

## Analysis of Ingredients, Nutritional value and Heavy Metals content in Norbu Bdun Thang compound.

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### ABSTRACT:

The aim of this study was to determine the ingredients, nutritional value, and content of heavy metals in Norbu Bdun Thang compound. The ingredients used in the preparation of Norbu Bdun Thang decoction were identified and examined by Sowa-Rigpa experts for its authenticity, while Fare Lab evaluated the nutritional value and the net content of heavy metals in it. This study found that every ingredient used to make Norbu Bdun Thang was derived from plants only. The highest value of nutrition content in this decoction was calcium and potassium, whereas it was observed that the very minimal amount of copper was the only heavy metal found in this decoction. Investigating the nutritional composition and safety of Sowa-Rigpa medicines like Norbu Bdun Thang is crucial, especially considering the limited research available. Therefore, this study unveils the properties of Norbu Bdun Thang compound and fills a small gap in scientific literature about Sowa-Rigpa medicine.

Key words: Sowa-Rigpa, Norbu Bdun Thang, Nutritional, Decoction, Herbs.

### I. INTRODUCTION:

The term Sowa-Rigpa literally means science of healing [2]. It is one of the traditional medical systems of India, with an established history of more than 2500 years. This system is mostly being practiced in the Himalayan region of India and its neighbouring countries like Bhutan, Nepal, Tibet, and China. In India its mostly being practised in Sikkim, Arunachal Pradesh, Darjeeling (West Bengal), Dharamsala, Lahaul and Spiti (Himachal Pradesh), UT Ladakh, and a Paldar part of Jammu and Kashmir [3]. This traditional science of healing provides many novel concepts on prevention of diseases, treatment of diseases and prolonging life techniques. Dietary disciplines, daily behavioural regime, external and internal therapies, and medicines are some of the concepts to maintain healthy life. In Sowa-Rigpa medicine, Herbs are widely being used to manufacture

medicines and decoctions. Thang or Decoctions is one of the standard processes which involves a herb or combination of herbs formula, which are boiled to extract their medicinal properties in liquid form and often consumed orally to treat cold and fever mostly [9].

Norbu Bdun Thang also known as seven Jewel Decoction [4] is one of the commonly used decoctions, which imparts immunity, cure cold, coughs, blood disorder, phlegm-related disorders, chronic and acute fevers. It is a plant-based formula, made up of seven blended herbs, i.e. Terminalia chebula (Aru), Terminalia bellirica(Baru), Emblica officinalis(Skuru), Inula Racemosa(Manu), Tinospora cordifolia (sLaetares), Rubus biflorus(Kantakari), and Zingiber officinale(sGaskya). As per the canonical textbook of Sowa-Rigpa "rGyud bZhi", Norbu 7 Thang is known as a composition of two decoction formula i.e. "bras bu gsum thangand ma nu bzhi thang"[1].

### Aims and Objectives:

To identify the medicinal plants used in the preparation of Norbu 7 Thang.

To evaluate the nutritional value of Norbu 7 Thang by quantifying some of the nutritional parameters.

To verify the content of heavy metals and validate the safety of Norbu 7 Thang for consumption.

### II. MATERIALS AND METHODS:

**A) Materials:** To prepare Norbu Bdun Thang, it's important to identify the ingredients correctly and the ratio of each ingredient used in it. Therefore, the current formula of decoction is based on the pharmacopeia book called bod kyi gso ba rig pa'i sman rdzasrnams spyod yul sman sbyor gang du gsal ba btso sbyang zhun thigs [5] to validate decoction authenticity. There are seven types of medicinal plants, which are used in making Norbu Bdun Thang, i.e. Terminalia chebula (Aru), Terminalia bellirica (Baru), Emblica officinalis (Skuru), Inula racemo-sa (Manu), Tinospora cordifolia(sLaetares), Rubus biflorus (Kantakari), and Zingiber officinale(sGaskya) [5] -

(Table 1).

All the Norbu Bdun Thang’s ingredients were purchased from Ladakh Amchi Sabha. Ladakh Amchi Sabha is an organization in Ladakh that plays a significant role in manufacturing of Sowa-Rigpa medicine and supplying of medicinal

raw materials to Sowa-Rigpa clinics and institutes in Ladakh. They are also involved in cultivation of medicinal plants, preservation of traditional knowledge, and promotion of the uses of Sowa-Rigpa’s medicines in healthcare system.

**Table 1:** Detail of Medicinal Plants used in preparation of Norbu Bdun Thang.

S.No	Scientific name of ingredients	Sowa-Rigpa name	Part Used	Net-Weight as per formulation
1.	Terminalia chebula.	Aru	Fruit (DRY)	100g
2.	Terminalia bellirica.	Baru	Fruit (DRY)	30g
3.	Emblica officinalis	Skuru	Fruit (DRY)	30g
4.	Inula racemosa	Manu	Root (dry)	100g
5.	Tinospora cordifolia	Lates	Stem(dry)	50g
6.	Rubus biflorus	Kantakari	Stem(dry)	50g
7.	Zingiber officinale	Gaskya	Root (dry)	30g

**B) Methods:**

**1) Identification:** In order to authenticate the ingredients and to maintain the therapeutic properties of Norbu Bdun Thang, Sowa-Rigpa’s doctors from esteemed institutions like the National Institute of Sowa-Rigpa and the Central Institute of Buddhist Studies in Leh were requested to identify the ingredients as per the Norbu Bdun Thang formula recorded in the pharmacopeia book. With the doctors verifying, all the ingredients were found to be plant-based and correct ingredients. This fundamental verification has aided in identifying the correct ingredients of Norbu Bdun Thang.

**2) Cleaning:** In order to prepare good quality of Norbu Bdun Thang compound, it is important to remove impurities and contaminants from the ingredients, which may contain foreign particles, dust or dirt residues. Employing methods like sorting, brushing, and air blowing can significantly reduce impurities and contaminants in the ingredients:

- a) **Sorting:** it ensures removal of impurities substances such as soil, dead insects, plastic residuals and hair from raw materials. It also removes unwanted substances like bark and seeds from stem and fruits (Figure 1).
- b) **Brushing:** using a brush to clean the ingredients has effectively removed non plant residual from the fruits and stems which was stucked to it (Figure 2).

c) **Air Blowing:** followed by the above two methods, this technique involves blowing compressed air to remove fine dust particles effectively from raw materials, without effecting the dryness of herbs (Figure 3).

With these cleansing techniques, it ensures high standard of cleanliness and Purity, contributing to overall quality of the Norbu Bdun Thang Ingredients.

**3) Weighing:** accurate weighing of ingredients is crucial to maximise the effectiveness of decoction and to reduce the risk of adverse effect or toxicity. Therefore, all the ingredients of Norbu Bdun Thang was accurately weighed according to the formula given in the pharmacopeia book of Sowa-Rigpa called “bod kyi gso ba rig pa’i sman rdzas rnam spyod yul sman sbyor gang du gsal ba btso sbyang zhun thigs”.(Table 1).

**4) Pounding:** to enhance the extraction of therapeutic properties from herbs and to make it more water soluble, breaking down of these herbs into smaller pieces is very important. Thus, all the ingredients were mixed together and manually pounded using iron mortar and pestle, crushing herbs into grain sized (Figure 4).

**5) Sample preparation for Lab Test:** In order to determine accurate data about Norbu 7 Thang, sufficient amount of decoction sample was tightly sealed in cleaned polybags, labelled as Norbu 7 Thang. Sealed sample was then sent

to Fare Lab Private Limited (M.G Road Gurugram, Haryana, India) on 19<sup>th</sup> July 2022 for required lab test.

FARE Labs is an accredited body as per ISO/IEC 17025:2017 by the National Accreditation Board for Testing & Calibration Laboratories (NABL) for both testing and calibration [6]. It is

also known for Recognised laboratory by FSSAI for testing a wide range of food products for safety and nutritional characteristics to meet their regulatory requirements.

Representative images of some of the methods followed during the preparation of Norbu Bdun Thang are shown as below:



Figure 1: Sorting



Figure 2: Brushing



Figure 3: Air Blowing



Figure 4: Pounding

### III. OBSERVATION AND RESULT:

On receiving the test report from Fare lab of Norbu Bdun Thang sample, it was observed that the 100g of Norbu Bdun Thang sample contain several minerals such as calcium, sodium and potassium. The present of potassium, calcium and sodium is 1196.36mg/100g, 484.34mg/100g and 22.12mg/100g respectively. In addition to the above minerals, it provides 357.18 calories, 6.4%

of protein, 79.43% of carbohydrates, 6.77% of dietary fibre, 2.09% of total sugar and 1.54% total fat as shown in (Table No- 2). Whereas the content of heavy metal such as Lead, Arsenic, Tin, Cadmium, Mercury, Methyl Mercury were not detected except copper. Cooper was the only metal found with the value of 1.06mg/kg (Table No-3), which is very low as compared to the permissible limit setup by the FSSR- Regulation 2011[7].

**Table 2:** Test Report of Nutritional Components of Norbu Bdun Thang.

S.No	Parameters	Value	Unit of Measure	Protocol
1.	Energy	357.18	Kcal/100g	FL/SOP/FC-02
2.	Protein	6.4	%	IS-7219
3.	Fat	1.54	%	FL/SOP/FC-298
4.	Total sugar	2.09	%	FSSAI Manual 4
5.	Carbohydrates	79.43	%	IS-1656
6.	Dietary Fiber	6.77	%	FL/SOP/FC-185
7.	Calcium	484.34	mg/100g	FL/SOP/AAS-11
8.	Sodium	22.12	mg/100g	FL/SOP/AAS-11
9.	Potassium	1196.36	mg/100g	FL/SOP/AAS-11

**Table 3:** Test Report of Heavy Metal content in Norbu Bdun Thang

S.No	Parameters	Test Result	FSSR,2011	Protocol
Heavy Metals:				
1.	Lead, mg/kg	ND,(LOQ-0.05)	NMT 2.5	FL/SOP/ICPMS-11
2.	Copper, mg/kg	1.06	NMT 30	FL/SOP/ICPMS-11
3.	Arsenic, mg/kg	ND,(LOQ-0.05)	NMT 1.1	FL/SOP/ICPMS-11
4.	Tin, mg/kg	ND,(LOQ-0.05)	NMT 250	FL/SOP/ICPMS-11
5.	Cadmium, mg/kg	ND,(LOQ-0.05)	NMT 1.5	FL/SOP/ICPMS-11
6.	Mercury, mg/kg	ND,(LOQ-0.01)	NMT 1.0	FL/SOP/ICPMS-11
7.	Methyl Mercury calculated as element, mg/kg	ND,(LOQ-0.01)	NMT 0.25	FL/SOP/ICPMS-11

Note: ND= Not detected, LOQ= Limit of Quantification, NMT= Not More Than

**IV. CONCLUSION:**

This study showed that the Norbu Bdun Thang compound formula is purely composed of seven herbs, which is all plant-based ingredients. The nutritional analysis result from the Fare Lab shows that Norbu Bdun Thang is a good source of potassium and calcium. It was observed that the traceable amount of copper was the only heavy metals detected in the Norbu Bdun Thang compound, which is under the range of copper permissible specified by the Food Safety and Standard (Contaminants, Toxin and Residues) Regulation, 2011. Thus, above analysis showed that the Norbu Bdun Thang prepared from the seven herbs is risk free for consumption.

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