ISSN 2456-3110
Vol 7 · Issue 6
July 2022

JAiMS
INTERNATIONAL

Journal of Ayurveda and Integrated Medical Sciences

www.jaims.in

JAIMS

An International Journal for Researches in Ayurveda and Allied Sciences

Maharshi Charaka
Ayurveda

Indexed

Journal of
Ayurveda and Integrated Medical Sciences
ISSN 2456-3110
ORIGINAL ARTICLE July 2022

Proximate Analysis and Organoleptic Properties of therapeutic *Kadha* tablet for Immunity Booster

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ABSTRACT

Kadha is a traditional drink with a variety of medicinal benefits. It has been utilized in India since ancient times, but the corona pandemic 2020 has brought it to the forefront. As we are all aware that prevention is preferable to treatment, improving the body's natural defense system (immunity) is crucial to maintaining good health. Ayurveda, as the science of life, promotes nature's gifts in sustaining health. The medicinal plants play a supplementary role in developing the immune system and fighting deadly viruses including COVID-19. The objective of this study is to evaluate the nutritional content through proximate analysis and organoleptic properties of *Kadha* tablet for immunity booster. Result showed that it has a good sensory property and nutritional content making it a good choice for consumer for achieving better immunity.

Key words: *Immunity, Covid-19, Organoleptic properties, Proximate analysis.*

INTRODUCTION

Immunity is the state of protection against infectious disease conferred either through an immune response generated by immunization or previous infection or by other non-immunological factors**.** The immune system helps to protect the host from pathogens while minimizing damage to self tissue.[1] Immune system is the second line of body defense mechanism. The immune system consists of an intricately linked network of cells, proteins and lymphoid organs which are strategically placed to ensure maximal protection against infection. Immune defenses are normally categorized into the innate immune response, which provides immediate protection against an invading pathogen, and the adaptive or acquired immune response, which takes more time to develop but confers exquisite specificity and long lasting protection. The immune system is made up of good bacteria that live in the gut and defend the human body from a variety of diseases. When the immune system's response is low, weak, or impaired, infections like the corona virus or diseases like diabetes, heart disease, or cancer might thrive.[2]

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Submission Date: 07/05/2022 Accepted Date: 18/06/2022

Access this article online

Quick Response Code

Website: www.jaims.in

DOI: 10.21760/jaims.7.6.13

Immunity booster food

The food plays a key role in deciding generally health and immunity (Fig 1). Eating a low-fat, plant-based eating habit may help give the immune system a boost. The immune system depends on WBCs which produce antibodies to battle against microbes, viruses etc. Plant-based diets boost intestinal beneficial bacteria and the general health of the gut micro biome, which accounts for up to 85% of the body's immune system. Excessive consumption of animal foods, on the other hand, depletes the body's healthy bacteria, promotes inflammation, and is the root cause of diabetes, COPD, cardiovascular disease, hepatitis B, cancer, and chronic kidney disease.[1] Generally, plant-based diets are non-

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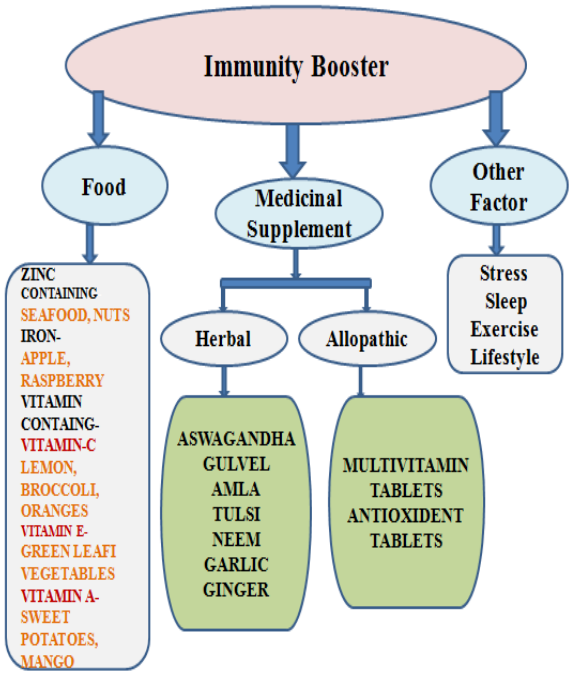
toxic and without any side effects. Various parts of medicinal plants are popular for their antiviral activities and immunity strengthening capacity. In times, when the world is busy fighting deadly corona virus, it is necessary to take extra precautions to keep yourself protected from getting infected. Therefore, the best way to strengthen our immune is to naturally with the help of medicinal plants/herbs. Mother nature has already blessed us with plenty of medicinal plants that help in fighting and curing the vast range of diseases. Ayurveda, the ancient medical science had stated long ago that plant extracts could do a lot to strengthen the body.[3] Some of the important medicinal plants are as follows that potentially can help in boosting immunity against COVID-19 and other infectious disease: *Drumstick tree (Moringa oleifera), Amla (Phyllanthus emblica), Ashwagandha (Withania somnifera), Giloy/ Guduchi (Tinospora cordifolia), Neem (Azadirachta indica), Garlic (Allium sativum), Tulsi (Ocimum sanctum), Cinnamon (Cinnamomum verum), Turmeric (Curcuma longa), Onion (Allium cepa), Wild carrot (Daucus maritimus), Black pepper (Piper nigrum).*

Fig. 1: The various types of immunity booster



Nutritional properties of decoction (*Kadha)*

Decoction (*Kadha*) is an Ayurvedic beverage. Ayurvedic drink made from a mixture of herbs and spices that are simmered in water and then decocted to obtain their health effects. The process of making kadha dates back about 500 years. In fact, the decoction, or spice and herb mixture, is believed to be one of Ayurveda's oldest types of medicine. In this study, we have developed a *Kadha* in the form of tablet using *Ashwagandha, Giloy, Tulsi* and *Pippali* etc. Some of the medicinal properties of these herbs include:

Ashwagandha (Withania somnifera) is a little shrub with pale green flowers, simple leaves, and berries that are crimson in color. The root and leaves of Ashwagandha provide the majority of the advantages. Tea leaves are the most popular usage for the leaves. The root can be consumed in a variety of ways, although these days it's most typically dried, powdered, and taken as a supplement. Ashwagandha extract can help to lower blood sugar levels, cortical levels, depression symptoms, and inflammation. It aids in the development of strength, muscle mass, and mental function. By increasing cell-mediated immunity, Ashwagandha boosts the body's resistance against disease. It also has powerful antioxidant qualities, which help to protect cells from free radical damage. It also exhibited inhibitory properties against a variety of malignancies, including breast, colon, prostate, colon, ovarian, lung, and brain tumours, as well as the mechanisms of action and pathways involved.[3]

Giloy/Gauche (Tinospora cordifolia) is a plant with heart-shaped leaves that has been used and recommended in Indian medicine for centuries. Immunity can be boosted by drinking fresh Gilroy juice. It enhances the activity of macrophages (cells that fight foreign substances and also serve as microscopes) and so aids in early recovery. Giloy is also well-known for its anti-inflammatory properties, which aid in the reduction of respiratory issues such as frequent coughing, colds, and tonsillitis. Gilroy powder, *Kadha* (tea), or pills can be used to treat a variety of skin conditions by aiding in the removal of toxins from the body.[3]

*Tulsi (*Osmium *sanctum);* different portions of Osmium sanctum have been advised for the treatment of

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various ailments in traditional medicine. Vitamin C, antioxidants, antibacterial, and antiviral activities are abundant in this herb. Because of its antimicrobial properties, *Tulsi* has been utilized as a natural hand sanitizer. *Tulsi* tea is one of the most common home treatments for a common cold or sore throat. Because of its influence on chemical changes in the body, *Tulsi* can aid to strengthen the respiratory system. Through a unique combination of pharmacological activities, *Tulsi* has been discovered to alleviate physical, physiological, metabolic, and psychological stress. In addition, the crude extract and torpedoed extracted from Osmium sanctum leaves have shown promise antiviral activity against H9N2 virus.[3]

Pippali is an Ayurvedic herb that is utilized in a variety of Ayurvedic treatments. *Pippali's* roots and fruits are used for medical purposes. This plant's fruits are pale yellow to orange in cooler and have a strong flavor. *Pippali* is a popular home treatment for coughs and colds. Because of its expectorant properties, swallowing *Pippali* powder with honey after lunch and dinner helps release mucus from the airways, allowing the patient to breathe more easily. Its ingestion may also assist in weight loss by increasing the body's metabolic rate. Due to its laxative properties, *Pippali* powder may help manage constipation by encouraging bowel movements.[4]

Materials and Methods

Sample preparation

Raw Ingredients: *Ashwagandha* (10gm), *Gilloy* (10gm), *Tulsi* leaves (10-15), *Pippali* (2gm), cinnamon (10gm), clove (5gm), black pepper (5gm), ginger (15gm), turmeric (10gm), honey (100gm), jaggery (250gm), sugar (250gm).

Preparation of *Kadha* tablet

First of all, a powder mixture is prepared using *Ashwagandha, Gilloy, Pippali, Tulsi* leaves, cinnamon, cloves, black pepper, ginger and turmeric. Boil 2 glass of water in a saucepan. Add sugar and jaggery in water until it makes a thick consistency of sugar syrup. In this sugar syrup add powder mixture and boil it for 30 min. Turn off the gas when the mixture turns dark in color and becomes thick. After cooling the this paste now pour it in a silicon tray to make the *Kadha* in tablet form. Fig 2. shows the preparation of *Kadha* tablet in flow chart, along with the image of final product.

Fig. 2: Flow chart of *Kadha* tablet preparation and the image of final product.

Proximate analysis

Proximate analysis refers to the quantitative analysis of macromolecules in food. A Combination of different methods and techniques are used to determine protein, fat, moisture and ash levels in sample.[5]

Moisture estimation

The moisture content was determined by oven drying method. The sample of 5gm were crushed and dried in an oven at 100°C to constant weight. After cooling in the desiccators, the sample was weighed again. The loss in weight was recorded as moisture content.[6]

$$\text{Moisture (\%)} = \frac{W1-W2}{W1} \times 100$$

Where,

W1 = Initial weight of bottle with sample before drying.

W2 = Final weight of the sample after drying

Fat estimation

Soxhlet Extraction Method was used for the estimation of fat. First of all, rinse all the glass apparatus by

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petroleum ether and dry it in the oven at 102°C and after removing it keep in the desiccator. Weigh 5 gram of grounded and dried sample and place it in the thimble. Place the thimble in the soxhlet extractor. Take a 150ml round bottom flask and clean it and fill the flask with 90 ml petroleum ether. Place the whole setting on a heating mantle and allow the petroleum ether to boil. Continue the extraction process for several hours, almost 6 hours. Remove the condensing unit from extraction unit and allow the sample to cool down. Finally, it removes all the lipid. Collect almost all the solvent after distillation. Place the sample in the oven and after removing it place in the desiccator. Take the weight of the sample. As a result, we get a defat sample.[7]

$$\text{Crude Fat (\%)} = \frac{\text{weight of ether soluble material}}{\text{Weight of Sample}} \times 100$$

Fiber estimation

The total dietary fiber content was estimated by AACC method 32-05.01 and AOAC Method 985.29.[6]

pH estimation

The pH meter used should have a minimum accuracy of 0.1 pH unit, and reproducibility should be ± 0.05 pH unit or less. To obtain accurate results, a uniform temperature should be maintained for the electrodes, the standard buffer solutions and the sample.[8]

Ash estimation

Total ash content of sample was estimated by using direct-heating method of muffle furnace.[6]

$$\text{Ash (\%)} = \frac{\text{Weight of Ash}}{\text{Weight of sample}} \times 100$$

Protein estimation

Weigh quickly about 1-2 gm of the sample and transfer to a 500 or 800 mL Kjeldahl flask taking care to see that no portion of the sample clings to the neck of the flask. Add 0.7 gm of Mercuric oxide, 15gm of Potassium Sulphate and 40mL of concentrated sulphuric acid (Mercuric oxide is added to increase the rate of organic breakdown during acid digestion. Because of environmental/safety concerns over handling and disposal of mercury, copper sulphate can be used. This is important from safety point of view as mercury vapours might escape into the environment during the distillation process. Also, Missouri catalyst tablets known as Kjeldahl tablets (Composition: 48.8% Sodium sulphate & 48.9% Potassium sulphate & 0.3% copper sulphate) can also be used).[9]

Calculate protein as = N x 6.25

$$\text{Protein on dry wt. basis} = \frac{\text{Protein content}}{100 - \text{Moisture content}} \times 100$$

Organoleptic evaluation

The organoleptic evaluation in respect of colour / appearance, flavor / taste, aroma, texture, acceptability were evaluated by three trained judges using nine-point hedonic scales (Fig.3) and the result was calculated as average.

Fig. 3: Nine-point hedonic scales for organoleptic evaluation

Sensory Evaluation Form for Therapeutic Kadha Tablets as Immunity Booster

Name: _____

Date: _____

Attributes	9 Like extremely	8 Like very much	7 Like	6 Like slightly	5 Neither like or dislike	4 Dislike slightly	3 Dislike moderately	2 Dislike	1 Dislike Extremely
Appearance									
Flavour/ Taste									
Aroma									
Texture									
Acceptability									
Overall									

Results and Discussion

Proximate Analysis of therapeutic *Kadha* tablet

Table-1 represents the result of parameters of proximate analysis. Moisture content of therapeutic *Kadha* tablet found to be 15.40%. The ash content representing mineral matter is 8.409%. The protein, body building nutritional component is 1.01g/50g in therapeutic *Kadha* tablet. In this therapeutic *Kadha* tablet Fat is almost 0g. The *Kadha* sample was observed to be good source of dietary fiber (0.03g/50g)

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which assist in digestive tract cleansing. pH in therapeutic *Kadha* tablet is 4.76.

Table 1: Proximate Analysis of therapeutic *Kadha* tablet

Parameter	Value (per 50g)
Moisture content (%)	15.40
Fat	0
Ash content (%)	8.409
Dietary fiber (g)	0.03
pH	4.76
Protein (g)	1.01

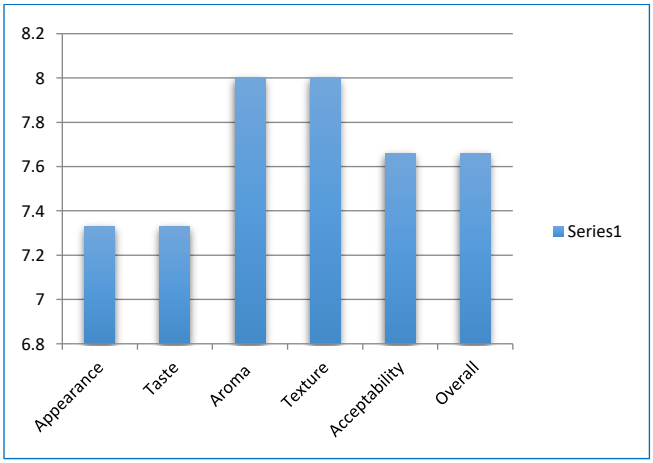
Organoleptic Evaluation of therapeutic *Kadha* tablet

The sensory evaluation was done using Nine-point hedonic scales. Result shows (Table 2) that the appearance / color of *Kadha* tablet is 7.33; flavor/taste is 7.33 as well; aroma of the *Kadha* is 8; texture is 8; acceptability is about 7.66 and overall it has received 7.66 points which is quite good (fig.4).

Table 2: Organoleptic parameters of therapeutic *Kadha* tablet

Sample	Appearance	Taste	Aroma	Texture	Acceptability	Overall
Therapeutic *Kadha* Tablets	7.33	7.33	8	8	7.66	7.66

Fig. 4: Sensory profile of therapeutic *Kadha* tablet



Conclusion

The study reveals that the sufficient quality control parameters were followed during the preparation of therapeutic *Kadha* tablet. Organoleptic parameters and nutritional analysis were carried out as per the norms of the guidelines. The results indicate the genuineness of final product that *Kadha* has important role in immunity enhancement and prevent infections whether bacterial or viral. It is also necessary to create awareness among people about *Kadha*, which will prevent disease and promote health of every individual because Great nutrition is central to improving immunity.[10]

Acknowledgement

The authors would like to thank the Research Laboratory of the Department of Food & Nutrition, Babasaheb Bhimrao Ambedkar University, Lucknow, for providing necessary chemicals and equipment's for the successful analysis.

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How to cite this article: Tripti Srivastava, Sunita Mishra. Proximate Analysis and Organoleptic Properties of therapeutic Kadha tablet for Immunity Booster. J Ayurveda Integr Med Sci 2022;6:99-104.
http://dx.doi.org/10.21760/jaims.7.6.13

Source of Support: Nil, **Conflict of Interest:** None declared.

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