



# GUIDELINES

for

## Mongolian Food Composition Database



Rural Development  
Administration



MINISTRY OF FOOD,  
AGRICULTURE AND LIGHT INDUSTRY



# **Guidelines**

**for**

## **Mongolian Food Composition Database**

Rural Development Administration (RDA)  
Ministry of Food, Agriculture and Light Industry (MoFALI)  
Mongolian University of Life Sciences (MULS)

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# Mongolian Food Composition Table/Database



## **1. Mongolian Food Composition Table/Database**

In Mongolia, the first “Food composition table” was established and published in 1997. It contains information for the following eight groups of products. It includes:

1. Meat and meat products;
2. Milk and dairy products;
3. Cereals and their products;
4. Vegetables;
5. Fruits and their products;
6. Fat, oils;
7. Sugar contents products;
8. Alcoholic

In the first FCT, a total of 12 nutrients of protein, fat, carbohydrates, fiber, ash, and vitamins A, C, E, Ca, K, Na, and Fe are covered in 288 products of the above eight groups. It was managed by the Ministry of Food, agriculture, and Light Industry. The FCT is available in hard copy. It contains few types of foods and has not been updated for more than 20 years.

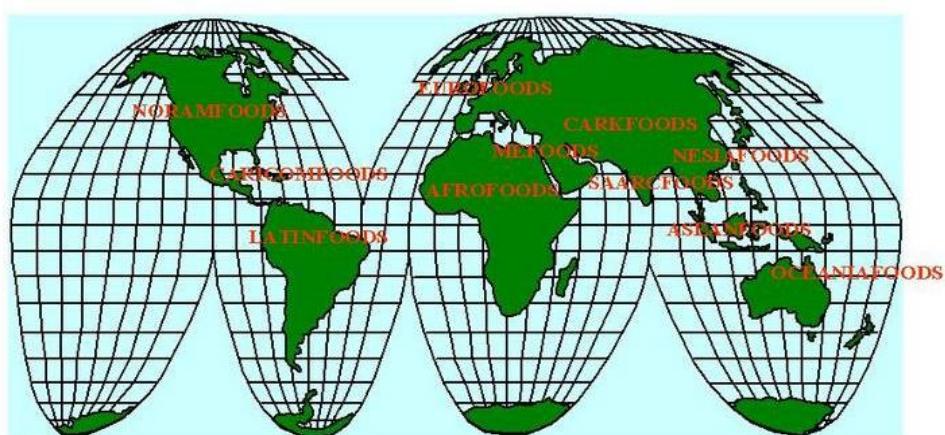


Figure 1.1 FAO/INFOODS Regional Data Centers



2

## The Second Revision of The Mongolian Food Composition Database



## **2. The Second Revision of The Mongolian Food Composition Database**

The listed foods were categorized into the following 13 groups:

1. Cereals and Cereal products
2. Starchy Roots and Starch products
3. Pulses and legumes
4. Vegetables
5. Fruits
6. Nuts and seeds
7. Meat and meat products
8. Eggs
9. Fish and fish products
10. Milk and milk products
11. Seasonings
12. Mushrooms
13. Prepared foods

## Nutrients listed in the Mongolian Food Composition Database

Table 2.1 Nutrients listed in the Mongolian Food Composition Table

Nutrients (English)	Nutrients (Abb.)	Unit	Decimal place
1. PROXIMATE			
Energy	ENERC	kcal	0
Water	WATER	g	1
Protein	PROT	g	2
Fat	FATCE	g	2
Ash	ASH	g	2
Carbohydrate	CHOCDF	g	2
Total dietary fiber	FIBTG	g	1
2. MINERALS			
Calcium	CA	mg	0
Iron	FE	mg	2

Table 2.1 (continued)

Nutrients (English)	Nutrients (Abb.)	Unit	Decimal place
Magnesium	MG	mg	0
Phosphorus	P	mg	0
Potassium	K	mg	0
Sodium	NA	mg	0
3. VITAMINS			
Vitamin A	VITA_RAE	µg	0
Thiamin	THIA	mg	3
Riboflavin		mg	3
Folic acid	FOLAC	µg	0
Vitamin C	VITC	mg	2

Table 2.1 (continued)

Nutrients (English)	Nutrients (Abb.)	Unit	Decimal place
4. FATTY ACIDS			
Total fatty acids	FACID	g	2
Total essential fatty acids	FAESS	g	2
Total saturated fatty acids	FASAT	g	2
Butyric acid	F4D0	mg	2
Caproic acid	F6D0	mg	2
Caprylic acid	F8D0	mg	2
Capric acid	F10D0	mg	2
Lauric acid	F12D0	mg	2
Tridecanoic acid	F13D0	mg	2
Myristic acid	F14D0	mg	2
Pentadecanoic acid	F15D0	mg	2

Table 2.1 (continued)

Nutrients (English)	Nutrients (Abb.)	Unit	Decimal place
4. FATTY ACIDS			
Palmitic acid	F16D0	mg	2
Heptadecanoic acid	F17D0	mg	2
Stearic acid	F18D0	mg	2
Arachidic acid	F20D0	mg	2
Henicosanoic acid	F21D0	mg	2
Begenic acid	F22D0	mg	2
Tricosanoic acid	F23D0	mg	2
Lignoceric acid	F24D0	mg	2
Total unsaturated fatty acids	-	g	2
Myristoleic acid	F14D1	mg	2

Table 2.1 (continued)

Nutrients (English)	Nutrients (Abb.)	Unit	Decimal place
4. FATTY ACIDS			
Palmitoleic acid	F16D1	mg	2
Heptadecenoic acid	F17D1	mg	2
Oleic acid	F18D1N9	mg	2
Vaccenic acid	F18D1N7	mg	2
Gadoleic acid	F20D1	mg	2
Erucic acid	F22D1	mg	2
Nervonic acid	F24D1	mg	2
Total polyunsaturated fatty acids	FAPU	g	2
Linoleic acid	F18D2N6	mg	2
$\alpha$ -Linolenic acid	F18D3N3	mg	2

Table 2.1 (continued)

Nutrients (English)	Nutrients (Abb.)	Unit	Decimal place
4. FATTY ACIDS			
γ-Linolenic acid	F18D3N6	mg	2
Eicosadienoic acid	F20D2N6	mg	2
Dihomolinolenic acid	F20D3N3	mg	2
Eicosatrienoic acid	F20D3N6	mg	2
Arachidonic acid	F20D4N6	mg	2
Eicosapentaenoic acid (EPA)	F20D5N3	mg	2
Docosadienoic acid	F22D2	mg	2
Docosapentaenoic acid (DPA)	F22D5N3	mg	2
Docosahexaenoic acid (DHA)	F22D6N3	mg	2

Table 2.1 (continued)

Nutrients (English)	Nutrients (Abb.)	Unit	Decimal place
4. FATTY ACIDS			
Total n-3 polyunsaturated fatty acids	FAPUN3	g	2
Total n-6 polyunsaturated fatty acids	FAPUN6	g	2
Total <i>trans</i> -fatty acids	FATRN	g	2
<i>trans</i> -Oleic acids	F18D1TN9	mg	2
<i>trans</i> -Linoleic acids	F18D2TN6	mg	2
<i>trans</i> -Linolenic acids	F18D3TN3	mg	2
5. AMINO ACIDS			
Total amino acids	-	mg	0
Total essential amino acids	AAE10A	mg	0
Isoleucine	ILE	mg	0

Table 2.1 (continued)

Nutrients (English)	Nutrients (Abb.)	Unit	Decimal place
5. AMINO ACIDS			
Leucine	LEU	mg	0
Lysine	LYS	mg	0
Methionine	MET	mg	0
Phenylalanine	PHE	mg	0
Threonine	THR	mg	0
Tryptophan	TRP	mg	0
Valine	VAL	mg	0
Histidine	HIS	mg	0
Arginine	ARG	mg	0
Tyrosine	TYR	mg	0
Cysteine	CYSTE	mg	0

Table 2.1 (continued)

Nutrients (English)	Nutrients (Abb.)	Unit	Decimal place
5. AMINO ACIDS			
Alanine	ALA	mg	0
Aspartic acid	ASP	mg	0
Glutamic acid	GLU	mg	0
Glycine	GLY	mg	0
Proline	PRO	mg	0
Serine	SER	mg	0
Taurine	TAU	mg	0



3

## National Food Analysis System



### 3. National Food Analysis System

Currently, there is no unified national food nutrition analysis system in Mongolia. Food nutrition analysis is carried out according to the following drafted structure.

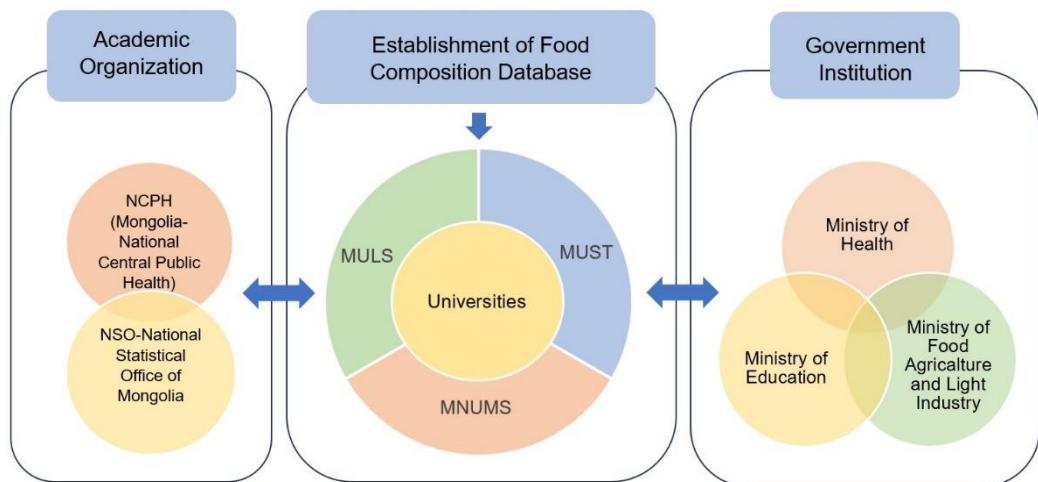


Figure 3.1 Cooperation in the Construction of the Mongolian Food Composition database

In Mongolia, at the moment, the work of analyzing the composition of food is carried out informally by laboratories of Universities. According to the above scheme, the second revision of the database of food composition is being established by the University of Life Sciences, and the Ministry of Food, Agriculture, and Light Industry is participating.



4

## Traditional foods brief



## **4. Traditional foods brief**

### **4.1 Cultural background**

#### **Geographical characteristics**

Mongolia is a landlocked country in the central part of Asia, situated between 41°–52° northern latitude and 87°–119° eastern longitude. Regarding land area, it ranks 19th in the world and 7th in Asia. The average elevation of Mongolia is 1,580 meters above sea level, with its highest point reaching 4,374 meters, reflecting its mountainous terrain. Mongolia shares its southern border with China and its northern border with Russia. As a result, the country's traditional food culture has been slightly influenced by the culinary traditions of its neighboring countries.

#### **Climatic characteristics**

Mongolia has four seasons, each with varying temperatures, precipitation, and wind intensity. Winter temperatures range from -15°C to -35°C, while summer temperatures range from 20°C to 25°C. Due to its location in the Northern Hemisphere's cold temperate zone, Mongolia experiences sub-zero temperatures for most of the year. The country's high altitude, distance from oceans, and surrounding mountain ranges contribute to its cold and extreme climate. Mongolia is generally windy, with wind intensity varying across regions, and the dominant wind direction is from the northwest. The growing season is relatively short, lasting from June to September. Due to the harsh climate, Mongolia can harvest crops only once per year.

As a result, the primary livelihood is pastoral livestock herding, with herders moving seasonally to find fresh pastures. Mongolians migrate between seasonal pastures in winter, spring, summer, and autumn to ensure optimal grazing for their livestock. Meat products dominate the diet in winter, spring, and autumn, while dairy products are primarily consumed in summer. Mongolia is home to a variety of wild fruits, berries, mushrooms, nuts, onions, and medicinal plants such as taana (wild thyme) and gögd, which have been traditionally used in food preparation. Historical records indicate that millet and other grains were cultivated in Mongolia as early as the Xiongnu (Hunnu) era.

### **Topographical characteristics**

The geographical location of Mongolia includes a desert region in the south, mountainous areas in the north and west, and a steppe zone in the east. To the west of Mongolia lies the Altai mountain range, which is characterized by steep, rugged high mountains. The Altai range stretches from the northwest to the southeast, branching out into several ridges. Most of the mountains in the region stand at an elevation of 3,500 to 4,000 meters above sea level. The largest mountain range in Mongolia is the Khangai Mountains, which stretches 900 kilometers from the northwest to the southeast. The northern part of the country is home to high mountains and forests, where cattle and yaks are primarily herded. Yak milk is thick and fatty, although it has a lower yield.

The steppe zone starts from the Khangai range and extends eastward, continuing until it reaches the desert region. The southern part of the country is a desert zone, consisting of 33 different deserts. The largest of these is the "Gulbani Gobi," known for its famous red-brown camels. In the Gobi, camel herds are raised, with some camels having two humps.

Camel milk is used to prepare a sweet drink called "Ingei Khormog," which is widely consumed for medicinal purposes and as a food product.

Mongolia has around 3,800 rivers and streams. Mongolians, as a nomadic people, have always cherished and protected their mountains, rivers, and nature, passing down their traditions and culture from generation to generation.

## **4.2 Materials and Origin**

### **Animal meat**

#### **1) Beef**

Pastoral livestock farming is a way of feeding exclusively on pasture grasses throughout the four seasons of the year, without requiring dedicated housing, living in open pastures, and being able to bear and reproduce even in the cold of winter.

Grazing livestock in Mongolia primarily feeds on grass and plants in the open pasture, requiring no special housing, and can live outdoors, even during the cold winter, while raising and nurturing their young. During the summer and autumn, livestock gain strength, and in the winter and spring, they convert fat reserves into energy to survive. As a result, the lipid composition of Mongolian livestock meat maintains its natural balance, meaning that the ratio of saturated to unsaturated fatty acids is roughly equal. Mongolians have historically utilized every part of the animal, including meat, head, offal, and blood, without waste, for food.

The tenderness and juiciness of beef vary depending on the age, gender, and breed of the cow. When selecting meat for cooking, it is essential to consider the thickness of the cut and the method of heat processing.

For grilled dishes, cuts from the main body of beef are ideal, while for steamed dishes, cuts from the leg or other parts of the cow work best. Beef can also be minced to prepare various minced meat dishes, such as buuz (dumplings), khuushuur (fried dumplings), and bansh (boiled dumplings). In the winter, beef is often boiled to prepare hearty soup-based meals.

Beef liver, heart, lungs, and kidneys are often chopped and frozen with blood to make a traditional dish called khyramtsag. This dish is typically prepared in the spring and used to make soup. The offal is rich in minerals, which makes it particularly beneficial in the spring. The beef head and brain are boiled and then turned into tsartsamal, a traditional dish that is rich in collagen and highly nutritious.

## 2) Borts

The art of preparing borts (dried meat) is based on Mongolia's natural climate, utilizing a drying method that evaporates moisture even at subzero temperatures. This process, called sublimation, allows the moisture in the meat to transition directly from solid (ice) to gas, preserving the meat's nutritional value with minimal changes. For this reason, borts is best made between November and December using beef, camel, or goat meat.

To prepare borts, the selected meat is cleaned of tough membranes and sinews before being cut into uniform strips, about 2–4 cm wide and 5–30 cm long, following the natural grain of the meat. The cut meat is then hung on ropes or cotton fabric lines at a height of around 2 meters, with 10–15 cm spacing between each piece for proper airflow. A more modern technique involves slicing the meat into flat pieces, puncturing one side, and hanging them on wooden hooks.

This method prevents uneven drying, mold formation, and hardening in folded areas, ensuring consistent dehydration. The meat remains hung until its juices fully absorb inward and it dries thoroughly in the wind.

Borts takes approximately 3–5 months to be ready. During this process, its weight is reduced by four to five times, with its moisture content dropping to no more than 7.5%, leaving it light and porous. Camel and beef borts typically contain 4.8–7.1% moisture, 65–89% protein, and 12.5% fat. Properly stored borts—kept in cloth bags, paper, or wooden boxes to prevent moisture absorption—can retain its quality at room temperature for up to a year.

Traditionally, borts is used as a staple food during long journeys and summer months. Before consumption, it is pounded into a powder, soaked in warm water, and used to prepare soups such as borts-based porridge (bantan), noodle soup (guriltai shul), or even borts-infused tea.

### 3) Sheep

Sheep are well adapted to grazing on both short and sparse vegetation, allowing them to quickly gain weight and provide significant benefits. They are an essential part of Mongolian nomadic life, serving as a primary source of food and livelihood. Among all livestock, Mongolians consume mutton the most. Traditionally, male lambs are castrated at three to five months old, a practice that enhances the quality of the meat by removing hormonal odors and increasing its fat and protein content.

The nutritional value of mutton depends on the age and sex of the sheep, a fact Mongolians have long understood and incorporated into their diet. A well-preserved tradition involves giving a postpartum mother a soup made from young male sheep to restore her strength.

The meat of young male sheep is particularly tender, juicy, easy to digest, and highly nutritious due to its balanced muscle fiber structure and high protein water-binding capacity. Mutton contains 50% essential amino acids, including lysine, methionine, threonine, histidine, and tryptophan, which are crucial for metabolism. Because of its rich nutritional content, Mongolians prepare both everyday and ceremonial dishes with mutton.

There are various ways to cook mutton, including boiling, roasting, steaming, and preparing traditional dishes like khorkhog (meat cooked with hot stones). In some regions, during winter, boiled meat broth is mixed with dried curd (aaruul) and consumed to boost immunity and prevent infections. Khorkhog is one of the most popular traditional dishes made with mutton.

Beyond consuming the meat, Mongolians have developed unique processing techniques to ensure no part of the animal is wasted, including the use of internal organs, the head, hooves, and blood. Organ meats are considered highly nutritious as they contain a balanced ratio of vitamins and minerals. Some of the most common traditional dishes made from sheep offal include khyaramtseg (a mixture of blood and chopped organs encased in a cleaned stomach) and tavan tsulyn shul (a soup made from five internal organs).

### **Sheep Fat Tail**

The fat tail of Mongolian sheep has unique nutritional properties. It is traditionally classified into three parts: protein tail, melted fat tail, and fatty tail. The protein tail is given to infants to promote healthy growth, as fats are essential for transporting and breaking down nutrients in the body. Feeding sheep tail fat to young children is believed to help them grow strong and healthy.

The protein tail contains 2.6% protein and has a higher proportion of unsaturated fatty acids compared to other parts of the tail.

Melted fat from the tail is purified and used for medicinal and therapeutic purposes, a tradition that continues today. For Mongolians living in cold climates, consuming foods rich in fat is a key source of energy. Sheep tail fat is widely used in Mongolian cuisine, including soups, dumpling soup (*banshtai tsai*), stir-fried noodles (*tsuivan*), and stone-cooked meat (*khorkhog*). It is an important ingredient in both everyday meals and special feasts.

### **Milk**

Milk contains essential proteins, fats, carbohydrates, minerals, and vitamins that are beneficial to the human body. Since domesticating livestock, Mongolians have utilized milk as a staple food source. Over time, they developed traditional dairy-processing techniques suited to Mongolia's climate and livestock. Although the basic composition of milk is similar across different animals, the quantity and ratio of nutrients vary depending on the species and environmental conditions. In cold climates, livestock produce milk with a higher fat content, providing essential energy for young animals.

Dairy processing methods depend on the region and type of livestock. In high-altitude areas, milk from hainag (a yak-cattle hybrid) and yaks is used to produce butter and protein-rich dairy products. In the Gobi region, camels and goats are the primary dairy animals, and their milk is fermented into sour dairy drinks. In the steppes and forest-steppe regions, horses, sheep, and cattle are raised for milk, which is processed into various dairy products.

Mongolians produce a wide range of dairy products, which are consumed year-round. Traditional preservation techniques ensure a steady supply of dairy products during winter and spring. Some of the most common dairy products include clotted cream (*öröm*), thick cream (*zöökhi*), yogurt (*tarag*), dried curd (*aaruul*), cheese (*eezgii*), and distilled fermented milk (*shimiin arkhi*). Mare's milk (*airag*) and camel's milk (*ingeenii khuurmog*) are popular fermented beverages with significant nutritional and medicinal benefits. Mare's milk has a casein-to-albumin protein ratio of 1:1 and contains 53% essential amino acids, making it highly valuable for therapeutic use.

### **Anhydrous Milk Fat (Ghee)**

Mongolians have a long-standing tradition of processing milk into various dairy products, one of which is ghee (*shar tos*). Ghee consists of up to 99.6% milk fat, 0.4% free fatty acids, and 0.1% moisture, making it highly stable, antioxidant-rich, and long-lasting [9].

In the central and eastern provinces, Mongolians traditionally extract butter by heating clotted cream (*öröm*). The cream is collected in a special container over time, allowing the growth of lactic acid and propionic acid bacteria, which break down lactose and proteins. This fermentation process creates the distinct aroma and flavor of Mongolian ghee. The clotted cream is then melted in a pot over fire, separating the pure butterfat.

In some regions, ghee is extracted by churning milk. Western and southern provinces use a method involving fermentation and churning, where cow, camel, or mare's milk is placed in wooden barrels or leather bags and churned at a specific temperature.

Regular consumption of ghee is believed to support brain function and boost immunity. Mongolians commonly use ghee in tea, soups, and porridge. It is also added to barley flour (arvain guril) for a nutritious mix. Additionally, ghee is used in dough-based recipes to keep baked goods soft and prevent them from drying out.

### **Flour**

As early as the 12th-13th centuries, Mongolians cultivated grains such as wheat, barley, and millet in the Orkhon and Selenge river valleys [2]. Different Mongolian ethnic groups have distinct tea preparation customs. During winter, roasted flour is often added to tea to enhance its flavor, a tradition known as khuitstei tsai (fortified tea).

Flour is used to prepare a variety of Mongolian dishes, including dumplings (buuz), fried pastries (khuushuur), noodle soup (guriltai shöl), and thick soups (bantan, bitüü shöl). Today, domestically grown wheat is processed into flour for making bread and other baked goods, playing a crucial role in the country's food supply.

### **Vegetables**

Mongolia's diverse climate, ranging from deserts to steppes and forests, has fostered the growth of various plants that have historically supplemented the Mongolian diet [2]. Mongolians consume wild berries such as strawberries (güzeelzgene), lingonberries (anis), and bilberries (nérs), while also brewing herbal teas from plant stems and leaves.

For seasoning and food preservation, Mongolians use aromatic wild herbs such as caraway (gönd), wild garlic (khaliar), onion (songino), thyme (taana), and chives (mangir). Medicinal plants are traditionally dried and infused for year-round use.

Even today, these traditional herbs play an essential role in Mongolian cuisine, particularly for flavoring dishes. When making dumplings (buuz), Mongolians frequently use caraway, and cultivated varieties of this herb are now commonly grown for culinary use.

### **4.3 Overview**

#### **Definition of ‘Local Food’**

Mongolian cuisine varies by region, influenced by climate, geography, and livestock practices. In the western Altai region, barley flour is a staple food, and the tradition of using Gobi-Altai barley flour continues today due to its rich flavor. The Gobi region, with its hot climate and sandy terrain, is suitable for camel herding, while the cold, mountainous Khangai region is ideal for yak husbandry. Traditional dairy processing techniques also differ by region, adapting to local environmental conditions.

#### **Selection and Exploration of Local Food**

The food characteristics of each geographical region of Mongolia vary depending on climate, livestock farming, and agricultural conditions. Dairy products dominate in the Khangai region, while a diverse range of foods is common in the Central region. Fat-rich foods are prevalent in the Gobi region, while game meat and fish are widely consumed in the Northern region. In the Western region, traditional Kazakh and Uriankhai cuisine is predominant.

## **Methodology**

### **1) Content Analysis**

The study utilized national nutrition surveys, academic journals, traditional Mongolian cuisine books, restaurant publications, and online resources.

### **2) Nutrient Analysis**

A total of 17 nutrients such as Moisture, Fat, Protein, Carbohydrates, Ash, Folic Acid, Vitamins B1, B2, and C, and Minerals (Na, Ca, K, P, Fe, Mg) were analyzed from the local foods by the AAS, HPLC methods and the information on traditional foods have been developed in accordance with the guidelines for Korean local foods (See Chapter 6.).

### **3) Reviving of Recipes through Field Survey**

Local food products were cataloged, and forgotten traditional dishes were studied. Historical sources, including books and manuscripts on Mongolian and traditional foods, were used to reconstruct recipes. The cooking process was documented through photographs, slides, and videos.

## **Validation of Locality**

The project team compiled a list of daily Mongolian dishes and presented it to the project's advisory board. Ten dishes were selected, including everyday staples like bantan (flour soup), borstoi shöl (dried meat soup), tavan tsuliin shöl (organ soup), tsuivan (stir-fried noodles), and banshtai tsai (dumpling soup). These dishes are prepared using traditional techniques, with distinct ingredients contributing to unique flavors.

Mongolians have a tradition of welcoming guests with delicious meals. Special ceremonial dishes include buuz (steamed dumplings), khuushuur (fried dumplings), khorhog (meat cooked with hot stones), tsagaan shuvuu, and bitüü shöl (sealed meat soup). In the Gobi region, a unique dish called Tsagaan Shuvuu is traditionally served to honored guests.



# 5

## Sampling

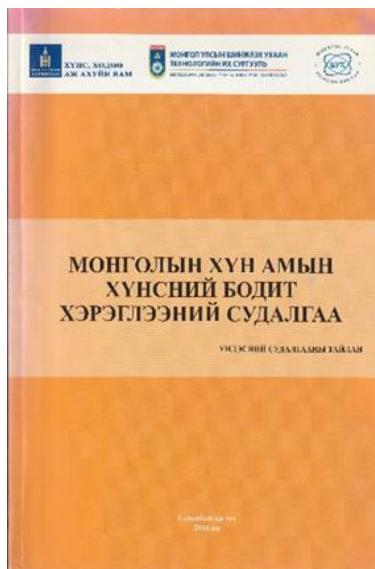


## 5. Sampling

### 5.1 Sample selection

**Use of statistical data:** At the international, the nutritional status of the population is assessed every 5 years and the prevalence of nutrition-related diseases is determined. In Mongolia, since 1997, the Ministry of Health has been conducting nutrition surveys I, II, III, IV, and V, and the last survey was conducted in 2017. The assessment of food consumption at the household level is part of the "Socioeconomic Population" survey conducted annually by the National Statistics Committee (<https://www.nso.mn/mn>). According to the results of this survey, food consumption is represented by food group indicators. Food groups are useful for evaluating food consumption patterns about poverty levels, but they do not indicate the total calories and nutrients available at the household level, and the actual consumption of individual nutrients. As a result of the 2003 household livelihood survey conducted by the National Statistics Committee, data on 92 types of food was collected, and in 2008, it increased to 122.

On the order of the Ministry of Food and Agriculture, the University of Science and Technology completed the "National Survey of Food Consumption of the Mongolian Population" in 2016. According to this survey, a total of 114 consumer products were registered in household food consumption, and they were divided into 14 groups and daily consumption was determined by population.



The image shows the cover of the 'National Survey of Food Consumption of the Mongolian Population' report. The cover features the logos of the National Statistical Office (NSO) and the Ministry of Health (MOH). The title is written in both Mongolian and English. Below the title, it says 'National Survey of Food Consumption of the Mongolian Population'.

Хүснэгт 14. Орчин хэрэгжүүний хүчиний бүлэгтэснэй байх Түүхийн будалтуулжсан хүчиний ядр гаралт			
Хүчиний бүлэг			
Үр тарина	Улаан буулайн болон бусаш үр тарина, газарзарийн гурвал, талх, цагаан будаа, шар будаа буудаа, бүх төрийн гоймж, боов бодрлог, жинтөмөг, гурвалан бүтээгдэхүүн		
Томс	Томс		
Хүчиний ноггоо	Луулал, машжин, горел бүрйин байшия, сонгино, сармиж, оргост хэмжэх, улаан поо ногион нийнгэй ноггоо, мөнж, кичи, ламзасан бүх төрийн ноггоо		
Мах, макан бүтээгдэхүүн	Бүх төрийн мах, дотор мах, борц, хиам, зайдас, аниийн мах, загас, лавазалсаа пошигийн макан бүтээгдэхүүн		
Өндөг	Өндөг		
Сүү, сүүн бүтээгдэхүүн	Үүгээний болон бусад малин сүү, тараа, ааруул, айраг, хоорхог, эзгийн, хуур сүү, бишч, етэргүйсэн сүү		

Хүснэгт 15. Орчиний жишигээ дундаж хувийн хоногийн хүчиний будалтуулж, сууриншилж Хүчиний бүлэг Хот Хоногийн хэрэлээ, тонн			
Хүчиний бүлэг	Хот	Аймгийн төв	Хөдөл
Үр тарина	386	442	420.1
Томс	73	65.3	64.2
Хүчиний ноггоо	90	55.4	46.1
Мах, макан бүтээгдэхүүн	138.9	142.7	133.3
Өндөг	10.7	4.6	0.01
Сүү, сүүн бүтээгдэхүүн	229.5	297.1	503.7
Жицэс, жимсээ	42.7	17.9	25.7
Ургамалын тос, веҳен тос	23.8	28.7	48.3
Амгалагч	10.6	9.9	11.6
Пай, кофе	3.2	3.6	3.9
Сотгүүрүүлийн үнэлээ	5.1	3.4	7.4
Сотгүүрүүлийн бус уллаа	60.2	32.7	26.6
Чисэр, саахрын зүйл	23.0	26.0	31
Бусад төрийн хүчин	3.0	0.3	1.6

**Figure 5.1 Lists of the most consumed and frequently consumed foods using statistics from the National Survey of Food Consumption of the Mongolian Population**

Using statistical data from the NSO and Survey of actual food consumption of the population this time selected 114 most consumed and most used foods in Mongolia. In addition, the food culture of the population, regional brands, and some products targeted for export are included.

**National Nutrition Survey (MOH and NCPH):** MOH and NCPH are a nationwide cross-sectional survey conducted every five years, and its target population is comprised of nationals, representatives, and non-institutionalized civilians in Mongolia. The last NNS V report focuses on the prevalence of nutrition conditions during the life course and is divided into five sections for specific target populations: children under 5 years, school-aged children 6-11 years, pregnant women 15-49 years, mothers 15-49 years, and men 15-49 years.

Also included are household socio-demographic characteristics, food security status, and iodized salt coverage. The survey report also includes six thematic chapters examining in greater depth the most pressing nutrition concerns facing Mongolia - iron, vitamin A, vitamin D, iodine deficiency, household food insecurity, and overweight and obesity – along with recommendations for nutrition-specific policy and programmatic actions for each topic.

Table 5.1 Nutrition status of the population of Mongolia - national nutrition survey V

Target population	The research scope and result
Children under 5 years of age	Low birth weight Nutrition status Micronutrient status Multiple micronutrient powder supplementation Receipt of micronutrient supplementation Care of illness Breastfeeding and infant and young child feeding
Mothers 15-49 years of age	Nutrition status Receipt of vitamin and mineral supplementation Antenatal care coverage Receipt of counseling messages First complementary foods are provided to children Media sources for health information

Table 5.1 (continued)

Target population	The research scope and result
Pregnant women	Nutrition status Anthropometric indicators Micronutrient status Dietary quality Micronutrient supplementation Antenatal care attendance Receipt of counseling messages in ANC Knowledge about breastfeeding and complementary feeding
Men 15-49 years of age	Nutrition status Micronutrient status Dietary quality Media sources for health information
School Children 6-11 years of age	Nutrition status Iodine status Consumption of junk foods Physical education

**Investigation of production by major agricultural product variety:** As recommended by the FAO to reflect the biodiversity of agro-food resources. The National Bureau of Statistics publishes an annual "Agricultural Sector Profile" that includes data on livestock and crop production, production and supply, exports and imports, and per capita output. Based on this information, a sample of livestock and agricultural products can be selected from the target area.

**Reflection of processing, sales, and consumption patterns:** Agro-food resources are sold raw or packaged after drying or application of other simple processing. Collecting nutritional component data at various levels in consideration of actual distribution and intake patterns is necessary to ensure convenient access to accurate data for information users. For example, it is possible to eat an apple with the skin intact or removed, so data on both should be collected.

If sufficient nutritional information on raw primary commodities has already been obtained, the cooking method that reflects the food culture (blanching, boiling, steaming, roasting, etc.) can be applied to identify changes in nutritional content according to the cooking process and to prevent excess or insufficient nutritional intake. For example, since potatoes are usually eaten baked or boiled, the database can be expanded with nutritional analysis data on raw, baked, and boiled potatoes.

## 5.2 Sample collection

Since most foods are biological materials with a composition that undergoes natural changes, factors such as variety, production/harvest time and cultivation environment/method should be considered so that representative samples are collected, with information on collected samples documented. The areas where the samples were collected are shown in the following figure.

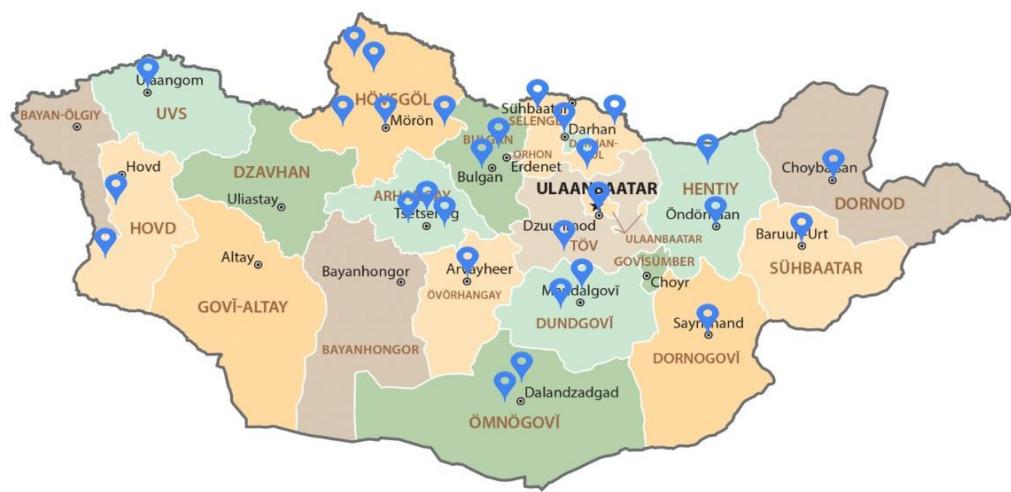


Figure 5.2 Sampling area of selection to food items

The material sampling activity followed the sample collection plan in Table 4.2.

Table 5.2 Sample Collection Plan

No	Sampling step	Description
1	Selection of food items	Frequently consumed food Biodiversity Potential staple food Local brand food Exported food
2	Sample population	The chosen region for sampling was the production areas of each commodity The sampling time is based on the harvesting season
3	List of population area	List of locations (provinces, cities) where commodity is available Date of available time for each commodity
4	Sampling methods	Selective sampling
5	Sampling unit	Sample are collected from 5 lots in the defined location. In every lot, about 2-5 kg samples (cereals), 5-10kg samples (vegetables and fruits), and 10-15 units (packaging food)
6	Minimum size laboratory sample	Cereal 1kg from every lot Vegetables and fruits: 2kg edible portion from every lot Liquid samples, dairy products: 2 L from every lot Meat and their products: 2kg from every lot Egg: 2-3kg every lot

For grains and fruit, the variety with the widest growing area and highest production should be selected, while for vegetables, separate samples should be collected from greenhouse crops and open-field crops. The main production area should also be considered. Fruit and vegetables should be transported immediately after harvest and pretreated for analysis to minimize changes in nutritional content.

For example, since more than 60% of Sea buckthorn is produced in the Uvs Province (according to the fruit production statistics by city and province), samples should be collected from the region.

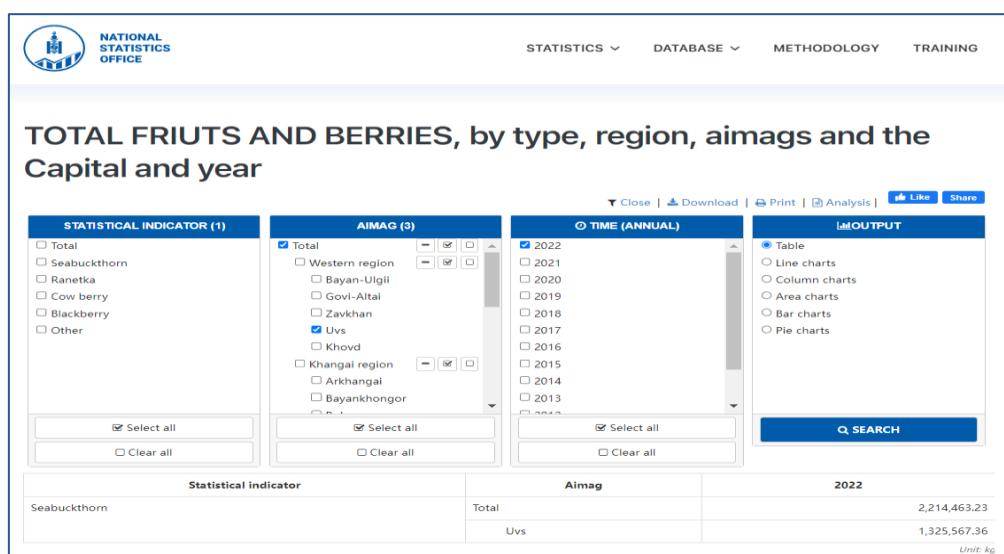


Figure 5.3 Selection of sample collection area using statistics on fruit, cereals, and vegetable production by province

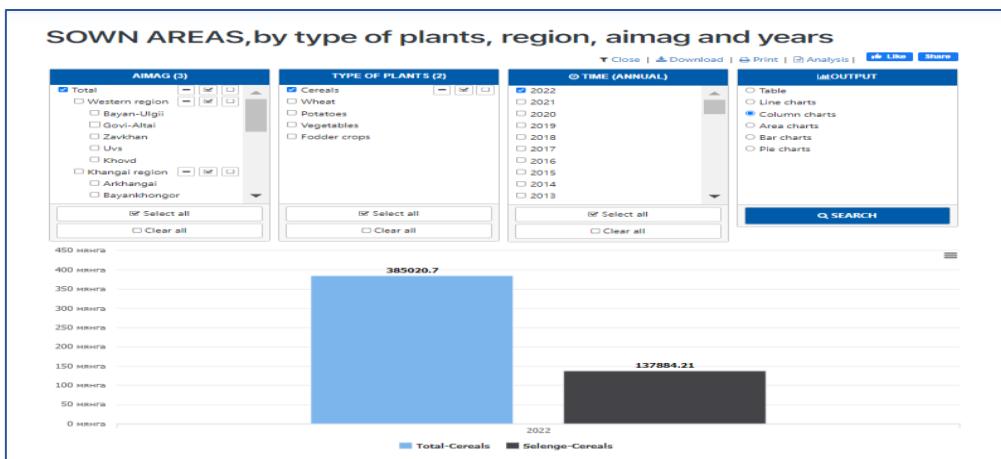


Figure 5.3 (continued)

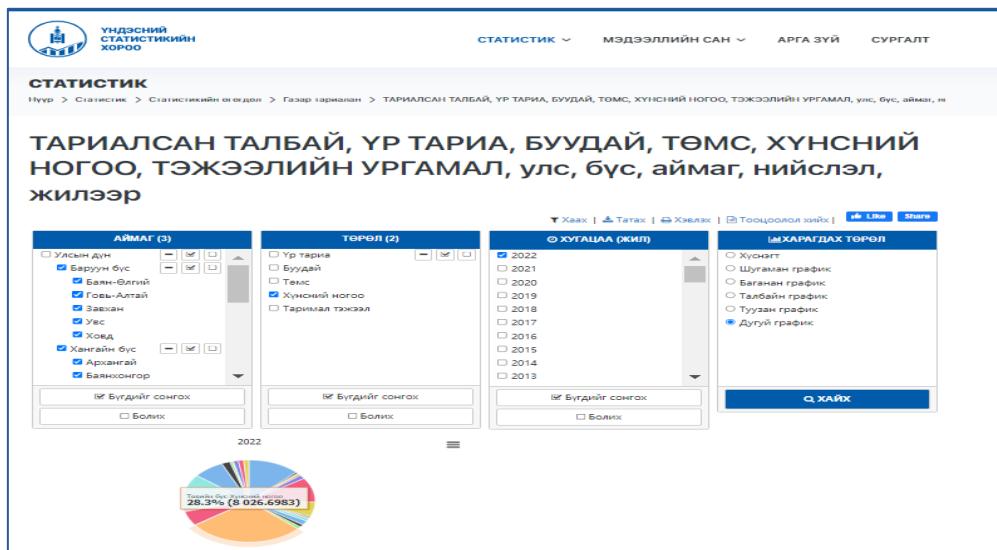


Figure 5.3 (continued)

Food industry statistics and market share data are used to determine the top 2 or 3 processed products to collect, which are then mixed or individually pretreated in consideration of the number of raw materials with which to make samples.

### 5.3 Analytical sample production and storage

Since the samples are representative of the whole food being tested, collection and homogenization should be handled with care. Agricultural products vary significantly in terms of variety, production area, cultivation environment, maturing time, and storage period and conditions. Therefore, the necessary information should be investigated in advance and referred to when making samples. When samples are not uniform, each one should be made by collecting small amounts from various parts and then mixing them. Samples should be taken carefully to avoid cross-contamination when grinding.

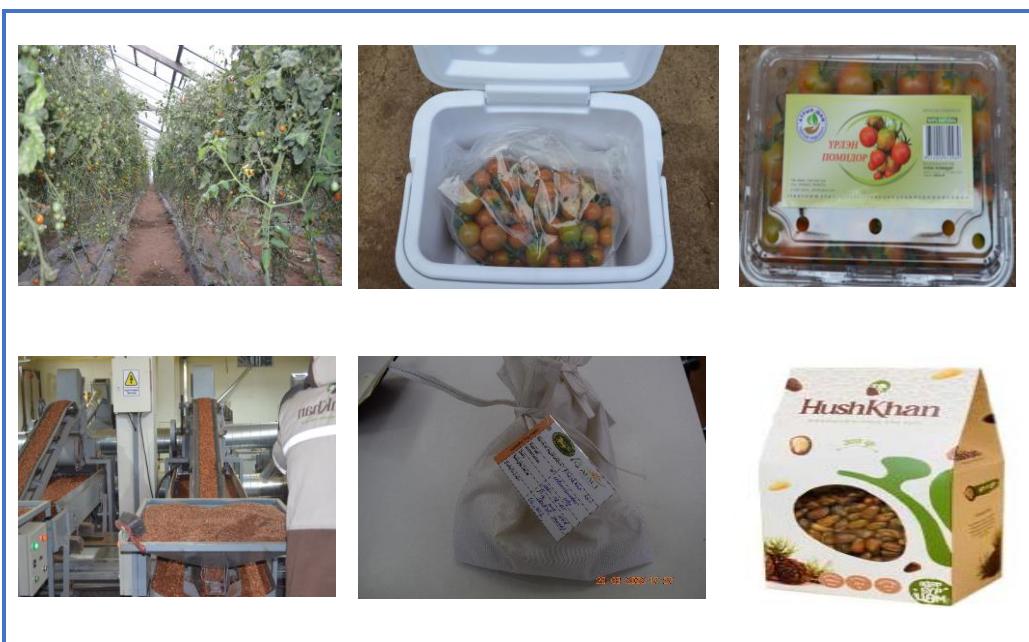


Figure 5.4     Check the sample information on the label  
(tomato and pine nut)

Flow chart of the process analytical sample production of acquisition of data on analysis result as seen in Figure 4.4.

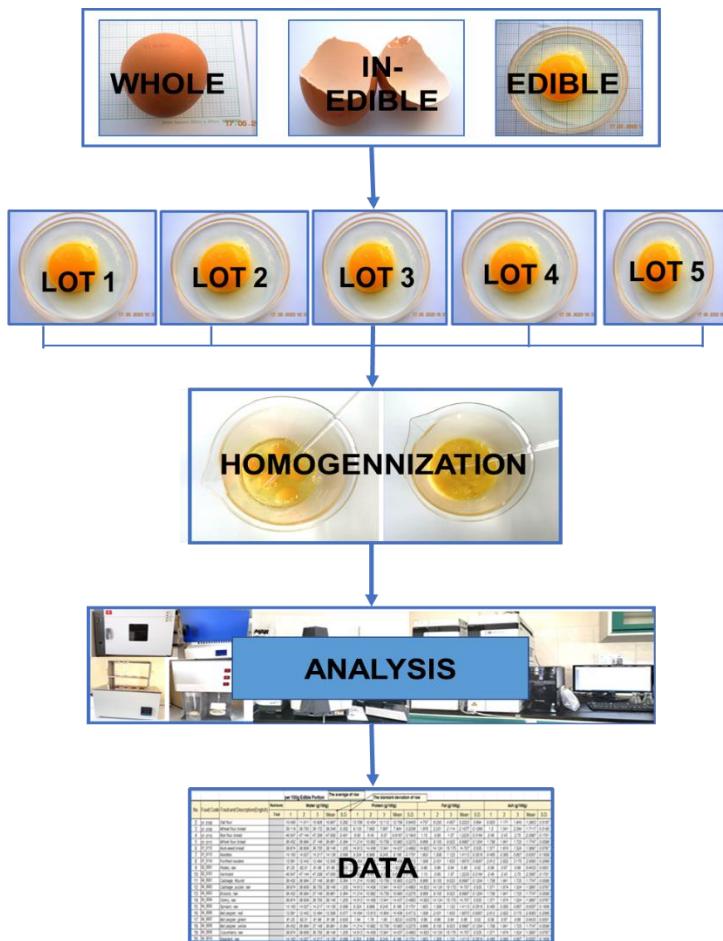


Figure 5.5 Flow chart of the process of analytical sample production

#### Production of analytical sample - Confirming sample information

**Preparation samples:** The collected samples are first washed under running water and then with distilled water. Moisture on the surface should be removed and inedible parts such as skins, seeds, and bones must be removed. Be careful not to include damaged or immature parts.

Samples with low moisture content, such as wheat, barley, and red and other beans, are homogenized by removing impurities such as dust and soil, then pulverized and sieved.

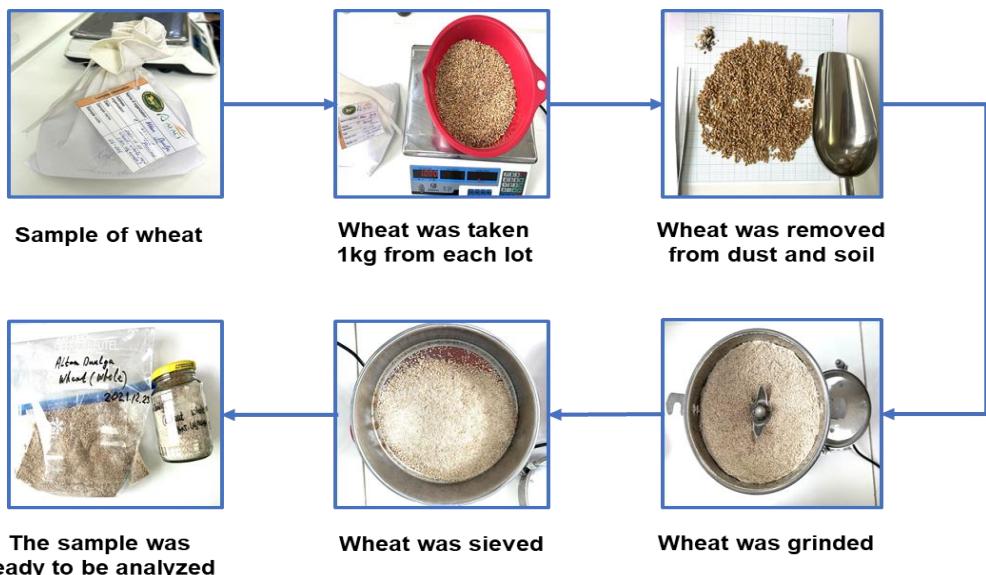


Figure 5.6 Preparation samples of wheat (raw)

Those with high moisture content, such as fruit and vegetables, are cut into approx. 1 cm cubes and quickly frozen with liquid nitrogen, ground, and then mixed well.

The information such as the weight of the entire sample, and the weight of the edible and inedible parts should be recorded during sample processing to create the sample information database.

Since the composition of ingredients often varies by part, samples should be cut so that the entire part is included while maintaining moisture. They should be processed as soon as possible after collection.

After grinding and homogenization, the samples are placed in a sample container, sealed with Parafilm M®, and stored in an ultra-low temperature freezer (deep freezer) at -70°C or lower for analysis.

Information such as the weight of the entire sample, the weight of the inedible part (the discarded part), and the weight of one cup (200mL) of the chopped sample should be recorded during sample processing to create the sample information database.

The application of simple cooking and its methods should be selected in consideration of the intake pattern and the characteristics of the tissue depending on the agro-food resources. The sample information database should record cooking and frying time, temperature, and tools. Within the sampling of this project, we have developed and prepared 2 types (Хэвийн боов-Kheviin boov and өрөм-урум) of traditional food products commonly used by the Mongolian population.

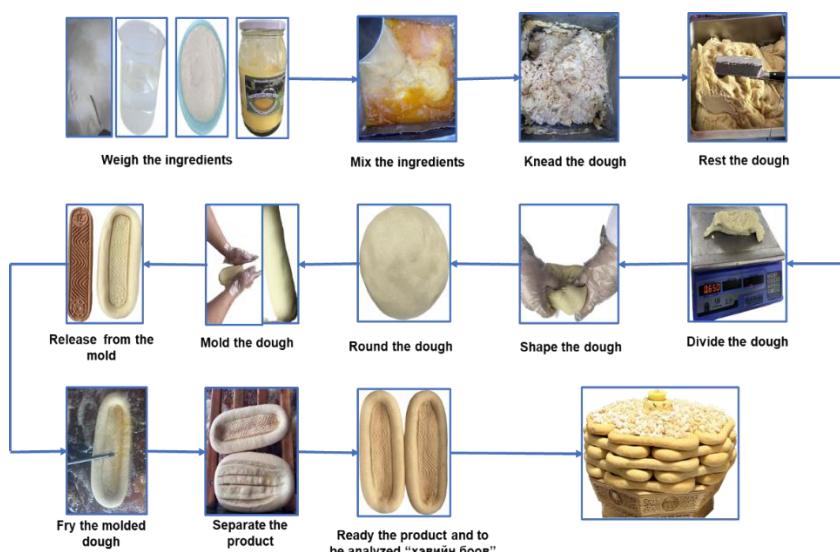


Figure 5.7 Preparation samples of cooked products in oil, “Хэвийн боов”

## **5.4 Creating the Sample Information Database**

The sample database should contain the records of collection information, pretreatment (cooking), and specifications (length, weight, etc.). It should also contain images of samples (whole, edible part, and inedible parts) for database management.

**Sample management:** For the management of analytical samples, rules should be established, coded individually, and stated on the label attached to the sample containers. The generated code and sample information should be recorded in the sample information database for management.

Table 5.3 Food Group Code

No.	Food Groups	Food Group Code
1	Cereals and Cereal products	A
2	Starchy Roots and Starch products	B
3	Pulses and legumes	C
4	Vegetables	D
5	Fruits	E
6	Nuts and seeds	F
7	Meat and meat products	G
8	Eggs	H
9	Fish and fish products	I
10	Milk and milk products	J
11	Seasonings	K
12	Mushrooms	L
13	Prepared foods	M

\*Example: The 2nd sample of the ‘Cereals and Cereal products’ which is prepared and stored in October 2021 is labeled as 2111A010

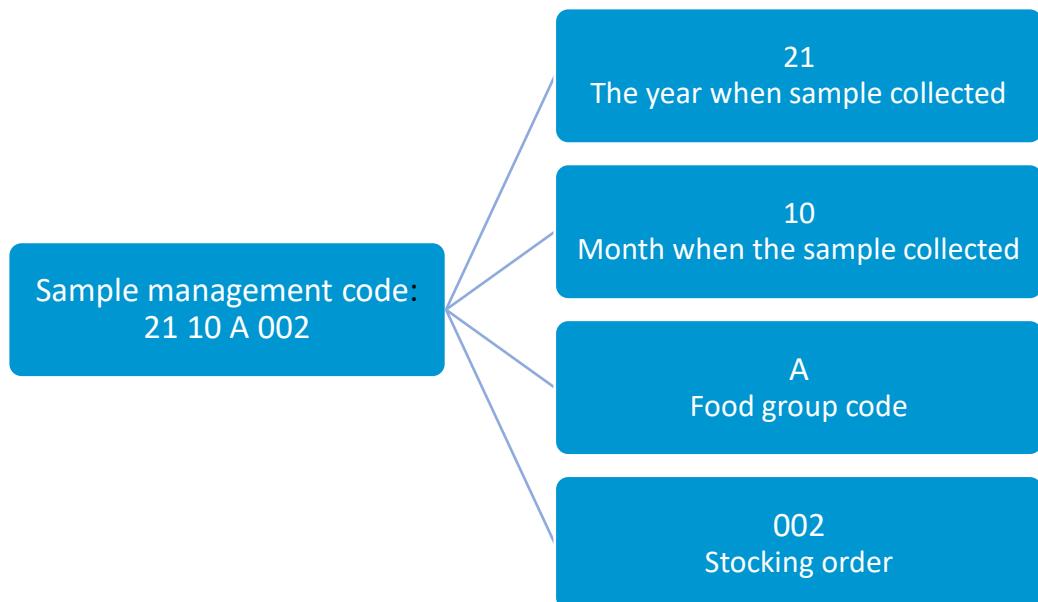


Figure 5.8 Sample management code

Sample information collection:

Table 5.4 Collected Information

	Collected Information	Description
Code	Sample management code	Code assigned to manage a collected sample
	Food composition database code	Food code listed in the Mongolian Food Composition DB

Table 5.4 (continued)

	Collected Information	Description
Food name (Agricultural product)	Common name (Native language)	Food name on Mongolian
	Another name (Native language)	Another Mongolian name used for the food
	Variety name (Native language)	Variety name in Mongolian (Cultivar/Species)
	Characteristics (English)	Appearance characteristics such as color and maturity
	Common name (English)	Food name in English
	Another name (English)	Another name used for the food in English
	Variety name (English)	Variety name in English (Cultivar/Species)
	Scientific name	Scientific name

Table 5.4 (continued)

	Collected Information	Description
Food name (Processed food)	Common name (Native language)	Food names in Mongolian
	Another name (Native language)	Another name used for the food in Mongolian
	Characteristics (English)	Appearance characteristics such as color and maturity
	Common name (English)	Food name in English
	Another name (English)	Another name used for the food in English
Collection information	Collection area	Where the sample is collected (province, city, country)
	Collection date	When the sample is collected (year, month, day)
	Rationales of sample selection	Why the sample is collected (e.g. 1. commonly consumed food, 2. biodiversity)
	Additional collection information	Other information related to the collection

Table 5.4 (continued)

	Collected Information	Description
Pretreatment conditions	Cooking (processing) time	Cooking(processing) time during sample pretreatment
	Cooking (processing) temperature	Cooking(processing) temperature during sample pretreatment
	Other cooking (processing) conditions	Soaking in water, etc.
	Reference for condition setting	Source of cooking method. (ex. Report, Cook book, online recipe, etc.)

Table 5.4 (continued)

	Collected Information	Description
Photo	Whole	Photo of the whole sample
	Cross section	Cross-sectional photo of a sample cut in half
	Edible part	photo of edible part
	Inedible part (Discarded part)	Photo of inedible(discarded) part
	Front of the packaging	Photo of the front of product packaging
	Back of the packaging	Photo of the back of the product packaging
	Information of raw materials	Information of raw materials stated on the product packaging
	Information of nutrition facts	Information of nutritional facts stated on the product packaging
	Others	Other photographic information that requires a sample-related record

Table 5.4 (continued)

	Collected Information	Description
Management	Storage location (short-term storage)	Storage location of short-term storage samples
	Storage location (long-term storage)	Storage location of long-term storage samples
	Number of sent samples (short-term storage)	Number of short-term storage samples sent for sample analysis and re-analysis
	Number of sent samples (long-term storage)	Number of long-term storage samples sent for re-analysis
	Date of sending samples	Date of sending the sample for analysis and re-analysis
	Name of person who released the sample	Name of the person who sent the sample for analysis and re-analysis
	Additional information	Any additional necessary information

## 5.5 Traditional food recipe

Table 5.5 White bird

Dish name	White bird
Local name	Tsagaan shuvuu
Image of the dish	
Ingredients	Sheep tail fat 2 kg, beef 400 g, onion 30 g, spring onion (scallion) 60 g, Mongolian chives 20 g, chopped sheep tail fat
Seasoning	Salt 4 g, black pepper 0.5 g

Table 5.5 (continued)

Dish name	White bird
Technology and processing	<ol style="list-style-type: none"> <li>1. Trim the hair on the sheep's tail, shortening it. Sing the hair at the root using fire and wash it.</li> <li>2. Leave about 1 cm of fat on the skin and carefully remove it to form a pouch. Spread the end of the fat on a plate.</li> <li>3. Finely dice onions or chop onions.</li> <li>4. Chop the beef into small cubes. Season with 60 g of chopped sheep tail fat, salt, and pepper, then add 50 g of water and mix well.</li> <li>5. Evenly coat and season the previously prepared tail with Mongolian chives.</li> <li>6. Place the seasoned meat on top of the prepared tail and sew the ends carefully.</li> <li>7. Place the prepared sheep tail in a single layer, in a basket. Pour boiling water into a wok until one-quarter full. Place the steamer over the wok, ensuring the base doesn't touch the water. Steam the prepared sheep tail dumplings for 2.5-3 hours till tender and cooked</li> <li>8. Once ready, cut the tail into 1.5 cm thick slices, and serve it garnishing with long-cut spring onions.</li> </ol>

Table 5.5 (continued)

Dish name	White bird		
Image of the dish preparation			
Additional information	<p>The dish from the Gobi region is served to honored guests as a gesture of respect. The cooked dish resembles a bird, so it is named “White Bird”.</p>		
Reference	Traditional Mongolian 99 Recipes, 2013		
Reason of selection	Traditional local food		

Table 5.6 Sheep Stomach Steamed Soup with Organ Meats

Dish name	Sheep stomach steamed soup with organ meats
Local name	Tavan tsuliin shul
Image of the dish	
Ingredients	Liver 60 g, kidneys 60 g, heart 60 g, lungs 60 g, stomach 60 g, onion 20g, barley 150g, spring onion 10g.
Seasoning	Salt 4 g, black pepper 0.5 g

Table 5.6 (continued)

Dish name	Sheep stomach steamed soup with organ meats
Technology and processing	<p>1. Thoroughly wash the liver, kidneys, heart, lungs, and stomach, then simmer them on low heat for 30-40 minutes. (Five main internal organs)</p> <p>2. Soak the barley in cold water, wash it well, and then add it to the boiling water, simmering for 10-15 minutes.</p> <p>3. Once the internal meat soup boils, remove the scum, and strain the soup.</p> <p>4. Place the organs into a bowl to cool and strain the soup thoroughly.</p> <p>5. Slice the heart, stomach, liver, kidneys, and lungs thinly and ensure the total weight 150 g.</p> <p>6. Simmer the previously cooked soup and add the sliced internal organs.</p> <p>7. Rinse the soaked barley and drain it with cold water.</p> <p>8. Add the drained barley to the boiling soup and simmer on low heat.</p> <p>9. Slice the spring onions into thin sticks and add them to the soup. Season the soup with salt and pepper, then serve it, garnishing with the sliced green onions on top.</p>

Table 5.6 (continued)

Dish name	Sheep stomach steamed soup with organ meats		
Image of the dish preparation	    		
Additional information	The internal meat is rich in minerals such as Ca, Mg, K, P, Mn, Cu, Zn, and Fe		
Reference	chrome-extension://efaidnbmnnibpcajpcgjclefindmkaj/https://		
Reason of selection	One of the most common dishes in Mongolia and is primarily consumed during the spring season.		

Table 5.7     Flour Soup

Dish name	Flour Soup
Local name	Bantan
Image of the dish	
Ingredients	Beef 120 g, flour 80 g, spring onion 50 g, carrot 80 g, broccoli 50 g
Seasoning	Salt 1 g

Table 5.7 (continued)

Dish name	Flour Soup
Technology and processing	<ol style="list-style-type: none"> <li>1. Mix the flour thoroughly with an egg.</li> <li>2. Slice the beef thigh thinly, add it in the bone broth then boil it till tender and properly cooked.</li> <li>3. Wash the carrot and broccoli, then chop them into small pieces.</li> <li>4. Remove the scum formed during the boiling of the soup.</li> <li>5. Add the carrot and the flour mixture into the boiling soup, stir well, and boil for 5-8 minutes.</li> <li>6. Add the broccoli to the boiling soup and season with salt and pepper.</li> <li>7. Serve with spring onions as garnish.</li> </ol>
Image of the dish preparation	

Table 5.7 (continued)

Dish name	Flour Soup
Additional information	Bantan is suitable for infants and the elderly, as it is included in their regular meals. The flour for bantan is kneaded into different sizes: small kneaded pieces are called 'lamb bantan,' medium kneaded pieces are called 'sheep bantan,' and large kneaded pieces are called 'beef bantan.'
Reference	Traditional Mongolian 99 Recipes, 2013
Reason of selection	One of the most common dishes in Mongolia.

Table 5.8 Bowl Soup

Dish name	Bowl soup
Local name	Bituu shul
Image of the dish	
Ingredients	150g of sheep meat, 80g of flour, 3g of spring onion, 5g of garlic, 5g of white ginger, 10g of butter, 30g of boiled lamb ribs.
Seasoning	Salt 1 g, black pepper 0.5 g, wild garlic 5 g

Table 5.8 (continued)

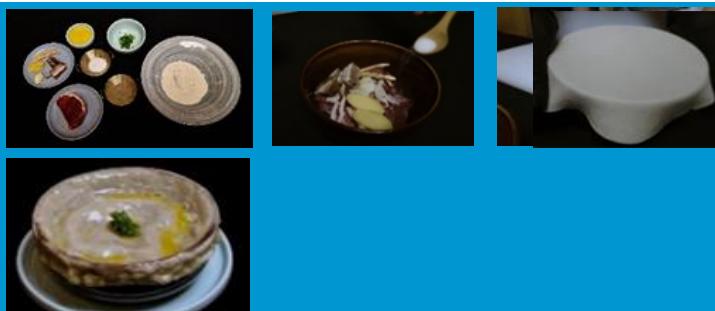
Dish name	Bowl soup
Technology and processing	<ol style="list-style-type: none"> <li>1. Mix the flour with warm water and let it rest.</li> <li>2. Slice the lamb thigh meat thinly.</li> <li>3. Place the sliced meat in a bowl, add garlic, white ginger, wild garlic, lamb ribs, and season with salt and pepper.</li> <li>4. Roll out the rested dough into thin, flat pieces.</li> <li>5. Add 400-450 ml of hot water or bone broth to the seasoned meat, stir, and seal the edges with the rolled dough.</li> <li>6. Steam the prepared thick soup in boiling water for 18-20 minutes.</li> <li>7. After steaming, brush the dough with butter and sprinkle with sliced green onions before serving.</li> </ol>
Image of the dish preparation	

Table 5.8 (continued)

Dish name	Bowl soup
Additional information	In some regions, thick soup is called "bowl soup." Mongolians use thick soup to improve physical strength and energy.
Reference	Asiana Restaurant's recipe and technology
Reason of selection	Nourishing meal

Table 5.9     Dumpling Tea

Dish name	Dumpling Tea
Local name	Banshtai Tsai
Image of the dish	
Ingredients	Beef 100 g, flour 60 g, onion 5 g, milk 150 ml, beef tendon meat 100 g, barley flour 5 g, rice 40 g, tea mix 50 g ghee 5 g.
Seasoning	Salt 1 g, black pepper 0.5 g, 1 teabag

Table 5.9 (continued)

Dish name	Dumpling Tea
Technology and processing	<p>Boil the beef tendon meat in boiling water on low heat until fully cooked.</p> <p>Prepare 7 dumplings:</p> <ol style="list-style-type: none"> <li>1. Mix flour with warm water and let it rest.</li> <li>2. Chop onion into small square pieces.</li> <li>3. Add the chopped onion, finely chopped lamb tail, salt, and pepper to the minced beef. Add 40 ml of water and mix well to season.</li> <li>4. Divide the rested dough into 7 portions and roll each into a round shape.</li> <li>5. Place the meat filling in the center of each dough piece and shape them into dumplings.</li> <li>6. In a pot, melt the lamb tail fat, then add the rice and fry until golden. Add hot water, tea mix, and bring to a boil, seasoning with salt.</li> <li>7. Once the tea is boiling, add the milk and the prepared 7 dumplings and cook them.</li> <li>8. Slice the cooked tendon meat thinly and place it on top of the tea.</li> <li>9. Drizzle with butter and sprinkle with barley flour before serving.</li> </ol>

Table 5.9 (continued)

Dish name	Dumpling Tea
Image of the dish preparation	
Additional information	Mongolians have consumed various types of milk tea in terms of geographical location. In the summer, on a rainy and cold day, they prefer to have dumpling tea, which provides warmth and energy. It is a traditional dish known for its light quality.
Reference	Asiana Restaurant's recipe and technology
Reason of selection	daily meal

Table 5.10 Dumplings

Dish name	Dumplings (8 pieces)
Local name	Buuz
Image of the dish	
Ingredients	Beef 260 g, lamb 80 g, lamb tail fat 45 g, flour 200 g, onion 40 g, cabbage 60 g, carrot 10 g, apple vinegar, vegetable oil, red tomatoes 40 g, shallot 5 g, cilantro 3 g, green chili pepper.
Seasoning	Salt 1 g, black pepper 0.5 g, cumin 3 g, tomato ketchup.

Table 5.10 (continued)

Dish name	Dumplings (8 pieces)
Technology and processing	<p><b>Buuzs (8 pieces):</b></p> <ol style="list-style-type: none"> <li>1. Mix the flour with warm water and let it rest.</li> <li>2. In minced beef, add minced lamb tail, minced lamb meat, chopped onion, salt, pepper, and garlic. Add 40g of water and mix well to season.</li> <li>3. Divide the rested dough into 20g portions and roll them into round shapes.</li> <li>4. Place the meat filling in the center of each dough piece and shape the dumplings.</li> <li>5. Place the dumplings in a steamer and steam for 12-15 minutes until cooked.</li> <li>6. <b>Cabbage Salad:</b> 6. Finely chop cabbage, carrot, and purple onion. Season with salt, apple vinegar, sugar, and vegetable oil.</li> <li>7. <b>Tomato Side Dish:</b> 7. Chop purple onion, cilantro, and green chili into small pieces. Cut the tomatoes in half and lightly char them. Mix the chopped vegetables with vegetable oil and season with red tomato ketchup.</li> <li>8. Serve the steamed dumplings with cabbage salad and tomato side dish.</li> </ol>

Table 5.10 (continued)

Dish name	Dumplings (8 pieces)
Image of the dish preparation	
Additional information	<p>Dumplings (Buz) are a traditional Mongolian dish made by preparing a filling with meat and onions, wrapping it in thin dough, and steaming it. This type of closed food is similar to dishes found in many Central Asian cuisines, but Mongolians have their own unique twist, using meat from livestock raised in their regions, medicinal herbs, wild onions, wild garlic, and juniper berries.</p> <p>Mongolians traditionally make dumplings during the national holiday of Tsagaan Sar (Lunar New Year). It is a customary dish to serve to guests as a sign of respect and hospitality.</p>
Reference	Asiana Restaurant's recipe and technology
Reason of selection	Special occasional meal

Table 5.11 Meat Hot Pocket

Dish name	Meat hot pocket (6 pieces)
Local name	Khuushuur
Image of the dish	
Ingredients	Beef 200 g, lamb 80 g, lamb tail fat 20 g, flour 210 g, onion 40 g.
Seasoning	Salt 2.5 g, black pepper 0.5 g, tomato ketchup.

Table 5.11 (continued)

Dish name	Meat hot pocket (6 pieces)
Technology and processing	<ol style="list-style-type: none"> <li>1. Remove the skin from the onions and cut them into small squares. Cut the beef, lamb, and lamb tail into small squares as well. Add the chopped onions, salt, and pepper and mix well to season.</li> <li>2. Mix the flour with warm water and let it rest. Divide the rested dough into 50g portions and roll them into round shapes.</li> <li>3. Place the meat filling in the center of each dough piece and fold the edges to seal the dumpling. Flatten it slightly.</li> <li>4. Heat oil in a frying pan and fry the dumplings on both sides until golden brown.</li> <li>5. Cabbage Salad Preparation: Slice cabbage, carrot, and purple onion into thin strips. Season with salt, apple vinegar, sugar, and vegetable oil.</li> <li>6. Tomato Side Dish Preparation: Chop purple onion, cilantro, and green chili into small pieces. Cut the tomatoes in half and lightly char them. Mix the chopped vegetables with vegetable oil and season with red tomato ketchup.</li> <li>7. Serve the fried dumplings with cabbage salad and tomato side dish.</li> </ol>

Table 5.11 (continued)

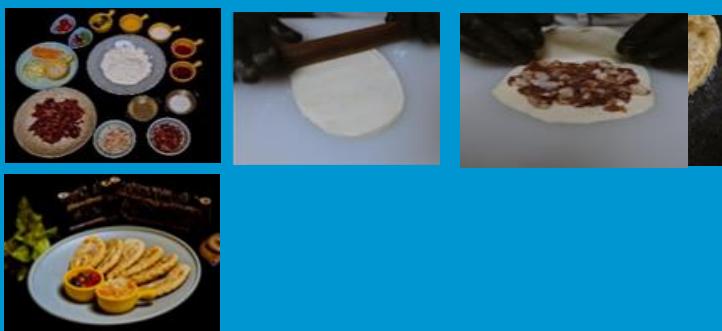
Dish name	Meat hot pocket (6 pieces)
Image of the dish preparation	
Additional information	<p>Khuushuur is a type of wrapped food made by preparing a filling with meat and onions, wrapping it in thin dough, and frying it in oil. Khuushuur is one of the ancient traditional dishes of the Mongolian people and is closely connected to the nomadic culture. Since it is fried, it is easy to prepare and eatable for long journeys, which fits well with the nomadic lifestyle.</p> <p>Khuushuur is traditionally made during the Naadam festival, for celebrations, and as a special dish to serve to guests in honor.</p>
Reference	Asiana Restaurant's recipe and technology
Reason of selection	Special occasional meal

Table 5.12 Stomach Khorkhog (Mongolian Hot-Stone Method)

Dish name	Stomach khorkhog
Local name	Guzeenii khorkhog
Image of the dish	
Ingredients	1 kg of lamb with bone, 500g of lamb fat, 200g of flour, 30g of onion, 40g of green onion, 5g of garlic, 150g of potatoes, 150g of carrots.
Seasoning	Salt 10 g, black pepper 1 g.

Table 5.12 (continued)

Dish name	Stomach khorkhog
Technology and processing	<ol style="list-style-type: none"> <li>1. Cut the lamb with bone into pieces about 6-8 cm in size.</li> <li>2. Clean the lamb fat and stuff it with the small pieces of meat, adding hot stones that have been heated to help cook the meat.</li> <li>3. Add potatoes, carrots, onions, and garlic, seasoning with salt and black pepper.</li> <li>4. Carefully seal the opening of the lamb fat.</li> <li>5. Place the stuffed lamb fat into a pot, lay cabbage leaves underneath, and cook it for 1 hour on low heat.</li> <li>6. Mix the flour with warm water, let it rest, and then roll it out thinly.</li> <li>7. Steam the rolled dough until it is cooked.</li> <li>8. Serve the stuffed lamb fat with the steamed dough and green onions.</li> </ol>

Table 5.12 (continued)

Dish name	Stomach khorkhog
Image of the dish preparation	
Additional information	Khorkhog is typically made with lamb meat. It is a traditional dish prepared for honored guests during the summer season. There is also a method of cooking it in smaller quantities in a pot or inside the lamb fat.
Reference	Asiana Restaurant's recipe and technology
Reason of selection	Special occasional meal

Table 5.13 Fried Noodles and Meat

Dish name	Fried noodles and meat
Local name	Tsuivan
Image of the dish	
Ingredients	230g of beef tenderloin, 50g of onion, 100g of cabbage, 100g of carrot, 220g of flour, 30g of dried meat (borts), 100g of partridge bones, 30g of green onion, 20ml of vegetable oil, 5g of celery.
Seasoning	Salt 3 g, black pepper 0.5 g.

Table 5.13 (continued)

Dish name	Fried noodles and meat
Technology and processing	<p>1. Boil the beef tenderloin on low heat until fully cooked. Once cooled, slice it thinly.</p> <p>2. To prepare the dough, cook the partridge bones and dried meat (borts) to make broth. Use this broth to knead and rest the flour.</p> <p>3. Roll the dough into a thin, round shape. Heat it on a hot cast-iron surface and slice it into 1 cm wide pieces.</p> <p>4. Finely chop the onion, carrot, and cabbage into thin strips.</p> <p>5. In a frying pan, heat vegetable oil, then add the onion, carrot, and cabbage, and stir-fry. Add the ground dried meat (borts) and beef tenderloin, and continue to fry. Season with salt and pepper.</p> <p>6. Add the bone broth to the pan and bring to a boil. Evenly distribute the dough pieces and steam for 8-10 minutes until fully cooked.</p> <p>7. Chop the celery and mix it with butter, then add it to the prepared dish and stir.</p> <p>8. Serve the dish by plating it, topping it with the sliced beef tenderloin, and garnishing with green onions. Cut the lamb with bone into pieces about 6-8 cm in size.</p>

Table 5.14    Soup with Dried Meat

Dish name	Soup with Dried Meat
Local name	Борцтой шөл
Image of the dish	
Ingredients	Beef 100g, minced mutton 50g, flour 60g, onion 20g, dried meat (borts) 30g, mutton fat 50g, spring onions 5g, cabbage for soup 30g, dried plum (red plum) 5g.
Seasoning	Salt 3 g, black pepper 0.5 g.

Table 5.14 (continued)

Dish name	Soup with Dried Meat
Technology and processing	<p>1. Mix the flour with warm water and let it rest.</p> <p>2. Cut the beef into thin slices.</p> <p>3. Boil the dried meat, mutton fat, and beef in cold water over low heat.</p> <p>4. Skim off the fat and impurities from the boiling broth.</p> <p>5. Chop the onion into small squares.</p> <p>6. In the minced mutton, add the chopped onion, salt, pepper, and 20 ml of water. Mix well to season.</p> <p>7. Divide the rested dough into 7 portions and roll them into round shapes.</p> <p>8. Place the meat filling in the center of each dough and shape the dumplings.</p> <p>9. Add the dumplings into the boiling broth and cook, seasoning with salt and pepper.</p> <p>10. Finally, add the dried plums and cabbage to the broth and finish cooking.</p> <p>11. Serve the soup in bowls, garnish with green onions, and serve.</p>

Table 5.14 (continued)

Dish name	Soup with Dried Meat			
Image of the dish preparation				
Additional information	<p>Borts is dried meat that Mongolians have traditionally prepared using freezing and drying methods since ancient times. It is a convenient and nutrient-rich source of meat, perfectly suited to the nomadic lifestyle, as it is easy to store and preserve.</p>			
Reference	Asiana Restaurant's recipe and technology			
Reason of selection	Traditional dishes made with borts (dried meat)			

## Guidelines for Mongolian Food Composition Database

No.	Code	Food composition (Mongolian code)	Common name (Native language)	Common name (English)	Characteristics (English)	Scientific name	Date of procurement	Image								Information of raw materials	Information of nutrition facts	Oils	Collection area	Collection date	Kinds of sample collection	Additional collection information	Weight of whole part (g/1 piece)	Weight of solid part (g/1 piece)	Weight of raw material part (g/1 piece)	Weight of processed part (g/1 piece)
								Whole	Cross section	Fillets/past	Meatlike part	Front of the packaging	Back of the packaging	Information of raw materials	Information of nutrition facts											
8	10103	Бүрэлдэх үрээс 140	Wheat flour, brown	light brown, powder	wheat processed	12.28.2021									Packaging weight: 1kg, Calories in 100g product: 324kcal, fat 0.6g, protein 12.0g, carbohydrates 86.1%, ash 1.1g, fiber 0.16%, fat 1.6g, %, sugar 0g		Oulan-Uul province, Ulaanbaatar flour mill LLC	24.11.2021	Commonly consumed food	Product name: Ulaanbaatar flour, first grade wheat flour	1000	1000				
9	10104	Бүрэлдэх үрээс	Wheat flour, whole	beige brown, powder	wheat processed	12.28.2021									Packaging weight: 5kg, 232 kcal per 100g product; calculated by the amount of nutrients contained in 100g product. Carbohydrates 75.4g±43.22%, protein 23g±13.22%, fat 1.4g±0.7%, sugar 0g		Khangai province, Altai duulge LLC	25.11.2021	Commonly consumed food	Product name: Altai duulge flour, whole wheat flour	5000	5000				
10	10105	Харин дээдэгээртэй	Psouted barley flour, whole	brown, powder	psouted barley processed	12.25.2021									Ingredients: Psouted barley, Roasted barley can be used directly or added to the ingredients of pastries and bread.	Packaging weight: 1kg, Calories per 100g product: 324kcal, fat 0.6g, protein 11.97%, carbohydrates 86.1%, ash 1.8%, fiber 4%, sugar 1.5%		Khangai province, Altai duulge LLC	25.11.2021	Culture and customs	Product name: Psouted barley flour, Roasted barley flour	1000	1000			
11	10106	Агаадын ячнын тус	Barley flour, whole, raw	beige brown, powder	barley processed	12.28.2021									Ingredients: Barley, flour can be enriched with a drill, mixed with flour and milk, and used directly, sprinkled in tea and soup.	Packaging weight: 1kg, Calories per 100g product: 294.4 kcal, nutrient content per 100g product: Carbohydrates 48g, protein 12.8g, fat 0.5g		Uvs province, Uvs food LLC	05.10.2021	Culture and customs	Product name : Fiber barley flour	1000	1000			
12	40001	Бацайдүй	Peanut, dried, raw	dark green, solid	Peanut essence	12.15.2022												Oulan-Uul province, Plant Protection and Research Institute	24.11.2021	Biodiversity		0.128	0.128			
13	40002	Шар бүргүүс	Soybean, dried, raw	beige, solid	Glycine hispida L	12.15.2022											Oulan-Uul province, Plant Protection and Research Institute	05.10.2021	Biodiversity		0.146	0.146				
14	80001	Чаварчийн ячнын	Stabuckdrom	orange, soft	Hippophae rhamnoides	11.12.2021									Blue variety of sea buckthorn fruit grown in Uvs province			Uvs province, Uvs food LLC	05.10.2021	Commonly consumed food		0.572	0.553	Uam and seed	0.019	
15	80101	Чаварчийн шөвүүрээс тус	Stabuckdrom, syrup	orange, liquid	Stabuckdrom processed	11.12.2021									Ingredients: Sea buckthorn juice and sugar. Concentrated juice contains a lot of soft tissue of sea buckthorn after shaking thoroughly, mix with 150-200 ml of water.	Packaging volume: 35ml, Nutrient content in 100g product: Calories 192.5kcal, carbohydrates 46g, fat 0.5g, protein 1g		Uvs province, Uvs food LLC	05.10.2021	Commonly consumed food	Product name:Stabuckdrom concentrated juice	35	35			
16	140001	Чаварчийн ячнын ардын тоо	Stabuckdrom, pulp	orange, liquid	Stabuckdrom processed	11.12.2021									Ingredients: Pulp of sea buckthorn, 20-30 drops 1-2 times a day, can be added to bread for enrichment.	Packaging volume: 100ml, Content of nutrients in 100ml product: Calories 192.5kcal, carbohydrates 46g, fat 0.5g, protein 1g		Uvs province, Uvs food LLC	05.10.2021	Exported food	Product name:Stabuckdrom pulp oil	100	100			
17	140002	Чаварчийн урьжийн тоо	Stabuckdrom, seed oil	orange, liquid	Stabuckdrom processed	11.12.2021									Ingredients: seed of sea buckthorn, 20-30 drops 1-2 times a day, can be added to bread for enrichment.	Packaging volume: 100ml, the content of nutrients in 100ml product: Calories 351.5kcal, Vitamin E 123mg, Vitamin C 171mg, carbohydrates 48.5g, omega 3 + 6 45mg, omega 6 + 9 44.622mg		Uvs province, Uvs food LLC	05.10.2021	Exported food	Product name:Stabuckdrom seed oil	100	100			
18	50001	Күүр алданын салбар	Cedar (pine) nut, raw	dark brown, solid	Cedrus deodara	01.17.2022									Ingredients: Cedar nuts	Packaging weight: 100g, nutrient content in 100g product: Calories 334 kcal, carbohydrates 38.17g, fat 31.4g, protein 26.7g, calcium 16mg, iron 5.5mg, zinc 6.45mg, Vitamin C 0.8mg, Vitamin E		Ulaanbaatar city, Nord Road LLC	24.12.2021	Exported food	Product name:Hushkhain pine nut	0.271	0.123	shell	0.138	
19	50101	Күүр алданын салбар чөлөө	Cedar (pine) nut, solid	beige, solid	Cedar processed	01.17.2022									Ingredients: Cedar nuts solid	Packaging weight: 100g, nutrient content in 100g product: Calories 304 kcal, carbohydrates 30.16g, fat 25.35g, fat 25.25g, protein 25.8g, calcium 17.7mg, iron 8.8mg, potassium 933mg, thiamine 7.7mg, Vitamin E 11.18mg, Vitamin		Ulaanbaatar city, Nord Road LLC	24.12.2021	Exported food	Product name:Hushkhain pine nut seeds	0.133	0.133			
20	140003	Күүр алданын салбар тоо	Cedar (pine) nut oil	yellow, liquid	Cedar processed	01.17.2022									Ingredients: Cedar nuts solid		Cold pressed oil	Ulaanbaatar city, Nord Road LLC	24.12.2021	Exported food						

**Figure 5.9      Example of generated sample information database**



# 6

## Nutrients Analysis Method



## 6. Nutrient Analysis Method

Analytical data is produced by applying methods certified by domestic and foreign accredited institutions such as the Food Code (Ministry of Food and Drug Safety) and AOAC Official Methods (Association of Official Analytical Chemists) and methods that have been verified by domestic and foreign academic journals.

Table 6.1 Analysis Methods

Nutrients	Analysis Method	Reference
Water	Dry-oven method	Determination of calories in food products, MNS 6958:2021 AOAC 2000 AOAC 2000
Protein	Kjeldahl method, *N conversion factors	Determination of calories in food products, MNS 6958:2021 No. 984.13; AOAC 2000
Fat	Soxhlet method	Determination of calories in food products, MNS 6958:2021 No. 991.36 of AOAC 2000
Ash	Gravimetric methods	Determination of calories in food products, MNS 6958:2021 AOAC Official Method, 1998d

Table 6.1 (continued)

Nutrients	Analysis Method	Reference
Dietary fiber	Gravimetric method- ADF	AOAC Official Method 973.18
Calcium	The Atomic Absorption Spectrophotometer (AAS)	AOAC, 2000
Iron		
Potassium		
Sodium		
Phosphorus	Spectrophotometric method	ASEAN Manual of Food Analysis, 2011
Magnesium	EDTA titration	AOAC 964.01-1996
Retinol	Ultrasound-assisted extraction, HPLC	ASEAN Manual of Nutrient Analysis (2011).
Thiamine	Ultrasound-assisted extraction, HPLC/UVD	ASEAN Manual of Food Analysis, 2011

Table 6.1 (continued)

Nutrients	Analysis Method	Reference
Riboflavin	Ultrasound-assisted extraction, HPLC/FLD	ASEAN Manual of Food Analysis, 2011).
Folate	Ultrasound-assisted extraction, HPLC/UVD	Journal of Composition and Analysis 21 (2008) 336-342).
Vitamin C	Colorimetric method	Method of Folin
Vitamin D	UPLC-MS/MS	Food Code, General Test Methods, 2.2.2.7 Kim, Hyun-cheol. Et al. 2001. Determination of Vitamin D2 and D3 in Milk using HPLC, J Anim Sci Technol, 43(1) 111-120 J. Chromatography A 1320, 48 – 65, 2013;

Table 6.1 (continued)

Nutrients	Analysis Method	Reference
Amino acid	LC-MS/MS	LC-MS/MS [J]. Anhui Agricultural Sciences, 2022, 50(19): 187-192+222.
Fatty acid	Acid and base hydrolysis, GC/FID	Food Code, General Test Methods, 2.1.5.4 AOAC Official Method 996.06; 41.1.28A; Fat (total, saturated, and unsaturated) in foods. AOAC Official Method 963.22

All values, including for beverages and other liquids, are presented per 100 g edible portion on a fresh weight basis (EP) (*Guidelines for converting units, denominators, and expressions. Version 1.0 (FAO/IN FOODS, 2012b)*).

### Edible portion

Two edible portion coefficients are presented. The first is from the whole food as purchased to the food as described. The second is for the food as described as eaten. For example, Cedar pine nuts have an edible portion coefficient as described as eaten at 0.5 and account for inedible parts of bones. The value of the second edible portion coefficient is important for other foods it is 1.0.

### **Energy (kcal)**

Metabolizable energy is presented in kilocalories (kcal) for all food. Metabolizable energy is calculated based on protein, fat, available carbohydrate, and dietary fiber values by applying the energy conversion factors according to the formulae below.

$$\text{Energy (kcal/100 g EP)} = \text{total protein (g/100 g EP)} \times 4 + \text{total fat (g/100 g EP)} \times 9 + \text{available carbohydrate (g/100 g EP)} \times 4 + \text{total dietary fiber (g/100 g EP)}$$

### **Water (g)**

Water is measured as the decrease in weight after drying the food sample to a constant weight (*AOAC 2000*).

### **Protein, total (g) and XN**

The main analytical method used to determine total nitrogen is the Kjeldahl method (*No. 984.13; AOAC 2000*). The protein content was calculated by multiplying the nitrogen values with conversion factors (XN). The total protein is then estimated from the total amount of nitrogen in the food sample, using the following formula:

$$\text{Total protein (g/100 g EP)} = \text{nitrogen conversion factor (XN)} \times \text{total nitrogen (g/100 g EP)}$$

### **Fat, total (g)**

The majority of fat value was derived by the continuous extraction method (Soxhlet method) (*no. 991.36 of AOAC 2000*).

### **Carbohydrate, available; calculated by difference (g)**

Available carbohydrate was therefore calculated by difference using the following formula:

*Carbohydrate, available; calculated by difference (g/100 g EP) = 100 – (water + total fat + total protein+ ash + total dietary fiber) (g/100 g EP)*

### **Fiber, total dietary (g)**

Fiber, total dietary (g) Dietary fiber was determined by the acid detergent method (ADF). The Acid Detergent Fiber method is based on the assumption that the waste obtained with the use of the detergent is made up of cellulose and lignin. ADF is determined gravimetrically as the residue remaining after extraction (AOAC Official Method 973.18).

### **Ash (g)**

The ash content of foods is determined by gravimetric methods. It was estimated by heating the dried raw sample in a Muffle furnace at 600°C to burn out all organic materials for 3-5 hours till to constant weight (AOAC, 1998d).

### **Minerals (mg)**

Mineral contents including, calcium, magnesium, sodium, potash, sodium, and iron were determined by the Atomic Absorption Spectrophotometer (AAS) (AOAC, 2000) and determined of phosphorous by the UV visible spectrophotometric method (ASEAN Manual of Food Analysis, 2011).

### **Vitamin C (mg)**

The content of L-Ascorbic acid was estimated by the colorimetric method (Method of Folin). The determination of ascorbic acid is an example of the analysis of a colored product resulting from an oxidation-reduction reaction. The method is based on the use of Folin's phosphorus-molybdenum reagent, which when interacting with ascorbic acid, is reduced to molybdenum blue, the color intensity depends on the concentration of the reducing agent.

### **Vitamin A (mcg)**

Beta-carotene of the sample extract for foods was estimated by HPLC according to the method the of *ASEAN Manual of Nutrient Analysis (2011)*.

### **Vitamin Folic acid (mcg)**

Folic acid can be determined using reverse-phase HPLC with C18 columns and ultraviolet detection. The method includes folic acid extraction with phosphate buffer solution and purification by solid-phase extraction with strong anion exchange cartridges (*Journal of Composition and Analysis 21 (2008) 336-342*).

### **Vitamin B1 (Thiamin) (mg)**

For foods, the aqueous extract obtained from the food by acid hydrolysis followed by enzymatic hydrolysis was injected onto a reverse-phase HPLC with a C18 column and then Thiamin was determined after post-column derivatization with alkaline potassium ferricyanide that converted Thiamin to this chrome which fluorescence in ultraviolet light ( $\lambda=942.23$ ) (*ASEAN Manual of food Analysis, 2011*).

### **Vitamin B2 (Riboflavin) (mg)**

For the estimation of the riboflavin content of KFs, the aqueous extract of the food by acid hydrolysis followed by enzymatic hydrolysis was injected onto a reverse-phase HPLC with Ca 18 column and then the fluorescence of riboflavin was measured (*ASEAN Manual of food Analysis, 2011*).

### **Fatty acids (g)**

Fatty acids, total saturated; total monounsaturated; and total polyunsaturated were determined by gas chromatography (GC) (*AOAC Official Method 963.22*)



# 7

## Documentation, Quality, and Source Data



## **7. Documentation, Quality, and Source Data**

### **Documentation**

For each food group, the source of the data is compared and evaluated by bibliographic codes (BibioID), which are included in Annex 3 and the reference list.

The food presented in this table represents the mean values of the collected compositional data. For water, exceptionally, the median was calculated. When the number of data points was # or above the standard deviation (SD) was calculated. Some vitamins not detected during the analysis were marked as "0". For each value, the number of data points is indicated (n).

### **Quality of data**

Foods were collected according to a sampling plan that represented the nationally representative samples of key foods of Mongolia. At the same time, it was ensured that compositional data were generated for highly consumed dominant varieties. These data for foods (n=108) were generated according to AOAC recommended methods with method validation, precision, and accuracy.

## **Limitations**

Data were compared and evaluated using the following from other sources (Korean FCT, Russian FCT, Bangladesh FCT, Turkish FCT, Pakistan FCT, Negerian FCT, Finland FCT, French FCT, Denmark FCT, Estonia FCT, South Africa FCT, USDA, FAO/INFOODS analytical Food composition Database -ADB, FAO/INFOOD and Food composition Database for Biodiversity-BID). Fat estimation was done by the Soxhlet method which might cause underestimation of fat values for certain food groups.

A total of 13 groups and 108 food items entries were compiled in the archival DB. These have been entered into an archival database for their original analysis of nutrient compositional data.

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## Appendix A

**Table A.1 Human Resources Inputs**

Name	Position/Affiliation	Contact	Note
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**Table A.1 (continued)**

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**Table A.1 (continued)**

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