ANALYTICAL SERVICES AND PRODUCT DEVELOPMENT

The Analytical Services and Product Development (ASPD) known as Agricultural Laboratory is a Sub-Division of the Product Development, Training and Quality Assurance Division under the Directorate of Agricultural Research and Development in the Ministry of Agriculture, Water and Land Reform. It is established for agricultural purposes, to provide analytical services to the agricultural sector of Namibia primarily, with an ultimately goal to increase crop and animal production.

Duties & Functions:

- Formulates plans and programs for the efficient and effective operation of the Sub-Division in accordance with the regulations and policies of the Ministry.
- Establishes standards, procedures and techniques in the analysis of soil, manure, plant, feed and other materials vital to crop and animal production.
- Provides services in testing soil, manure, plant, feed samples and other materials to farmers and the general public and provides recommendations in the use of fertilizers. Identifies problem soil areas for research and development.
- Provides services in the production and distribution of Mushroom Spawn, as well as organizing training.
- Provides services on detection for the presence of GMOs in crops, etc. in order to protect crop diversity and develop appropriate technologies.
- Conducts research on new methodologies and technologies that can be used to transform local produce into products that have the potential to be commercialized for value addition purposes.
- Ensures quality control and quality assurance measures are implemented.

The laboratory has four sections:

1. The Nutrition Laboratory specializes in animal nutrition, with feed, lick, plant and faeces analyses
2. The Soil Laboratory supports plant nutrition analysis through soil and leaf analyses
3. Biotechnology- protect crop biodiversity through detection of presence of GMOs
4. Value addition and Product development

Nutrition Laboratory Section

Standard analytical packages offered for:

Feed Analysis, Lick Analysis and Faeces Analysis

Package 200 - Scientific **N$ 120.00 per sample**
[for nutritional research, plant composition, quality control]
Sample preparation; crude protein; residual moisture; crude fibre; acid detergent fibre; neutral detergent fibre; fat; ash; calcium; phosphorus

Package 201 - Scientific Plus **N$ 120.00 + xx per sample**
Package 200 plus either of the following, or a combination of the following:
Moisture (wet) (+ N$ 10.00) *[mandatory for samples that are not air-dry]*
ME/dOM (+ N$ 20.00)
Urea (+ N$ 20.00) *[for quality control]*
ADL (+ N$ 20.00)

Package 202 - General **N$ 70.00 per sample**
[for feed registration, legal claims, feeds, licks, plants]
Sample preparation; crude protein; residual moisture; crude fibre; fat; calcium; phosphorus

Package 203 - General Plus **N$ 70.00 + xx per sample**
Package 202 plus either of the following, or a combination of the following:
ME/dOM, ash (+ N$ 30.00)
Urea (+ N$ 20.00) *[mandatory for feed registration of feeds containing a NPN-source]*
Moisture (wet) (+ N$ 10.00) *[mandatory for samples that are not air-dry]*

Package 204 - Mineral licks **N$ 40.00 per sample**
Sample preparation; residual moisture; calcium; phosphorus

Package 205 - Faeces **N$ 50.00 per sample**
Sample preparation; crude protein; residual moisture; moisture (wet); phosphorus

Costs for Individual Analyses

Code	Analysis	Cost N$/sample
220	Sample Preparation (drying, milling, sieving)	15.00
221	Crude Protein (CP)	15.00
222	Urea	30.00
223	Moisture (wet / not air-dry) / Dry Matter	15.00
224	Moisture (residual) / Dry Matter	15.00

225	Crude Fibre	15.00
226	Acid Detergent Fibre (ADF)	30.00
227	Neutral Detergent Fibre (NDF)	30.00
228	Acid Detergent Lignin (ADL)	30.00
229	Fat	15.00
230	Ash / Organic Matter	15.00
231	Calcium	15.00
232	Phosphorus	15.00
233	Metabolizable Energy / Digestible Organic Matter (ME/DOM) (including crude protein, moisture, ash, fat, Hohenheim Gas Test)	90.00
234	Gross Energy (GE)	15.00
235	Lead (Pb)	30.00
236	Iron (Fe)	30.00
237	Cadmium (Cd)	30.00
238	Magnesium (Mg)	30.00
239	*[new / other]*	*15.00*
240	*[new / other]*	*30.00*

Soil Laboratory Section

The main function of the section is to conduct analytical services on specified parameters and the contents of chemical elements in the soil, manure and leaf tissue samples. It is important to know nutrient norms and correspondingly adjust their concentrations. Soil analysis avails valuable information, essential for soil quality improvement. By tracking the exact amount of soil nutrients, a farmer can easily adjust fertilization in accordance with soil and crop requirements.

Standard analytical packages offered for:

Soil Analysis, Leaf Tissue Analysis and Manure Analysis

Package 100 - Standard Farm Soil Analysis **N$ 100.00/sample**

[for fertility assessment & fertilizer recommendations]

Sample preparation; pH-H2O (2:5 extract) [or pH-KCl or pH-CaCl2 , on request]; soluble salts (EC on 2:5 extract); texture (finger-method); organic matter; available nutrients (phosphorus, potassium, calcium and magnesium); estimation of sulphate and free carbonates; particle size analysis on samples finer textured than loamy sand; salinity (EC on saturated extract) and sodicity (calcium, magnesium, potassium, sodium on saturated extract) assessment on samples with high electrical conductivity and/or high extractable sodium relative to magnesium and calcium; report preparation and fertiliser recommendations.

Package 101 - Salinity & Sodicity Assessment **N$ 80.00/sample**

[for soils high in soluble salts or liable to be irrigated with saline water]

Sample preparation; preparation of saturated extract; pH (saturated extract); electrical conductivity (saturated extract); sodium; magnesium; calcium (saturated extract); particle size distribution; calculation of sodium adsorption ratio; report preparation.

Package 102 - Soil Characterization **N$ 200.00/sample**

[for soil mapping and description]

Sample preparation; pH; electrical conductivity; organic carbon; total nitrogen; available phosphorus; calcium carbonate equivalent; particle size distribution; cation exchange capacity; exchangeable calcium, magnesium, potassium and sodium; acidity in case of acid soils.

Package 103 - Manure Analysis **N$ 70.00/sample**

[for fertilization purposes]

Sample preparation; moisture content; organic matter (ashing); salts (EC of 1:5 water extract & calculation); total content of nitrogen, phosphorus and potassium.

Package 104 - Plant Leaf Tissue Analysis **N$ 100.00/sample**

[for nutrient diagnosis]

Sample preparation; organic matter (ashing); major nutrients (nitrogen, potassium, calcium, magnesium); trace elements (zinc, copper, iron and manganese); sodium content.

Costs for Individual Analyses

Code	Analysis	Cost N$/sample
120	Sample Preparation	15.00
121	pH in water (2:5) or KCl or $CaCl_2$ or saturated extract	15.00
122	EC (2:5 extract)	15.00
123	EC (saturated extract)	30.00
124	Phosphorus (P)	30.00
125	Potassium (K)	15.00
126	Calcium (Ca)	15.00
127	Magnesium (Mg)	15.00
128	Sodium (Na)	15.00
129	Total Nitrogen (N)	30.00
130	Organic Carbon (Walkley-Black method)	30.00
131	Organic Matter (ashing)	15.00
132	Texture (finger- method)	15.00
133	Particle Size Analysis (hydrometer method)	50.00
134	Calcium Carbonate Equivalent	30.00
135	Acidity	30.00

Code	Analysis	Cost N$/sample
136	Copper (Cu)	30.00
137	Zinc (Zn)	30.00
138	Iron (Fe)	30.00
139	Manganese (Mn)	30.00
140	Lead (Pb)	30.00
141	Total salt (manure)	30.00
142	Moisture content	15.00
143	Sulphate (estimate)	10.00
144	Chloride (estimate)	10.00
145	Free carbonate (estimate)	10.00
146	Water Dispersible Clay	30.00
147	Water Retention Curve	100.00
148	Cation Exchange Capacity	50.00
149	Dry sieving sand fractions	80.00
150	Water stable aggregates	100.00
151	*[new / other]*	*[15.00]*
152	*[new / other]*	*[30.00]*
153	*[new / other]*	
154	*[new / other]*	
155	*[new / other]*	

Biotechnology Section

Value addition and Product development Section

The main function of the section is to conduct research on new methodologies and technologies that can be used to transform local produce into products that have the potential to be commercialized. With great emphasis placed on coming up with gluten-free organic products.

Service

The section works in close collaboration with the members of the public. Whereby proto-types are developed and all the information is shared with any local business individual that wants to set-up a food processing facility. Shared information can be in regards with the involved processes, recipes, nutritional analysis, required technology, safety and quality aspects.

Achievements

Financial assistance through the Namibian Agronomic board facilitated the successful completion of the development of mahangu cookies in Namibia. A complete baking processing line was secured and leased to a female owned local company for commercial production. Four types of cookies namely Oatmeal cookie, mahangu nut cookie, mahangu biscuit chocolate chip are currently being produced through this project. These products were the first kind in the country and are currently available on the market.

On-going

Currently the section is busy formulating three (3) products from pearl millet (*mahangu*) by the process of extrusion cooking. The products are ready-to-eat breakfast cereals, puffed chips as well as instant porridges all made from 100% mahangu.

100% mahangu products

Instant Porridge

Plain and savory snacks

Ready-to-eat breakfast cereals

Quality Control

Laboratory Quality Assurance (QA) encompasses a range of activities that enable laboratories to achieve and maintain high levels of accuracy and proficiency despite changes in test methods and the volume of specimens tested.

The Analytical Services and Product Development Laboratory (ASPD) is currently going through the process of accreditation for ISO/IEC 17025. ISO/IEC 17025 is an international standard for testing and calibration laboratories. It was established with the aim of offering quality and improving the processes within laboratories. The ASPD however is currently involved in a Proficiency Testing Scheme (PTS) with Agri-Laboratory Association of Southern Africa (AgriLASA) that allows the laboratory to compete with other laboratories within Southern Africa. By so doing the tests, methods and results are constantly kept in check.

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