
# ANNUAL BULLETIN

## 2080/81 (2023/24)


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Our Ref. No.
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# Preface

It is with great pleasure that I present the Annual Bulletin of the Department of Food Technology and Quality Control for the fiscal year 2080/81 (2023/24). This regular publication underscores the Department's steadfast commitment to excellence in the fields of food and feed technology, as well as in quality assurance.

This bulletin provides a comprehensive overview of the Department's core activities, including the enforcement of acts and regulations related to the safety and quality control of food and feed products. It highlights significant achievements in key areas such as laboratory analysis of food and feed, research and development in food technology, certification of imports and exports, pesticide residue testing through both rapid test methods and gas chromatographic techniques, and the implementation of training programs for food entrepreneurs.

A major legislative milestone this year is the enactment of the Food Safety and Quality Act, 2081, which replaces the earlier Food Act, 2023. This important development is expected to further strengthen regulatory frameworks and enhance the overall effectiveness of food safety and quality control systems in the country.

The Department plays a vital role in safeguarding the safety, nutritional integrity, and overall quality of the national food supply. The primary objective of this publication is to disseminate critical information on food safety and to inform stakeholders about the Department's responsibilities and ongoing initiatives. In addition to documenting our achievements, this bulletin serves as a valuable resource for professionals, researchers, and the general public. It offers insights into emerging trends, recent legislative developments, institutional responses to food safety challenges, and public awareness campaigns concerning food adulteration. Through these efforts, we aim to empower consumers with knowledge about their rights to safe and nutritious food, thereby contributing to better public health and well-being.

I am confident in the continued progress and success of this Department. Let us work together to foster innovation, expand knowledge, and make a lasting and meaningful impact in the field of food technology, quality control and food nutrition.

.....

**Sanjeev Kumar Karn**
Director General
Department of Food Technology and Quality Control
Babarmahal, Kathmandu

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# Editorial

The Department of Food Technology and Quality Control (DFTQC), under the Ministry of Agriculture and Livestock Development, Government of Nepal (GoN), is the designated authority responsible for implementing the Food and Feed Acts and associated regulations. Its primary mandate is to safeguard consumers' rights by ensuring the safety and quality of food and feed products available in the country. In addition to its regulatory responsibilities, the Department also plays a promotional role by supporting the commercialization and industrialization of agricultural products and facilitating trade. This is achieved through the development of appropriate food technology packages aimed at ensuring the availability of safe, high-quality, and nutritious food in the market.

In alignment with these two overarching objectives—regulatory enforcement and technological advancement—the Government of Nepal has been implementing a range of initiatives through the DFTQC on an annual basis. These initiatives focus on both the development of food technology and the enhancement of quality control mechanisms.

This bulletin presents the progress and accomplishments of various Divisions, Sections, and Offices within the Department during the fiscal year 2080/81 B.S. (2023/24). The Department is structured into two major Divisions: Food and Feed Safety and Quality Control Division and Food Technology Development and Nutrition Division. It also includes the National Food and Feed Reference Laboratory, the SPS National Enquiry Point, the Codex and INFOSAN Secretariat, eight Food Technology and Quality Control Offices, twelve Food Import-Export Quality Certification Offices, and twenty-two Food Technology and Quality Control Division Offices.

The Planning, Monitoring, and Evaluation Section of the Department has compiled this bulletin based on the annual progress reports submitted by all Divisions, Sections, and Offices.We extend our sincere gratitude to the Director General and Deputy Director General for their continued guidance and support throughout the preparation of this bulletin. We also acknowledge with appreciation the efforts of all officials across the Divisions, Sections, and Offices who contributed the necessary information and data.

It is our hope that this bulletin serves as a valuable resource for our esteemed stakeholders, including consumers, food processors, import-export professionals, distributors, policy-makers, academic institutions, and both national and international non-governmental organizations. We welcome your constructive suggestions, comments, and feedback, which are essential for enhancing the quality and relevance of future editions of this publication.

**Pratima Shrestha**
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# List of abbreviatiuons

| | | |
|---|---|---|
| GoN | - | Government of Nepal |
| MoALD | - | Ministry of Agriculture and Livestock Development |
| DFTQC | - | Department of Food Technology and Quality Control |
| NFFRL | - | National Food and Feed Reference Laboratory |
| FFSQRD | - | Food and Feed Safety and Quality Regulation Division |
| FTDND | - | Food Technology Development and Nutrition Division |
| FTQCO | - | Food Technology and Quality Control Office |
| FIEQCO | - | Food Import Export and Quality Certification Office |
| FTQCDO | - | Food Technology and Quality Control Division Office |
| NABL | - | National Accreditation Board for Testing and Calibration Laboratories |
| FSSAI | - | Food Safety and Standards Authority of India |
| WTO | - | World Trade Organization |
| SPS | - | Sanitary and Phytosanitary |
| INFOSAN | - | International Food Safety Authorities Network |
| RBPR | - | Rapid Bioassay for Pesticide Residues |

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# Executive Summary

*In the fiscal year 2080/81 B.S. (2023/24A.D.), Department of Food Technology and Quality Control has accomplished the following targets as per the approved annual program:*

- *In the fiscal year 2080/81, food/feed market and industries were inspected 3,779and 4,296 times respectively. Hotel/Restaurant and sweets shop inspection was conducted 2585 times. Joint monitoring as per the Rapid Response Team Modality including representatives of local authority and other stakeholders was done 543 times. In total, inspection was done 11,203 times throughout the country.*
- *In this fiscal year, a total of 3,125 food and feed samples were collected as per the Food and Feed Act during market inspection across the country from the Food and Feed Safety and Quality Regulation Division under this department, 8 Food Technology and Quality Control Offices and 22 Food Technology and Quality Control Division Offices. Among 2,659 samples analyzed, 110 samples were found to be non-compliant as per mandatory standard, which was 4.72% of total collected samples.*
- *In this year, 178 cases were filed against the business operators at the respective District Administration Offices/District Courts, who had violated the provisions of Food/Feed Acts, regulations and mandatory standards.*
- *A total number of 26,307 food/feed samples were analyzed for various purposes at the laboratory facilities within the department and offices under this department.*
- *In this fiscal year, altogether 15,678 import permit were issued while 61 were rejected, and a total number of 46,948samples were analyzed for export/import certification in the 12 Food Import Export Quality Certification Offices located at different custom points. Among them, 45 samples did not meet the conditions for export/import.*
- *A total number of 63,357 samples of fresh fruits and vegetables were analyzed for pesticide residues (Organophosphates and organochlorines) using RBPR (Rapid Bio-assay for Pesticide Residue) method among which 40 samples exceeded the permitted enzyme activity inhibition level.*
- *A total number of 2,430 licenses of existing food/feed industries were renewed, 933 new licenses were issued and 1,417 industries were recommended for registration.*
- *A total number of 225 hotel/restawwurants were categorized as per Directive on categorization of hotels / restaurants based on food safety standards (2074). Among them 25 were very good, 37 good, 54 satisfactory and 70 average. Similarly, 39 were not placed on categorisation.*

- *Recipe for mid day meal program was developed*
- *Study on ethnic food profiles (Tharucuisines) and Study on the Texture Profile Analysis (TPA) of Newari foods using texture meter was done.*
- *Study on Total Phenolic Compound and Antioxidant Property on Different Bee Products was performed.*
- *Food safety and quality related training for hotel/ homestay canteen operators was conducted 61 times, food safety and quality related interaction programs for food business operators was conducted 14 times, interaction program related to food safety and nutrition with stakeholders and provincial level was conducted 113 times and programs related to knowledge of food safety in street food products in collaboration with local level was conducted 59 times.*
- *Microbiological safety analysis study of milk, processed drinking water and street food was conducted 30 times.*
- *Skill development training on food processing and preservation was conducted 12 times.*
- *A total number of 337 food and food product samples were analyzed for nutritional composition.*
- *A total of NRs.8654500(NRs Eighty six million five hundred forty thousand five hundred rupees) was collected as non-tax revenue from different services, mainly laboratory testing services, food/feed licensing and food import/export service.*

# A. Introduction

## Background

Department of Food Technology and Quality Control (DFTQC) is one of the three departments under the Ministry of Agriculture and Livestock Development (MoALD) of Government of Nepal (GoN). It was established in 1961A.D. as the Department of Food in Singhadurbar, which later in 1965 was shifted to the present location of Babarmahal, Kathmandu. In 1966, the name Department of Food was renamed as Food Research Laboratory. It became Central Food Research Laboratory in 1980. In the year 2000, the Central Food Research Laboratory was given the name"Department of Food Technology and Quality Control (DFTQC)" and became the third department under the then Ministry of Agriculture and Cooperatives. From the very beginning, DFTQC has devoted its efforts for ensuring the availability of safe, quality and nutritious food to Nepalese people through a number of activities in the area of food quality control, development and dissemination of food processing technologies as well as food and nutrition programs. As mandated by the Government of Nepal, DFTQC is the sole government agency to execute the food and feed acts and regulations in the country.

## Vision

Create environment for availability of wholesome, safe and nutritious food to all Nepali citizens and facilitate food trade.

## Mission

- Safeguard and protect the health of consumers by assuring the availability of safe and nutritious food with the creation of awareness among producers, traders as well as consumers and facilitate food trade in a coordinated and collaborative approach based on scientific evidence with the updated regulatory framework.
- Promote food businesses by developing appropriate food processing technology through Research and Development (R &D), disseminating, and adopting the outcome of research for the development of food processing enterprises.
- Promote nutritional status of people through the development of food based nutritional approaches.

## Goal

DFTQC has the following three major goals:

- Ensure the safety and quality of food supply in the market
- Promote food processing industries by developing and disseminating appropriate technologies
- Improve the nutritional status of Nepalese people

## Objectives

The following are the main objectives of the department:

- Reduce the incidence of hazards(adulteration) related to food/feed
- Facilitate the national /international trade related to food and agriculture
- Reduce the post harvest loss through the development and dissemination of appropriate processing/preservation technologies

- Promote the establishment of small scale food industries
- Improve the knowledge, attitude and practice of consumers on food safety, quality and nutrition
- Improve the food consumption status of Nepalese people in general and of vulnerable groups and communities.

## Human Resource

DFTQC has a total number of 370 staff (281 technical and 89 non technical) including experts having advanced education from local as well as foreign universities in the field of food technology, nutrition, chemistry ,botany and other relevant subjects.

## Organizational Structure

Under the department, there are currently the following offices.

- Two divisions (Food and Feed Safety and Quality Regulation Division and Food Technology Development and Nutrition Division),
- One National Food and Feed Reference Laboratory,
- One SPS National Enquiry Point,
- One Codex and INFOSAN Secretariat,
- One Planning, Monitoring and Evaluation Section,
- One Administration Section,
- Eight Food Technology and Quality Control Offices (Biratnagar, Janakpur, Hetauda, Pokhara, Bhairahawa, Nepalgunj, Surkhet and Dhangadhi),
- Twelve Food Import Export Quality Certification Offices (Kakarbhitta, Rani, Jaleshwar, Birgunj, Tribhuvan International Airport, Belahiya, Krishnanagar, Nepalgunj, Dhangadhi, Mahendranagar, Rasuwa and Tatopani),
- Twenty-two Food Technology and Quality Control Division Offices (Jhapa, Sunsari, Dhankuta, Udayapur, Saptari, Mahottari, Sarlahi, Chitwan, Parsa, Sindhuli, Dhulikhel, Kathmandu, Nuwakot, Tanahun, Kapilvastu, Palpa, Baglung, Dang, Jumla, Baitadi, Doti and Dadeldhura).

The existing structural network of the department is as shown in the Figure.

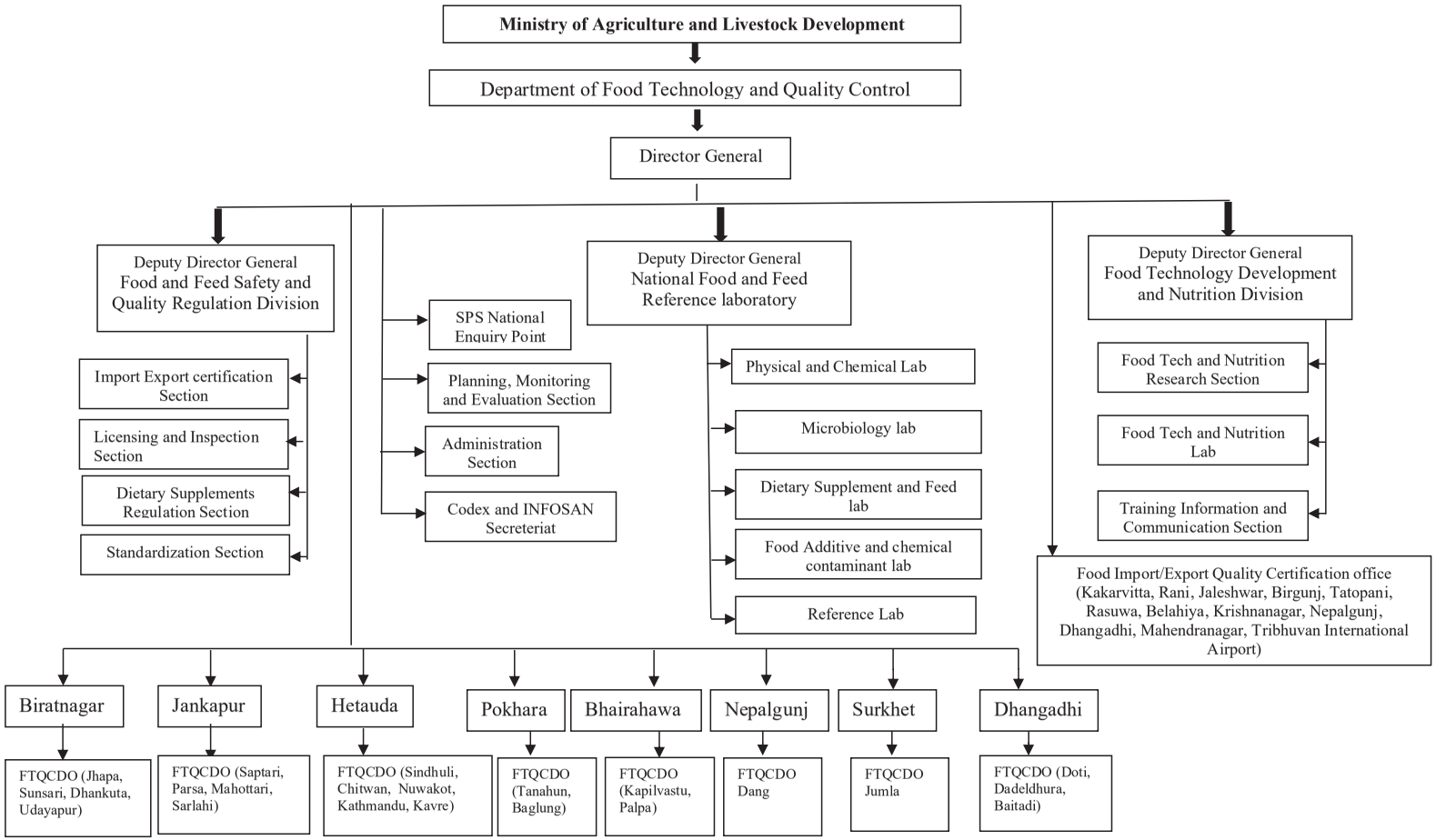



**Figure: Organizational structure of Department of Food Technology and Quality Control**

## B. Annual Progress Report

## Fiscal Year 2080/81 (2023/24)

## 1. Food Quality Control Program

Department of Food Technology and Quality Control has implemented following major programs in this fiscal year as an effort of enforcing foods safety and quality control as well as consumer awareness. The main programs were as follows:

1. Food/feed inspection and food/feed sample collection
2. Food/feed industry licensing
3. Development of new food standard and updating the standard
4. Consumer awareness campaign
5. Export/import certification
6. Dietary food supplement regulation

### 1.1 Market, Industry, Hotel/Restaurants and Sweet Shops Inspection

During this period, Food and Feed Safety and Quality Regulation Division (FFSQRD), eight Food Technology and Quality Control Offices (FTQCOs)) and twenty two Food Technology and Quality Control Division Offices (FTQCDOs) inspected food/feed markets, industries, hotel/restaurants and sweets shops. In this fiscal year, food/feed market inspection, industry inspection, hotel/restaurant /sweet shops inspection and rapid response modality inspection in coordination with different related stakeholders carried out 3779, 4296, 2585 and 543 times respectively throughout the country with the aim to maintain food safety and quality. Details on food/feed market inspection, industry, hotel/ restaurants/sweets shops and joint monitoring (rapid response) is shown in the Table 1.1 and Table 1.2.

**Table1.1: Summary of Market, Industry, Hotel/Restaurant/Sweet Shops inspection and Rapid response monitoring.**

| S.N. | Office | Market Inspection | Industries Inspection | Hotel/ Restaurant Inspection | Rapid Response | Total |
|---|---|---|---|---|---|---|
| 1 | DFTQC, Kathmandu | 115 | 186 | 120 | 7 | 358 |
| 2 | FTQCO, Biratnagar | 131 | 207 | 83 | 16 | 393 |
| 3 | FTQCO, Janakpur | 76 | 224 | 55 | 22 | 358 |
| 4 | FTQCO, Hetauda | 176 | 229 | 204 | 15 | 580 |
| 5 | FTQCO, Pokhara | 57 | 196 | 44 | 27 | 288 |
| 6 | FTQCO,Bhairahawa | 67 | 231 | 54 | 24 | 350 |
| 7 | FTQCO, Nepalgunj | 147 | 212 | 126 | 35 | 463 |
| 8 | FTQCO, Surkhet | 73 | 177 | 43 | 8 | 261 |
| 9 | FTQCO, Dhangadhi | 235 | 327 | 152 | 23 | 674 |
| 10 | 22 FTQCDOs | 2702 | 2927 | 1704 | 366 | 7699 |
| | **Total** | **3779** | **4296** | **2585** | **543** | **11203** |

**Table 1.2: Market, Industry, Hotel/Restaurant/ Sweet Shops inspection and Rapid response monitoring conducted by division offices.**

| S.N. | Office | Market Inspection | Industry Inspection | Hotel/Restaurant Inspection | Rapid Response | Total |
|---|---|---|---|---|---|---|
| 1 | FTQCDO, Jhapa | 181 | 147 | 84 | 16 | 428 |
| 2 | FTQCDO, Sunsari | 101 | 307 | 102 | 36 | 546 |
| 3 | FTQCDO, Dhankuta | 191 | 113 | 58 | 19 | 381 |
| 4 | FTQCDO, Udayapur | 118 | 157 | 119 | 13 | 407 |
| 5 | FTQCDO, Saptari | 113 | 129 | 90 | 20 | 352 |
| 6 | FTQCDO, Mahottari | 104 | 61 | 37 | 15 | 217 |
| 7 | FTQCDO, Sarlahi | 112 | 48 | 60 | 14 | 234 |
| 8 | FTQCDO, Parsa | 142 | 74 | 50 | 14 | 280 |
| 9 | FTQCDO, Chitwan | 106 | 94 | 54 | 18 | 272 |
| 10 | FTQCDO, Sindhuli | 116 | 139 | 82 | 20 | 357 |
| 11 | FTQCDO, Kavre | 156 | 162 | 53 | 16 | 387 |
| 12 | FTQCDO, Kathmandu | 112 | 491 | 159 | 27 | 789 |
| 13 | FTQCDO, Nuwakot | 104 | 76 | 80 | 14 | 274 |
| 14 | FTQCDO, Tanahun | 88 | 264 | 65 | 21 | 438 |
| 15 | FTQCDO, Baglung | 213 | 59 | 69 | 13 | 354 |
| 16 | FTQCDO, Palpa | 123 | 122 | 146 | 16 | 407 |
| 17 | FTQCDO, Kapilbastu | 110 | 104 | 65 | 13 | 292 |
| 18 | FTQCDO, Dang | 93 | 134 | 52 | 12 | 291 |
| 19 | FTQCDO, Jumla | 110 | 53 | 54 | 12 | 229 |
| 20 | FTQCDO, Doti | 88 | 78 | 87 | 14 | 267 |
| 21 | FTQCDO, Baitadi | 88 | 52 | 40 | 12 | 192 |
| 22 | FTQCDO, Dadeldhura | 181 | 63 | 50 | 11 | 305 |
| | **Total** | **2702** | **2927** | **1704** | **366** | **7699** |

### 1.1.1 Industry Inspection

Altogether 4296 food and feed industries were inspected in this period focusing on:

- Industry licensing and renewal
- Product packaging and labeling
- Premises and surrounding environment of industry
- Processing technology and processing flowchart
- Production plant condition
- Ingredients and additives used
- Storage condition of raw and finished products
- Good Manufacturing Practices and Good Hygienic Practices

Necessary suggestion for enhancing in safety and quality of product was given to responsible personnel. Figure 1.1 shows the industry inspection carried out for past 10 fiscal years.

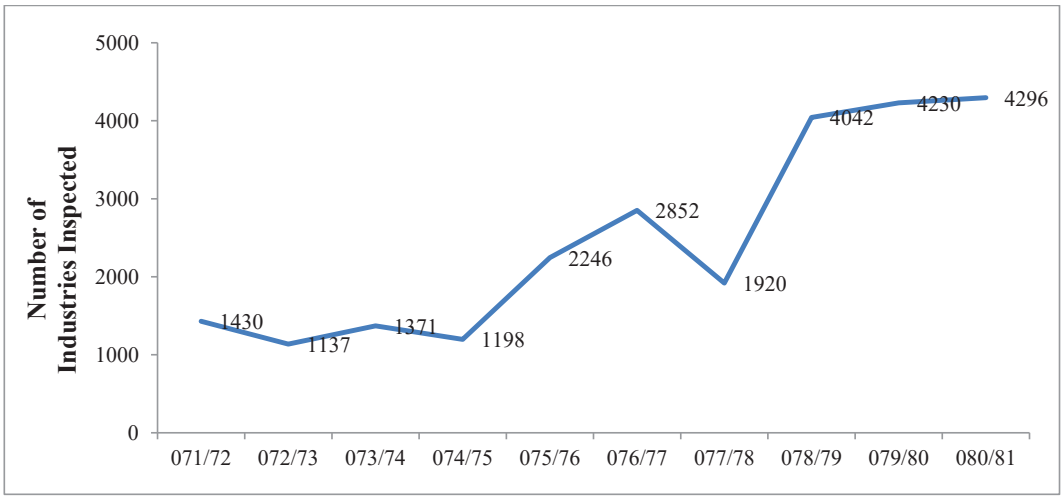



**Figure 1.1: Number of Industries Inspected for the Past Ten Fiscal Years (071/72-080/81).**

From the above figure, it can be observed that the number of industries inspected were nearly similar from fiscal year 2071/72 to fiscal year 2074/75. After the establishment of division offices in the year 2075, the number increased gradually. However, in the fiscal year 2077/78, the decrease in the number was observed and it can be due to the impact of Covid-19 pandemic. In contrast, substantial increase in number was found due to reopening of industries after the settlement of pandemic in the following year.

### 1.1.2 Hotel/Restaurant and Sweets Shop Inspection

In this fiscal year 2080/81, different hotel/restaurants and sweet shops were inspected 2585 times throughout the country. Figure1.2 shows the number of hotels / restaurants/ sweetshops inspection conducted by FFSQRD, FTQCOs and FTQCDOs for the past 10 fiscal years.

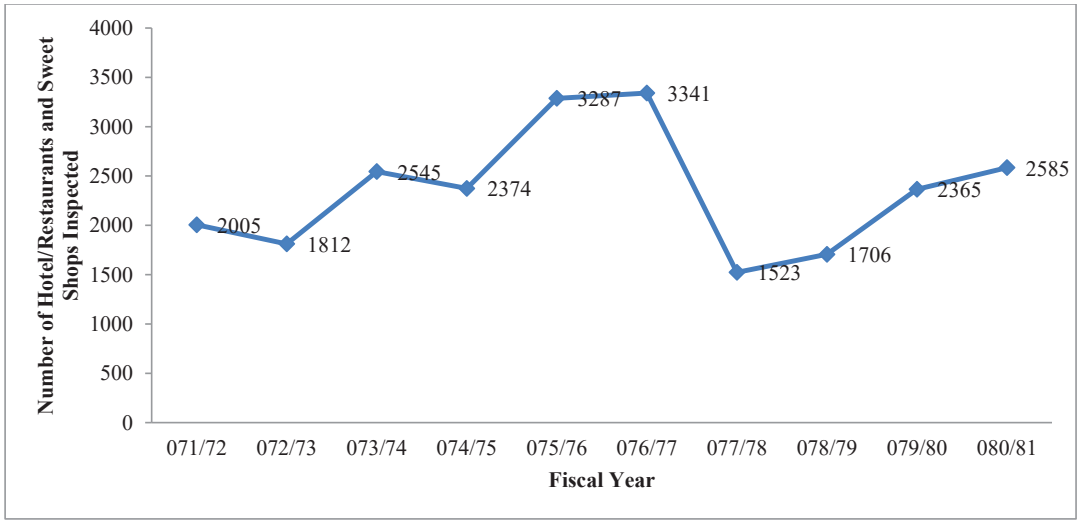



**Figure 1.2: Number of Hotel/Restaurants and Sweet Shops Inspected for Past Ten Fiscal Years.**

Figure 1.2 shows that the number of hotels/ restaurants and sweets shop inspected increased drastically in fiscal year 2073/74 compared to previous years. Nevertheless, the number then decreased slightly in fiscal year 2074/75 but again increased until fiscal year 2076/77. This is due to the priority given to hotels/restaurants inspection in the 14th periodic plan. Due to the Covid-19 pandemic and subsequent lockdown, there was a massive decrease in the number of hotel restaurants inspected. However, from the fiscal year 2078/79, the hotel restaurant inspection slightly increased as compared to the previous fiscal year. This slight increase was observed after the settlement of Covid-19 pandemic.

## 1.2 Sample collection (As per food/feed act and surveillance)

During this fiscal year, FFSQRD, eight FTQCOs and twenty-two FTQCDOs collected 3003 food and 122 feed samples with total 3082 samples under the Food/Feed Act. In this fiscal year, total 3710 surveillance samples were collected. Summary of the food/feed samples collected by various offices are reflected in the Table 1.3 and 1.4.

**Table 1.3: Summary of Sample Collection (as per Food/Feed act and Surveillance)**

| S.N. | Office | Number of samples as per act | | | Surveillance |
|---|---|---|---|---|---|
| | | Food | Feed | Total | |
| 1 | FFSQRD, DFTQC | 92 | 0 | 92 | 463 |
| 2 | FTQCO, Biratnagar | 109 | 10 | 119 | 230 |
| 3 | FTQCO, Janankpur | 107 | 14 | 121 | 155 |
| 4 | FTQCO, Hetauda | 102 | 20 | 122 | 218 |
| 5 | FTQCO, Pokhara | 80 | 0 | 80 | 220 |
| 6 | FTQCO, Bhairahawa | 102 | 0 | 102 | 207 |
| 7 | FTQCO, Nepalgunj | 86 | 0 | 86 | 256 |
| 8 | FTQCO Surkhet | 103 | 0 | 103 | 167 |
| 9 | FTQCO, Dhangadhi | 104 | 20 | 124 | 267 |
| 10 | 22 FTQCDOs | 2118 | 58 | 2176 | 1527 |
| | **Total** | **3003** | **122** | **3125** | **3710** |

**Table 1.4: Summary of Sample Collection (as per food/feed act and surveillance) by Division Offices.**

| S.N. | Office | Number of samples as per act | | | Number of Surveillance Sample |
|---|---|---|---|---|---|
| | | Food | Feed | Total | |
| 1 | FTQCDO, Jhapa | 90 | 0 | 90 | 70 |
| 2 | FTQCDO, Sunsari | 94 | 5 | 99 | ∘ |
| 3 | FTQCDO, Dhankuta | 97 | 0 | 97 | 82 |
| 4 | FTQCDO,Udayapur | 100 | 7 | 107 | 74 |
| 5 | FTQCDO, Saptari | 101 | 3 | 104 | 66 |
| 6 | FTQCDO, Mahottari | 100 | 8 | 108 | 60 |
| 7 | FTQCDO, Sarlahi | 101 | 0 | 101 | 38 |
| 8 | FTQCDO, Parsa | 101 | 15 | 116 | 62 |
| 9 | FTQCDO, Bharatpur | 80 | 6 | 86 | 36 |
| 10 | FTQCDO,Sindhuli | 101 | 0 | 101 | 69 |
| 11 | FTQCDO,Dhulikhel | 100 | 0 | 100 | 60 |
| 12 | FTQCDO, Kathmandu | 102 | 0 | 102 | 278 |
| 13 | FTQCDO, Nuwakot | 103 | 11 | 114 | 79 |
| 14 | FTQCDO,Tanahun | 101 | 0 | 101 | 78 |
| 15 | FTQCDO, Baglung | 82 | 0 | 82 | 60 |
| 16 | FTQCDO, Palpa | 100 | 0 | 100 | 74 |
| 17 | FTQCDO, Kapilbastu | 65 | 0 | 65 | 59 |
| 18 | FTQCDO, Dang | 100 | 0 | 100 | 60 |
| 19 | FTQCDO, Jumla | 100 | 0 | 100 | 30 |
| 20 | FTQCDO, Doti | 100 | 0 | 100 | 60 |
| 21 | FTQCDO, Baitadi | 100 | 3 | 103 | 60 |
| 22 | FTQCDO, Dadeldhura | 100 | 0 | 100 | 72 |
| | **Total** | **2118** | **58** | **2176** | **1527** |

Figure 1.3 shows the number of food and feed samples (as per act) collected throughout the country for the past five fiscal years. There was decrease in the number of formal samples collected in the fiscal year 2077/78 compared to previous fiscal years. This was due to the effect of Covid-19 pandemic. The number of collected formal samples increased rapidly in the fiscal year 2078/79 after the settlement of Covid-19 pandemic. However, the number of collected sample reduced in the fiscal year 2079/80 and 2080/81 due to interruption and huge cut off of government budget.

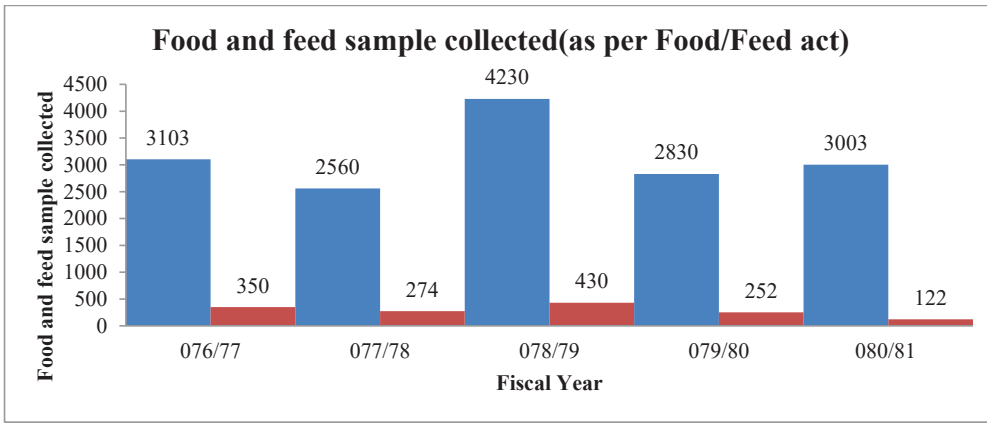



**Figure 1.3: Food and Feed Sample Collection (as per Food/Feed act) of past five fiscal years**

During the fiscal year 2080/81, laboratory analysis of formal food and feed sample was conducted by National Food and Feed Reference Laboratory (NFFRL) and eight FTQCOs. In total, NFFRL and eight FTQCOs analyzed 2659 formal food and feed samples, 110 samples were non-compliant out of them (4.1%). Altogether, 178 cases were filed by different offices under the department during this period. Table 1.5 shows the number of samples analyzed, number of non-compliant samples and the number of cases filed under different food category. Table 1.6 shows the number of cases filed by different offices during fiscal year 2080/81. Highest number of cases were filed by FTQCDO, Kathmandu followed by FTQCDO Parsa and FTQCO Dhangadhi. Most of the cases filed belonged to the category of processed drinking water followed by milk/milk products, fats and oils and cereals, legumes and their products.

**Table 1.5: Number of sample analyzed as per act and cases filed during the fiscal year 2080/81.**

| S.N. | Food Groups | Samples Analyzed | Number of non-compliance samples | Cases filed* |
|---|---|---|---|---|
| 1 | Milk and Milk Products | 79 | 8 | 27 |
| 2 | Fats and Oils | 326 | 15 | 20 |
| 3 | Fruits and Vegetable Products | 359 | 12 | 9 |
| 4 | Spices | 294 | 5 | 7 |
| 5 | Tea and coffee | 155 | 9 | 3 |
| 6 | Salt | 40 | 0 | 0 |
| 7 | Cereals, legumes and their products | 887 | 32 | 17 |
| 8 | Processed Drinking Water | 114 | 10 | 31 |
| 9 | Sweetening Agents | 84 | 7 | 7 |
| 10 | Sweets and Confectionery | 80 | 2 | 0 |
| 11 | Meat and meat products | 3 | 0 | 0 |
| 12 | Feed | 129 | 10 | 11 |
| 13 | Other food products | 109 | 0 | 46 |
| **Total** | | **2659** | **110** | **178** |

Note: * Case filed from previous year's non –compliant samples also included.

**Table 1.6: No. of Cases Filed by Offices**

| S.N. | Office | No. of case filed |
|---|---|---|
| **1** | DFTQC,Kathmandu | 17 |
| **2** | FTQCO, Biratnagar | 21 |
| **3** | FTQCO, Janakpur | 0 |
| **4** | FTQCO, Hetauda | 7 |
| **5** | FTQCO, Pokhara | 5 |
| **6** | FTQCO, Bhairahawa | 18 |
| **7** | FTQCO, Nepalgunj | 0 |
| **8** | FTQCO, Surkhet | 3 |
| **9** | FTQCO, Dhangadhi | 20 |
| **10** | FTQCDO, Jhapa | 0 |
| **11** | FTQCDO, Sunsari | 3 |
| **12** | FTQCDO, Dhankuta | 5 |
| **13** | FTQCDO, Udayapur | 0 |
| **14** | FTQCDO, Saptari | 0 |
| **15** | FTQCDO, Mahottari | 0 |
| **16** | FTQCDO, Sarlahi | 8 |
| **17** | FTQCDO, Parsa | 22 |
| **18** | FTQCDO, Chitwan | 5 |
| **19** | FTQCDO, Sindhuli | 0 |
| **20** | FTQCDO, Dhulikhel | 8 |
| **21** | FTQCDO, Nuwakot | 0 |
| **22** | FTQCDO, Kathmandu | 24 |
| 23 | FTQCDO,Tanahun | 7 |
| **24** | FTQCDO, Baglung | 2 |
| **25** | FTQCDO, Kapilbastu | 0 |
| **26** | FTQCDO, Palpa | 0 |
| **27** | FTQCDO, Dang | 3 |
| **28** | FTQCDO, Jumla | 0 |
| **29** | FTQCDO, Baitadi | 0 |
| **30** | FTQCDO, Doti | 0 |
| **31** | FTQCDO, Dadeldhura | 0 |
| | **Total** | **178** |

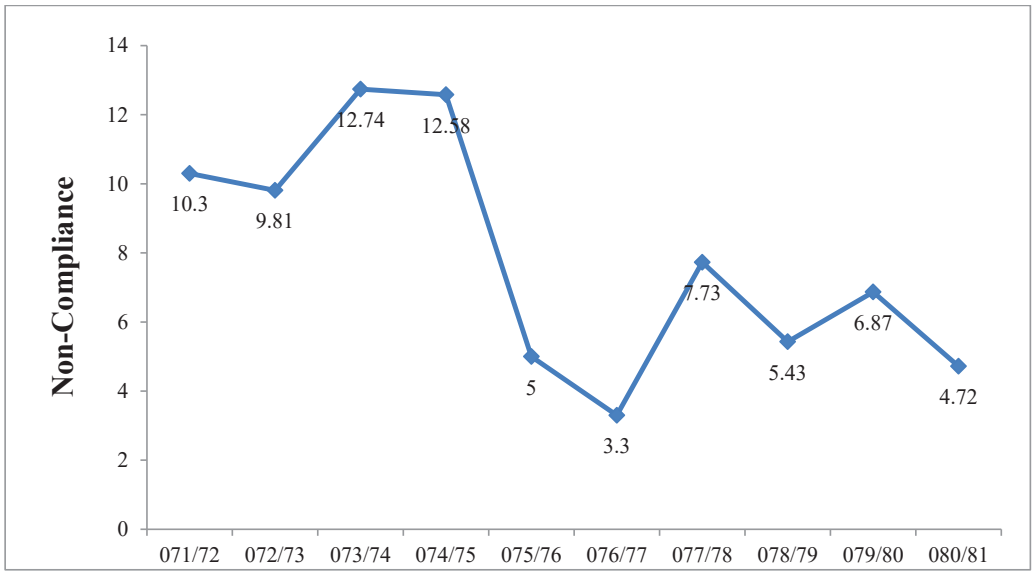



**Figure 1.4: Percentage Non- compliance of Food/Feed Samples for the Past Ten Fiscal Years.**

Figure 1.4 presents the percentage of non-compliance in food and feed samples since 10 fiscal years. From above figure, there was improvement with a consistent decline in percentage of non-compliant samples. The decrease in percentage of non-compliant samples may be due to massive, regular market inspection, inspection via rapid response modality and food safety awareness programs after the establishment of division offices in FY 2075/76.

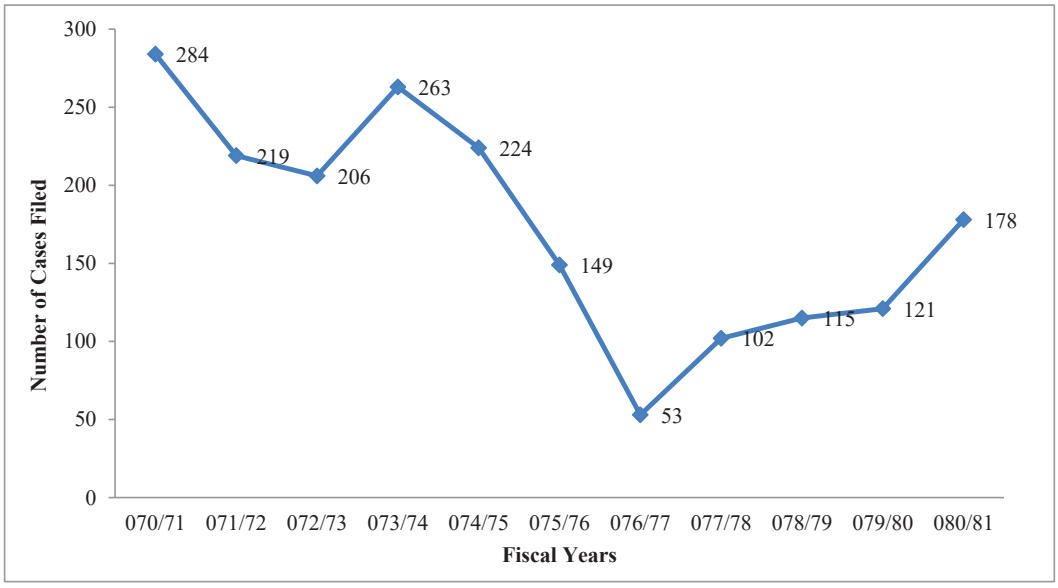



**Figure 1.5: Cases Filed for Past Ten Fiscal Years**.

Figure 1.5 presents the number of cases filed over the past 10 years. The cases were filed at the district administrative office and district court to those violating the Food /Feed Act and Food/Feed regulations. From above figure, the number of cases filed increased since fiscal year 076/77 to 080/81 due to prioritization of action against non-compliant sample. In this fiscal year 2080/81, 66 and 44 cases were filed against adulterated and substandard samples, respectively where as 20 and 48 were against label and acts and regulations, respectively.

## 1.3 Food and Feed Industry Licensing

It is mandatory for all food/feed industries to get license issued from DFTQC as per Food and Feed Act. The issued license needs to be renewed annually. Altogether, 933 new licenses were issued, 2430 licenses were renewed whereas 1417 new industries have been recommended during this fiscal year. Table 1.7 shows the details on the status of licensing and recommendation of food /feed industries throughout the country in this fiscal year.

**Table 1.7: Summary of Licensing and Recommendation of Food/Feed Industries.**

| S.N. | Office | New License Issued (No.) | License Renewal (No.) | Industry Recommendation (No.) | Total (No.) |
|---|---|---|---|---|---|
| 1 | DFTQC, Kathmandu | 238 | 663 | 433 | 1334 |
| 2 | FTQCO, Biratnagar | 220 | 388 | 286 | 891 |
| 3 | FTQCO, Janakpur | 89 | 436 | 160 | 685 |
| 4 | FTQCO, Hetauda | 60 | 165 | 86 | 311 |
| 5 | FTQCO, Pokhara | 71 | 308 | 90 | 469 |
| 6 | FTQCO, Bhairahawa | 106 | 133 | 156 | 395 |
| 7 | FTQCO, Nepalgunj | 45 | 87 | 66 | 198 |
| 8 | FTQCO, Surkhet | 38 | 60 | 50 | 148 |
| 9 | FTQCO, Dhangadhi | 66 | 190 | 93 | 349 |
| | **Total** | **933** | **2430** | **1417** | **4780** |

The food/feed industry licensing (new issue and renewal) for past 10 fiscal years is shown in Figure 1.6.

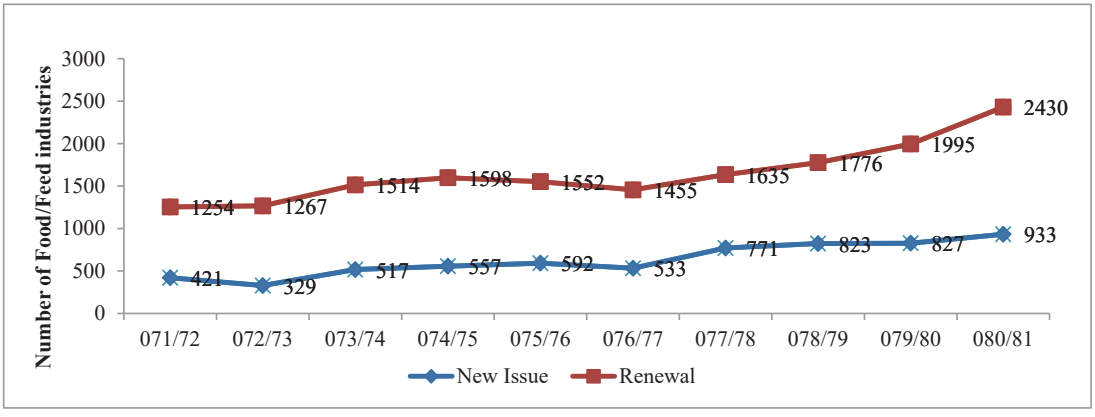



**Figure 1.6: Food/Feed Industry Licensing (New Issue and Renewal) for Past Ten Years.**

The number of industries getting new license and renewal is increasing. This could be due to active inspection, continuous consultancy services and increased awareness of agro-business operators about the provision of food/feed industry licensing according to Food and Feed Act. Summary of issuance of new license, renewal and recommendation given to different category of food products is shown in Table 1.8.

**Table 1.8: Summary of Issuance of New License, Renewal and Recommendation.**

| S.N. | Category | New Issue | Renewal | Recommendation | Total |
|---|---|---|---|---|---|
| 1 | Milk and Milk Products | 89 | 127 | 161 | 377 |
| 2 | Fats and Oils | 39 | 148 | 25 | 212 |
| 3 | Fruits and Vegetable Products | 86 | 163 | 143 | 392 |
| 4 | Spices | 86 | 221 | 143 | 450 |
| 5 | Tea and coffee | 57 | 119 | 66 | 242 |
| 6 | Salt | 0 | 6 | 0 | 6 |
| 7 | Cereals, legumes and their products | 380 | 893 | 643 | 1916 |
| 8 | Processed Drinking Water | 65 | 292 | 63 | 420 |
| 9 | Sweetening Agents | 22 | 45 | 37 | 104 |
| 10 | Sweets and Confectionery | 4 | 43 | 18 | 65 |
| 11 | Meat and meat products | 24 | 82 | 52 | 158 |
| 12 | Feed | 19 | 102 | 6 | 127 |
| 13 | Other food products | 62 | 189 | 60 | 311 |
| **Total** | | **933** | **2430** | **1417** | **4780** |

## 1.4 Food Export Import Inspection and Certification

It is mandatory to get permission from DFTQC before importing food products to Nepal as a part of pre-border food quality control mechanism. For this purpose, FFSQRD provides import permit to those willing to import food products in Nepal if the importers provide the necessary documents regarding safety of the food products. After getting import permit, the importers can bring their products at custom points. From the custom points, sample of the products are sent to FIEQCO for laboratory analysis and approval for entry as a part of border food quality control mechanism. Food products fit for entry are imported whereas those failing the criteria are either destroyed or sent back to exporting country.

In this fiscal year, FFSQRD issued 15,678 food import permits while 61 food import permit request were rejected as they did not meet the import criteria whereas 46,948 samples were analyzed for export/import certification from twelve FIEQCOs located at different custom points of Nepal. Out of the total samples received at the FIEQCOs, 45 samples were rejected due to non-compliance. The number of samples analyzed for food import/export certification by different FIEQCOs is shown in Table1.9.

**Table 1.9: Samples Analyzed for Import/Export Certification.**

| S.N. | Office | Number of Samples | Rejection |
|---|---|---|---|
| 1 | FIEQCO, Kakarvitta | 1459 | 0 |
| 2 | FIEQCO, Rani | 4852 | 0 |
| 3 | FIEQCO, Jaleshwar | 2931 | 1 |
| 4 | FIEQCO, Birgunj | 11815 | 5 |
| 5 | FIEQCO, Tatopani | 11263 | 9 |
| 6 | FIEQCO, Rasuwa | 1611 | 1 |
| 7 | FIEQCO, Belahiya | 5330 | 7 |
| 8 | FIEQCO, Krishnanagar | 4178 | 9 |
| 9 | FIEQCO, Nepalganj | 2332 | 1 |
| 10 | FIEQCO, Dhangadhi | 672 | 0 |
| 11 | FIEQCO, Mahendranagar | 232 | 0 |
| 12 | FIEQCO, TIA | 273 | 12 |
| | **Total** | **46948** | **45** |

## 1.5 Rapid Bioassay for Pesticide Residue (RBPR)

Pesticide residue analysis of imported fresh fruits and vegetables at different custom point was started in the fiscal year 2078/79 as directed by Ministry of Agriculture and Livestock Development. Initially, the responsibility was assigned to four FIEQCO (Kakarvitta, Rani, Jaleshwor and Birgunj) and three FTQCO (Bhairahawa, Nepalgunj and Dhangadhi). However, in the fiscal year 2079/80, this facility was provided by all FIEQCOs.

A total number of 63,357 samples of fresh fruits and vegetables were analyzed for testing pesticide residues (Organophosphates and Organochlorines) using RBPR method, out of which, 40 samples were found substandard. Table 1.10 shows the number of imported fresh fruits and vegetables samples analyzed by different offices for pesticide residue in this fiscal year.

**Table1.10: Number of Fresh Fruits and Vegetable Samples Analysed for Pesticide Residue by RBPR Method.**

| S.N. | Office | Number of Samples | Rejection |
|---|---|---|---|
| 1 | FIEQCO, Kakarvitta | 10568 | 6 |
| 2 | FIEQCO, Rani | 3022 | 0 |
| 3 | FIEQCO, Jaleswar | 4399 | 0 |
| 4 | FIEQCO, Birgunj | 138 | 0 |
| 5 | FIEQCO, Tatopani | 17331 | 23 |
| 6 | FIEQCO, Rasuwa | 11375 | 8 |
| 7 | FIEQCO, Belahiya | 11736 | 0 |
| 8 | FIEQCO, Krishnanagar | 3189 | 3 |
| 9 | FIEQCO, Nepalganj | 1132 | 0 |
| 10 | FIEQCO, Dhangadhi | 231 | 0 |
| 11 | FIEQCO, Mahendranagar | 236 | 0 |
| 12 | FIEQCO, TIA | 0 | 0 |
| | **Total** | **63357** | **40** |

## 1.6 Hotels/Restaurants Inspection and Categorization

In this fiscal year, 225 hotels and restaurants were inspected for categorization as per Directives on Categorization of Hotels/Restaurants Based on Food Safety (2074). Inspected hotel/restaurants were provided different stickers according to their grades based on food safety criteria as shown in Figure 1.7. Among the hotels inspected for categorization, 25 were categorized as very good, 37 as good, 54 as satisfactory and 70 as average. Remaining 39 hotels/restaurants below average were instructed for further improvement.

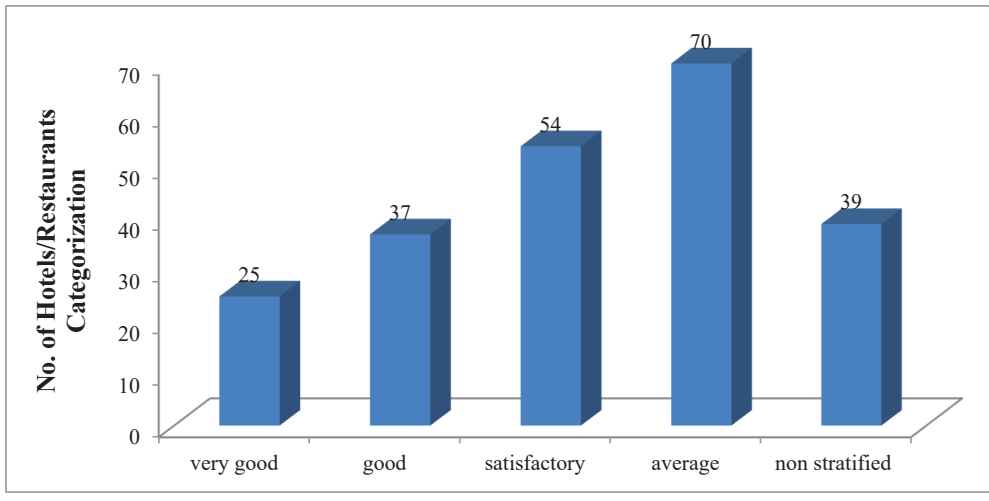



**Figure 1.7: Hotel/Restaurant categorization.**

## 1.7 Dietary Supplement Registration and Renewal

Dietary supplement registration and renewal of registered product are conducted by FFSQRD as a part of dietary supplement regulation. In this fiscal year, 1331 dietary supplements were registered whereas 1641 were renewed as per the guidelines on regulation of dietary supplements. Figure 1.8 shows dietary supplement registration and renewal for past five years.

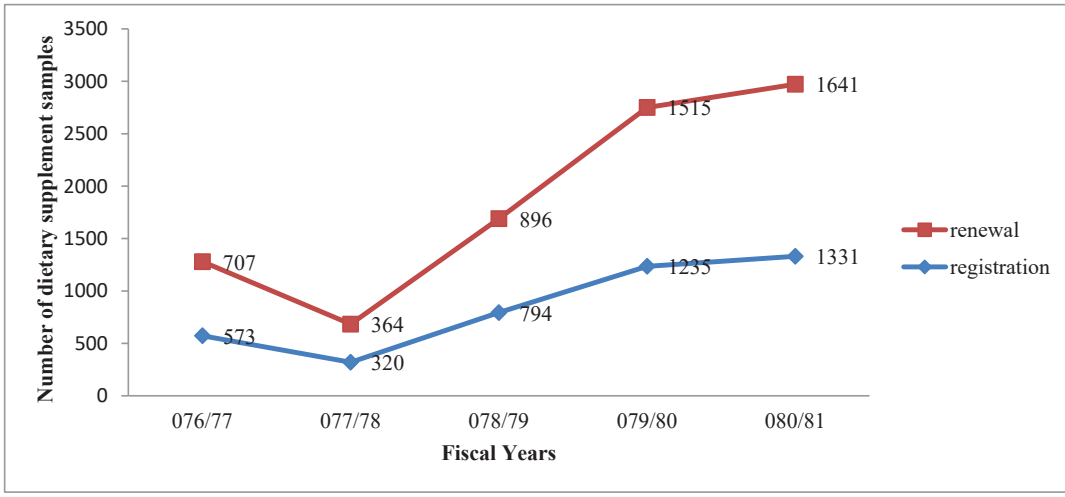



**Figure 1.8: Dietary Supplement Registration and Renewal for Past Five Years.**

## 1.8 Food and Feed Standardization

In the fiscal year 2080/81, mandatory standard for Industrial trans fat in food products and the standard for the prohibition of use of inked paper in direct contact with food products and published in Nepal Gazette. Mandatory standard for *chhurpi* was submitted to Ministry of Agriculture and Livestock Development (MoALD) for WTO notification and mandatory standard for *Masyaura* was submitted in cabinet.

## 1.9 Food Safety and Quality Awareness Programs

In the fiscal year 2080/81, following interaction programs related to awareness on food safety, hygiene and quality assurance were conducted by Department of Food Technology and Quality Control:

- Food safety and quality related training for hotel/ homestay canteen operators was conducted 61 times, food safety and quality related training for interaction programs for food business operators was conducted 14 times, interaction program related to food safety and nutrition with stakeholders, provincial level was conducted 113 times and programs related to food safety issues in street food products in was conducted 59 times.
- Microbiological safety analysis study of milk, processed drinking water and street food was conducted 30 times.

# 2. Laboratory Analysis of Food/Feed

## 2.1 Analysis of Food/Feed

National Food and Feed Reference Laboratory (NFFRL) and food laboratories at FTQCOs perform analysis of food/feed for various purposes such as:

1) Compliance of Food and Feed Act/Regulation
2) Standardization
3) Licensing(Issue and renewal)
4) Certification
5) Requested and complaint samples
6) Others

Laboratory analysis conducted by different offices is shown in the Table 2.1.

**Table 2.1: Summary of Laboratory Analysis by different offices.**

| S.N. | Office | Food | Feed | Total |
|---|---|---|---|---|
| 1 | DFTQC, Kathmandu | 6600 | 126 | 6726 |
| 2 | FTQCO, Biratnagar | 4516 | 148 | 4664 |
| 3 | FTQCO, Janakpur | 3587 | 111 | 3698 |
| 4 | FTQCO, Hetauda | 2511 | 152 | 2663 |
| 5 | FTQCO, Pokhara | 2160 | 24 | 2184 |
| 6 | FTQCO, Bhairahawa | 1778 | 46 | 1824 |
| 7 | FTQCO, Nepalgunj | 1826 | 69 | 1895 |
| 8 | FTQCO, Surkhet | 843 | 8 | 851 |
| 9 | FTQCO, Dhangadhi | 1755 | 47 | 1802 |
| | **Total** | **25576** | **731** | **26307** |

In the fiscal year 2080/81, laboratory analysis services were provided by NFFRL and eight FTQCOs. A total of 26,307 samples received as formal, surveillance, licensing, requested and other purpose were analyzed for different parameters. Table 2.2 shows the summary of sample analyzed by different offices for different purpose.

**Table 2.2: Sample Analysis for Different Purpose.**

| Sample/ Office | Formal Sample | | Surveillance sample | | Licensing Sample | | Requested Sample | | Others | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Analyzed sample | Non - compliance | Analyzed sample | Non - compliance | Analyzed sample | Non - compliance | Analyzed sample | Non - compliance | Analyzed sample | Non - compliance |
| NFFRL, Kathmandu | 851 | 45 | 896 | 93 | 3539 | 115 | 1044 | 76 | 396 | 15 |
| FTQCO, Biratnagar | 485 | 19 | 484 | 20 | 2106 | 95 | 1114 | 17 | 475 | 48 |
| FTQCO, Janakpur | 387 | 14 | 280 | 35 | 1649 | 41 | 1271 | 0 | 111 | 0 |
| FTQCO, Hetauda | 350 | 8 | 132 | 19 | 1942 | 45 | 152 | 12 | 87 | 0 |
| FTQCO, Pokhara | 64 | 0 | 320 | 34 | 1435 | 0 | 0 | 0 | 365 | 0 |
| FTQCO, Bhairahawa | 102 | 8 | 262 | 16 | 1131 | 168 | 329 | 8 | 0 | - |
| FTQCO, Nepalgunj | 121 | 4 | 382 | 9 | 989 | 86 | 266 | 1 | 137 | 0 |
| FTQCO, Surkhet | 140 | 12 | 164 | 21 | 490 | 54 | 36 | 8 | 21 | 0 |
| FTQCO, Dhangadhi | 118 | 0 | 508 | 0 | 1017 | 0 | 125 | 0 | 34 | 0 |
| Total | **2618** | **110** | **3428** | **247** | **14298** | **604** | **4337** | **122** | **1626** | **63** |

The food and feed sample analyzed by laboratories under DFTQC (except import/export certification) for last six years is shown in the Figure 2.1.

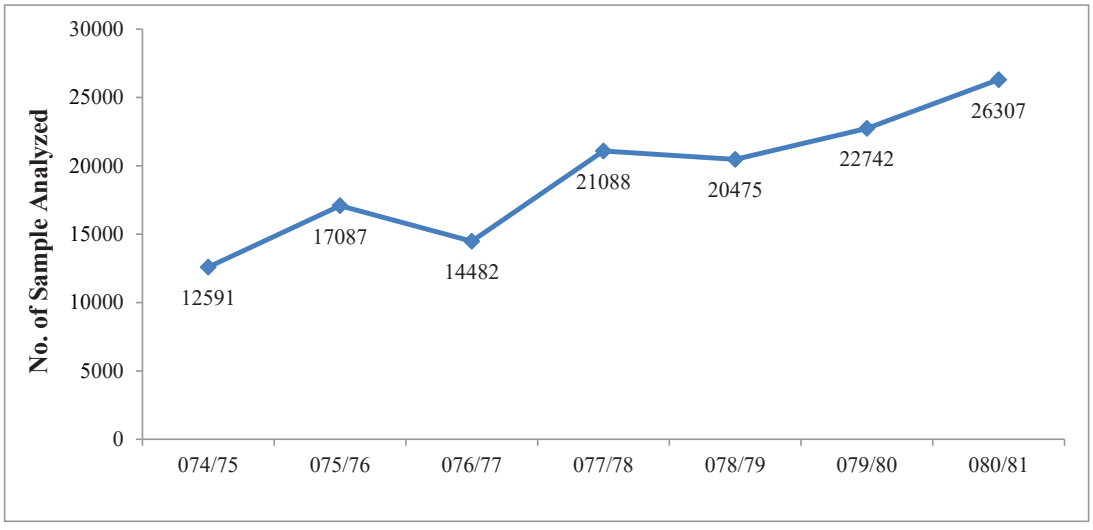



**Figure 2.1: Laboratory Analysis for Past Seven Year**

Figure shows that the number of sample analyzed by laboratories is increasing. This could be due to active inspection, increasing number of industries, increased awareness of agro-business operators about the provisions in Food and Feed Act.

## 2.2 Laboratory Analysis service for Export Promotion

National Food and Feed Reference Laboratory has been providing the laboratory analysis service for export promotion. In fiscal year 2080/81, 156 samples were analyzed for this purpose. Table 2.3 shows the summary of sample analyzed for trade promotion.

**Table 2.3: Sample Analyzed for Trade Promotion.**

| S.N. | Analyzed food commodities | Number of Sample |
|---|---|---|
| 1 | Milk products (esp. *Chhurpi*) | 134 |
| 2 | Fruits and Vegetables & its products | 2 |
| 3 | Spices and condiments (Large cardamom) | 2 |
| 4 | Sweets | 12 |
| 5 | Others | 6 |
| **Total Sample** | | **156** |

## 2.3 Progress on Laboratory Accreditation

In the fiscal year 2080/81, NFFRL was accreditated by National Accreditation Board for Testing and Calibration Laboratories (NABL), India as per ISO/IEC 17025:2017 and the accreditation scope was extended to 286 parameters (245 chemical and 41 microbiological). Moreover, laboratory of Food Technology and Quality Control Office, Biratnagar was also accredited by NABL for 7 commodities which includes 23 chemical parameters. Details on existing scope of accreditation of NFFRL (chemical and microbiological) and FTQCO, Biratnagar is given in Annex 1.

# 3. Food Technology Development and Nutrition program

In the fiscal year, 2080/81 following were the approved programs in the sector of Food Technology Development and Nutrition.

1) Training on Food Processing Technology
2) Nutrient content analysis of different food and food products
3) Method verification on food nutrient analysis
4) Recipe development for school mid-day meal program
5) Trial study
6) Food profiling of traditional and ethnic foods of Nepal
7) Texture profile analysis of *Newari* food using texture meter
8) Technology package for commercial agricultural produce
9) Baseline study for food standardization purpose

## 3.1 Training on Food Processing Technology

Food Technology Development and Nutrition Division (FTDND), Food Technology and Quality Control Offices (FTQCOs) and Food Technology and Quality Control Division Office (FTQCDO), Jumla conducted food processing trainings in order to promote small and medium scale food businesses.

Training of Trainers was conducted by FTDND for the staff of FTQCO. Theoritical knowledge on food laws and regulations, food additives, food processing, labelling and packaging, food licensing and good manufacturing practices were covered in the training. Hands on practical knowledge on processing of different food products were also carried out. Food processing trainings conducted by different offices is given in Table 3.1.

**Table 3.1: Food Processing Training Conducted by Different Offices.**

| S. N. | Name of the office | Name of training | Date of training | Female | Male | Total |
|---|---|---|---|---|---|---|
| 1. | FTDND, DFTQC | Food processing technology training | 2080/08/06-2080/08/12 | 11 | 13 | 24 |
| 2. | FTDND, DFTQC | Food processing technology training | 2080/09/18-2080/09/24 | 15 | 10 | 25 |
| 3. | FTDND, DFTQC | Food processing technology training | 2080/12/01-2080/12/07 | 20 | 5 | 25 |
| 4. | FTDND, DFTQC | Food processing technology training | 2081/2/29-2081/03/04 | 17 | 8 | 25 |
| 5. | FTQCO, Biratnagar | Food processing technology training | 2080/10/07-2080/10/10 | 14 | 7 | 21 |
| 6. | FTQCO, Janakpur | Food processing technology training | 2080-11-14 - 2080-11-16 | 13 | 7 | 20 |
| 7. | FTQCO, Hetauda | Food processing technology training | 2081/2/29-2081/03/04 | 17 | 8 | 25 |
| 8. | FTQCO, Pokhara | Food processing technology training | 2080/12/19-2080/12/21 | 17 | 3 | 20 |
| 9. | FTQCO, Bhairahawa | Food processing technology training | 2080/12/19-2080/12/21 | 17 | 3 | 20 |
| 10. | FTQCO, Nepalganj | Food processing technology training | 2080/10/22-2020/10/26 | 8 | 13 | 21 |
| 11. | FTQCO, Surkhet | Food processing technology training | 2080/10/10-2080/10/12 | 18 | 2 | 20 |
| 12. | FTQCO, Dhangadhi | Food processing technology training | 2080/12/26-2080/12/28 | 10 | 6 | 16 |
| 13. | FTQCDO, Jumla | Apple processing training | 2080/06/08-2080/06/10 | 10 | 21 | 31 |
| 14. | FTQCDO, Jumla | Apple processing training | 2080/06/24-2080/06/26 | 14 | 11 | 25 |
| | **Total participants** | | | **201** | **117** | **318** |

## 3.2 Nutritional analysis of food

Altogether 337 different food and food products were analyzed for their proximate nutrient content content in the food technology development and nutrition laboratory. Table 3.2 shows the categories of food products analyzed.

**Table 3.2: Nutritional analysis of food (proximate, research and export, nutritional labelling samples)**

| S.No | Category of food | Number of samples |
|---|---|---|
| 1. | Cereal and cereal products (including millet and its products, bakery, snack foods, dalmoth and its varieties, snacks bar etc.) | 186 |
| 2. | Pulses and legumes | - |
| 3 | Green and dry leafy vegetables (including fermented) | 61 |
| 4 | Condiments and spices (large cardamom etc.) | 8 |
| 5 | Traditional foods (*Newari, Limbu, Tharu* dishes etc) | 27 |
| 6 | Milk and milk products | 3 |
| 7 | Miscellaneous foods (R&D, tea, coffee, pickles, honey, propolis, pollen, *masyaura* etc) | 52 |
| **Total** | | 337 |

In the fiscal year 2080/81, nutrient content of different snack food were analyzed. Altogether 151 different snack foods were assessed throughout the year. Among the 151 snack foods, 74 samples were different varieties of *dalmoth,* 24 were *furandana,* 21 were potato chips, 12 were puffed rice, 10 were fried mung beans and 7 were fried green peas samples. Table 3.3 shows the nutrient content analysis of different snacks food samples.

**Table 3.3: Nutrient Content Analysis of Different Snack Products.**

| Sample Category | Moisture (%) | Crude Fat (%) | Crude Protein (%) | Total ash (%) | Crude fiber (%) | Carbohydrate (%) | Energy (Kcal/100g) | Average AIA (%, d.b) | Acid value (mg KOH/g of oil) | Average salt (as NaCl) content, % (d.b) |
|---|---|---|---|---|---|---|---|---|---|---|
| *Dalmoth* and its varieties (n=74) | 1.00 - 4.67 | 10.35 - 44.64 | 5.65 - 24.38 | 0.39 - 4.74 | 0.00 - 10.37 | 31.40 - 71.96 | 393.18 - 601.10 | 0.00 – 0.50 | 0.06 - 1.68 | 0.70 - 3.81 |
| *Furandana* (n=24) | 1.17 - 3.83 | 17.98 - 42.97 | 5.43 - 20.10 | 1.13 - 7.72 | 0.00 - 3.19 | 40.51 - 78.51 | 382.97 - 600.82 | 0.00- 0.48 | 0.10 - 2.76 | 0.33 - 2.35 |
| Potato chips (n=21) | 1.25 - 5.21 | 16.22 - 44.13 | 5.05 - 9.45 | 2.27 - 5.46 | 0.00 - 1.90 | 42.47 - 64.89 | 406.02 - 594.27 | 0.00 - 3.09 | 0.07 - 1.06 | 0.49 - 4.17 |
| *Bhuja* (n=12) | 2.86 - 6.00 | 0.21 - 0.54 | 5.37 - 9.40 | 0.00 - 1.98 | 0.00 0.97 | 85.25 - 92.04 | 370.72 - 394.31 | 0.00 - 0.77 | 0.18 - 2.76 | 0.44 - 1.28 |
| Mung fry (n= 10) | 2.16 - 5.31 | 10.44 - 21.57 | 15.02 - 21.69 | 2.31 - 3.85 | 0.46 - 4.66 | 50.30 - 63.39 | 427.32 - 482.07 | 0.00 0.12 | 0.17 - 0.70 | 0.48 - 1.83 |
| Green peas fried (n=7) | 2.02 - 7.33 | 9.31 - 13.50 | 18.37 - 22.34 | 2.69 - 4.71 | 0.49 - 6.38 | 50.86 - 61.76 | 388.48 - 410.04 | 0.00 - 0.80 | 0.82 - 2.00 | 0.60 - 2.68 |

All the snack foods were found to confirm the mandatory standard for moisture content (<5.00%) except two samples of fried green peas. The crude fat content of all the samples were found be below 45.00 %

(w.b). Among samples of fried green peas, total ash content of one sample of fried green peas was reported to be higher than 4.00 (i.e. 4.71%, w.b). Among the 74 dalmoth samples, 10 samples were found to exceed mandatory standard of the total ash content (i.e. greater than 4.00%). The total ash content of potato chips, furandana and bhuja were found to be within 2.27-4.46% (w.b), 1.13-7.72 % (w.b) and 0-1.98% respectively. Among the 74 dalmoth samples, 19 samples exceeded the mandatory standard for the Acid Insoluble Ash (AIA), i.e greater than 0.1% (d.b). Among the 21 potato chips samples, 8 samples were reported to be higher in AIA (greater than 0.1%), whereas six samples each of furandana and bhuja were found to have high AIA content. The acid value of mung fry, fried green peas, dalmoth and potato chips samples were reported be within the mandatory standard of Nepal (i.e less than 2.0 mg KOH/ g oil sample) while two samples of furandana and three samples of bhuja were reported to exceed the mandatory standard for the acid value of the extracted fat. Among the snack food samples, mung fry and green peas fried samples were found to have high crude protein content. The analysis of snack food showed that these are energy dense foods.

### 3.3 Method verification of nutrient analysis in foods (estimation of tannic acid by spectrophotometric method)

Tannins are astringent, bitter plant polyphenols that either bind and precipitate or shrink proteins and other organic compounds including amino acids and alkaloids. Tannis are potential biological antioxidant and used for defense of oxidative damage, which has been implicated in a wide range of diseases including cancer, cardiovascular disease, and arthritis and ageing. Tannis also exhibit anti nutritional properties. Tannin was determined using Folin-Denis reagent spectrophotometrically. Tannin-like compounds reduce phosphotungstomolybdic acid in alkaline solution to produce a highly coloured blue solution, the intensity of which is proportional to the amount of tannins. Different samples like tea, coffee and fruits were collected from the local market of the Kathmandu valley for the estimation of tannin content. One gram of sample was weighed into 100mL of volumetric flask. 50-60mL of distilled water was added and sonicated for 10 minutes. The flask was heated gently for 30 minutes and then cooled to room temperature. The volume was made up to 100ml with distilled water and filtered with Whatmann no.1 filter paper. Suitable amount of aliquot was transferred to 10ml volumetric flask. 0.5ml of folinciocalteau was added followed by addition of 1ml of saturated sodium carbonate solution and volume was made up to 10 ml with distilled water. The solution was shaken well and absorbance was measured at 760 nm after 30 minutes against blank (Blank was prepared omitting tannic acid standard solution). Certified Reference Material (CRM) from Agilent technologies was used. The standard calibration curve of tannic acid was plotted. The $R^2$ value of 0.9997 was obtained which showed good linearity. The Limit of Detection (LOD) was estimated be 0.00019548 mg/mL (3(SEb/slope)) while the Limit of Quantification (LOQ) was estimated to be 0.00039096 mg/mL (2*LOD). The tannin content as tannic acid was estimated in different food samples like kiwi, green tea, orthodox tea (lightly roasted), black tea (leaves), tokla gold (CTC tea), instant coffee and roasted coffee. Figure 3.1 shows the tannic acid content in different food samples. The highest tannic acid content was estimated in green tea 14038.26mg/100g (d.b) while lowest was estimated in kiwi (i.e. 806.25mg/100g (d.b)). Accuracy was calculated by determining the recovery of the spiked sample of analyte into the

matrix of the sample in low, medium and high concentration. The mean recovery was found to be 98.36-116.30%.

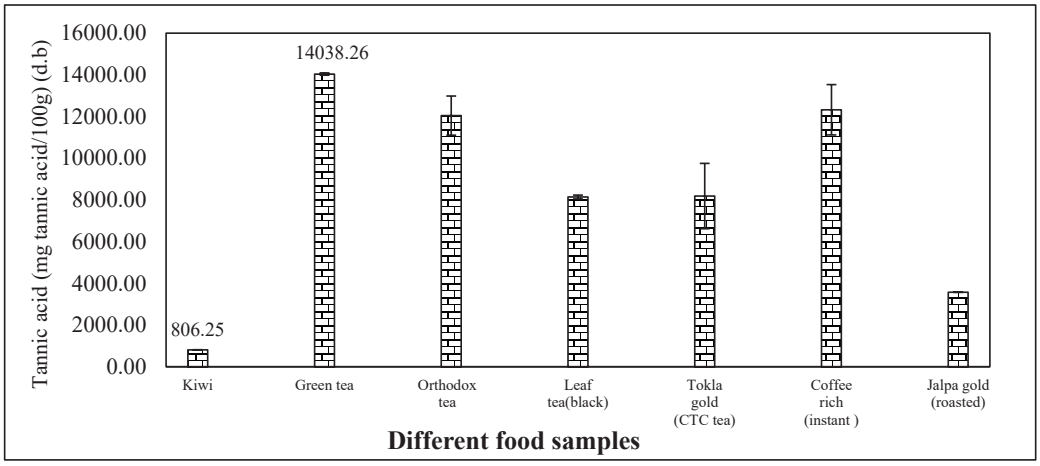



**Figure 3.1: Tannic acid content of different food samples.**

### 3.4 Recipe development for mid- day meal program

Nepal government believes that only a healthy body can develop a healthy brain **(स्वस्थ शरीरमा स्वस्थ मस्तिष्कको निर्माण हुन्छ)**. Thus, to practically achieve this, Nepal government has been launching mid-day meal program in all public schools since fiscal year 2077/78. Under this program, all students upto class five are given midday meals at school and midday meals should cover at least 30% of their required daily calorific values. Furthermore, a menu comprising of differet midday meal has been developed for different regions using internationally established Menu Planning Tool (MPT) and the Nepalese Food Composition Table and published by the Education and Human Resource Development Centre, Sanothimi, in the form of **" विद्यालय दिवा खाजा व्यवस्थापन सहयोगी पुस्तिका, २०७७".** In line with this program, FTDND has been carrying out the nutritious recipe development program every year to verify the recipes and provide feedback for further improvements to GoN about nutritious midday meal to school children.

Mixed flour biscuits and mixed flour sattu was prepared under the receipe development of mid-day meal programme. Major objective of this study was to help overcome the malnutrition problem in school going children by utilizing locally available food sources as well as development of nutritionally balanced food product recipe which meets the standard of Nepal government, ease in preparation, affordable and cost effective.

#### 3.4.1 Mixed Flour Biscuits

Mixed flour biscuit (Composite biscuit) is healthier option than regular biscuit made with refined flour. Mixed flour biscuits were made by baking a blend of mixed flour (wheat, millet, soyabean & chickpeas), vegetable oil and sugar. Recipe for mixed flour biscuit is given in the Table 3.4.

**Table 3.4: Recipe for Mixed Flour Biscuits.**

| S.N | Ingredients | Amount |
|---|---|---|
| 1. | Composite flour (wheat: buckwheat =1:1) | 52g |
| 2. | Bengal gram: soayabean (1:1) flour | 35g |
| 3. | Oil | 25ml |
| 4. | Powdered sugar | 9g |
| 5. | Baking powder | 2g |

On the basis of proximate analysis carried out in laboratory, 100g of mixed flour biscuit prepared using above recipe was found to have 492 Kcal energy value. The nutritional composition of the mixed flour biscuit is given in the Table 3.5.

**Table 3.5: Nutritional Composition of Mixed Flour Biscuits.**

| S.N | Nutrients | Amount |
|---|---|---|
| 1. | Carbohydrate | 50.2% |
| 2. | Protein | 13.03% |
| 3. | Fat | 26.5% |
| 4. | Crude fiber | 6.54% |
| 5. | Total Ash | 2% |

### 3.4.2 Mixed Flour *Sattu*

Mixed flour *Sattu* (Composite *Sattu*) was prepared by combining grains such as rice, wheat, maize, barley, chickpeas & peanuts offering its best features along with pleasant taste. Recipe for composite *sattu* is given in the Table 3.6.

**Table 3.6: Recipe of Composite *Sattu.***

| S.N | Ingredients | Amount (g) |
|---|---|---|
| 1. | Composite flour (rice, maize, wheat, barley) | 60 |
| 2. | Bengal gram flour | 40 |
| 3. | Peanuts flour | 20 |
| 4. | Powdered milk | 3 |
| 5. | Sugar powder | 10 |

On the basis of proximate analysis carried out in laboratory, 100g of composite *sattu* prepared using above recipe was found to have 425 Kcal energy value. The nutritional composition of composite *sattu* is given in the Table 3.7.

**Table 3.7: Nutritional Composition of Composite *Sattu.***

| S.N | Nutrients | Amount |
|---|---|---|
| 1. | Carbohydrate | 64.8% |
| 2. | Protein | 15.9% |
| 3. | Fat | 11.2% |
| 4. | Crude fiber | 2.77% |
| 5. | Ash | 1.95% |

## 3.5 Trial study

### 3.5.1 Study on Stability of Paste and Puree Prepared from Nepalese Tomato Varieties

Tomato is a key ingredient in Nepalese kitchen and often used as condiments for vegetables. So, it offers a great market potentiality for processed tomato products like tomato puree and paste. At present, there are only few tomato processing plants at Nepal and they have been using imported tomato concentrate for production. So, tomato puree preparation at local level can be an effective intervention to address the post-harvest losses and provide better returns to farmers.

Syneresis or separation of tomato paste/tomato ketchup during storage is a serious technical problem for tomato processors. A wide range of stabilizers can be used for solving this problem but the efficiency depends on processing methods, tomato varieties and others. So, a study was conducted on the stability of tomato puree (TSS 11°Bx) and paste (25°Bx) prepared from Nepalese variety of tomato using different stabilizers like corn starch (2%), pectin (0.4%), guar gum (0.4%), gum acacia (0.4% and CMC (0.4%). Tomato paste prepared with 25°Bx TSS and acidity of 1.13 ± 0.04 (g citric acid/100 g) showed no syneresis problem with any of the stabilizers used while the effect of stabilizers on syneresis was observed for the tomato puree prepared (11° Bx, 0.47± 0.01 g citric acid/100g. No syneresis was observed in the puree prepared with guar gum at 0.4% for the period of 6 months. For other stabilizers, syneresis was observed but the stability was better for CMC (0.4%) followed by corn starch (2%), pectin (0.4%) and gum acacia (0.4%).

### 3.5.2 Study on Total Phenolic Compound and Antioxidant Property on Different Bee Products

Bee products are of great benefit to human since they have a good scavenging effect on free radicals. They contain high bioactive properties which vary according to flora, season, bee race, production method etc.

The aim of the study was to determine total polyphenol and antioxidant capacity in different bee products (n=30). The total polyphenol content and antioxidant capacity was investigated by DPPH and Folin-ciocalteu method. Moisture content, water activity, and color were measured by refractometer, water activity meter and chromameter respectively. The rank order of antioxidant property was found to be propolis>pollen>honey>royal jelly. The range of total polyphenol for propolis was found to be 6318.95 mg GAE/100g to 6822.42 mg GAE/100g, 1774.4995 mg GAE/100g to 1822.0795 mg GAE/100g for pollen, 27.7895 mg GAE/100g to 226.6395 mg GAE/100g for honey and 75.795 mg GAE/100g for royal jelly. The antioxidant capacity ranges from 90.33% to 90.79% for propolis, 26.64% to 32.04% for

pollen, 5.4%-62.57% for honey and 15.71% for royal jelly. Buckwheat honey was found to contain 118.6695 mgGAE/100g to 240.4595 mgGAE/100g total polyphenol and 37.75%-55.72% antioxidant capacity. Wild honey contains higher antioxidant capacity (29.76%-62.57%) and total polyphenol content (133.1395 mg GAE/100g to 226.6395 mg GAE/100g) than other floral honey. Strong positive correlation($P<0.01$) was observed in antioxidant capacity and total polyphenol content ($r=0.772$) and moisture content and water activity ($r=0.704$). However, strong negative correlation between color (lightness) with total polyphenol ($r=-0.569$) and antioxidant capacity |($r=-0.900$) was observed indicating dark colored bee product has high phenolic content and antioxidant capacity than light one. Honey of *Apis. Mellifera* has high antioxidant capacity 5.4%-55.72% and polyphenol content 41.54 to 240.45 mg GAE/100g than *Apis. Cerena* bee races.

### 3.6 Study on ethnic food profiles (*Tharu* cuisines)

*Tharus* constitute the largest ethnic group of the Terai that spread across the length of Nepal's plains. *Tharu* community, mainly resides near marshlands, rivers, and flooded plains. That's why most of the *Tharu* cuisines include locally available ingredients, such as rice, freshwater fish, crabs, snails, wild mushrooms, pig, chicken, wild boar etc. In this study, different *Tharu* cusines were collected from market and analyzed for their nutrient composition as presented in the Table 3.8.

**Table 3.8: Nutritional profile of *Tharu* cuisines.**

| Name of the cuisine | Moisture (%) | Carbohydrate (%, w.b) | Crude protein (%, w.b) | Crude fat (%, w.b) | Crude fiber (%, w.b) | Total ash (%, w.b) | Energy (k.cal/ 100 g) |
|---|---|---|---|---|---|---|---|
| ***Dhikri*** | 44.09-49.84 | 46.01-50.60 | 3.15-4.77 | 0.06-0.27 | - | 0.25-0.35 | 200.94-223.48 |
| ***Anadii bhaat*** | 50.61 | 44.83 | 4.32 | 0.06 | - | 0.18 | |
| ***Anadii roti*** | 19.60 | 63.92 | 3.24 | 12.43 | 0.49 | 0.31 | |
| ***Sorahi roti*** | 37.14 | 53.91 | 3.29 | 5.45 | - | 0.21 | |
| ***Bariyaa*** | 15.37-29.96 | 35.43-56.46 | 10.63-14.66 | 13.06-16.80 | 1.08-1.63 | 2.07-2.84 | 351.55-385.90 |
| ***Masulaar*** | 53.36 | 4.82 | 7.63 | 21.30 | 2.82 | 10.61 | 241.46 |
| ***Bairik chatni*** | 90.61 | 1.45 | 2.53 | 2.86 | 1.03 | 1.50 | 41.76 |
| ***Ghongi*** | 79.00-79.86 | 5.20-6.35 | 5.85-7.99 | 3.26-3.40 | 0.27-0.77 | 3.77-4.27 | 79.41-82.21 |
| ***Sipi/ situwa*** | 42.00 | 14.50 | 20.85 | 12.65 | 1.63 | 8.36 | 255.30 |
| ***Gangato*** | 42.00 | 8.27 | 14.80 | 15.61 | 6.21 | 16.39 | 232.79 |
| ***Jingiya machhari*** | 23.95 | 1.38 | 17.53 | 47.97 | 2.89 | 6.28 | 507.38 |
| ***Machhi*** | 49.34-56.58 | 0.31-3.71 | 16.70-20.62 | 17.38-25.02 | 0.24-0.37 | 4.34-5.39 | 238.12-308.90 |
| ***Bangur ko sekuwaa*** | 39.00-42.82 | 5.12-5.46 | 21.19-24.12 | 28.34-28.85 | 0.38 | 1.81-2.52 | 361.68-376.62 |
| ***Haans ko maasu*** | 56.13 | 3.09 | 16.15 | 21.12 | 0.40 | 3.11 | 267.03 |

### 3.7. Study on the Texture Profile Analysis (TPA) of Newari Foods Using Texture Meter

*Woh* (*Bara* in Nepali) is a traditional Nepalese product made by the people of *Newar* community. It can be prepared from different types of legumes like green gram, black gram, field pea, and lentil. Generally, it is prepared from black gram and green gram. It is made in ring or doughnut shape which is deep fried. Texture is an important parameter for *bara* with respect to the acceptance of consumers and shelf life as well. One can assess many parameters with a double compression cycle from TPA. Variates that can be analyzed from TPA are: hardness, springiness, cohesiveness, adhesiveness, resiliency, fracturability, gumminess, chewiness etc. The general variants analyzed are hardness, springiness and cohesiveness, the three altogether allows the calculation of chewiness. This study was aimed to study effect of freezing on the texture profile analysis of *bara* using different form of black gram pulses (with hull, dehulled and powder form). The raw materials required for the study were purchased from the local market of the Kathmandu valley. Three different forms of raw material (black gram pulses) were used for the preparation of *bara*, i.e black gram pulses with hull, dehulled black gram pulses and dehulled and powdered black gram. *Bara* was prepared from all the three raw materials and its texture was studied using texture analyzer (TA.XT Plus, Stable Micro Systems Ltd., UK). For the test mode compression, 75% stress was applied with test speed of 5mm/s (pretest speed -1.5 mm/sec). A diameter platen of 36mm was used as probe for the study. Thus prepared *bara* were stored in chest freezer for two months and TPA was studied in two weeks interval for each of the *bara.* The number of samples analyzed in each lot was ten. The average weight of the thus prepared *bara* was 37.98 gram, average diameter was 74.4mm with an average thickness of 12.3 mm. These *bara* were deep frozen and stored for two months. The TPA was studied in two weeks interval till two months. The *bara* samples were thawed in refrigerator, one day prior to analysis, then brought to room temperature and TPA was analyzed. *Bara* prepared from black gram with hull was more spongy and aerated. Figure 3.2 shows the hardness of *bara* prepared from different raw materials over a period of two months.

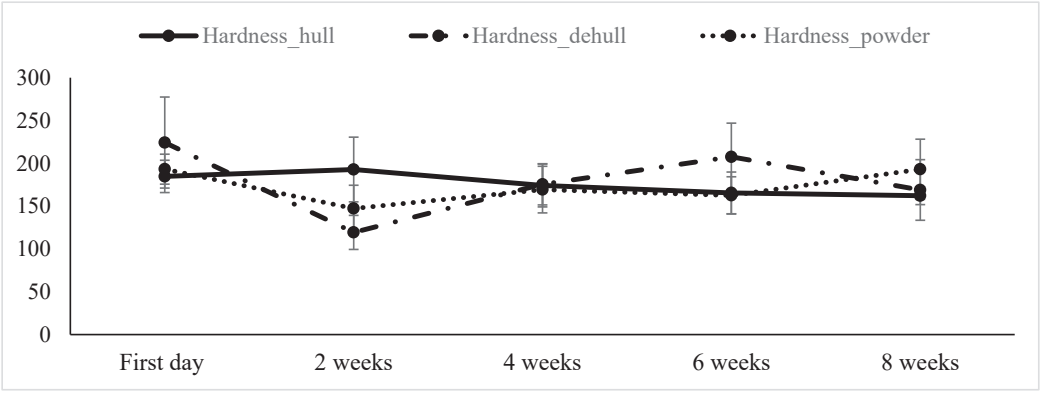



**Figure 3.2: Hardness of *bara* prepared from different raw materials.**

The drastic change in hardness was observed in bara prepared from dehulled black gram while there wasn't significant change in the hardness of bara prepared from black gram with hull, during eight weeks of storage.

Figure 3.3 shows resilience of bara prepared from different raw materials. The significant change in resilience was observed in bara prepared from dehulled black gram while resilience was first in increasing order and then steady state in powder. For deep frozen storage of bara, either bara from hull black gram or bara from powder would be desirable.

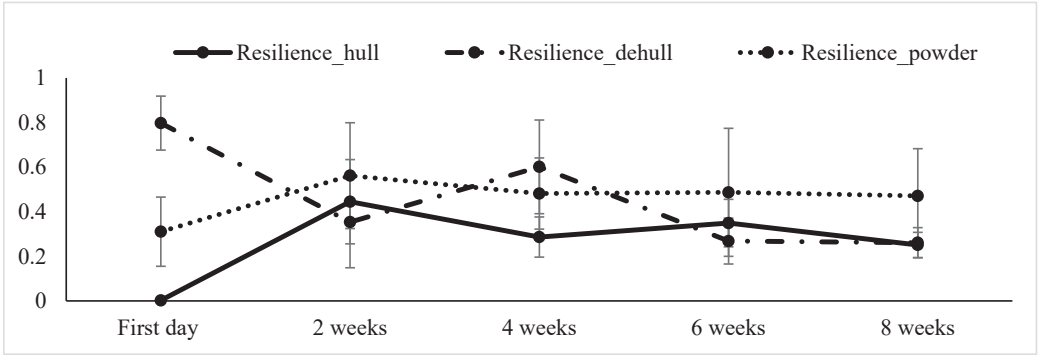



**Figure 3.3: Resilience of bara prepared from different raw materials**

## 3.8 Technology Package for Commercial Agricultural Produce

Millet, being a potential commercial agricultural produce, was selected for the technology package study. The physiochemical properties of various native varieties of millets were analyzed and further utilized for product diversification. The results obtained from these studies were compiled and published in the booklet form.

### 3.8.1 Sample Collection and Physiochemical Characterization of Prominent Millet Varieties of Nepal

Millets encompass a diverse group of small grained dry land cereals. Finger millet is the first important crop among the millets in Nepal in terms of area and production followed by proso millet and foxtail millet. Sorghum, barn yard millet, pearl millet, little millet and kodo millet are the other crops that have been reported to be grown in parts and parcels of the country. Use of millet in different processed and value added food products is increasing due to their nutritive and therapeutic qualities and contribution towards meeting objective of sustainable diet, food security and eradication of hunger. Table 3.9 presents the results obtained from the study on major physicochemical properties of prominent millet species of Nepal.

**Table 3.9: Physiochemical Properties of Prominent Millet Species of Nepal.**

| Sample name | Moisture (%) | Ash (%) | Protein (%) | Fat (%) | Crude fiber (%) | 1000 kernel wt. (g) | Bulk Density (kg/m$^3$) | Water Holding Capacity | Oil Holding Capacity |
|---|---|---|---|---|---|---|---|---|---|
| *Chino* Jumla | 10.68 ± 0.05 | 0.40 ± 0.01 | 8.96 | 0.74 ± 0.01 | 0.59 ± 0.19 | 5.00 ± 0.22 | 914.22 ± 12.15 | 192.48 ± 0.26 | 56.76 ± 5.11 |
| *Kaguno* Jumla | 7.33 ± 0.02 | 1.42 ± 0.05 | 10.5 | 3.50 ± 0.05 | 0.70 ± 0.18 | 2.17 ± 0.06 | 805.42 ± 4.59 | 206.95 | 68.18 |
| *Kalo kodo* Jumla | 11.64 ± 0.06 | 2.15 ± 0.07 | 6.88 | 1.34 ± 0.1 | 4.05 ± 0.58 | 2.69 ± 0.17 | 852.02 ± 2.23 | 204.20 | 90.47 ± 20.86 |
| *Rato kodo* Jumla | 11.72 ± 0.14 | 1.95 ± 0.06 | 6.70 | 1.13 ± 0.01 | 3.06 ± 0.41 | 2.63 ± 0.02 | 864.18 ± 0.45 | 209.85 | 75.19 |
| *Okhle 1 kodo* | 12.42 ± 0.07 | 1.90 ± 0.09 | 5.70 | 1.17 ± 0.12 | 3.86 ± 0.19 | 3.15 ± 0.1 | 877.02 ± 5.90 | 209.21 | 59.51 |
| *Dalle 1 kodo* | 12.11 ± 0.01 | 2.08 ± 0.07 | 6.50 | 1.28 ± 0.01 | 3.28 ± 0.11 | 2.26 ± 0.05 | 879.62 ± 0.82 | 211.83 | 129.49 ± 18.17 |
| *Sailung 1 kodo* | 12.91 ± 0.02 | 1.59 ± 0.08 | 7.02 | 0.92 ± 0.03 | 3.37 ± 0.36 | 3.07 ± 0.05 | 829.27 ± 7.78 | 200.92 | 70.68 |
| *Kavre 2 kodo* | 11.74 ± 0.2 | 1.69 ± 0.14 | 6.84 ± 0.23 | 1.10 ± 0.01 | 3.23 ± 0.61 | 3.15 ± 0.08 | 836.98 ± 2.06 | 217.14 | 73.13 |
| *Kavre 1 kodo* | 11.68 ± 0.02 | 2.06 ± 0.09 | 6.84 ± 0.28 | 1.22 ± 0.08 | 2.90 ± 0.13 | 3.05 ± 0.1 | 886.17 ±6.87 | 196.06 | 82.79 |

### 3.8.2 Product diversification of millets

Millets possess unique nutritional and functional properties that can lend themselves to the development of healthy and nutritious foods at low costs. There is an increased utilization of millets in different processed and value added foods. So, this study was aimed to develop recipe of various products based on millet varieties of Nepal and also analyze their nutritional value. Recipe of instant millet *Halwa* mix, millet ready to cook soup mix, millet energy bar and millet cracker were developed. The products prepared were analyzed for their nutritional value and evaluated for sensorial acceptance. Among the products developed, Instant *Halwa* mix and millet bar were liked by the majority of sensory panelist and were willing to pay for these products.

**A. Instant millet *Halwa* mix**

Instant *Halwa* mix was prepared using pre-gelatinized millet flour, roasted peanut flour, ground cardamom, cinnamon and clove, sugar, milk powder and ghee. Recipe for preparation of the product is given in the Table 3.10.

**Table 3.10: Recipe of Instant millet *halwa* mix**

| S.N. | Ingredients | Amount (g) |
|---|---|---|
| 1. | Pre-gelatinized millet flour | 100 |
| 2. | Roasted peanut flour | 20 |
| 3. | Ground cardamom and clove | 1 |
| 4. | Sugar | 20 |
| 5. | Milk powder | 10 |
| 6. | Cinnamon powder | 0.5 |
| 7. | Ghee | 10 |

**B. Ready to Cook Millet Soup Mix**

Ready to cook millet soup mix was prepared using malted millet flour, salt, garlic powder, cumin powder, starch powder, *timur* and monosodium glutamate. Recipe for preparation of the product is given in the Table 3.11.

**Table 3.11: Recipe of Ready to cook millet soup mix**

| S.N. | Ingredients | Amount (g) |
|---|---|---|
| 1. | Malted millet flour | 100 |
| 2. | Salt | 10 |
| 3. | Garlic powder | 2 |
| 4. | Cumin powder | 1 |
| 5. | Starch powder | 1 |
| 6. | *Timur* | 0.4 |
| 7. | Monosodium glutamate | 0.1 |

**C. Millet Energy Bar**

Millet energy bar was prepared using roasted *chino, kaguno,* nuts, seeds, jaggery powder, liquid glucose, ghee, milk powder and powder of spices (cinnamon, cardamom and clove). Recipe for preparation of the product is given in the Table 3.12.

**Table 3.12: Recipe of Millet energy bar.**

| S.N. | Ingredients | Amount (g) |
|---|---|---|
| 1. | Roasted *Chino* | 50 |
| 2. | Roasted *Kaguno* | 50 |
| 3. | Roasted nuts | 20 |
| 4. | Roasted seeds | 10 |
| 5. | Cinnamon powder | 1 |
| 6. | Cardamom and clove powder | 0.5 |
| 7. | Ghee | 10 |
| 8. | Jaggery powder | 40 |
| 9. | Liquid glucose | 25 |
| 10. | Milk powder | 5 |

**D. Millet Cracker**

Millet cracker was prepared using malted millet flour, wheat flour, oil, baking powder and salt. Recipe for preparation of the product is given in the Table 3.13.

**Table 3.13: Recipe of Millet crackers.**

| S.N. | Ingredients | Amount (g) |
|---|---|---|
| 1. | Malted millet flour | 70 |
| 2. | Wheat flour | 30 |
| 3. | Oil | 20 |
| 4. | Baking powder | 4 |
| 5. | Salt | 1 |

The nutritional composition of the millet based products prepared from the recipe mentioned above were analyzed in the laboratory. Table 3.14 shows the nutritional composition of these products.

**Table 3.14: Nutritional Composition of Millet based products.**

| S.N. | Nutrients (%) | Instant millet *halwa* mix | Ready to cook millet soup mix | Millet energy bar | Millet crackers |
|---|---|---|---|---|---|
| 1. | Moisture | 2.13±0.04 | 3.85±0.04 | 7.93±0.04 | 1.64±0.02 |
| 2. | Total ash | 1.7±0.02 | 11.59±0.02 | 1.38±0.02 | 1.38±0.02 |
| 3. | Crude protein | 7.66±0.12 | 6.7±0.12 | 10.44±0.29 | 6.52±0.29 |
| 4. | Crude fat | 13.57±0.11 | 1.71±0.11 | 11.76±0.11 | 16.97±1.15 |
| 5. | Crude fibre | 4.52 | 3.98 | 1.21 | 2.35 |
| 6. | Carbohydrate | 70.52 | 72.17 | 67.28 | 69.98 |
| | Energy (kcal/100g) | 434.85 | 330.87 | 416.72 | 458.81 |

## 3. 9 Baseline Study for Standards Formulation

### 3.9.1 Study on the Effect of Processing on Non-Protein Nitrogen (NPN) and Acid Insoluble Ash (AIA) Of *Gundruk* Samples

*Gundruk* is a non-salted fermented and dried vegetable product of Nepal. It is prepared by spontaneous lactic acid fermentation of green leafy vegetables, including the leaves of *Brassica* species such as mustard (*Brassica campestris* L.), rayo (*B. juncea* L.), cauliflower (*B. compestris* L. var. *botrytis* L.), cabbage (*B. oleracea* L, and radish (*Raphanussativus* L.). The baseline study done on the physiochemical properties of gundruk samples from different regions of Nepal showed a great variation in Acid insoluble ash, crude protein and non-protein nitrogen content which are important safety and nutritional parameter. So, it is important to verify whether the variation exists due to biogenic reasons or improper handling and processing. So, this study was aimed at finding the effect of processing methods basically raw material selection, crushing (stone vs metal) and drying (open sun drying vs cabinet) on non-protein nitrogen content and acid insoluble ash of *gundruk*. From the study following observations was noted.

A. Acid insoluble ash was affected by handling and processing like proper cleaning of leaves before wilting, crushing method used (stone crushed had higher AIA than metal*)* and drying condition (open sun drying had higher AIA than solar drying ).
   - *Gundruk* samples crushed by metal and solar dried had AIA in the range of 0.14 – 0.52 %, d.b. majority were below 0.2%.
   - *Gundruk* samples crushed by metal and sun dried had AIA in the range of 0.09 – 0.76%, d.b majority were below 0.3%.
   - *Gundruk* samples crushed by stone and solar dried had AIA in the range of 0.1 – 0.88%, d.b majority were above 0.4%.
   - *Gundruk* samples crushed by stone and sun dried had AIA in the range of 0.27 – 0.85%, d.b, majority were above 0.5%

B. Lower NPN was evident in the unfermented dried leaves compared to their corresponding fermented *gundruk* samples.
   - Unfermented dried *Rayo* leaves had NPN in the range of 8.18-9.10%, d.b, while their respective fermented samples NPN was in the range of 12.27 – 19.42%, d. b.
   - Unfermented *Tori* leaves had NPN in the range of 12.26 -14.15%, d.b, while their respective fermented samples NPN was in the range of 18.62 - 20.39 %, d. b

C. For the similar fermentation temperature and time, acidity was affected by the maturity of leaves, tender leaves had lower acidity (3.06 ± 0.21% lactic acid, d.b) compared to mature leaves 6.88 ± 0.21%, lactic acid, d.b.

### 3.10.2 Study on the Factors Affecting Non- Protein Nitrogen Content of *Gundruk*

Nitrogenous substances such as pigments (chlorophyll and phycoerythrin), nucleic acids, free amino acids and inorganic nitrogen (nitrate, nitrite and ammonia) has been shown to be relatively high in leaves and fruits of plants contributing to its high non- proteinous nitrogen content. Previous study carried out at Food technology and Nutrition laboratory of DFTQC on physiochemical composition of *Gundruk*samples had revealed higher percentage of non- protein nitrogen ranging from 6.6-20.1%, d.b. So, this study was done to assess the effect of different factors like intra sample variation i.e leaves vs stalk, dry matter content of leaves, fermentation rate, and soil nitrogen level on the NPN content of *Gundruk*. The results obtained from the study is presented in the Table 3.15.

**Table 3.15: Effect of Leaves, Stalk, Dry Matter Content and Fermentation Rate on Protein and NPN of *Gundruk.***

| Sample name | Moisture (%) | Protein (%) | NPN(%) |
|---|---|---|---|
| Leaves only wilted, 24 hrs ambient temperature | 86.50 ± 0.08 | 34.68 ± 0.37 | 15.30 ± 0.78 |
| Whole leaves wilted, 24 hrs, ambient temperature | 89.44 ± 0.44 | 32.36 ± 0.29 | 11.47 |
| Stalk only wilted, 24 hrs, ambient temperature | 92.67 ± 0.43 | 25.58 | 10.43 |
| Whole leaves wilted at 30º C, 18 hrs | 76.91 ± 0.82 | 31.83 ± 1.35 | 12.34 |
| Whole leaves wilted at 30º C, 5 hsr | 87.84 ± 0.08 | 29.56 ± 0.37 | 15.11 |
| Gundruk control | 8.7 ± 0.6 | 27.7 ± 0.02 | 20.7 |
| Gundruk leaves only | 10.9 ± 1.2 | 31.4 ± 1.02 | 24.6 ± 1.1 |
| Gundruk stalk only | 8.7 ± 0.3 | 26.3 ± 0.5 | 13.4 ± 0.5 |
| Gundruk fermented at 30º C | 8.2 ±0.02 | 29.25 ± 0.5 | 23.9 ± 1.6 |
| Gundruk wilted at 30º C, 18 hr | 6.8 ± 0.1 | 28.13 ±3.4 | 21.6 |

A large intra sample variation was observed in the protein and NPN content as relatively higher NPN content was observed in the *Gundruk* prepared from leaves as compared to its respective stalk. Also, the rate of fermentation affected the NPN content as it was higher for faster rate of fermentation. However, protein and NPN content was similar for dry matter content of *Rayosaag*.

Also, the soil where *Rayo* were cultivated were analyzed for nitrogen content and organic matter and *Gundruk* prepared from these were analyzed for NPN content. A positive correlation was observed between NPN of *Gundruk* and organic matter of soil ($R^2 = 0.9254$) and NPN of *Gundruk* and nitrogen content of soil ($R^2 = 0.9235$).

## 4. Sanitary and Phytosanitary (SPS) National Enquiry Point

The SPS National Enquiry Point has been established at DFTQC as per provision on transparency in WTO SPS Agreement in order to respond query made by WTO member countries or SPS related stakeholders. In fiscal year 2080/81, the following activities were accomplished:

1) SPS enquiry services such as SPS enquiry on mandatory food standards and SPS notifications were timely responded.

2) SPS notification works were accomplished.

3) Stakeholders meeting on working guidelines of SPS National Enquiry Point was performed.

Upto this fiscal year, the rules, regulations and guidelines notified by SPS National Enquiry Point is shown in the Table 4.1. Details about SPS notifications is given in Annex 2.

**Table 4.1: SPS Notifications**

| S.N. | Notification |
|---|---|
| 1. | Quarantine pest of Gerbera , Carnation, Cauliflower |
| 2. | Standard of Rice Bran Oil |
| 3. | Quarantine standards for Day Old Chicks, Table Egg |
| 4. | Proposed quality standard for Cornflakes, Preservatives |
| 5. | Proposed mandatory quality standard for fortified wheat flour |
| 6. | Plant Protection Rule, 2010 |
| 7. | Plant Protection Act, 2007 |
| 8. | Plant Protection Act, 2007-Extension of the comment Period (Add.) |
| 9. | Notification regarding the establishment of animal |
| 10. | National Plant Quarantine Pests of apple, citrus, |
| 11. | Standards of Maize (corn), Wheat, Paneer, Cinnamon powder and Wheat flour |
| 12. | All Products–Phytosanitary Certificate– Extension of the comment period |
| 13. | Directives on Export Import Inspection and Quality Certification System (Food) |
| 14. | Brief recap of the Original Notification (Add.) |
| 15. | Blended Edible Vegetable Oil Standard |
| 16. | Avian influenza (bird flu) (Emergency Notification) |
| 17. | Animal Slaughter house & Meat Inspection Act and Regulation |

| | |
|---|---|
| 18. | Animal Quarantine Working Procedure, 2007 |
| 19. | Animal Health & Livestock Services Act, 1998 and Regulation (Add.) |
| 20. | All Food Products–Directives on Export-Import (Add.) |
| 21. | Phytosanitary Certificate |
| 22. | Processed Drinking Water/Mineral Water |
| 23. | Standard for Whiskey, Brandy, Gin and Vodka |
| 24. | Maximum Limit of Aflatoxin and Melamine |
| 25. | Standard for processed milk, low fat milk, full cream milk skimmed milk. |
| 26. | Glossary of Phytosanitary terms |
| 27. | Maximum Residue Limit of Pesticides on fresh fruits, vegetables and tea |
| 28. | Proposed Quality and Safety Standards of Pustakari, Gundpak |
| 29. | Proposed Quality and Safety Standards of Pustakari, Dalmoth and Beaten Rice |
| 30. | Proposed Standard for Fruit juices |
| 31. | Proposed Standard for Fruit Beverages |
| 32. | Proposed Standard for Fruit Nectar |
| 33. | Proposed Maximum Residue Limits of Pesticide for Fruits and Vegetables |
| 34. | Maximum Limit of Industrial Trans-fat in Food Products |
| 35. | Prohibition in Use of Inked Paper in Food |
| 36. | Plant Protection (First amendment) Rules, 2080 |
| 37. | Proposed Standard for Masyaura |
| 38. | Food Safety and Quality Act, 2081 |

## 5. Activities related to Antimicrobial Resistance (AMR)

The World Health Organization (WHO) considers Antimicrobial Resistance (AMR) as a top global health threat, emphasizing the urgent need for coordinated action across the food production and healthcare sectors. Due to spread of resistant bacteria in different sectors (human, animal, food and environment) leads to the ineffectiveness of antibiotics in treating infections impacting public health threat.

In the food chain, resistant bacteria can be transferred via foods like meat products, dairy products, vegetables etc. AMR bacterial can also be spread through food handlers if proper food hygiene practices are not followed. The overuse and misuse of antibiotics in food-producing animals can lead to the development of resistant bacteria, which can then contaminate the food supply.

The Fleming Fund Country Grant Nepal (FFCGN), FHI 360 and Action to support implementation of Codex AMR Text (ACT) project, FAO Nepal have been continuously supporting different activities in mitigating AMR problems in food sector. Some of the key activities related to AMR are as follows:

### 5.1 Regular TWG meeting among different stakeholders:

Director General of DFTQC is the chairperson of the Technical Working Group (TWG) meeting. Meeting is called regularly in every three months among officials from Human Health, Animal Health, Environment and Senior Food Research Officers, Food Research Officers of DFTQC and technical specialist from FHI 360 and FAO (ACT) project. Findings from surveillance and other related agendas were shared and discussed among stakeholders in the meeting

### 5.2 Quality Control Activities (EQASia and NEQAS)

- The microbiology laboratory of NFFRL participated in International EQAS program (EQAsia 7 and EQAsia 8) conducted from Chulalongkorn University, Thailand and DTU. Seven different panels of unknown test organism were sent and laboratory had to identify the targeted organism along with the Antibiotic Suspceptibility test of targeted isolate.
- In addition to this, microbiology laboratory also participated in National Quality Assurance Program organized by Central Veterinary Laboratory under the Department of Livestock and Services.

### 5.3 Strengthening laboratory facility and Laboratory Capacity Building:

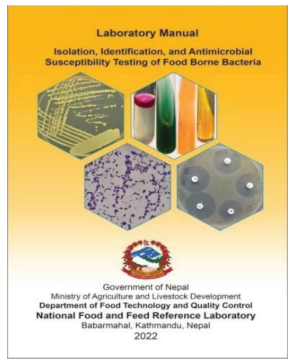
- Fleming Fund Country Grant Nepal (FFCGN), FHI 360 had supported different microbiological instruments (Autoclave, Biosafety Cabinet, Incubators, Microscope, Balance, Deep freeze, Refrigerators, pH meter, antibiotic zone reader, media dispensers) and consumables (petridishes, media, antibiotic discs, cool boxes, antibiotic dispensers) which are required for testing Antimicrobial Susceptibility test in food products.
- Regional Bench marking workshop on AMR surveillance in human health, animal health and environmental science was conducted on 8$^{th}$ to 10$^{th}$ May 2024 in Bangkok, Thailand. One official from DFTQC presented a poster on "AMR Laboratory Network in Nepal between Human health sector, Terrestrial animal health sector, food sector and environment sector. The poster also reflected gaps and challenges for the coordination of inter-sectoral laboratory network. The program was supported by FAO (ACT) project.
- There were an active participation from DFTQC officials in BTSF Training on Prevention and Control of Antimicrobial Resistance which was held in New Delhi, India on Feb 2024

### 5.4 Monitoring of AMR activities

A team from Mott MacDonald visited Microbiology laboratory of DFTQC for scope extension for AMR surveillance in DFTQC. They suggested to conduct a need assessment of microbiology laboratory of two provincial laboratories (FTQC Biratnagar and FTQC Nepalgunj)

### 5.5 Protocol development:

Laboratory manual for isolation, identification and AST of food borne bacterial pathogens was developed with the support of Fleming Fund Country Grant Nepal, FHI 360. This manual will be reviewed every two years and will be followed for conducting Antimicrobial Susceptibility Testing.




### 5.6 Passive AMR surveillance on meat and milk products

Effective surveillance plays a vital role in generating evidence to tackle AMR burden. So, in order to monitor the prevalence of prevalence of food borne pathogenic bacteria and their resistance to commonly used antibiotics of animal origin food products, Passive AMR surveillance is carried out in meat and dairy products which are requested for routine analysis. Since 2023 July, Enterococcus faecalis and Enterococcus faecium was included in AMR surveillance in Food.

### 5.7 Other AMR related activities:

Every year World Antimicrobial Resistance Awareness Week (WAAW) is celebrated on 18$^{th}$ to 24$^{th}$ November. "Preventing Antimicrobial Resistance Together" was theme for 2023. It is a global campaign to raise awareness and understanding of AMR and promote best practices among One Health stakeholders to reduce the emergence and spread of drug-resistant infections. Different awareness sessions among students of food technology and veterinary science were carried out during AMR awareness week. Representatives from DFTQC also actively participated in morning rally which was initiated in leadership of Department of Livestock Services.

## 6. Other activities

During this period, various programs conducted by the department are as follows:

- World Food Safety Day was celebrated on June 7, 2024 with the global slogan " Food Safety: prepare for the unexpected" with a week-long various food safety related awareness, interactions, market and hotel/restaurant monitoring, street food safety targeted programs and other various programs.
- A web based Laboratory Information Management System (LIMS) for NFFRL has been developed under Strategic Road Connectivity and Trade Improvement Project (SRCTIP) supported by World Bank. The system was developed with the objective to manage laboratory service more efficiently and effectively.

## 7. Revenue Collection

Revenues are generated from services like laboratory analysis and licensing of food/feed industries. The analytical fee depends on the parameter to be analyzed. Details of non-tax revenue rates for laboratory

analysis services as published in Nepal Gazette is given in Annex 3. Table 7.1 shows the detail of revenue collection in this fiscal year.

**Table 7.1: Revenue collection in the fiscal year 2080/81.**

| S.N. | Office | Revenue collection in thousands |
|---|---|---|
| 1 | DFTQC, Kathmandu | 18117 |
| 2 | FTQCO, Biratnagar | 3915 |
| 3 | FTQCO, Janakpur | 2677 |
| 4 | FTQCO, Hetauda | 2233 |
| 5 | FTQCO, Pokhara | 1641 |
| 6 | FTQCO, Bhairahawa | 2533 |
| 7 | FTQCO, Nepalgunj | 1814 |
| 8 | FTQCO, Surkhet | 650 |
| 9 | FTQCO, Dhangadhi | 1454 |
| 10 | FIEQCO, Kakarvitta | 4316 |
| 11 | FIEQCO, Rani | 3079 |
| 12 | FIEQCO, Jaleshwar | 3000 |
| 13 | FIEQCO, Birgunj | 9237 |
| 14 | FIEQCO, Tatopani | 13379 |
| 15 | FIEQCO, Rasuwa | 4382 |
| 16 | FIEQCO, Belahiya | 7731 |
| 17 | FIEQCO, Krishnanagar | 3783 |
| 18 | FIEQCO, Nepalganj | 1477 |
| 19 | FIEQCO, Dhangadhi | 793 |
| 20 | FIEQCO, Mahendranagar | 190 |
| 21 | FIEQCO, TIA | 140 |
| | **Total** | **86545** |

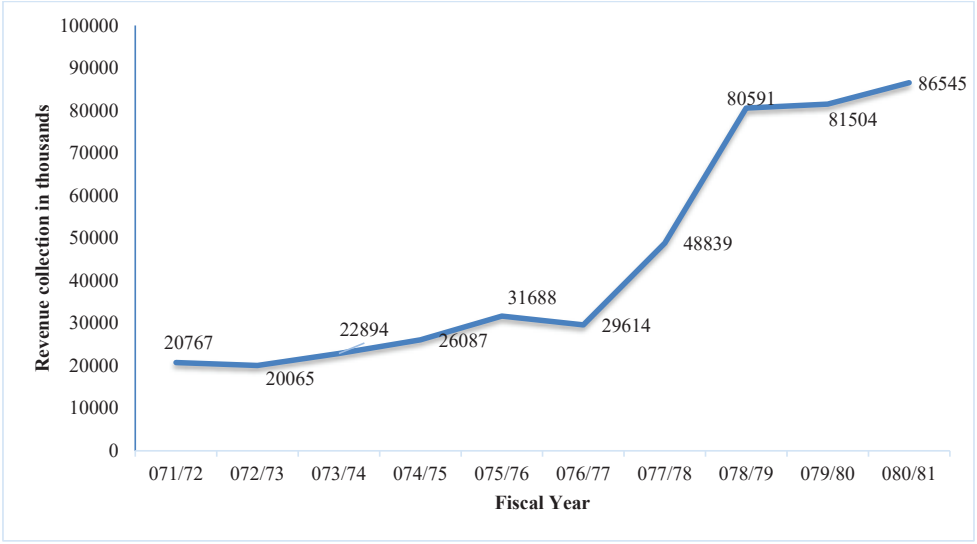



**Figure 7.1: Revenue Collection for Past Ten Years.**

Figure 7.1 shows the trend of revenue collection over past ten years. From the figure, it can be observed that the revenue collection is increasing every year. This was due to increase in the number of samples analyzed by the laboratories for import/export certification, licensing purpose, requested samples, lot verification etc. After the establishment of 24 division offices and 8 new food import/export quality certification offices in the fiscal year 075/76, revenue collection increased gradually due to increase in number of samples received for import/export certification at custom points and increased awareness about the legal provision of licensing for food business operators. In the fiscal year 078/79, the revenue collection has nearly doubled in comparison to previous year after beginning the testing of pesticide residue analysis using rapid bioassay of pesticide residue (RBPR) from 1$^{st}$of Kartik, 2078.

# ANEXES

# Annex - 1

National Accreditation Board for Testing and Calibration Laboratories

## CERTIFICATE OF ACCREDITATION

**NATIONAL FOOD & FEED REFERENCE LABORATORY, DEPARTMENT OF FOOD TECHNOLOGY AND QUALITY CONTROL (DFTQC)**

**has been assessed and accredited in accordance with the standard**

**ISO/IEC 17025:2017**

**"General Requirements for the Competence of Testing & Calibration Laboratories"**

**for its facilities at**

Babarmahal, Kathmandu, Nepal

**in the field of**

**TESTING**

| | | | |
|---|---|---|---|
| **Certificate Number** | **TC-4062** | | |
| **Issue Date** | **31/03/2023** | **Valid Until** | **30/03/2025** |

**This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.**
**(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)**

**Name of Legal Identity : Ministry of Agriculture and Livestock Development, Government of Nepal**

**Signed for and on behalf of NABL**

8907697010003000258 2

**N. Venkateswaran**
**Chief Executive Officer**

**(a) Existing Scope of Accreditation in NFFRL (Chemical)**

| S.N. | Commodities | | Specific test performed |
|---|---|---|---|
| 1. | Fats and Oils | | Free fatty acid |
| | | | Refractive index |
| | | | Acid value |
| | | | Peroxide value |
| 2. | Fruits and vegetables Products | | Total soluble solids(TSS) |
| | | | Acidity |
| | | | Sulfur dioxide (SO2) |
| | | | Benzoic acid |
| | | | Tartazine |
| | | | Sunset Yellow |
| 3. | Spices and Condiments (Ginger,Cardamom) | | Volatile oils |
| | | | Crude fibre |
| | | | Total ash |
| 4. | Tea and coffee | | Total ash |
| | | | Water extracts |
| | | | Crude fibre |
| | | | Caffeine |
| | | | Lead |
| 5. | Cereals and cereals products(Instant noodles, Biscuits, Infant foods) | | Moisture |
| | | | Proteins |
| | | | Total aflatoxin |
| | | | Aflatoxin G2 |
| | | | Aflatoxin B1 |
| | | | Zinc |
| | | | Calcium |
| | | | Magnesium |
| | | | Iron |
| 6. | Honey | | Moisture |
| | | | Acidity as formic acid |
| | | | Hydroxy methyl furfural |
| 7. | Fruits and Vegetables | OrganochloridePesticide | Aldrin,SS |
| | | | Alpha–BHC,SS |
| | | | Alpha–Chloridane,SS |
| | | | Gamma-BHC, (Lindane) SS |
| | | | Endosulphan sulphate SS |
| | | | Endosulfan I (Alpha) SS |
| | | | Endrin,SS |

| | | | |
|---|---|---|---|
| | | | Endrin Aldehyde,SS |
| | | | EndosulfanII, (Beta) SS |
| | | | Beta-BHC, SS |
| | | | Delta-BHC, SS |
| | | | Dieldrin, SS |
| | | | Endrin Ketone,SS |
| | | | Heptachlor, 99% SS |
| | | | Gamma-Chlordane SS |
| | | | Heptachlor-epoxide Isomer B, SS |
| | | | 4,4'-DDD,SS |
| | | | 4,4'-DDE,SS |
| | | | 4,4'-DDT |
| | | | Methoxy Chlor |
| | | Organo phosphorus Pesticide | Sulfotep |
| | | | Thionazin |
| | | | Disulfoton |
| | | | MethylParathion |
| | | | Parathion |
| | | | O,O,O- Triethylphosphorothiotae |
| | | | Famphur |
| | | | Dimethoate |
| | | | Phorate |
| 8. | Processed water | | pH |
| | | | Hardness |
| | | | Alkalinity |
| | | | Chloridecontent |
| | | | Lead |
| | | | Cadmium |
| | | | Arsenic |
| | | | Calcium |
| | | | Copper |
| | | | Iron |
| | | | Magnesium |
| | | | Zinc |
| 9. | Milk and milk products(skimmed, whole milk powder, condensed milk) | | Milkfat |
| | | | Moisture |
| | | | Protein |
| | | | Ashcontent |
| | | | Solid not fat |
| 10 | Meat and Meat Product | | SodiumNitrite |

**(b) Existing Scope of Accreditation in NFFRL (Microbiological)**

| S.N. | Products(s)/Materialoftest | Specific tests performed |
|---|---|---|
| 1. | Fruits and vegetable products | Total Bacterial Count, cfu/mlorgm |
| | | Yeast and Mould Count, cfu/mlorgm |
| | | Coliform count, cfu/gm or ml |
| | | ***Escherichia coli*** |
| | | **Enterobacteriaceae** |
| 2. | CerealsandBakeryproducts | TotalBacterial Count, cfu /mlor gm |
| | | Yeastand Mould Count, cfu/mlorgm |
| | | Coliformcount,cfu/gmorml |
| | | ***Escherichiacoli*** |
| | | **Enterobacteriaceae** |
| 3. | Water | TotalBacterialCount, cfu/mlorgm |
| | | Yeastand Mould Count, cfu/mlorgm |
| | | Coliformcount,cfu/gmorml |
| | | *Escherichiacoli* |
| 4. | MilkandMilkProducts | TotalBacterialCount, cfu/mlorgm |
| | | Yeastand Mould Count, cfu/mlorgm |
| | | Coliformcount,cfu/gmorml |
| | | ***Escherichiacoli*** |
| | | **Enterobacteriaceae** |
| 5. | MeatandMeatproducts | TotalBacterialCount, cfu/mlorgm |
| | | Yeastand Mould Count, cfu/mlorgm |
| | | Coliformcount,cfu/gmorml |
| | | *Escherichiacoli* |
| | | **Enterobacteriaceae** |

# Annex - 2

National Accreditation Board for Testing and Calibration Laboratories

## CERTIFICATE OF ACCREDITATION

**FOOD AND FEED LABORATORY, FOOD TECHNOLOGY AND QUALITY CONTROL OFFICE**
**has been assessed and accredited in accordance with the standard**

**ISO/IEC 17025:2017**
**"General Requirements for the Competence of Testing & Calibration Laboratories"**

**for its facilities at**

Biratnagar-10, Morang, Province No. 1, Nepal

**in the field of**

**TESTING**

| | | | |
|---|---|---|---|
| **Certificate Number** | **TC-4057** | | |
| **Issue Date** | **31/12/2022** | **Valid Until** | **30/12/2024** |

**This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.**
**(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)**

**Name of Legal Identity : Dept. of Food Technology and Quality Control, Ministry of Agriculture and Livestock Development, Government of Nepal**

**Signed for and on behalf of NABL**

8907697010003000257 3

**N. Venkateswaran**
**Chief Executive Officer**

**SPS Notifications till Fiscal Year 2080/81**

| S.N. | Distribution date | Document symbol | Title |
|---|---|---|---|
| 1 | 28/05/2024 | G/SPS/N/NPL/44 | Food Safety and Quality Act, 2081 |
| 2 | 29/01/2024 | G/SPS/N/NPL/43 | Proposed standard for Masayaura |
| 3 | 06/07/2023 | G/SPS/N/NPL/42 | Plant Protection (First Amendment) Rules, 2080 |
| 4 | 19/06/2023 | G/SPS/N/NPL/41 | Proposed prohibition on use of inked paper |
| 5 | 19/06/2023 | G/SPS/N/NPL/40 | Proposed standard for Industrial trans fat |
| 6 | 25/01/2023 | G/SPS/N/NPL/39 | Proposed standard for Rolled Oats |
| 7 | 16/11/2022 | G/SPS/N/NPL/38 | Proposed standard for Fortified Rice |
| 8 | 06/09/2022 | G/SPS/N/NPL/37 | Proposed Standard for Poultry Feed |
| 9 | 02/09/2022 | G/SPS/N/NPL/36 | Plant Protection Act 2007, first revision 2022 |
| 10 | 19/07/2022 | G/SPS/N/NPL/35 | Proposed maximum limit of heavy metal in food |
| 11 | 19/07/2022 | G/SPS/N/NPL/34 | Proposed Standard for Cereal Based Complementary Foods for Infants and Young Children (CBCF Standard Approved) |
| 12 | 09/02/2022 | G/SPS/N/NPL/33 | Proposed Maximum Residue Limits of Pesticides for fruits and Vegetables |
| 13 | 16/07/2020 | G/SPS/N/NPL/32 | "Proposed standard for fruit juice" and "Proposed standard for fruit nectar" |
| 14 | 16/07/2020 | G/SPS/N/NPL/31 | Proposed standard for fruit beverages |
| 15 | 06/01/2020 | G/SPS/N/NPL/30 | Quality and Safety Standard of Dalmoth and Beaten Rice |
| 16 | 20/12/2019 | G/SPS/N/NPL/29 | Proposed Quality and Safety Standard for Pustakari (Available in Nepali Language, 2 pages), Proposed Quality and Safety Standard for Gudpaak (Available in Nepali Language, 2 pages), Proposed Maximum Level of Total Polar Material (TPM) in Cooking oil ( available in Nepali language, 1 Page) |
| 17 | 15/03/2019 | G/SPS/N/NPL/28 | Maximum Residue Limit of Pesticides on Fresh Fruits and Vegetables |
| 18 | 28/06/2017 | G/SPS/N/NPL/27 | Proposed Processed Flavoured Milk, Proposed Processed Full Cream Milk, Proposed Processed Low Fat Milk, Proposed Processed Skimmed Milk |
| 19 | 23/03/2017 | G/SPS/N/NPL/26 | Proposed quality standard for Brandy; Proposed |

| S.N. | Distribution date | Document symbol | Title |
|---|---|---|---|
| | | | quality standard for Gin |
| 20 | 16/03/2017 | G/SPS/N/NPL/25 | Proposed maximum limits of mycotoxin in food products |
| 21 | 15/11/2016 | G/SPS/N/NPL/24 | Proposed maximum limits of melamine in food products |
| 22 | 15/11/2016 | G/SPS/N/NPL/23 | Proposed quality standard for whisky (malt grain whisky, blended whisky, other whisky); Proposed quality standard for rum (rum, white rum and flavored rum); Proposed quality standard for vodka |
| 23 | 19/04/2016 | G/SPS/N/NPL/22 | Quality standard for Packaged drinking water and Mineral Water |
| 24 | 09/03/2016 | G/SPS/N/NPL/21 | Glossary of Phytosanitary Terms |
| 25 | 28/01/2014 | G/SPS/N/NPL/20 | National Standards for PhytosanitaryMeaures (NSPM 2, 11, 14, 17, 20, 21, 23, 24, 26, 27, 29, 31, 32, 34, 35 and 36) |
| 26 | 24/01/2014 | G/SPS/N/NPL/19 | Regulated Disease Pests and Insects in Importing Pumpkin, Cucumber, Bitter gourd and Radish into Nepal |
| 27 | 11/06/2013 | G/SPS/N/NPL/18 | Quarantine Disease Pests in Importing Cut flowers (Gerbera and Carnation), Cabbage, Cauliflower, Hot Chilli, Large Cardamom and Tea |
| 28 | 29/11/2012 | G/SPS/N/NPL/17 | Blended Edible Vegetable Oil Standard |
| 29 | 29/11/2012 | G/SPS/N/NPL/16 | Rice Bran Oil |
| 30 | 18/09/2012 | G/SPS/N/NPL/15 | National Plant Quarantine Pests of apple, citrus, potato, ginger, garlic, banana, and coffee of Nepal |
| 31 | 16/08/2010 | G/SPS/N/NPL/14 | Proposed mandatory quality standard for fortified wheat flour |
| 32 | 28/04/2010 | G/SPS/N/NPL/13 | Plant Protection Rule, 2010 (22 March 2010) |
| 33 | 27/07/2009 | G/SPS/N/NPL/12 | Here are the four documents to be notified:<br>1. Proposed quality standard for Corn flakes (Available in Nepali Language, 1 page)<br>2. Proposed quality standard for Preservatives<br>(Available in Nepali Language, 5 pages)<br>3. Proposed quality standard for Heavy metals<br>(Available in Nepali Language, 5 pages) |

| S.N. | Distribution date | Document symbol | Title |
|---|---|---|---|
| | | | 4. Proposed quality standard for Fennel (Available inNepali language, 1 page)<br>5. Proposed quality standard for Green tea (Available in Nepali language, 2 pages)<br>6. Proposed quality standard for Luncheon meat (Available in Nepali language, 2 pages)<br>7. Proposed quality standard for Rice (Available in Nepali language, 2 pages) |
| 34 | 26/01/2009 | G/SPS/N/NPL/11/Add.1 | Plant Protection Act, 2007 - Extension of the comment period |
| 35 | 26/11/2008 | G/SPS/N/NPL/11 | Plant Protection Act, 2007 (13 September 2007) |
| 36 | 04/06/2008 | G/SPS/N/NPL/6/Add.1 | Animal Health & Livestock Services Act, 1998 and Regulation 1999 - Extension of the comment period |
| 37 | 07/04/2008 | G/SPS/N/NPL/10 | Notification regarding the establishment of animal Quarantine check posts |
| 38 | 07/04/2008 | G/SPS/N/NPL/9 | a. Quarantine Standards for Day Old Chicks (available in Nepali)<br>b. Quarantine Standards for Table Egg (available in Nepali)<br>c. Quarantine Standards for Fingerlings (available in Nepali)<br>d. Quarantine Standards for Hatching Egg (available in Nepali) |
| 39 | 04/04/2008 | G/SPS/N/NPL/8 | Animal Quarantine Working Procedure, 2007 (available in Nepali, 33 pages) |
| 40 | 04/04/2008 | G/SPS/N/NPL/7 | a. Animal Slaughterhouse & Meat Inspection Act, 1999 (available in English, 3 pages)<br>b. Animal Slaughterhouse & Meat Inspection Regulation, 2001 (available in English, 22 pages) |
| 41 | 04/04/2008 | G/SPS/N/NPL/6 | a. Animal Health & Livestock Services Act, 1998 (available in English, 9 pages)<br>b. Animal Health & Livestock Services Regulation, 1999 (available in English, 24 pages) |
| 42 | 27/03/2008 | G/SPS/N/NPL/5/Add.1 | All Food Products - Directives on Export-Import Inspection and Quality Certification System in Nepal - Extension of the comment period |
| 43 | 28/01/2008 | G/SPS/N/NPL/5 | Directives on Export-Import Inspection and Quality |

| S.N. | Distribution date | Document symbol | Title |
|---|---|---|---|
| | | | Certification System in Nepal |
| 44 | 30/11/2006 | G/SPS/N/NPL/4 | 1. Phytosanitary Operational Manual for Export Import Certification. August 2005 (42 pages): The original document is in Nepali language. 2. National Pest Status Record of Nepal, 2005 (30 pages), original document is in English. |
| 45 | 30/11/2006 | G/SPS/N/NPL/3 | Here are the four documents to be notified: Proposed quality standard for maize (Available in Nepali Language, 1 page) Proposed quality standard for wheat (Available in Nepali Language, 1 page) Proposed quality standard for paneer (Available in Nepali Language, 1 page) Proposed quality standard for cinnamon powder (Available in Nepali language, 1 page) Proposed volunteer quality standard for wheat flour (Available in Nepali language, 1 page) |
| 46 | 20/04/2006 | G/SPS/N/NPL/1/Add.2 | |
| 47 | 20/03/2006 | G/SPS/N/NPL/2 | Gazette of His Majesty's Government, Section 55, Number 46, 6 March 2006 (Available in Nepali, 1 page). |
| 48 | 15/09/2005 | G/SPS/N/NPL/1/Add.1 | |
| 49 | 15/07/2005 | G/SPS/N/NPL/1 | 1. Ministry of Agriculture and Cooperatives' Notice regarding the compulsory provision for Phytosanitary Certificate Gazette of His Majesty's Government, Section 54, Number 33, 6 December 2004 (1 page): The original document is in Nepali language. 2. Establishment of Plant Quarantine Check posts in Nepal bordering with India and China. Notice of Department of Agriculture, 14 May 2004 (Available in Nepali language, 4 pages). 3. Ministry of Agriculture and Cooperatives assigns the Plant Protection Directorate as the "National Plant Protection Organization (NPPO)". Government decision, 16 March 2005 (1 page), original document is in Nepali language. |

## Annex 3

Non-tax revenue rates for Laboratory analysis services as published in Nepal Gazette, 2078/04/25, section 71, Number 17, Part 5.

| S.N. | Food Products | Revenue (NPR) |
|---|---|---|
| 01.00 Milk and Milk Products | | |
| 1 | Infant Milk Food | 1000/- |
| 2 | Whole milk powder | 1,500/- |
| 3 | Skimmed milk powder | 1,500/- |
| 4 | Fluid milk | 650/- |
| 5 | Condensed milk | 700/- |
| 6 | Butter | 1,500/- |
| 7 | Frozen Dessert | 1,500/- |
| 8 | Ice cube | 1,000/- |
| 9 | Yoghurt | 900/- |
| 10 | Cream | 500/- |
| 11 | Paneer | 500/- |
| 12 | Processed milk | 650/- |
| 13 | Nutrient content and microbiological test of Infant Food | For nutrient content, as per code no. 12, and for microbiology as per code no. 17 |
| 02.00 Fats and Oils | | |
| 1 | Edible Vegetable Oil | 700/- |
| 2 | Crude oils | 400/- |
| 3 | Mustard oil/Rapeseed oil | 1,100/- |
| 4 | Animal Ghee | 800/- |
| 5 | Vegetable Ghee | 800/- |
| 6 | Peanut butter | 1,000/- |
| 7 | Bakery Shortening | 800/- |
| 8 | Mustard seeds | 300/- |
| 9 | Coconut powder | 1,000/- |
| 03.00 Fruits and Vegetable Products | | |
| 1 | Jam, Jelly, Marmalade, Squash, Fruit juice, Beverages etc. | 800/- |
| 2 | Tomato ketchup, Sauce including microbiological test | 1,200/- |
| 3 | Pickles (excluding preservatives test) | 500/- |
| 4 | Tomato juice and other juices | 600/- |

| | | |
|---|---|---|
| 5 | Canned Fruits | 800/- |
| 6 | Soft drinks, Soda, Energy drinks, Sports drinks, Carbonated beverages etc. | 1,000/- |
| 7 | Fruit beverage powder | 500/- |
| 8 | Vinegar | 800/- |
| 04.00 Spices and Condiments | | |
| 1 | Spice seed Grading | 300/- |
| 2 | Spice powder | 600/- |
| 3 | Seasoning powder | 500/- |
| 4 | Prawn cracker | 500/- |
| 5 | Dried Ginger | 900/- |
| 05.00 Salt | | |
| 1 | Edible Salt | 700/- |
| 07.00 Cereal and Legume Products | | |
| 1 | Wheat flour, semolina, Fortified flour, Rice | 700/- |
| 2 | Biscuit, Bread | 600/- |
| 3 | Cookies | 550/- |
| 4 | Other Bakery items | 500/- |
| 5 | Stick noodles | 400/- |
| 6 | Instant noodles | 900/- |
| 7 | *Dalmoth*, *Bhujia* and other Snacks food | 700/- |
| 8 | Cereals/Legumes | 500/- |
| 08.00 Processed drinking water | | |
| 1 | Processed drinking water including microbiological tests | 2,500/- |
| 09.00 Sweetening Agents | | |
| 1 | Sugar, Sugar candy | 850/- |
| 2 | Honey | 1,100/- |
| 10.00 Confectionery Products | | |
| 1 | Chocolate, Toffee, Candy, Lozenges | 750/- |
| 2 | Chewing gum, Bubble gum | 500/- |
| 11.00 Food Preservatives, Additives and Contaminants | | |
| 1 | Per Heavy metal | 550/- |
| 2 | More than one Heavy metal group | 1,500/- |
| 3 | Minerals (Fe, Ca, Mg, Mn, etc.) | 250/- |
| 4 | Mycotoxins/Total aflatoxins | 1,000/- |

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| 5 | Vitamins | 1,000/- |
| 6 | Melamine | 1,000/- |
| 7 | Color qualitative | 250/- |
| 8 | Color quantitative | 700/- |
| 9 | Formalin | 1,000/- |
| 10 | Benzoic acid preservative | 400/- |
| 11 | Nitrite preservative | 400/- |
| 12 | Other preservatives/Food additives each | 400/- |
| 13 | Sulfur dioxide preservative | 2,000/- |
| 14 | **Pesticide Residues** | |
| | • Organochlorine, Organophosphorus group | 2,000/- |
| | • Other groups/per pesticide | 2,000/- |
| | • Per Pesticide residue | 1,000/- |
| 15 | Veterinary drug residue per antibiotic each | 700/- |
| 16 | Veterinary drugs residue in group | 2,000/- |
| 17 | Monosodium glutamate, MSG | 500/- |
| 18 | Radiation test by Becquerel Monitor | 1,000/- |
| 19 | Taurine amino acid | 1,000/- |
| 20 | Histamine | 1,000/- |
| 21 | Amino acids profile | 2,000/- |
| 22 | Fatty acids/Trans fatty acids | 2,000/- |
| 23 | Antioxidant each | 1,000/- |
| 24 | Specific gravity | 400/- |
| 25 | HMF test | 1,000/- |
| 26 | Caffeine in foods and Beverage | 300/- |
| 27 | Iodin content | 300/- |
| 28 | Grayanotoxins including other natural toxins each | 1,000/- |
| 12.00 Parameter wise Revenue for Misc. Food Products | | |
| 1 | Moisture | 150/- |
| 2 | Protein | 300/- |
| 3 | Carbohydrate | 300/- |
| 4 | Sugar | 300/- |
| 5 | Total solid | 300/- |
| 6 | Starch qualitative | 300/- |

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| 7 | Crude Fat | 300/- |
| 8 | Total Ash | 200/- |
| 9 | Grading per parameter (Cereals, Spices and others) | 150/- |
| 10 | Acidity | 150/- |
| 11 | pH | 100/- |
| 12 | Alkalinity | 150/- |
| 13 | Crude fiber | 400/- |
| 14 | Water soluble ash | 200/- |
| 15 | Acid Insoluble Ash | 200/- |
| 16 | Alcoholic extract | 200/- |
| 17 | Salt content | 200/- |
| 18 | Solubility | 150/- |
| 19 | Refractive index | 200/- |
| 20 | Saponification value | 200/- |
| 21 | Iodine value | 200/- |
| 22 | Unsaponification matter | 300/- |
| 23 | Free fatty acid/Acid Value | 150/- |
| 24 | Peroxide value | 200/- |
| 25 | Melting point | 150/- |
| 26 | Sucrose quantitative | 800/- |
| 27 | Glucose quantitative | 800/- |
| 28 | Fructose quantitative | 800/- |
| 29 | Drained weight | 800/- |
| 30 | Volatile oil | 100/- |
| 31 | Non-volatile oil | 200/- |
| 32 | Lead chromate test | 200/- |
| 33 | Curcumine | 100/- |
| 34 | Sodium chloride | 250/- |
| 35 | Organic acid each | 800/- |
| 36 | RM value | 250/- |
| 37 | Lactometer verification each | 550/- |
| 38 | Carbondioxide pressure test | 400/- |
| 39 | Net weight or volume | 100/- |
| 40 | Proximate test | 1,500/- |
| 41 | Antinutritional compound | 700/- |

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| 42 | Color profile test by Chromameter | 1,000/- |
| 43 | Texture profile test | 1,000/- |
| 44 | Water activity | 500/- |
| 45 | Fill of container | 100/- |
| 46 | Fruit content | 400/- |
| 47 | Uric acid | 500/- |
| 48 | Gluten | 250/- |
| 13.00 Adulteration Test | | |
| 1 | Hexabromide test | 150/- |
| 2 | Argemone test | 300/- |
| 3 | Beliar test | 300/- |
| 4 | Baoudine test | 150/- |
| 5 | Lard test, Qualitative | 300/- |
| 6 | Mineral oil test, Qualitative | 300/- |
| 7 | Phosphatase test, Qualitative | 200/- |
| 8 | Methylene blue test | 200/- |
| 9 | Resasurine test | 200/- |
| 10 | Bicarbonate test, Qualitative | 200/- |
| 11 | Glucose test, Qualitative | 150/- |
| 12 | Starch test, Qualitative | 150/- |
| 13 | Nonedible color test, Qualitative | 300/- |
| 14 | Urea test, Qualitative | 300/- |
| 15 | Neutralizer test, Qualitative | 300/- |
| 16 | Formalin test by test kit | 300/- |
| 17 | Pesticide test by test kit | 300/- |
| 18 | Khesari test, Qualitative | 300/- |
| 14.00 Alcoholic Beverages | | |
| 1 | Wine and Beer quality | 2,000/- |
| 2 | Liquors, Whiskey, Rum, Vodka, Gin etc. | 2,000/- |
| 3 | Methyl alcohol, Qualitative | 400/- |
| 4 | Ethyl alcohol | 550/- |
| 5 | Methyl alcohol, Qualitative | 1,100/- |
| 6 | Other each parameter | 400/- |
| 15.00 Meat Products | | |
| 1 | Fresh meat | 950/- |

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| 16.00 Animal Feeds | | |
| 1 | Feed products | 1,600/- |
| 2 | Feed Ingredients | 1,500/- |
| 17.00 Microbiological Test | | |
| 1 | Mold count | 250/- |
| 2 | Yeast and its spores | 250/- |
| 3 | Total Bacterial count | 250/- |
| 4 | Coliform count | 300/- |
| 5 | Salmonella spp. | 500/- |
| 6 | Staphylococcus spp. | 500/- |
| 7 | Clostridium botulinum/perfringes | 500/- |
| 8 | Streptococcus spp. | 300/- |
| 9 | Bacillus cereus | 300/- |
| 10 | Vibrio spp. | 300/- |
| 11 | Listeria monocytogenes | 300/- |
| 12 | Nematodes | 100/- |
| 13 | Other microorganisms each | 300/- |
| 14 | Swab test | 300/- |
| 15 | Enterobacterioceae | 400/- |
| 16 | Microorganism not mentioned in the above list (per parameter) | 400/- |