

The image is a cover page for a catalog. It features a large background image of a university campus nestled in a lush green valley, with mountains in the distance under a clear blue sky. The campus buildings have red roofs and are surrounded by dense tropical forest. A winding road or path is visible through the trees. The top right and bottom right corners of the page are solid orange. A black rectangular box is centered over the middle of the image, containing the title in white, italicized, serif font.

***ESSENTIAL EQUIPMENT CATALOG FOR
RESEARCH LABORATORIES***

Direction of Scientific Facilities

Universidad Regional Amazónica Ikiam

2024



LIVING LABORATORY

Contact us:

Direction of Scientific Facilities
dir.instalacionescientificas@ikiam.edu.ec

Research and Innovation
coordinacion.investigacion@ikiam.edu.ec

Telephone:
062999160-063700040 ext. 152

Index

NATIONAL WATER REFERENCE LABORATORY

Laser LIWA-Isotopes Marca/Modelo: Los Gatos Research (LGR) / LWIA – 45-EP 912-0008.....	5
Ion Chromatograph - HPLC Marca/Modelo: SHIMADZU / PROMINENCE IÓNICO.....	6
Gas Chromatograph Marca/Modelo: SHIMADZU / MODELO.....	7
Total Organic Carbon Marca/Modelo: SHIMADZU / TOC-I/SSM-5000A/ASI-L.....	8

MOLECULAR BIOLOGY AND BIOCHEMISTRY LABORATORY

Peptide Synthesizer Marca/Modelo: CEM / Liberty Blue.....	9
MALDI-ToF Mass Spectrometer Marca/Modelo: Shimadzu / Maxima Confidence.....	10
Lyophilizer Marca/Modelo: SP Scientific / Virtis BenchTop Pro.....	11
Vacuum Suction Concentrator Marca/Modelo: Genevac SP Scientific / Mi Vac Duo.....	12

NATURAL PRODUCTS LABORATORY

Liquid Chromatograph (UPLC) with Q-TOF Mass Spectrometer Marca/Modelo: Waters / Acquity I Class UPLC Xevo G2-XS QTOF.....	13
1D and 2D Gas Chromatograph (GC and GCxGC) with Quadrupole Mass Spectrometer and FID Detector with Automatic Injector Marca/Modelo: Shimadzu / Nexis GC-2030 GCMS-QP2020 NX.....	14
Flash Chromatograph Marca/Modelo: Buchi / X50.....	15

UV VIS NIR Spectrophotometer
Marca/Modelo: Shimadzu / UV-3600 Plus.....16

MICROSCOPY LABORATORY

Fluorescence Trinocular Microscope
Marca/Modelo: Nikon / Eclipse Ni-U.....17

Ultramicrotome
Marca/Modelo: RCM Boeckeler / PT-XL.....18

Embedding Center
Marca/Modelo: Myr / EC 350.....19

Semi-Automatic Microtome
Marca/Modelo: Lupetec / MRP 2016 SA.....20

GEOSCIENCE LABORATORY

Atomic Absorption Spectrophotometer
Marca/Modelo: Aurora / Trace AI1200.....21

Sampling Pump
Marca/Modelo: Geotech / SS Geosub.....22

Portable X-ray Fluorescence Spectrometer
Marca/Modelo: Bruker / S1 Titan 600.....23

Interface Meter
Marca/Modelo: Geotech / GT-82050322.....24

Portable Multiparameter Meter
Marca/Modelo: YSI Professional Plus / YSI-6050000.....25

Petrographic Microscope
Marca/Modelo: Zeiss / Primotech D/A.....26

Water Level Probe
Marca/Modelo: Global Water / WL500.....27

Exploration Seismograph
Marca/Modelo: Geometrics / ES-3000.....28

BIOMASS LABORATORY

Gas Chromatograph with FID Detector and Automatic Injector
Marca/Modelo: Shimadzu / Nexis GC-2030 FID - AOC-30i.....29

Chiller Circulator
Marca/Modelo: Polyscience / MX07R-20-A11B.....30

Oven with Membrane Pump
Marca/Modelo: MTI / GSL-1100X-S.....31

Dehydrator
Marca/Modelo: Food Dehydrator / LT-93/1500 Watt/50 Hz.....32

Spectrophotometer
Marca/Modelo: PERSE / UV-VIS T6.....33

HYDROMETEOROLOGICAL SERVICES LABORATORY

Discharge Radar
Marca/Modelo: Sommer Messtechnik RQ-30a.....34

Discharge Radar (Additional Sensors)
Marca/Modelo: Temperature and humidity sensor: Vaisala HMP155, Barometric pressure sensor: Vaisala Baro-1, Wind direction and speed sensor: Vaisala WMT702, Pyranometer: Hukseflux SR11, Rain gauge: Texas TR-525M, Soil temperature sensor: Vaisala QMT-107, and data logger QML201C.....35

GLOBAL CHANGE LABORATORY

Drone with Multispectral Camera
Marca/Modelo: DJI / P4 Multispectral.....36

NATIONAL WATER REFERENCE LABORATORY



Equipment

Laser LIWA-Isotopes

Brand / Model

Los Gatos Research (LGR) / LWIA – 45-EP 912-0008

Function

The LGR liquid water isotope analyzer provides $\delta^{18}\text{O}$ and $\delta^2\text{H}$ measurements of water. This equipment is ideal for a wide range of analytical and biological hydrology studies. We work with samples of surface groundwater, rainwater, and seawater.

NATIONAL WATER REFERENCE LABORATORY



Equipment

Ion Chromatograph - HPLC

Brand / Model

SHIMADZU / PROMINENCE IÓNICO

Function

Ion chromatography (IC) is a quick and straightforward technique for analyzing trace ions in water and wastewater. We perform analyses of Anions (F⁻, Br⁻, Cl⁻, NO₃⁻, NO₂⁻, SO₄⁻, PO₄⁻) and Cations (Ca⁺², Mg⁺², Na⁺, NH₄⁺, K⁺, Li⁺) simultaneously.

NATIONAL WATER REFERENCE LABORATORY



Equipment

Gas Chromatograph

Brand / Model

SHIMADZU / MODELO

Function

Gas chromatography is an analytical technique used to separate and analyze easily volatilizable and thermally stable compounds into their individual components. The sample is transported by a mobile phase through an immiscible stationary phase fixed to a column or solid surface.

NATIONAL WATER REFERENCE LABORATORY



Equipment

Total Organic Carbon

Brand / Model

SHIMADZU /TOC-I/SSM- 5000A/ASI-L

Function

Allows detection of Total Organic Carbon. The TOC-L series uses catalytic combustion oxidation method. It completely oxidizes easily decomposed low molecular weight organic compounds, as well as insoluble macromolecular organic compounds and even hard-to-decompose particles.

MOLECULAR BIOLOGY AND BIOCHEMISTRY LABORATORY



Equipment

Peptide Synthesizer

Brand / Model

CEM / Liberty Blue

Function

This equipment enables the automatic synthesis of peptide chains via high-efficiency solid-phase synthesis. It offers synthesis cycles (deprotection and coupling) of approximately 4 minutes, using 90% less solvent than conventional synthesis, with space for 27 amino acids. It is mainly used for peptide synthesis for biological activity assays with potential industrial interest.

MOLECULAR BIOLOGY AND BIOCHEMISTRY LABORATORY



Equipment

MALDI-ToF Mass Spectrometer

Brand / Model

Shimadzu / Maxima Confidence

Function

This equipment identifies molecules through their molecular mass using a time-of-flight detector. It is known for applying a matrix-assisted absorption and desorption mechanism. It provides powerful performance for reliable mass information and structural details derived from MS/MS. The linear mode allows for the interrogation of high molecular weight samples, while the reflector mode incorporating the patented curved field reflector (CFR) provides the high resolution and mass accuracy necessary for successful proteomics and biological sciences experiments. It includes a database for identifying microorganisms through their proteomic profile with >80% concordance.

MOLECULAR BIOLOGY AND BIOCHEMISTRY LABORATORY



Equipment

Lyophilizer

Brand / Model

SP Scientific/ Virtis BenchTop Pro

Function

This equipment lyophilizes samples by sublimation. It has an approximate capacity of 9L. The steel support allows lyophilizing samples of strong solvents without compromising the state of the sample or the equipment. Lyophilization at -80°C and 120 mTorr pressure. It is highly used for processing samples before being used in experiments and for long-term storage without altering their properties.

MOLECULAR BIOLOGY AND BIOCHEMISTRY LABORATORY



Equipment

Vacuum Suction Concentrator

Brand / Model

Genevac SP Scientific/ Mi Vac Duo

Function

This equipment concentrates solutions/samples by removing aqueous and organic solvents through vacuum centrifugation without altering the integrity of the samples. The equipment has a rotor for 84 tubes of 15 to 2 mL.

NATURAL PRODUCTS LABORATORY



Equipment

Liquid Chromatograph (UPLC) with Q-TOF Mass Spectrometer

Brand / Model

Waters/ Acquity I Class UPLC Xevo G2-XS QTOF

Function

This equipment separates the components of a sample and determines the mass-to-charge ratio of these components. The binary UPLC system allows speeding up complex separations without compromising chromatographic performance, combined with a detector with Qtof system that provides extreme sensitivity and extraordinary selectivity. It can perform quantifications over 5 orders of magnitude, allowing for greater accuracy.

NATURAL PRODUCTS LABORATORY



Equipment

1D and 2D Gas Chromatograph (GC and GCxGC) with Quadrupole Mass Spectrometer and FID Detector with Automatic Injector

Brand / Model

Shimadzu/ Nexis GC-2030 GCMS-QP2020 NX

Function

With a touch panel interface that presents clear graphics showing information instantly when needed. Main settings controllable via the GC unit's touch panel: analytical conditions, auto-diagnosis, automatic carrier gas leak check, chromatogram display. Auto start and stop functions. Minimization of helium gas usage, gas-saving function. Instrument operational status diagnosis. Auto-diagnosis function. Automatic notification of replacement time. Monitoring function. Equipment management via LabSolutions software that fully integrates the GC functionality. High sensitivity and reproducibility of analysis.

NATURAL PRODUCTS LABORATORY



Equipment

Flash Chromatograph

Brand / Model

Buchi / X50

Function

Flash chromatography systems allow the purification of organic compounds offering optimal performance and scalability regardless of purifying crude synthesis mixtures or plant extracts. It allows high-efficiency separations under pressures of up to 50 bar, saving time as it simultaneously controls 4 wavelengths and has multi-signal control for peak detection and fraction collection. It features detection across the UV-Vis range.

NATURAL PRODUCTS LABORATORY



Equipment

UV VIS NIR Spectrophotometer

Brand / Model

Shimadzu/UV-3600 Plus

Function

This equipment model employs three detectors consisting of a PMT for ultraviolet and visible regions and cooled InGaAs and PbS detectors for the near-infrared region. The use of an InGaAs detector to cover this crossover region ensures high sensitivity across the entire measured wavelength range and provides a noise level of 0.00003 Abs at 1500 nm. This equipment also allows high-sensitivity measurement in solid samples.

MICROSCOPY LABORATORY



Equipment

Fluorescence Trinocular Microscope

Brand / Model

Nikon / Eclipse Ni-U

Function

Manual trinocular microscope in focus for fluorescence techniques (DAPI, YFP, TRITC, GFP), objectives for fluorescence, bright field, and DIC of 10x, 20x, 40x, and 100x, and for phase contrast 20x and 40x. It has a monochromatic camera and NIS-Elements software.

MICROSCOPY LABORATORY



Equipment

Ultramicrotome

Brand / Model

RCM Boeckeler / PT-XL

Function

This equipment can make fine and ultrathin sections suitable for optical and electron microscopy. It has an integrated stereomicroscope with adjustable interpupillary distance, an eucentric displacement head, and a breathing protection screen. The cutting thickness has a minimum range from 5 to 4000 nm.

MICROSCOPY LABORATORY



Equipment

Embedding Center

Brand / Model

Myr / EC 350

Function

Paraffin embedding equipment for tissues that have been previously prepared in thin sections. This equipment has a 5 L paraffin tank capacity, with a cryo console adaptation to either side, with adjustable temperature from 0 to 12°C.

MICROSCOPY LABORATORY



Equipment

Semi-Automatic Microtome

Brand / Model

Lupetec / MRP 2016 SA

Function

This equipment achieves cuts through a manual cutting system and a motorized feed system that allows for more precise cutting, retraction, and trimming of the sample. It can be used for cutting materials embedded in paraffin or resin. It has support for high and low profile blades. It has control for cutting thickness and trimming from 0 to 2 microns in 0.5 micron steps, from 2 to 10 microns in 1 micron steps, from 10 to 20 microns in 2 micron steps, from 20 to 100 microns in 5 micron steps, and from 100 to 600 microns in 50 micron steps.

GEOSCIENCE LABORATORY



Equipment

Atomic Absorption Spectrophotometer

Brand / Model

Aurora / Trace AI1200

Function

This equipment determines the concentration of metals in solutions. The following lamps are available: As, Ca, Cd, Co, Cr, Cu, He, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Pd, Ti, Zn. Additionally, it has a Pt cathode. This equipment complements the graphite furnace and hydride generator.

GEOSCIENCE LABORATORY



Equipment

Sampling Pump

Brand / Model

Geotech / SS Geosub

Function

Submersible sampling pump that provides a continuous flow of water during groundwater sampling at depths of up to 280 feet (85 m). It operates with both high and low flow rates, providing maximum sample integrity and easy decontamination. Flow control ranges from 30 lt/min to 100 ml/min. The operating temperature ranges from 1°C to 28°C. It weighs approximately 5 pounds.

GEOSCIENCE LABORATORY



Equipment

Portable X-ray Fluorescence Spectrometer

Brand / Model

Bruker / S1 Titan 600

Function

This equipment is configured for geological samples, metal alloys, heavy metal calibration, and soil nutrients. It has a detector resolution of 155 eV or similar. It can measure minerals from magnesium to uranium. Measurements range from ppm to % of the following elements: Al, Si, P, S, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Y, Zr, Nb, Mo, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Hf, Ta, W, Re, Ir, Pt, Au, Pb, Bi.

GEOSCIENCE LABORATORY



Equipment

Interface Meter

Brand / Model

Geotech / GT-82050322

Function

Oil/water interface meter. The probe is pressure-proof (up to 500 psi). Easy access through narrow spaces and wells. The probe is designed for use in various monitoring applications. This meter uses a probe with an infrared beam and receiver contained within a cone-shaped tip. Accuracy of 1/200 ft. pre-marked tape length of 150 mt. Probe diameter 16 mm.

GEOSCIENCE LABORATORY



Equipment

Portable Multiparameter Meter

Brand / Model

YSI Professional Plus / YSI-6050000

Function

Meter for measuring combinations of dissolved oxygen, conductivity, specific conductance, salinity, resistivity, total dissolved solids (TDS), pH, ORP, pH/ORP combination, ammonia, nitrate, chloride, and temperature. Operating temperature: -10 to 60°C; parameters to measure: temperature, dissolved oxygen, pH, ORP/Redox, conductivity, TDS, ammonia, ammonium, nitrate, chloride, built-in barometer. Measurement units: mg/l ammonium, mg/l total dissolved solids (TDS), g/l air saturation, °F temperature, °C conductivity, mS/cm, pH units, mmHg, chloride mg/l, salinity ppt, ORP mV, dissolved O₂%, nitrate mg/l N. Includes: field cable with temperature and conductivity sensor, galvanic OD sensor, ORP sensor, pH sensor, YSI 6850 flow cell, YSI 1005 chloride sensor, YSI ISE ammonia sensor, YSI ISE nitrate sensor.

GEOSCIENCE LABORATORY



Equipment

Petrographic Microscope

Brand / Model

Zeiss / Primotech D/A

Function

Microscope with transmitted and reflected LED light. Objectives 5x, 20x, 40x optimized for polarization with lambda compensator, 360° polarizers.

GEOSCIENCE LABORATORY



Equipment

Water Level Probe

Brand / Model

Global Water / WL500

Function

Probe for measuring water level in wells, boreholes, vertical pipes, and tanks. Pressure-proof with capacity for 500 psi and PVDF tape marked with laser, submersible to at least 100 m, ideal for measuring the total depth of the well. The tape does not stretch, with high tensile strength and electrical efficiency. Tape graduation: intervals of 1 foot and 0.01 feet or intervals of 1m and 1mm. Tape length: 100 meters. Polyethylene probe diameter: 5/8" (16mm). Signal: buzzer and audible light.

GEOSCIENCE LABORATORY



Equipment

Exploration Seismograph

Brand / Model

Geometrics / ES-3000

Function

Exploration seismograph (24 channels, 24 bits). With high-resolution seismic module operated with a connection to an external PC loaded with compatible software for seismic data acquisition, transfer, visualization, and storage on PC. It contains data processing software, a one-clip two-switch hammer cable, a 25 mt network interface cable, an operation manual, two seismic cables (geophone cable with 12 equally spaced intervals of 5 m and 10 m with 61 socket connector at each end). Geophone-cable adapter (for connecting 12 cables with 61 socket connectors to a 24-channel seismograph with a 61-pin connector. Approximate length 1-2 mt). 24 vertical geophones of 4.5 Hz with water protection, spike base of 7 cm, and 1 m long cable with D-loop terminated with a pair of Mueller clip connectors. Piezoelectric hammer quick impact switch includes a 4.5 m cable and a 3-pin connector. Holds up to 250 m of smooth 8 mm diameter cable and up to 200 m of cable with takeouts. Loaded reel weight with a 250 m digital interface. Geophone-hammer cable, anti-static cable for use with hammer to extend shot to seismograph includes an abrasion-resistant jacket with 3-pin termination and 3 socket connectors on a 100-meter rail. 6-inch aluminum plate with one-inch thick rope handle.

BIOMASS LABORATORY



Equipment

Gas Chromatograph with FID Detector and Automatic Injector

Brand / Model

Shimadzu/ Nexis GC-2030 FID - AOC-30i

Function

With a touch panel interface that presents clear graphics showing information instantly when needed. Main settings controllable via the GC unit's touch panel: analytical conditions, auto-diagnosis, automatic carrier gas leak check, chromatogram display. Auto start and stop functions. Minimization of helium gas usage, gas-saving function. Instrument operational status diagnosis. Auto-diagnosis function. Automatic notification of replacement time. Monitoring function. Equipment management via LabSolutions software that fully integrates the GC functionality. High sensitivity and reproducibility of analysis.

BIOMASS LABORATORY



Equipment

Chiller Circulator

Brand / Model

Polyscience / MX07R-20-A11B

Function

Essential in laboratories requiring precise temperature control. Its main functions include cooling and heating liquids, ensuring uniform and stable temperature distribution. Equipped with an easy-to-use digital interface, it allows precise adjustments and constant monitoring. It also features safety functions such as high/low temperature alarms and overheat protection. Ideal for sensitive applications, guaranteeing constant and reliable conditions for various experiments and processes.

BIOMASS LABORATORY



Equipment

Oven with Membrane Pump

Brand / Model

MTI / GSL-1100X-S

Function

The GSL-1100 series of high-temperature vacuum tube furnaces is a compact design for heating samples up to 1100°C. Includes a stainless steel vacuum flange with valve, manometer, and quartz tube for immediate use. The built-in precision temperature controller allows programming the heating rate, maintenance time, and cooling rate up to 30 segments. The furnace can be installed both vertically and horizontally to meet various applications such as residual biomass pyrolysis and CVD (Chemical Vapor Deposition). It is an excellent furnace for annealing, diffusion, and sintering samples in various atmospheres.

BIOMASS LABORATORY



Equipment

Dehydrator

Brand / Model

Food Dehydrator / LT-93/1500 Watt/50 Hz

Function

Designed to remove moisture from samples, extending their shelf life and preserving their properties. With a powerful heating element and a ventilation system that ensures uniform hot air circulation, it allows quick and homogeneous dehydration. Ideal for dehydrating a variety of samples, this dehydrator ensures consistent and reliable results in the processing and analysis of laboratory materials.

BIOMASS LABORATORY



Equipment

Spectrophotometer

Brand / Model

PERSE / UV-VIS T6

Function

Allows high-precision quantitative and qualitative analysis, including COD, nitrites, nitrates, ammonium, phosphates, concentration quantification, purity analysis, kinetic reaction monitoring, endpoint determination in titrations, and DNA and protein studies. This device enables the evaluation of compound purity, detailed spectroscopic studies, and color measurement of solutions and materials.

HYDROMETEOROLOGICAL SERVICES LABORATORY



Equipment

Discharge Radar

Brand / Model

Sommer Messtechnik RQ-30a

Function

The RQ-30 radar is a device that employs radar technology for non-contact flow measurements in channels and rivers. This equipment combines two distinct radar methodologies to estimate the surface water velocity and level. It works by emitting 24 GHz radar signals towards the water surface, taking advantage of the Doppler effect to determine the flow velocity. Additionally, it measures the water level using short radial pulses emitted perpendicularly to the water surface. The distance to the surface is calculated from the time elapsed between the emission and reception of these pulses. The integration of these measurements allows the sensor to calculate the flow rate using the continuity equation. The sensor is designed to operate efficiently under a variety of hydrological conditions, maintaining low maintenance requirements due to the contact-free nature with water.

HYDROMETEOROLOGICAL SERVICES LABORATORY



Equipment

Discharge Radar

Brand / Model

Temperature and humidity sensor: Vaisala HMP155, Barometric pressure sensor: Vaisala Baro-1, Wind direction and speed sensor: Vaisala WMT702, Pyranometer: Hukseflux SR11, Rain gauge: Texas TR-525M, Soil temperature sensor: Vaisala QMT-107, and data logger QML201C

Function

The M5147, M5148, and Colonso Portable meteorological stations provide comprehensive monitoring of weather and environmental conditions. The stations are equipped with Vaisala sensors measuring temperature, humidity, barometric pressure, wind direction and speed, and air quality. Hukseflux pyranometers measure direct and diffuse solar radiation. Rain gauges' record precipitation events, and the data logger, along with the GPRS module, facilitates real-time data collection and transmission, crucial for meteorological applications, research, and natural resource management. The meteorological stations located at different sites along the altitudinal transect between the Sierra and the Amazon piedmont collect meteorological data.

GLOBAL CHANGE LABORATORY



Equipment

Drone with Multispectral Camera

Brand / Model

DJI / P4 Multispectral

Function

This equipment is used for aerial photography with a resolution of up to 1 cm per pixel with great accuracy using the P4 Multispectral - A highly accurate drone with a multispectral camera built for agricultural missions, environmental monitoring, and more.