies and optimize the contribution of traditional medicine to global health and sustainable development. Extensive evidence-based exploration of medicinal plants and Ayurvedic medicines with its therapeutic activities is needed. Covid 19 pandemic, which may be related to *Janpaddhwamsha*, it is mentioned in Ayurvedic literature, that *Dhupana karma*, *Yagya karma* should be performed in *janpadodhwamsha* for protection from infection and cleaning of polluted environment. From immemorial time *Bhurjah* has been used in *Yagya karma* by the sages. About 200-250 years ago, the literature were written on *Bhojpatra* in Kashmir. It was used for writing as a substitute of paper and for lining the roof in houses to make them watertight in Kashmir and other hilly areas.<sup>[2]</sup> *Betula*, a genus of ornamental trees and shrubs, commonly known as Birch, widely distributed in the temperate regions of northern hemisphere. *Betula alnoides*, *Betula cylindrostachys*, *Betula utilis* species are reported in India.<sup>[3]</sup>

MATERIALS AND METHODS

The literature review was compiled from distinctive available Ayurvedic compendium such as

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Samhitas (*Charaka Samhita, Sushruta Samhita, Astanga Hridaya, Astanga Sangraha, Harit Samhita, Sharangdhara Samhita, Kashyap Samhita*), *Chikitsa Granthas (Bhaisajya ratnavali, Bhavprakash), Nighantus*. Various

published articles were searched on different search engine such as Pubmed, Google Scholar by using key words – *Bhurjah, Bhojpatra, Betula utilis* etc.

**Table 1: Synonym of Bhurjah in Literature**

| <b>Nighantu/<br/>Synonym</b>        | <b>Abhidhan<br/>manjari</b> | <b>Kaideva<br/>Nighanru</b> | <b>Nighantu<br/>shesh</b> | <b>Paryay<br/>ratnamala</b> | <b>Bhavprakash<br/>Nighantu</b> | <b>Madndi<br/>Nighantu</b> | <b>Raj<br/>Ni.</b> | <b>Saraswati<br/>Nighantu</b> |
|-------------------------------------|-----------------------------|-----------------------------|---------------------------|-----------------------------|---------------------------------|----------------------------|--------------------|-------------------------------|
| <i>Chatrapa</i>                     | +                           | -                           | +                         | +                           | -                               | +                          | -                  | -                             |
| <i>Tanupatra</i>                    | +                           | -                           | -                         | -                           | -                               | -                          | -                  | -                             |
| <i>Mridutvaka</i>                   | +                           | +                           | +                         | -                           | -                               | -                          | -                  | +                             |
| <i>Bahuput</i>                      | -                           | +                           | +                         | -                           | -                               | -                          | -                  | -                             |
| <i>Chitrapatr</i>                   | -                           | +                           | -                         | -                           | -                               | +                          | -                  | -                             |
| <i>lekhyapatra</i>                  | -                           | +                           | -                         | -                           | +                               | +                          | -                  | -                             |
| <i>Bahutvak</i>                     | -                           | +                           | +                         | -                           | -                               | +                          | -                  | -                             |
| <i>Mriduchad</i>                    | -                           | -                           | +                         | -                           | -                               | +                          | -                  | -                             |
| <i>Rekhapatra</i>                   | -                           | -                           | +                         | -                           | -                               | -                          | -                  | -                             |
| <i>Charmi</i>                       | -                           | -                           | +                         | -                           | +                               | -                          | -                  | -                             |
| <i>Shivo</i>                        | -                           | -                           | -                         | +                           | -                               | -                          | -                  | -                             |
| <i>Sthirchad</i>                    | -                           | -                           | -                         | +                           | -                               | -                          | -                  | +                             |
| <i>Charmarum,<br/>Charmavriksha</i> | -                           | -                           | -                         | +                           | -                               | -                          | -                  | -                             |
| <i>Bahuvalkala</i>                  | -                           | -                           | -                         | -                           | +                               | -                          | -                  | -                             |
| <i>Bahuyuja</i>                     | -                           | -                           | -                         | -                           | -                               | +                          | -                  | -                             |
| <i>Valkadrum</i>                    | -                           | -                           | -                         | -                           | -                               | -                          | +                  | -                             |
| <i>Chitratvag/<br/>Bindupatra</i>   | -                           | -                           | -                         | -                           | -                               | -                          | -                  | -                             |

### Botanical Description

*Bhurjah (Betula utilis D. Don)* belongs to family Betulaceae. *Bhurjah* is a moderate sized, deciduous tree that grows up to 20m in height. It is found in mountainous regions at 2900–3900meter altitudes. Bark is smooth, reddish brown, with whitish, linear, horizontal lenticels. Leaves are stalked, 5-10cm long, unequally serrated, slightly hairy and having a round base. Male inflorescence is found at the tip of long shoots having 4 parted perianth and the female inflorescence is found at short shoots, erect, solitary or in pairs having no perianth. Its flowering occurs in the month of May-July and Fruits occur in September - October. Its papery bark is known as *Bhojpatra*. It also has a fungal growth, a black amorphous growth lump weighing 1-1.5 kg, also known as *Bhurjagranthi*.<sup>[4]</sup>



**Bark of Bhurjah (*Betula utilis D. Don*)**

### Pharmacological Property

*Bhurjah (Betula utilis D. Don)* comprises *Rasa* (taste) *Katu* (pungent), *Kashaya* (astringent) *Guna* (Attribute) *Laghu* (light), *Vipak* (metabolism) *Katu* (pungent), *Ushana* (hot) *Virya* (potency). It have *Tridoshghana Prabhav* (pacifies *Vata, Pitta, Kapha*) and it have some specific activities like *Bhutrakshakara, Vishaghana* (anti-toxic), *Balya* (strength promotor), *Sleshmahara* (pacify *Kapha dosha*), *Medohara* (anti-obesity).<sup>[5]</sup> *Bhurjah* indicated in disease conditions such as *Kustha* (various skin disease), *Bhootghana, Rakshashghana, Karnashoola* (otalgia), *Medovishhara* (anti-obesity and anti-toxic), *Vranashodhana* (wound purification), *Garbhanulomak* (to facilitate labour), *Visarpa* (Erysipelas), *Bhootagraha* (psychiatry), *Shopha* (oedema). (Table 4)

*Bhurjah* comprises betulin, lupeol, oleanolic acid, acetyloleanolic acid, betulic acid, lupenone, sitosterol, methyl betulonate<sup>6</sup> and major compounds in the essential oil were geranic acid (11.38%),  $\beta$ -seleneol (10.98%),  $\beta$ -linalool (10.91%), terragon (10.61%),  $\beta$  sesquiphellendrene (8.02%), champacol (6.33%), 1,8-cineol (5.49%), 2,4-decadienal (4.97%), cadinene (3.40%) and palmitic acid (3.07%). The main compounds of the oils were chemically classified as

alkenals (6.95%), phenylpropenes (10.61%), sesquiterpenoid alcohols (18.94%), acids and ester monoterpenes (30.29%), sesquiterpenes (13.40%), (4.79%), terpene alcohols (4.71%)<sup>7</sup>.

**Table 2: Classification of *Bhurjah* in Literature**

| Literature      | Name                                      | Varga/ Gana                     | Reference        |
|-----------------|---|---------------------------------|------------------|
| <b>Samhita</b>  | <i>Charak Samhita</i> <sup>8</sup>        | <i>Kashaya Skandha</i>          | Ca. Vi. 8/144    |
|                 | <i>Shushrut Samhita</i> <sup>9</sup>      | <i>Salsaradi Gana</i>           | Su. Su. 38/12    |
|                 |   | <i>Kashaya Varga</i>            | Su. Su.42/23     |
|                 | <i>Astang Hridya</i> <sup>10</sup>        | <i>Asnadi Gana</i>              | A.H. Su. 15/19   |
|                 | <i>Astang Samgraha</i> <sup>11</sup>      | <i>Kashaya Skandha,</i>         | A.S. 18/16       |
|                 |   | <i>Asnadi Gana</i>              | A.S.Su. 16/10    |
| <b>Nighantu</b> | <i>Astang Nighantu</i> <sup>12</sup>      | <i>Asnadi Gana</i>              | A. N. 10/79      |
|                 | <i>Amarkosh Nighantu</i> <sup>13</sup>    | <i>Vanaushadi Varga</i>         | A.K.N. 1/46      |
|                 | <i>Abhidanaratnamala</i> <sup>14</sup>    | <i>Kahaya Skandha</i>           | A.R.M.N 6/114    |
|                 | <i>Abhidhana Manjari</i> <sup>15</sup>    | <i>Ekartha Varga</i>            | A.M. 3/20        |
|                 |   | <i>Asnadi Varga</i>             | A.M.16/211,213   |
|                 | <i>Bhawprakash Nighantu</i> <sup>16</sup> | <i>Vtadi Varga</i>              | B.P.N. 6/39      |
|                 | <i>Hridyadipak Nighantu</i> <sup>17</sup> | <i>Eknam Varga</i>              | H.D.N. 6/120     |
|                 | <i>Kaidev Nighantu</i> <sup>18</sup>      | <i>Aushadi Varga</i>            | K.N.1/817-819    |
|                 | <i>Madnadi Nighantu</i> <sup>19</sup>     | <i>Shodasa Gana</i>             | M.N. 16/5-6      |
|                 | <i>Madhava Dravyaguna</i> <sup>20</sup>   | <i>Vividha-Aushadi Varga</i>    | M. D. 1/113      |
|                 | <i>Madanpal Nighantu</i> <sup>21</sup>    | <i>Vatadi Varga</i>             | M.P.N.5/37       |
|                 | <i>Nighantu Shesh</i> <sup>22</sup>       | <i>Vrikshakanda</i>             | N.S. 1/117-118   |
|                 | <i>Rajnighantu</i> <sup>23</sup>          | <i>Prabhadradi Varga</i>        | R. N9/4(112-113) |
|                 | <i>Rajballabha</i> <sup>24</sup>          | <i>Aushadiashraya Priksheda</i> | R.B. 6/59        |
|                 | <i>Sabda Chandrika</i> <sup>25</sup>      | <i>Vrikshadi Varga</i>          | S. Ch.1/67       |
|                 | <i>Sidhamantra</i> <sup>26</sup>          | <i>Kapha Pittaghana Dravya</i>  | S.M. 6/103       |
|                 | <i>Saraswati Nighantu</i> <sup>27</sup>   | <i>Mahavriksha Varga</i>        | Sa. N. 1/33,46   |
|                 | <i>Shodhala Nighantu</i> <sup>28</sup>    | <i>Aamradi Varga</i>            | S.N. 5/518       |
|                 | <i>Shoshruta Nighantu</i> <sup>29</sup>   | <i>Salsradi Gana</i>            | So.N. 6/120      |

**Table 3: Pharmacological Properties of *Bhurjah* in Nighantu**

| Nighantu                                  | Rasa           | Guna | Virya | Vipaka | Karma   | Doshaghanata                   |
|---|----------------|------|-------|--------|---|--------------------------------|
| <i>Bhawprakash Nighantu</i> <sup>15</sup> | <i>Kashaya</i> | -    | -     | -      | <i>Bhootagraha</i> (psychiatry),<br><i>Karnaroga</i> (otalgia),<br><i>Rakshashghana</i> , <i>Medovishahara</i><br>(anti-obesity and anti-toxic) | <i>Kapha, Pitta, Rakta jit</i> |
| <i>Kaiyadev Nighantu</i> <sup>17</sup>    | <i>Kashaya</i> | -    | -     | -      | <i>Bhootagraha</i> (psychiatry),<br><i>Karna Rog</i> (otalgia),<br><i>Vishanashaka</i> (anti-toxic)   | <i>Kapha, Pitta, Rakta jit</i> |
| <i>Madnadi Nighantu</i> <sup>18</sup>     | -              | -    | -     | -      | <i>Grahaghano</i> (psychiatry),<br><i>Dhupyog</i> (fumigation),<br><i>Papshamano</i> , <i>Medovishodhana</i><br>(anti-obesity and anti-toxic)   | <i>Kapha-Pitta Vishapaha</i>   |
| <i>Madhava dravyaguna</i> <sup>19</sup>   |                |      |       |        | <i>Vranaghana</i> (wound purification), <i>Kaphaghana</i> (pacify <i>Kapha Dosh</i> )   |                                |

|   |                                 |   |              |   |  |  |
|---|---------------------------------|---|--------------|---|--|--|
| <i>Madanpal Nighantu</i> <sup>20</sup>    |                                 |   |              |   | <i>Bhootgraha</i> (psychiatry),<br><i>Karnashool</i> (Otalgia)   | <i>Sleshma</i> ,<br><i>Raktapittajit</i> |
| <i>Priya Nighantu</i> <sup>22</sup>       | <i>Kashaya</i>                  | - | -            | - | <i>Lekhansadhan</i> (writing),<br><i>Bhootghana</i> (psychiatry),<br><i>Dhupana Karma</i> (fumigation),<br><i>Kustha</i> (various skin diseases) | -  |
| <i>Raj Nighantu</i> <sup>23</sup>         | <i>Katu</i> ,<br><i>Kashaya</i> | - | <i>Ushna</i> | - | <i>Bhootraksha</i> (psychiatry),<br><i>Kautilyanashna</i> , <i>Pathya</i>  | <i>Tridosha shaman</i>                   |
| <i>Rajballabha Nighantu</i> <sup>24</sup> | -                               | - | -            | - | <i>Balya</i> (strength promotor),  | <i>Kapha shravghana</i>                  |
| <i>Sabda chandrika</i> <sup>25</sup>      | -                               | - | -            | - | <i>Vrana</i> (wound)   | -  |
| <i>Sidhamantra</i> <sup>26</sup>          | -                               | - | -            | - | -  | <i>Kapha-Pittahara dravya</i>            |

Table 4: Formulations of *Bhurjah*

| Ayurvedic text                 | No. | Indication  | Doses form   | Reference              |
|--------------------------------|-----|---|--|------------------------|
| Charaka Samhita <sup>30</sup>  | 8   | <i>Kilas</i> (whitish discoloration of skin), <i>Indralupta</i> (alopecia), <i>Kitibha</i> (rough dry skin), <i>Dadru</i> (skin disease having circular patches), <i>Bhagandar</i> (fistula in ano), <i>Arsha</i> (piles) <i>Apachi</i> , <i>Pama</i> . | <i>Lepa</i> ( <i>Pradeha</i> ) (ointment)                  | <i>Ca. Su. 3/4</i>     |
|                                |     | <i>Kustha</i> (various skin diseases)   | <i>Kustha</i> (various skin diseases)                      | <i>Ca. Su. 3/15</i>    |
|                                |     | <i>Anagata Prasav</i>   | <i>Dhupana</i> (fumigation)                                | <i>Ca. Sh. 8/38</i>    |
|                                |     | <i>Prasav ki Tritiya avastha</i>  | <i>Yoni Dhupana</i> (fumigation)                           | <i>Ca. Sh.8/41</i>     |
|                                |     | <i>Kshatkshina</i>  | <i>Vesthyeta sarpiguda</i>                                 | <i>Ca. Chi. 11/59</i>  |
|                                |     | <i>Visarpa</i> (Erysipelas)   | <i>Baladi Lepa</i> (ointment)                              | <i>Ca. Chi. 21/125</i> |
|                                |     | <i>Vrana</i> (wound)  | <i>Lepa</i> (ointment)                                     | <i>Ca. Chi. 25/100</i> |
|                                |     | <i>Karna Rog</i> (Otalgia)  | <i>Kshar Tail</i> (oil)                                    | <i>Ca. Chi. 26/227</i> |
| Sushruta Samhita <sup>31</sup> | 2   | <i>Vataja Vrana</i> (wound)   | <i>Patradan</i> (covering the wound with medicinal leaves) | <i>Su. Chi. 1/113</i>  |
|                                |     | <i>Sarpa visha</i> (anti-toxic)   | <i>Ksharagad</i>   | <i>Su. Ka. 6/3</i>     |
| Astanga Hridaya <sup>32</sup>  | 4   | <i>Garbhasanga upchar</i>   | <i>Dhupana Karm</i> (fumigation)                           | <i>A. H. Sh. 1/86</i>  |
|                                |     | <i>Shravagrahanirbarhana</i>  | <i>Dhupana</i> (fumigation)                                | <i>A. H. Ut 3/48</i>   |
|                                |     | <i>Karna rog</i> (Otalgia)  | <i>Kshar Tail</i> (oil)                                    | <i>A.H. Ut 18/28</i>   |
|                                |     | <i>Vrana</i> (wound)  | <i>Dhupana Karma</i> (fumigation)                          | <i>A.H. Ut 25/45</i>   |
|                                |     | <i>Sarpavisha</i> (anti-toxic)  | <i>Chandrody Agad</i>                                      | <i>A.H. Ut 35/26</i>   |
|                                |     | <i>Vrana</i> (wound)  | <i>Patradan</i> (covering the wound with medicinal leaves) | <i>A.H. Su. 29/71</i>  |

|                                  |   |                                      |  |                       |
|----------------------------------|---|--------------------------------------|--|-----------------------|
| Astang Sangraha <sup>33</sup>    | 5 | <i>Garbhadhomukhsampadan</i>         | <i>Dhupana</i><br>(fumigation)             | A. S. Sh 3/15         |
|                                  |   | <i>Aprasangh</i>                     | <i>Yoni Dhupana</i><br>(fumigation)        | A. S. Sh 3/29         |
|                                  |   | <i>Visarpa</i> (Erysipelas)          | <i>Lepa</i> (ointment)                     | A.S. Chi 20/10        |
|                                  |   | <i>Kshatshina</i>                    | <i>Vesthyeta</i><br><i>Baladisarpiguda</i> | A.S. Chi 5/49         |
|                                  |   | <i>Shravagrahanirbarhana</i>         | <i>Dhupana</i><br>(fumigation)             | A.S. Ut. 4/3          |
| Chakradatta <sup>34</sup>        | 4 | <i>Rajyakshama</i>                   | <i>Vesthyeta sarpiguda</i>                 | C.D. Chi. 10/43       |
|                                  |   | <i>Vrana</i> (wound)                 | <i>Dhupana</i><br>(fumigation)             | C.D. Chi. 44/42       |
|                                  |   | <i>Kusth</i> (various Skin Diseases) | <i>Lepa</i> (ointment)                     | C.D. Chi. 50/8        |
|                                  |   | <i>Karnashula</i> (Otagia)           | <i>Tail</i> (oil)                          | C.D. Chi. 57/18       |
| Bhaisajyaratnawali <sup>35</sup> | 1 | <i>Garbhaniroga chikitsa</i>         | <i>Yoni Dhupana</i><br>(fumigation)        | Bh. R. Chi 68/<br>113 |

## Pharmacological Profile

### Anti-microbial Activity

1. Solvent extract viz., petroleum ether, chloroform, methanol, ethanol and water extracts of bark of *Betula utilis* were evaluated for antibacterial activity, against fourteen important bacterial strains by agar well diffusion method. Comparison of the inhibitory activity of the extracts with the antibiotics gentamicin revealed that methanol extracts of *Betula utilis* was significantly higher than that of the antibiotics tested. 36
2. This study showed that *B. utilis* essential oil has a strong antimicrobial activity against the fungus *Candida albicans* and Gram (+) and Gram (-) human pathogenic bacteria (MIC: 60.5-240 µg/ml). 37
3. A dried stored sample of bark of *Betula utilis* (Bhojpatra) has been found to be active against *Aspergillus niger* and *Aspergillus flavus*. 38

### Anti-oxidant Activity

1. Methanol and water soluble extract of *Betula utilis* showed significant anti oxidant activity. It showed DPPH and ABTS scavenging activity (8.4, 35.08 g/ml IC50 for DPPH, and 83.18, 37.14 g/ml IC50 for ABTS assay) but very mild activity against lipoxygenase inhibition activity (18.74 and 28.78% inhibition at 1.0 mg/ml).<sup>39</sup>

### Anti-inflammatory Activity

1. The methanol and water soluble extract of *B. utilis* showed very mild activity against lipoxygenase inhibition activity (18.74 and 28.78% inhibition at 1.0 mg/ml)<sup>39</sup>

### Anti-cancer Activity

1. *Betula utilis* Bark was extracted in methanol and fractionated with hexane, ethyl acetate, chloroform, n-butanol and water. All six fractions

were evaluated for their in-vitro anticancer activity in nine different cancer cell lines and ethyl acetate fraction was found to be one of the most potent fractions in terms of inducing cytotoxic activity against various cancer cell lines. In this study, they discovered novel source of ursolic acid having potent tumor cell specific cytotoxic property, indicating it's therapeutic potential against breast cancer.<sup>40</sup>

2. Betulin can be easily converted into Betulinic acid, which has antitumor activity. It also has the ability to induce apoptic cell death in cancer cell through triggering the mitochondrial pathway of apoptosis.<sup>41</sup>
3. Betulinic acid also inhibits the growth of malignant melanoma and cancers of the liver and the lung.<sup>42</sup>

### Anti-HIV Activity

1. Betulinic acid (BA) derivatives can inhibit human immunodeficiency virus type 1 (HIV-1) entry or maturation depending on side chain modifications. In this study, it was found that two BA entry inhibitors, IC9564 and A43D, exhibited a broad spectrum of anti-HIV-1 activity. Both compounds inhibited multiple strains of HIV-1 from clades A, B, and C at submicromolar concentrations.<sup>43</sup>

### Mild Anti-hyperglycemic Activity

1. The ethanolic extracts of different parts of the following 4 plants (*Eclipta alba* Hassk (Asteraceae) whole plant, roots of *Berberis aristata* DC (Berberidaceae), stem wood of *Betula utilis* D. Don (Betulaceae), stem wood of *Cedrus deodara* (Pinaceae), and fruits of *Myristica fragrans* Houtt. (Myristicaceae) exhibited and *Betula utilis* shows 8.3% significant fall in blood glucose profile in a

single dose experiment on Streptozotocin-induced diabetic rats.<sup>44</sup>

## DISCUSSION

Bhurjah is identified as *Betula utilis* D. Don (Betulaceae) and other species are *Betula alnoides*, *Betula cylindrostachys*, are reported in India. *Bhojapatra* is stem bark of *Bhurjah* and *Bhurjah granthi* is burl which are used for medicinal purpose. The extensive survey of literature discovered that description of Bhurjah's formulation was not found in this Bhavprakash Chikitsa, Harit Samhita, Sharangdhara Samhita, Kashyap Samhita. In Ayurvedic literature the *Rasa* of *Bhurjah* is mentioned *Kashaya* (astringent) but in Raj Nighantu it is mentioned *Katu rasa* (pungent) along with *Kashaya* (astringent). The *Guna* and *Vipaka* of *Bhurjah* is *Laghu* and *Ushna* respectively mentioned in API while there is no description of *Guna* and *Vipaka* in Nighantus. Most of the formulations of Bhurjah

indicated to be used externally except in *Ksharagada* which is indicated in *Sarpa visha chikitsa* for internal and external use.

In experimental (In-vitro) study Bhurjah has been found anti-microbial effect against *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Salmonella paratyphi*, *Staphylococcus aureus*, pathogenic bacteria and anti-fungal activity against *Aspergillus niger* and *Aspergillus flavus*. Many Manuscripts were written on Bhurjah and those literature remains unaffected by microbes, environmental conditions due to its antimicrobial property. Various therapeutic activities such as anti-microbial activity, anti oxidant activity, anti-inflammatory activity, anti hyperglycemic activity, anticancer activity, anti-HIV activity has been studied invitro and in vivo study.

**Table 5: Comparison Between Ayurvedic Indications and Evidence Based Activities**

| Indication in Ayurvedic Literature  | Dosage Form                  | Studies conducted In-Vitro/ In-Vivo      |
|---|------------------------------|--|
| <i>Bhootagraha, Bhootraksha, Rakshashghana, Bhootghana</i>                      | <i>Dhupana karma</i>         | Antimicrobial activity                   |
| <i>Karna Rog, Karnashool</i>  | <i>Kshar tail</i>            | Antimicrobial activity/Anti-inflammatory |
| <i>Medovishahara</i>  |                              | -  |
| <i>Vrana</i>  | <i>Dhupana karma, Lepa</i>   | Antimicrobial activity/Anti-inflammatory |
| <i>Anagata Prasav, Prasav ki Tritiya avastha, Garbhasanga upchar, Aprasangh</i> | <i>Yoni Dhupana</i>          | Antimicrobial activity/Anti-inflammatory |
| <i>Kustha, Kilas, Indralupta, Kibha, Dadru, Apchi, Pama, Visarpa</i>            | <i>Lepa</i>                  | Antimicrobial activity/Anti-inflammatory |
| <i>Kautilyanashna, Papshamano Shrivagrahanirbarhana</i>                         | <i>Dhupana karma</i>         | -  |
| <i>Sarpavisha</i>   | <i>Sarpavisha, Ksharagad</i> | -  |

*Dhupana* of *Yoni* also indicated in *Anagata Prasav, Prasav ki Tritiya avastha, Garbhasanga upchar, Garbhadhomukhsampadan*. Possible cause for using *Dhoopan karma* for creating aseptic condition during labour.

## CONCLUSION

The extensive survey of literature revealed that it is an important ingredient of many formulations. *Betula utilis* D. Don pharmacologically and medicinally important chemical constituent is betulinic acid. It has been attributed with different pharmacological properties *Katu Kashaya Rasa, Laghu Guna, Ushana Virya* and pacifies *Vata, Pitta* and *Kapha doshas*. In Ayurvedic literature *Bhurjah granthi* as ingredient in formulations indicated in different disease conditions having causative factors microbes but no clinical studies was found to prove efficacy. More intensive

scientific study on various classically claimed indication of *Bhurjah* is need of time.

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