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## Immunomodulatory herbs of Unani medicine: A review

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### Abstract

Immune system is a defence system within the body to protect the host from invading pathogens. The immune system dysfunction is responsible for various diseases like allergy, asthma, arthritis, cancer and other infectious diseases. Age-related changes of the immune system contribute to the increased susceptibility of elderly persons to infectious diseases, vaccine failure, and possibly autoimmunity and cancer. Immunomodulator agents increase the immune responsiveness of the body against pathogens by activating the both specific and non-specific immune system. In *Unani* literature a large number of herbs are mentioned to promote the physical and mental health, and have been claimed to possess immunomodulatory activity. Medicinal plants are used as immunomodulator to provide alternative potential to conventional chemotherapy for a variety of diseases. An attempt was made to put various plants in one place which are used as immunomodulator agents.

**Keywords:** Unani, immunomodulator, herbs, aging

### 1. Introduction

Immunity can be defined as the ability of the body to neutralize & eliminate the pathogenic micro-organism & their toxic products, thus providing protection to the individual<sup>[1]</sup>. Age-related changes of the immune system contribute to the increased susceptibility of elderly persons to infectious diseases, vaccine failure, and possibly autoimmunity and cancer<sup>[2]</sup>. Modulation of the immune system denotes to any change in the immune response that can involve induction, expression, amplification or inhibition of any part or phase of the immune response. Thus, immunomodulator is a substance used for its effect on the immune system. There are generally of two type's immunomodulators; immunosuppressants and immunostimulators<sup>[3]</sup>. In *Unani* literature is has been mentioned that *tabi'at* is solely responsible for capacity of the body to resist the disease and pathogens<sup>[4]</sup>. With age the function of preserving *ratubaat* in a body do not remain same, which leads to weakening of all *qua'* of the body making *tabi'at* unable to struggle with the disease and pathogens<sup>[5]</sup>. The immune system is increasingly found to be involved in the development of several chronic illnesses<sup>[6]</sup>. Intervention by the physician is required to help *tabi'at* so that it can accelerate the process of elimination of disease form the body<sup>[5]</sup>. A number of synthetic drugs like cyclosporine, corticosteroids, azathioprine etc. are being used in treating immune diseases but they have side effects like nephrotoxicity, anaemia, thrombocytopenia, bone marrow suppression etc. Medicinal plants have been used virtually in all cultures as a source of medicine for altering the immune system<sup>[1]</sup>. In recent times, focus on plants with their extracts and active fraction has been investigated for immune response modifying activity<sup>[7]</sup>. Herbal drugs are known to possess immunomodulatory properties and generally act by stimulating both specific and nonspecific immunity<sup>[6]</sup>. The present review is to highlight the importance of immunomodulator *Unani* herbs focused on their immunomodulatory effects.

### 2. Unani herbs with immunomodulatory potential

#### 2.1 *Asgand* (*Withania somnifera* L.)

Standardized aqueous extract of *Asgand* was evaluated in laboratory animals immunized with DPT vaccine. Treatment of immunized animals with extract of *Asgand* 100 mg/kg/day for 15 days resulted in significant increase of antibody titers to *B. pertussis*<sup>[8]</sup>. The main constituents of *Asgand* responsible increased antibody titer are steroidal Lactones (Withanolides), polysaccharides, lectins, proteins and peptides<sup>[9]</sup>.

## 2.2 Elwa (*Aloe vera*)

Pyrogallol-induced suppression of humoral as well as cell mediated immune response was significantly attenuated by daily oral treatment with *elwa* extract at the dose of 100 mg/kg on the albino mice. It produces stimulatory effect on the humoral and cell mediated immune response in the experimental animals. This suggests its therapeutic usefulness in disorders of immunological origin. Immunostimulant effect of *elwa* could be attributed to the alkaloids content<sup>[10]</sup>.

## 2.3 Fowah (*Rubia cordifolia L.*)

Administration of ethanolic extracts of the leaves of *fowah* 100 mg/kg, b.w. orally to CP- exposed Swiss albino rats resulted in enhanced immune responses. There was an increase in total counts of WBC and RBC cell count which was significantly high in immunocompromised animals. Responsible chemical constituents probably were alkaloids, cardiac glycosides, tannins, flavonoids and phenols<sup>[11]</sup>.

## 2.4 Kalonji (*Nigella sativa*)

Ethanol extract of *kalonji* seeds 1.5 g/kg, b.w. was orally administered in dexamethasone-induced immune-suppressed male rabbits for 42 days. It is reported to increase the phagocytic activity by stimulating the immune cells and increase the activity of immune potential. The immunomodulatory action may be due to its main constituent's thymoquinone, nigellone and d-limonene through their antioxidant and anti-inflammatory activities<sup>[12]</sup>.

## 2.5 Gudhal (*Hibiscus Rosa sinensis L.*)

The assessment of immunomodulatory activity of hydro-alcoholic extract of flowers of *gudhal* (75, 150 and 300 mg/kg p.o.) was done for non-specific immunity, humoral immunity and cell mediated immunity on wistar albino rats. *Gudhal* was found to possess significant immunostimulatory action on immune system. The chemical constituents reported in plant were cyanidin, quercetin, flavonoids, hentriacontane, thiamine, riboflavin, niacin and ascorbic acid<sup>[13]</sup>.

## 2.6 Haldi (*Curcuma longa*)

Aqueous extract of *haldi* rhizome at a dose of 50 mg/kg bw is given to carbon tetra chloride intoxicated Swiss albino mice for 15 days. Administration of *haldi* aqueous extract in that carbon tetra chloride intoxicated mice renders the macrophages to acquiring abnormal surface morphology so that they can function normally. The mechanism involving this protection by *haldi* extract probably related to the production of monocyte colony stimulating factor or granulocyte-monocyte stimulating factor. Curcumin is a main active constituent of *haldi*<sup>[6]</sup>.

## 2.7 Neem (*Azadirachta indica*)

Aqueous extract of *Neem* flowers were given at doses of 200 and 400 mg/kg, p.o. to albino mice may stimulate both specific and non-specific immune responses by stimulating macrophages, humoral and cell mediated response. It can therefore be concluded that aqueous extract of *Neem* flowers is a potential immunostimulant against cytotoxic drugs and can be used as a complimentary therapeutic agent<sup>[14]</sup>.

## 2.8 Bargad (*Ficu benghalensis L.*)

The successive methanol extract of aerial roots of *Bargad* showed a significant increase in percentage phagocytosis at concentrations of 0.5 mg/ml, 1.0 mg/ml and 2.0 mg/ml on albino rats. It was found to have a significant

immunostimulant activity on both the specific and non-specific immune mechanisms. The methanol extracts were found to contain flavonoids, phenolics, steroids, glycosides, carbohydrates and proteins<sup>[15]</sup>.

## 2.9 Musli safed (*Chlorophytum borivilianum*)

Aqueous extract and polysaccharide fraction of *Musli safed* were given to wistar strain albino rats in dose of 50 mg/kg b.w. and 100 mg/kg b.w. The crude *C. borivilianum* extract as well as the polysaccharide fraction were able to enhance the antibody titre, while the non-polysaccharide fraction was effective in enhancing a cell-mediated response by augmenting the natural killer cell activity<sup>[16]</sup>.

## 2.10 Satavar (*Asparagus recemosus wild.*)

Oral administration of aqueous extract of *Satavar* (at 1%) with or without milk to mice for 4 weeks resulted in a significant increase in percent phagocytosis, proliferation of lymphocytes, reduced glutathione content and decreased lipid peroxidation. The immune enhancing property may be related to the antioxidant vitamins, saponins, glycosides, polyphenol and flavonoids present in the extract. This clearly indicates that *Satavar* has immunomodulatory potential<sup>[17]</sup>.

## 3. List of immunomodulator herbs

S. no	Unani name	Botanical name	Part used
1.	<i>Asgand</i>	<i>Withania somnifera L.</i>	Root <sup>[9]</sup>
2.	<i>Elwa</i>	<i>Aloe vera</i>	Leaves <sup>[10]</sup>
3.	<i>Fowah</i>	<i>Rubia cordifolia L.</i>	Leaves <sup>[11]</sup>
4.	<i>Kalonji</i>	<i>Nigella sativa</i>	Seeds <sup>[12]</sup>
5.	<i>Gudhal</i>	<i>Hibiscus rosa sinensis L.</i>	Flower <sup>[13]</sup>
6.	<i>Haldi</i>	<i>Curcuma longa</i>	Rhizome <sup>[6]</sup>
7.	<i>Neem</i>	<i>Azadirachta indica</i>	Flowers, leaves, seeds <sup>[14]</sup>
8.	<i>Bargad</i>	<i>Ficu benghalensis L.</i>	Whole plant <sup>[15]</sup>
9.	<i>Musli safed</i>	<i>Chlorophytum borivilianum</i>	Root <sup>[16]</sup>
10.	<i>Satavar</i>	<i>Asparagus recemosus wild.</i>	Root <sup>[17]</sup>
11.	<i>Neelofar</i>	<i>Nelumbo nucifera</i>	Rhizome, seeds <sup>[18]</sup>
12.	<i>Aslussus</i>	<i>Glycyrrhiza glabra L.</i>	Bark and root
13.	<i>Filfil daraz</i>	<i>Piper longum L.</i>	Fruit and leaves
14.	<i>Halela</i>	<i>Terminalia chebula Retz.</i>	Fruits
15.	<i>Papita</i>	<i>Carica papaya L.</i>	Leaves, seeds <sup>[7]</sup>
16.	<i>Amla</i>	<i>Emblica officinalis L.</i>	Fruit <sup>[1]</sup>
17.	<i>Gilo</i>	<i>Tinospora cordifolia L.</i>	Stem & root <sup>[1,18]</sup>
18.	<i>Bartang</i>	<i>Plantago major L.</i>	Seeds
19.	<i>Baboona</i>	<i>Matricaria chamomilla</i>	Flowers <sup>[7]</sup>
20.	<i>Aam</i>	<i>Mangifera indica L.</i>	Fruits
21.	<i>Rehan</i>	<i>Ocimum sanctum</i>	Leaf
22.	<i>Zanjabeel</i>	<i>Zingiber officinale</i>	Rhizome <sup>[11]</sup>
23.	<i>Kath</i>	<i>Acacia catechu</i>	Bark
24.	<i>Darchini</i>	<i>Cinnamomum zeylanicum</i>	Bark
25.	<i>Balela</i>	<i>Terminalia belerica</i>	Fruit <sup>[9]</sup>

## 4. Conclusion

It is well recognized fact that there is high incidence of drug related unexpected side effects in allopathic medicine for immunomodulation in elderly persons. It is where role of Unani medicine come into play. Modulation of immune system with herbal drugs may offer novel approach in treatment of variety of diseases. There are many drugs in Unani system of medicine which are found to be effective and

safe in modulating immune system needs to be validated for their immunomodulatory activities.

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