नेपाल सरकार
वन तथा वातावरण मन्त्रालय
वनस्पति विभाग

प्राकृतिक सम्पदा अनुसन्धानशाला

Natural Products Research Laboratory

An ISO/IEC 17025:2017 Accreditated Laboratory

आ. व. २०७५/०७६ मा सञ्चालित कार्यक्रमको

वार्षिक प्रगति प्रतिवेदन



नेपाल सरकार
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आ. व. २०७५/०७६ मा सञ्चालित कार्यक्रमको

वार्षिक प्रगति प्रतिवेदन

२०७६

सम्पादक मण्डल

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वनस्पति विभाग
(..... शाखा)
फोन नं.: ४२६१४६६
४२६१४६७
४२५११६०
४२५११६१
फ्याक्स नं.: ४२५११४१
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काठमाडौं

पत्र संख्या:-
चलानी नम्बर:-

मिति:-

शुभकामना

वनस्पति विभाग अन्तर्गत रहेको प्राकृतिक सम्पदा अनुसन्धानशालाले आर्थिक वर्ष २०७५/०७६ को स्वीकृत कार्यक्रममा भएका अध्ययन, अनुसन्धान, प्रमाणीकरण लगायतका क्रियाकलापहरु समाविष्ट गरी वार्षिक प्रगति प्रतिवेदनको रूपमा पहिलो पटक पुस्तिका प्रकाशन गर्न लागेकोमा अनुसन्धानशालालाई धन्यवाद दिन चाहन्छु । यस पुस्तकको प्रकाशनबाट वनस्पति क्षेत्रमा भएको अध्ययन तथा उपलब्धीहरु सरोकारवाला माझ पुग्ने विश्वास लिएको छु ।

नेपालको जैविक विविधता तथा भौगोलिक विशिष्टताका कारण यहाँका जडीवुटीहरूको विशेष पहिचान हुनुका साथै उल्लेखनीय औषधीय गुणहरु रहेको पाईएको छ । यस अनुसन्धानशालाले यस्ता औषधोपयोगी गुणको खोज अनुसन्धान एवं वनस्पतिमा रहेको रासायनिक एवं जैविक तत्वहरूको अन्वेषण गरी जडीवुटीको उपयोगिता बढाउनेतर्फ उल्लेखनीय योगदान दिँदै आएको छ । जडीवुटी तथा सुगन्धित तेलजन्य वनस्पतिको महत्व बढ्दै गएको परिप्रेक्ष्यमा मूल्य अभिवृद्धि गरी निर्यात प्रवर्द्धन गर्नुपर्ने आवश्यकता समेत रहेको छ । यसका लागि अनुसन्धानशालाले आगामी दिनमा सोही वमोजिम कार्यक्रम तर्जुमा गर्दै जानेछ भन्ने विश्वास लिएको छु । यस अनुसन्धानशालाले अनुसन्धानको साथसाथै वनस्पतिजन्य पदार्थको प्रमाणीकरण एवं सिफारिस गरी निर्यात प्रवर्द्धनमा अन्तर्राष्ट्रिय गुणस्तर (ISO/IEC : 17025 : 2017) वमोजिम सेवा प्रवाह गर्दै आएकोमा आगामी दिनमा अझ विश्वसनीय एवं गुणस्तरीय सेवा प्रवाह गर्दै जाने विश्वास लिएको छु ।

समयसीमामा गुणस्तरीय सेवा प्रवाह गर्नु सार्वजनिक निकायको आभिष्ट हुनु पर्दछ । आगामी वर्षहरूमा थप पारामिटरमा गुणस्तरीयता लिई नमूना प्रयोगशालाको रूपमा स्थापित रहोस् भन्ने शुभकामना व्यक्त गर्दछु । अनुसन्धानशालाले गरेको वार्षिक पुस्तकको प्रकाशनबाट सम्पादित कार्यहरूको अभिलेखीकरण भई अध्ययन अनुसन्धानमा संलग्न सम्पूर्ण सरोकारवालालाई उपयोगी हुने विश्वास समेत लिएको छु ।

अन्त्यमा, यस पुस्तकलाई प्रकाशन गर्ने अनुसन्धानशालाका कार्यालय प्रमुख लगायत सम्पूर्ण परिवार धन्यवादका पात्र हुनुहुन्छ । अनुसन्धान एवं विश्लेषण कार्यमा संलग्न सम्पूर्ण कर्मचारीलाई उच्च मनोवलका साथ जडीवुटीको खोज, अनुसन्धान र प्रभावकारी सेवा प्रवाहमा अग्रसर भई समृद्ध नेपाल, सुखी नेपालीको राष्ट्रिय अभियानमा योगदान गर्न समेत अपिल गर्दछु ।

२०६६/०९/२२

धनञ्जय पौडेल
महानिर्देशक

नेपाल सरकार
वन तथा वातावरण मन्त्रालय
वनस्पति विभाग
प्राकृतिक सम्पदा अनुसन्धानशाला
थापाथली, देहरादून मोडौं

पत्र संख्या :- ०७६।७७
चलानी नम्बर :-

मितिः २०७६/०९/२२

दुई शब्द

यस प्राकृतिक सम्पदा अनुसन्धानशालाबाट भएका अध्ययन, अनुसन्धान एवं उपलब्धीहरु सरोकारवाला बीच पुऱ्याउने उद्देश्यले आ.व. ०७५/७६ मा सम्पादित कार्यक्रमहरुको नतिजा समावेश गरी पुस्तक प्रकाशन गर्न पाउँदा हामीलाई अत्यन्त खुसी लागेको छ । विगतका वर्षहरुमा बार्षिक प्रगतिहरु वनस्पति विभागमा समाबेश गरी प्रकाशन हुदै आएकोमा यस आ.व. मा पहिलो पटक यस अनुसन्धानशालाले समेत विस्तृत प्रगति सहितको पुस्तक प्रकाशन गरेको सहर्ष जानकारी गराउदछु ।

यस अनुसन्धानशालाले स्थापनाकालदेखि नै वनस्पति स्रोतको रासायनिक संरचना, जैविक असरको अध्ययन अनुसन्धानका साथसाथै प्रविधि विकास र सार्वजानिक विश्लेषण कार्यमा गुणस्तरीय सेवा प्रवाह गर्दै आएको छ । वनस्पति विभाग अन्तर्गत रही यस अनुसन्धानशालाले वनस्पति स्रोतको संरक्षण, सदुपयोग र प्रवर्द्धनका लागि अनुसन्धानका माध्यमबाट अग्रणी भूमिका निर्वाह गर्दै आएको छ । अध्ययन अनुसन्धानबाट जडीवुटीको औषधोपयोगी गुणको महत्त्व बढ्दै जाने र यसको उपयोगबाट देशमा आर्थिक समृद्धि ल्याउन महत्वपूर्ण भूमिका निर्वाह गर्ने भएकोले आगामी दिनमा अझ वैज्ञानिक, उपलब्धीमुलक एवं प्रभावकारी रूपमा कार्यक्रमहरु संचालन गर्दै जानुपर्ने आवश्यकता रहेको छ ।

जडीवुटीको सारतत्व एवं सुगन्धित तेलहरुको पहिचान, प्रमाणीकरण एवं विदेश निकाशीमा समेत यस अनुसन्धानशालाले सहजीकरण गर्दै आएको छ । सार्वजनिक सेवालाई गुणस्तरीय एवं प्रभावकारी बनाउन अनुसन्धानशाला ISO/IEC १७०२५: २००५ बाट प्रमाणीकरण भएको र स्तरोन्नती भई ISO/IEC १७०२५/२०१७ बाट प्रमाणीकरण भएको छ । अनुसन्धानशालामा हाल आठ वटा पारामिटरमा Accreditation भएको र आगामी दिनमा यसलाई निरन्तरता दिई थप पारामिटरमा Accreditation लिदै जाने लक्ष्य रहेको छ ।

यस प्रतिवेदनमा अनुसन्धानशाला अन्तर्गतका विभिन्न शाखाहरुबाट आ.व. २०७५/०७६ मा भएका महत्वपूर्ण अध्ययन अनुसन्धान एवं उपलब्धीहरु समावेश गरीएको छ । यो बार्षिक प्रतिवेदनले अनुसन्धानशालाले गरेको वनस्पतिको अध्ययन अनुसन्धान एवं क्रियाकलापको यस क्षेत्रमा काम गर्ने वैज्ञानिक अनुसन्धानकार्ता उद्योगी, व्यापारी एवं सर्वसाधारणलाई समेत उपपोगी हुने विश्वास लिएको छु ।

अन्त्यमा, प्रतिवेदन तयारीका क्रममा मार्गनिर्देशन गर्नुहुने विभागका महानिर्देशक श्री धनञ्जय पौडेल ज्यू, उप-महानिर्देशक मोहनदेव जोशीज्यू एवं पूर्व उप-महानिर्देशक श्री ज्योती जोशी भट्टज्यू प्रति हार्दिक आभार व्यक्त गर्दछु । प्रतिवेदन तयार गरी प्रकाशन कार्यमा सहयोग गर्नुहुने वैज्ञानिक अधिकृतहरु श्री राजेश्वर रंजितकार, लक्ष्मण भण्डारी, चेतना खनाल, प्रदीपिका आचार्य, कृष्ण कुमार साह, र असिष्टेन्ट केमिष्ट श्री दिपेश उप्रेती खत्री लाई धन्यबाद व्यक्त गर्न चाहन्छु । कार्यक्रम सम्पादन गर्न सहयोग पुर्याउनुहुने यस अनुसन्धानशालाका सम्पूर्ण कर्मचारीहरु धन्यवादका पात्र हुनुहुन्छ । यस प्रतिवेदन छपाईमा हुन गएका त्रुटी प्रति क्षमा माग्दै सुझाव एवं परामर्शको अपेक्षा गरेको छु ।

धन्यवाद

देवी प्रसाद भण्डारी
कार्यालय प्रमुख

विषय सूची

प्राकृतिक सम्पदा अनुसन्धानशालाको परिचय

प्राकृतिक सम्पदा अनुसन्धानशाला (Natural Products Research Laboratory - NPRL) वनस्पति विभाग अर्न्तगत वि. स. २०१९ सालमा शाही औषधी अनुसन्धानशालाको रूपमा स्थापना भएको हो । वनस्पति स्रोत अर्न्तगत वानस्पतिक रसायन, औषधोपयोगी जडीवुटीको अध्ययन, अनुसन्धान तथा विकासको लागि प्रविधि विकास, जडीवुटी, वनस्पति जन्य उत्पादन, औषधीको गुणस्तर अध्ययन तथा नियन्त्रण गर्ने कार्यको लागि स्थापना भएको थियो । वि.स. २०५० को सांगठनिक संरचना परिवर्तनको समयमा यस प्रयोगशालाको नाम परिवर्तन गरी प्राकृतिक सम्पदा विकाश महाशाखा र वनस्पति विभागको वि. सं. २०५६ मा सागंठनिक संरचनाको पुर्नविकासमा यस प्रयोगशालालाई प्राकृतिक सम्पदा अनुसन्धानशालाको रूपमा राखियो ।

नेपाल सरकारको वि. स. २०७५ को सागंठनिक पुर्नसंरचनामा संघ अर्न्तगत रहेको यस अनुसन्धानशालाले स्थापना काल देखिनै वनस्पति श्रोतको रासायनिक संरचना, जैविक असर एवं औषधोपयोगि वनस्पतिको अध्ययन अनुसन्धानमा केन्द्रीत भई तत् सम्बन्धी प्रविधि विकाशका साथै सार्वजनिक विश्लेषण कार्यमा गुणस्तरीय सेवा प्रवाह गर्दै आएको छ ।

लक्ष्य :

प्राकृतिक श्रोतको समग्र विकासका लागि वनस्पति श्रोतमा आधारित उद्योग तथा व्यापारको प्रवर्द्धन गर्ने हेतुले वानस्पतिक श्रोतको रासायनिक, जैविक अध्ययन अनुसन्धान तथा श्रोतको उत्पादन विकासको प्रविधि विकास गर्ने गराउने एवं तत् सम्बन्धी सेवा प्रदान गर्ने ।

उद्धेश्य :

- ❑ वानस्पतिक श्रोतको वायोप्रोस्पेक्टिङ्ग गर्नु ।
- ❑ वनस्पति श्रोतको रासायनिक संरचना एवं जैविक असरको अध्ययन अनुसन्धान गर्नु ।
- ❑ वनस्पति तथा वनस्पतिजन्य उत्पादनको व्यापार प्रवर्द्धनका लागि अध्ययन अनुसन्धान गर्नु ।
- ❑ वनस्पति श्रोतमा आधारित उद्योग तथा उत्पादन विकासमा सहयोग गर्नु ।
- ❑ जडीबुटीहरुको मूल्य अभिवृद्धि (Value addition) कार्यमा सहयोग पऱ्याउनु ।
- ❑ वनस्पतिहरुको आपूर्ति श्रृंखला व्यवस्थापन (Supply chain management) मा सहयोग गर्नु ।
- ❑ वनस्पतिजन्य उत्पादनको गुणस्तर तयार गर्नु ।

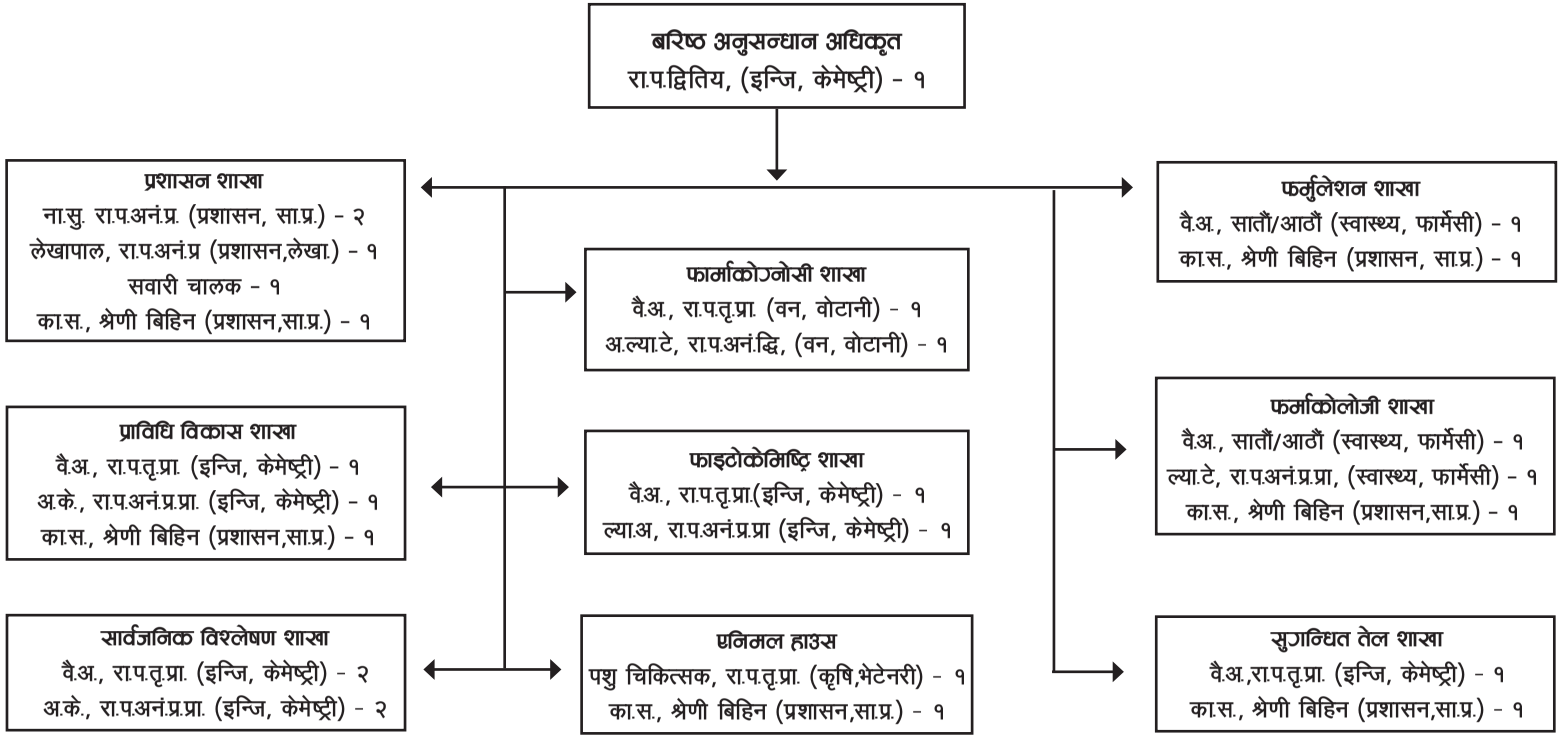
कार्यक्रम/कृयाकलाप :

- ❑ वनस्पति/जडीबुटीहरुको नमूना संग्रह गरी म्यूजियम व्यवस्थापन गर्ने ।
- ❑ वनस्पति/वनस्पतिजन्य उत्पादनको फार्माकोग्नोष्टीक अध्ययन तथा पहिचान कार्य गर्ने ।
- ❑ वनस्पति श्रोतको रैथाने प्रजातिलाई विशेष ग्राहयताका साथ अध्ययन अनुसन्धान गर्ने ।
- ❑ वनस्पतिश्रोतको रासायनिक संरचनाको अध्ययन अनुसन्धान एवं अभिलेखीकरण गर्ने ।
- ❑ वनस्पतिहरुमा पाईने रासायनिक तत्वको अध्ययन अनुसन्धान तथा प्रशोधन प्रविधि विकास गर्ने ।

- ❑ वानस्पतिक रसायन तथा वानस्पतिक सारतत्वको फर्माकोलोजिकल तथा जैविक असरको अध्ययन अनुसन्धान एवं अभिलेखीकरण गर्ने ।
- ❑ सुगन्धित तेलयुक्त वनस्पतिहरुको अध्ययन अनुसन्धान तथा सूचीकरण गर्ने ।
- ❑ वनस्पति तथा वनस्पति जन्य उत्पादनहरुको गुणस्तर निर्धारण, गुणस्तर विश्लेषण विधि विकास तथा गुणस्तर विश्लेषण गर्ने ।
- ❑ गुणस्तर निर्धारण संयन्त्र विकास गर्ने ।
- ❑ सरकारी, गैर सरकारी संघ संस्थाहरुलाई सुगन्धित तेल, वानस्पतिक रसायन, विश्लेषण विधि आदि बारे प्राविधिक ज्ञान तथा सिप दिने ।
- ❑ सरकारी एवं गैर सरकारी संघ संस्थालाई साना अनुसन्धानात्मक जीवहरु मुसा, खरायो र गिनिपिग अनुसन्धान कार्यका लागि सम्भव भएमा उपलब्ध गराउने ।
- ❑ विभिन्न विश्वविद्यालयका विद्यार्थी एवं उद्योगका प्रतिनिधिहरुलाई प्राकृतिक सम्पदा तथा गुणस्तर विश्लेषण सम्बन्धी तालिम उपलब्ध गराउने ।
- ❑ प्राकृतिक श्रोतमा आधारित उद्योग व्यापार प्रवर्द्धन गर्ने हेतुले जडीबुटी तथा तिनका सारतत्वको गुणस्तर विश्लेषण एवं प्रमाणीकरण कार्य गर्ने ।

संगठन संरचना

नेपाल सरकार
वन तथा वातावरण मन्त्रालय
वनस्पति विभाग
प्राकृतिक सम्पदा अनुसन्धानशाला



प्राकृतिक सम्पदा अनुसन्धानशालाको कार्य विवरण

१. वनस्पति अनुसन्धानको क्षेत्रमा गरीने सम्पूर्ण अनुसन्धानात्मक कार्यहरुको समन्वय कायम गरी कार्य संचालन गर्ने ।

२. दुर्लभ वन्यजन्तु र वनस्पतिहरुको अन्तर्राष्ट्रिय महासन्धि (CITES) तथा नेपाल सरकारको विभिन्न ऐन नियमहरुले संरक्षित गरीएका वनस्पतिहरुको परीक्षण तथा विश्लेषण सेवा उपलब्ध गराई नीति नियमहरुको कार्यान्वयनमा सहयोग गर्ने ।

३. जडीबुटी, वनस्पति आदिबाट औषधोपयोगी र अन्य बहुउपयोगी रासायनिक पदार्थहरु उत्पादन गर्न अनुसन्धान कार्य गर्ने ।

४. उत्पादित रसायनहरुको गुणस्तर परीक्षण तथा नियन्त्रण र प्रविधि विकास सम्बन्धी कार्यहरु गर्ने ।

५. वनस्पतिजन्य पदार्थको गुणस्तर परीक्षण कार्यलाई प्रभावकारी बनाउन आवश्यक कार्यक्रम संचालन गर्ने ।

६. प्रयोगशालालाई अन्तर्राष्ट्रिय गुणस्तर (ISO/IEC १७०२५) अनुरूप संचालन गर्न आवश्यक कार्यक्रम सञ्चालन गर्ने ।

७. कार्यालयको आगामी वर्षको प्रस्तावित कार्यक्रम बजेट तयार गरी विभागको योजना शाखामा पेश गर्ने र स्वीकृत कार्यक्रमको कार्यान्वयन योजना तयार गरी कार्य संचालन गर्ने र गराउने ।

८. अध्ययन अनुसन्धानका लागि खरायो, गिनीपिग, मुसा तथा माइसहरुको उत्पादन तथा संरक्षण कार्य गर्ने ।

९. विरूवाको अप्रशोधित, अर्ध प्रशोधित भागहरुको पहिचान गरी बाह्य सेवा उपलब्ध गराउने संकलित विरूवाहरु Museum मा राखी सोको व्यवस्थापन गर्ने ।

१०. सुगन्धित तेलजन्य विरूवाहरु संकलन गरी सुगन्धित तेल Extraction तथा सोको प्रतिशत निर्धारण गरी Physico-chemical गुणहरु अध्ययन गर्ने ।

फाइटोकेमेष्ट्री शाखा

- जडीबुटीजन्य विरूवाहरु संकलन गरी ती विरूवाहरुको बिभिन्न सारतत्व निकाल्ने ।
- सारतत्वमा रहेका बिभिन्न रसायनहरु पत्ता लगाउने ।
- सरतत्वबाट उपयोगी रसायनहरु छुट्याई परिमाण समेत पत्ता लगाउने जडीबुटी तथा सारतत्वको औषधीय गुण पत्ता लगाउन अन्य शाखासंग समन्वय गरी अनुसन्धान गर्ने ।
- नागरिक वडापत्रमा उल्लेख भए अनुसार फाईटोकेमिकल परीक्षण तथा विश्लेषण सेवा उपलब्ध गराउने ।

सुगन्धित तेल शाखा

- सुगन्धित तेलजन्य विरूवाहरु संकलन गरी सुगन्धित तेल Extraction गर्ने ।
- सुगन्धित तेलको प्रतिशत निर्धारण गरी Physico-chemical गुणहरु पत्ता लगाउने ।
- अध्ययन अनुसन्धान पश्चात उपयुक्त प्रविधि पाईलट स्तरमा सुगन्धित तेल उत्पादन गर्न सिफारिस गर्ने ।
- नागरिक वडापत्रमा उल्लेख भए अनुसार परीक्षण तथा विश्लेषण सेवा उपलब्ध गराउने ।

प्रविधि विकास शाखा

- जडीबुटीजन्य विरूवाहरूबाट सारतत्व प्रशोधन गर्ने प्रविधि पत्ता लगाउने ।
- जडीबुटीजन्य विरूवाहरूबाट उपयोगी (Markar Compound) रसायन छुटाउने प्रविधि पत्ता लगाउने ।
- अध्ययन अनुसन्धान पश्चात उपयुक्त प्रविधि पाईलट स्तरमा उत्पादन गर्न सिफारिस गर्ने ।
- सरोकारवालालाई प्रचलित ऐन कानुनको अधिनमा रही प्रविधि हस्तान्तरण गर्ने ।

फर्माकोग्नोशी शाखा

- अध्ययन अनुसन्धानका लागि विभिन्न शाखाहरु संग समन्वय गरी जडीबुटीजन्य विरूवाहरु संकलन गरी ती विरूवाहरुको पहिचान गर्ने ।
- संकलित विरूवाहरुको फर्माकोग्नोश्तीकल (Microscopic, Macroscopic, Powder Analysis etc.) अध्ययन अनुसन्धान गर्ने ।
- विरूवाको अप्रशोधित, अर्ध प्रशोधित भागहरुको पहिचान गरी बाह्य सेवा उपलब्ध गराउने, संकलित विरूवाहरु Museum मा समाबेश गरी दुरुस्त राख्ने ।

एनिमल हाउस शाखा

- खरायो, गिनीपिग, मुसा तथा माइसहरुको उत्पादन तथा संरक्षण कार्य गर्ने ।
- अध्ययन अनुसन्धानका लागि शाखाबाट माग भए बमोजिमको साना जनावरहरु उपलब्ध गराउने ।
- बाह्य संघ, संस्थाहरूबाट माग भएमा यस कार्यालयको नागरिक वडापत्रमा उल्लेख भए अनुसार साना जनावरहरु उपलब्ध गराउने ।

सार्बजनिक विश्लेषण शाखा

- वनस्पति वा वनस्पतिबाट उत्पादित वस्तुको परीक्षण तथा विश्लेषण सेवा दिने ।
- दुर्लभ वन्यजन्तु र वनस्पतिहरुको अन्तर्राष्ट्रिय महासन्धि (CITES) तथा नेपाल सरकारको विभिन्न ऐन नियमहरुले संरक्षित गरीएका वनस्पतिहरुको परीक्षण तथा विश्लेषण सेवा उपलब्ध गराई नीति नियमहरुको कार्यान्वयनमा सहयोग गर्ने ।
- सेवाग्राहीले वनस्पति वा वनस्पतिबाट उत्पादित वस्तुको देश बाहिर पठाउन पर्ने भए त्यस्तो पदार्थको प्रमाणीकरणको लागि यस कार्यालयबाट निम्न लिखित कार्यहरु गरिन्छ ।
- सेवाग्राहीले सेवा मागेको स्थानमा गई नमूना संकलन गरी सील गर्ने ।
- सेवाग्राहीले प्रयोगशालामा आई सेवा मागेमा नमूना संकलन गरी सील गर्ने ।
- संकलित नामुनाहरुको विश्लेषण पश्चात रिपोर्ट दिने ।
- प्रयोगशाला सम्बन्धी अन्तर्राष्ट्रिय गुणस्तर (ISO-17025) बमोजिम सेवा प्रवाहका लागि आवश्यक कार्यक्रम संचालन गर्ने ।

बायोकेमिकल शाखा

- जडीबुटीजन्य विरूवाहरु संकलन गरी ती विरूवाहरुको बिभिन्न सारतत्व निकाल्ने ।
- सार तत्वहरुको साना जनावरमा बयोकेमिकल (Antidiabetic, Hypolipidemic, Anti-cancer etc.) अध्ययन अनुसन्धान गर्ने ।
- सेवाग्राहीले माग गरे बमोजिम नागरिक वडापत्रमा उल्लेख भए अनुसार बयोकेमिकल परीक्षण तथा विश्लेषण सेवा उपलब्ध गराउने ।

फर्मूलेशन शाखा

- परम्परागत तथा आयुर्वेदिक ज्ञानमा आधारित आधुनिक हर्बल औषधी तथा उपयोगी कस्मेटिकको फर्मुला विकास गर्ने ।
- फर्मुला अनुसारको औषधी तथा उपयोगी कस्मेटिक (Tablet, Capsule, Cream etc.) तयार गर्ने ।
- तयार भएका औषधीको Clinical trial गर्ने ।
- सरोकारवालालाई प्रचलित ऐन कानुनको अधिनमा रही फर्मुला उपलब्ध गराउने ।

फर्मकोलोजी शाखा

- जडीबुटीजन्य विरूवाहरु संकलन गरी ती विरूवाहरुको बिभिन्न सारतत्व निकाल्ने ।
- सारतत्वहरु प्रयोगशालामा पालिएका साना जनावरमा बिभिन्न फर्मकोलोजिकल (Toxicity, Anti-ulcer, Anti-counvulsion, anti-diarrhoeal etc.) अध्ययन अनुसन्धान गर्ने ।
- नागरिक वडापत्रमा उल्लेख भए अनुसार फर्मकोलोजिकल परीक्षण तथा विश्लेषण सेवा उपलब्ध गराउने ।

प्रशासन शाखा

- विभाग अन्तर्गतका सम्पूर्ण कर्मचारीहरुको व्यक्तिगत फाईल लगायतका विवरणहरु सुरक्षित साथ राख्ने ।
- कर्मचारीहरुको काज, विदा लगायतका विवरणहरु सुरक्षित राखी हाजिर रेकर्ड अद्यावधिक गर्ने ।
- कार्यालयको प्रशासनिक कार्यको सिलसिलामा आइपर्ने विषयमा शाखा प्रमुख समक्ष राय साथ टिप्पणी पेश गर्ने ।
- कार्यालयको भौतिक सम्पत्तिको सुरक्षा गर्न नियमित रूपमा पालेहरुलाई पालो पहरा खटाउने ।
- कार्य विवरण संग सम्बन्धीत पत्र बुझी दर्ता गर्ने, पठाउने पत्रहरु चलानी गर्ने, पत्रहरुको फाईलिङ सम्बन्धी कार्य गर्ने ।

स्टोर सम्बन्धी कार्य

- कार्यालयको लागि आवश्यक सामानहरु खरिद गर्न र अन्य प्रयोजनको लागि समेत आवश्यकतानुसार टेण्डर वा बोलपत्र आव्हानको सूचना प्रकाशित गर्ने र रेकर्ड राख्ने ।
- खरिद भै दाखिला हुन आएका सामग्रीहरु बिल बमोजिम रूजु गरी स्टोर दाखिला गर्ने र प्रमाणीत गरी भुक्तानीको लागि बिल लेखामा पठाउने ।
- माग र स्वीकृति बमोजिम मालसामानहरु निकासा दिई अभिलेखमा जनाउने ।
- कार्यालयको चल-अचल सम्पत्तिको अद्यावधिक लगत राख्ने जिन्सीको निरीक्षण गराउने र वेरूजु फछ्र्यौट गर्न कारवाही गर्ने ।

लेखा सम्बन्धी कार्य

- आय व्यय र धरौटीको श्रेस्ताको मासिक रूपमा लेखा राख्ने ।
- आन्तरिक लेखापरीक्षणबाट देखिएका त्रुटीहरु लेखापरीक्षण कार्यालय प्रमुख समक्ष प्रतिवेदन पेश गर्ने ।
- आन्तरिक लेखापरीक्षण गर्दा कुनै गम्भीर प्रकारका आर्थिक अनियमितता र रकम हिनामिना भएको देखिएमा तुरून्त प्रतिवेदन गरी प्राप्त निर्देशन अनुसार गर्ने ।
- अन्तिम लेखापरीक्षण गर्नुअघि आन्तरिक लेखापरीक्षणबाट औँल्याएको बेरूजु र तत्सम्बन्धमा भएको कारवाही र शाखाको धारणा कार्यालय प्रमुख समक्ष लिखित रूपमा पेश गर्ने ।
- अन्तिम लेखापरीक्षणको लागि श्रेस्ता तयारी राख्ने ।
- राजस्व सम्बन्धीको लेखा राख्ने ।
- अन्तिम लेखापरीक्षणबाट देखिएका बेरूजुहरु नियमित वा असूल गर्नु पर्ने भए सो सम्बन्धीत काम गर्ने ।

Pharmacognostical Study र म्युजियम व्यवस्थापन

महत्वपूर्ण जडीबुटीहरुको सर्वेक्षण, संकलन तथा पहिचान गरी उपयोगी भागहरुको Macroscopic र Microscopic अध्ययन गर्ने र वाँकी भागहरुलाई Preservative हाली म्यूजियममा व्यवस्थित गराई राख्ने कार्य यस शाखाले वार्षिक कार्यक्रम अन्तरगत गर्दै आइरहेको छ । यस आर्थिक वर्षमा मुस्ताङ, ललितपुर, रूपन्देही, भक्तपुर, दोलखा, गोरखा, जुम्ला, मुगु तथा मकवानपुर क्षेत्रहरुको सर्वेक्षण भ्रमण गरी विभिन्न प्रजातिका जडीबुटीहरुका नमूनाहरुको संकलन कार्य गरियो । संकलित नमूनाहरु मध्ये ११ वटा नमूनाहरुको विस्तृत Pharmacognostical अध्ययन गरिएको छ र संकलित नमूनाहरुको म्यूजियममा व्यवस्थापन गरी पुराना तथा विग्रेका नमूनाहरुलाई हटाई नयाँ नमूना राखिएको छ ।

यस म्यूजियममा ४०० भन्दा वढी जडीबुटीजन्य वनस्पतिहरुको उपयोगी भागहरुलाई राखिएको छ । नेपालमा पाइने महत्वपूर्ण तथा वहुमुल्य वनस्पतिहरु यार्शागुम्बा, गुच्चि च्याउ, पाँचऔले, जटामसिं, ओखर तथा कुट्की जस्ता जडीबुटीहरुको उपयोगी भागको नमूनाहरु राखिएको छ । साथै नेपालबाट निर्यात हुने सुगन्धित तेलहरु क्यामोमाइल, लेमनग्रास, जटामसी, मेन्था आदिका नमूनाहरु पनि राखिएको छ ।

आन्तरिक अध्ययन अनुसन्धानको साथसाथै विद्यार्थी, व्यापारीहरुबाट ल्याइएका नमूनाहरुको पहिचान गरी प्रमाण पत्र दिने कार्यका साथै अवैध रूपमा संकलन गरिएका जडीबुटीहरुको पहिचान गरी मुद्धा मामिलामा पनि सहयोग गर्दै आएको छ ।

(क) आ.ब. २०७५/०७६ मा Pharmacognostical अध्ययन गरिएका प्रजातिहरु ।

१. सतुवा (*Paris polyphylla* Sm.)
२. काकोली (*Fritillaria cirrhosa* D.Don)
३. जीङगो बाइलोवा (*Ginkgo biloba* L.)
४. कूश (*Desmostachya bipinnata* (L.) Stapf)
५. इशबगोल (*Plantago major* L.)
६. चिराइतो (*Swertia paniculata* Wall.)
७. अभिजालो (*Drymaria cordata* (L.) Wild.ex Schult.)
८. चिराइतो (*Swertia recemosa*)
९. गुच्ची च्याउ (*Morchella esculenta* (Linn.) Pers)
१०. लौठ सल्ला (*Taxus Mairei*)
११. कालमेघ (*Andrographis paniculata* (Burm.f.) Wall.ex Nees)

(ख) संकलित नमूनाको Morphological विवरण

Paris polyphylla Sm.
Family: Melanthiaceae
Local Name: Satuwa

A glabrous, erect, perennial herb 30-45cm high with creeping root stock. Leaves arranged in whorl. Flowers solitary, terminal, short stalked, with 4 - 6 lanceolate, long-pointed green leaf like perianth-segments 5-10cm with an inner whorl of thread like yellow or purple segments as longer or shorter than the outer. Fruits capsule gloobose with yellowish brown numerous scarlet seeds.

Fritillaria cirrhosa D.Don
Family: Liliaceae
Local Name: Kaakolee

A glabrous bulbous plant, about 1m tall. Leaves simple, linear, often long pointed, the upper ones with coiled tips. Flowers solitary in terminal, drooping and variable in color, maroon, yellow, green or purple, petals 3-5cm long. Fruits six angled capsules.

Ginkgo biloba L.
Family: Ginkgoaceae

Ginkgos are large trees, normally reaching a height of 20–35 with some specimens in China being over 50m. The tree has an angular crown and long, somewhat erratic branches, and is usually deep rooted and resistant to wind and snow damage. Young trees are often tall and slender, and sparsely branched; the crown becomes broader as the tree ages. During autumn, the leaves turn a bright yellow, then fall, sometimes within a short space of time (one to 15 days). A combination of resistance to disease, insect-resistant wood and the ability to form aerial roots and sprouts makes ginkgos long-lived, with some specimens claimed to be more than 2,500 years old.

***Desmostachya bipinnata* (L.) Stapf**
Family: Poaceae
Local name: Kush

A perennial grass 20-100cm tall. Leaves simple, alternate, sessile, linear, 6-24cm long,parallel nerved with a sheathing base, sheath split to the base, rigid with filiform lip and hispid margins. Flowers spike in erect and terminal panicles, brown.The plant is sweet and acrid.

***Plantago major* L.**
Family: Plantaginaceae
Local name: Isabgol

A herb with basal rosette leaves growing in grassy wasteland. Leaves simple, ovate or oblong-ovate, 5-12cm long, variable in breadth. Flowers white, small in cylindrical or ovoid spike. Fruits ellipsoid obtuse capsule. Seeds yellowish brown, minute.

***Swertia paniculata* Wall.**
Family: Gentianaceae
Local name: Tite, Chiretta

An annual herb 30-80cm tall. Stem quadrangular. Leaves lanceolate- oblong. Inflorescence paniculate, many flowered. Flowers white. Petals greenish yellow or whitish blue with purple blotches above gland.

***Drymaria cordata* (L.) Wild.ex Schult.**
Family: caryophyllaceae
Local name: Abhijaalo

Annual prostrate herb. Leaves simple, opposite, petiolate, ovate -orbicular. Flowers greenish white or white, glandular- puberulous, repeatedly forked cyme . Fruits capsule.

Swertia recemosa

Family: Gentianaceae
Local name: Chiraita

Annual herb 3-50cm. Stem erect, hollow, ribbed, glabrous. Leaves sessile; blade lanceolate, dorsal glabrous and cilia present on veins only towards the ventral surface, margin entire, ciliate, apex acute, veins 3. Bracts lanceolate to linear-lanceolate, margin ciliate, 1.8-3.2 of cymes, many flowered, spreading.. Flowers 5-merous. Calyx green; tube campanulate, 3-4mm; lobes triangular lanceolate, margin ciliate, 4.5-12.5 × 2-3mm, veims 1-3. Corolla pale blue to pale blue-purple; tube campanulate, gland1ieachpetal,linear,fimbriate, fimbria 0.5-1.5mm. Stamens 5; filament basally white, apically blue, 6.5-8 × 1.2mm, basally much enlarged and connate; anthers blue, 1.7 ×1.1mm.
Carpel 8-12mm; stigma bifid.

Morchella esculenta (Linn.) Pers.

Family: Morchellaceae
Local name: Guchchi chau

A fungus with white, thick, erect, tapring stalk bearing rounded or conical pileus. Cap ligh yellowish brown, 6-12cm high, obtusely ovoid, pit large, ridges sinous, stipe 6-12cm high, almost smooth, terete or faintly grooved above, sometimes pitted grooved below, minutely scurfy, yellowish, browning with age.

Taxus Mairei

Family: Taxaceae
Local name: Lauth salla

An evergreen much branched coniferous tree. Leaves are slightly curved, somewhat flat , margin slippery and bracts at the joint of branches are not distinct. Flowers unisexual, male flowers in short stalk, globose catkins in axils of leaves, female flowers solitary, axillary, green. Fruits red fleshy, 8mm in diameter. Seeds encircled by a fleshy red aril.

Andrographis paniculata (Burm.f.) Wall.ex Nees

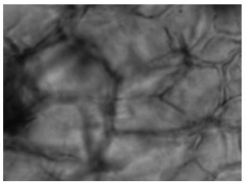
Family: Acanthaceae
Local name: Kalmegh

An erect, branched annual herb with quadrangular stem, 30-90cm long and about 2cm broad. Flowers small in axillary and terminal recemes or panicles, bi-lipped, rose or pink colored with white spot. Fruits linear capsule, 1.5-2cm long. Seeds rugose, brownish yellow. Plant is bitter.

(ग) संकलित नमूनाको Microscopic अध्ययन विवरण

S.N	Scientific Name	Vernacular Name	Locality	Part Used	Powder colour	Powder Characteristics
1	*Paris polyphylla* Sm.	Satuwa	Mustang	Rhizome	whitish brown	Presence of cork cells, starch grains, reticulate and spiral vessels and fibers.
2	*Fritillaria cirrhosa* D. Don	Kaakoli	Mustang	Bulb	White	Shows parenchymatous cells, crystals reticulate and spiral vessels.
3	*Ginkgo biloba* L. Nees (Kosterm)	Lalitpur	Leaves	Green		Shows irregular epidermal cells and stomatas with kidney shaped guard cells and trichomes.
4	*Desmostachya bipinnata* (L.) Stapf	Kush	Rupendehi	twigs	Yellowish-green	Shows epidermal cells with trichome, fibers, vesels, etc.
5	*Plantago major* L	Isabgol	Bhaktapur	Wholeplant	Gray	Shows trichomes, epidermal-cells, crystals, fibers, vessels, pollengrains etc.
6	*Swertia paniculata* Wall.	Chiretta	Dolakha	Wholeplant	Light-green	Presence of epidermal cells, pallisade layers, pollen grains and vessels.
7	*Drymaria cordata* (L.) Wild.ex Schult.	Abhijalo	Gorkha	Wholeplant	Dark-green	Epidermal cells with tri-chomes, starch grains, vessels and fibers etc.
8	*Swertia recemosa*	Chirreta	Kalinchwok, Dolakha	Wholeplant	Green	Shows parenchymatous cells, pollen grain, fibers and vessels.
9	*Morchella esculenta*	Guch-cheechyau	Jumla	Wholepart	Brown	Shows hyphae and spores in asci
10	*Taxus Mairi*	Lauthsalla	Leaves	Lightgreen		Shows upper epidermis and lower epidermis with sunken stomata, fiber etc.
11	*Andrographis paniculata*	Kalmegh	Makwan-pur	Wholeplant	Green	Epidermal cells with stoma, Trichome, Vessels, and fibers.

Microscopic अध्ययनका फोटाहरु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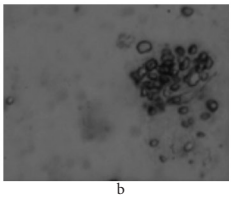
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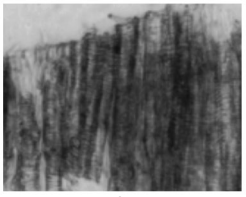
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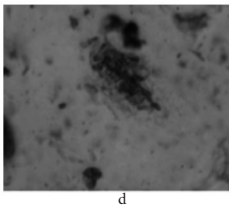
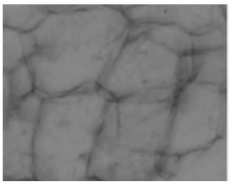

d

1. *Paris polyphylla* Sm. a.Cork cells b.Starch grains c.Reticulate vessels d.Spiral vessels.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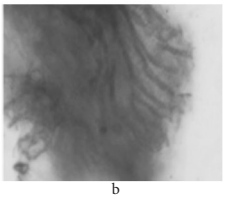
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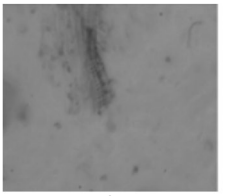
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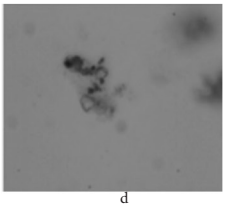
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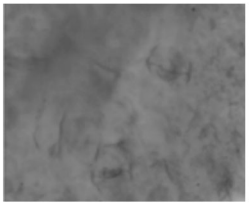
2. *Fritillaria cirrhosa* a.Parenchymatous cells, b. and c. Vessels, d. Crystals.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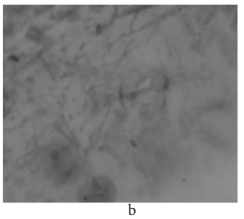
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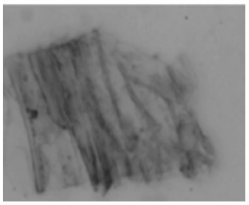
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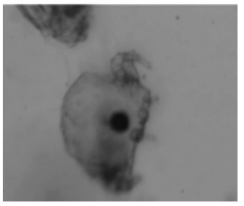
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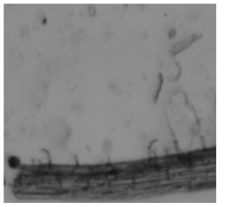
3. *Ginkgo biloba* L. a)Epidermal cells with stomata b)Stoma with guard cells, c)Fiber d)Trichome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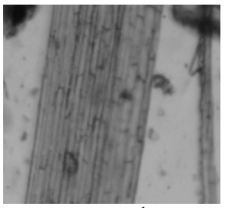
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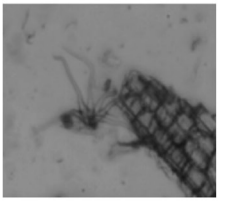
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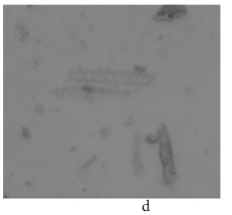
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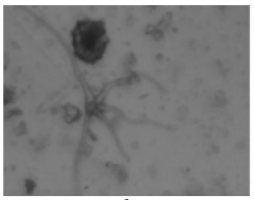
4. *Desmostachya bipinnata* a. cells and trichomes. b.Fibers c. Trichomes d. epidermal cells.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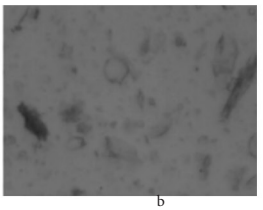
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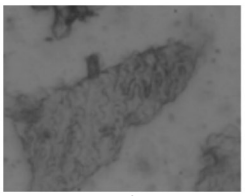
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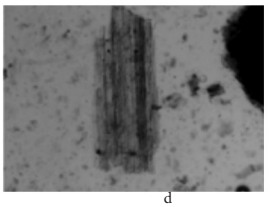
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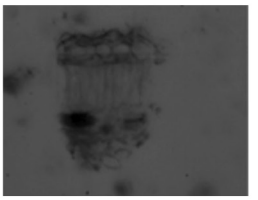
5. *Plantago major* a. Rosette crystal and trichome, b. pollen grains c. cells with trichome d. fibers.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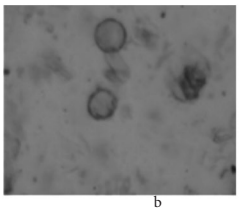
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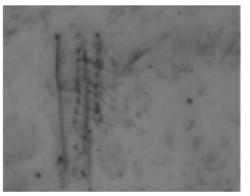
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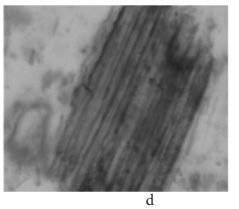
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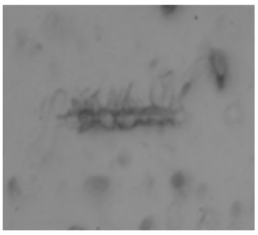
6. *Swertia paniculata* a. epidermal cells and pallisade layer, b.pollen grains c. vesells d. fibers.



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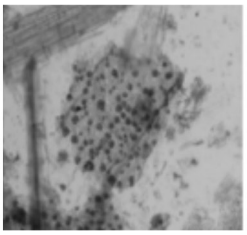

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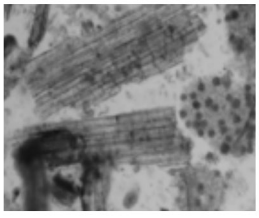

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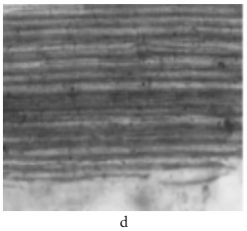

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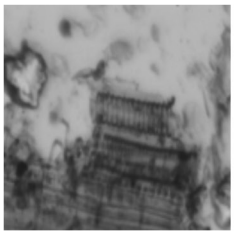
7. Drymaria cordata a. Epidermal cells with trichome, b. Starch grains c. Fibers d. Vessels.



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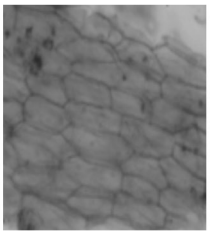

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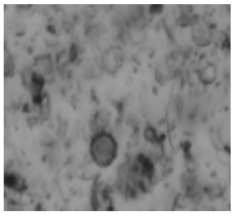

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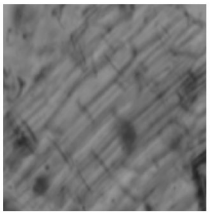
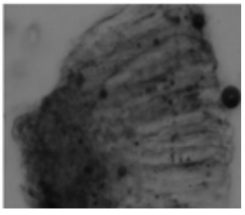
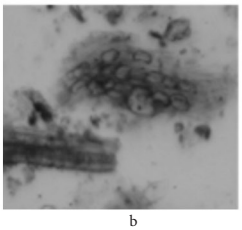


d

8. *Swertia recemosa* a. vessels b. parenchymatous cells c. pollen grain d. fibers



a



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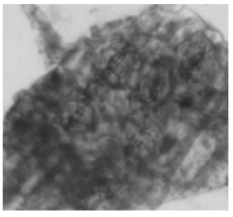

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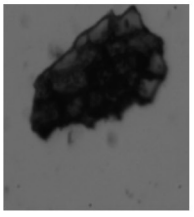

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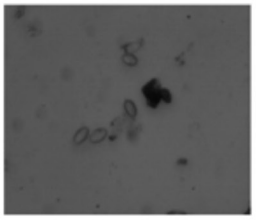
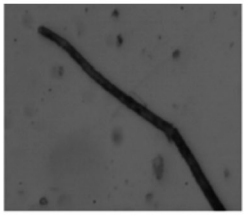


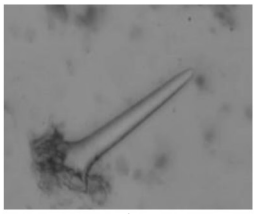
c

9. *Morchella esculenta* a. Surface hyphae and cylindrical hyphae b. spores in Asci c. spores

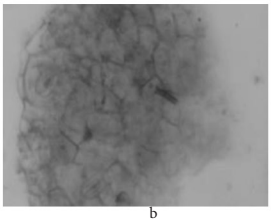


c

10. *Taxus mairei* a.Upper epidermis with sunken stomata, b.Lower epidermis c. Fiber



a



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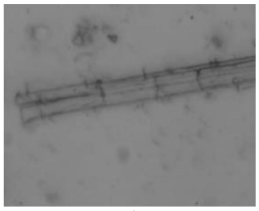

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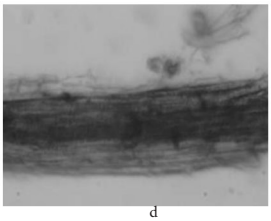


d

11. *Andrographis paniculata* a.Epidermal cells with stomata, b. Trichome c. vessels d.fiber

Public Sample Identified in Pharmacognosy section (2075/2076

तालिका: १

1. *Princepia utilis*
2. *Ophiocordyceps nepalensis*
3. *Ophiocordyceps multiaxialis*
4. *Crocus sativus* (Fake)
5. *Pterocarpus santalinus*
6. *Ophiocordyceps nepalensis*
7. *Elaeocarpus sphaericus*
8. *Corydalis Chaerophylla*
9. *Cinnamomum tenuipile*
10. *Allium wallichi* (Fake)
11. *Choerospondias axillaris*
12. *Dactylorhiza hatagirea*
13. *Taxus contarta*
14. *Neopicrorhiza scrophularifolia*
15. *Cinnamomum tenuipile*
16. *Neopicrorhiza scrophularifolia*
17. *Paris polyphylla*
18. *Rhododendron anthopogon*
19. *Juniperus recurva*
20. *Neopicrorhiza scrophularifolia*
21. *Meconopsis* sp.
22. *Gentiana* sp.
23. *Ganoderma* sp.
24. *Paris polyphylla*
25. *Polygonatum* sp.

Phytochemical Study

यस आ. व. २०७५/०७६ मा १० रैथाने र उपयोगिताको आधारमा औषधीजन्य तथा सुगन्धित वनस्पतिको अध्ययन अनुसन्धानमा फाइटोकेमिकल स्क्रिनिङको परीक्षण भएको छ । परीक्षणको प्रक्रिया एवं विधि निम्न बमोजिमको रहेको छ ।

A: Flow Chart

1. Identification, collection, air dried and powder of plant sample

↓

2. Method of extraction: Percolation, Reflux and Soxhlet method

↓

3. Operation of Rotavapour

↓

4. Extractive Value of different extract and storage

↓

5. Phytochemical screening

↓

6. Test: alkaloids, terpenoids, flavonoids ,essential oils, saponin etc.

↓

7. Report + or - by Colour

Preliminary phytochemical screening

आ.व २०७५/०७६ मा भएका Phytochemical Screening हरूको वनस्पति नमूनाको नाम नतिजा तालिका (२) मा उल्लेख भए बमोजिम रहेको छ ।

Phytochemical Screening of Medicinal plants in 50% ethanol

Table 2

Chemical constituents	1	2	3	4	5	6	7	8	9	10
Volatile oil	+	+	-	+	-	-	-	-	+	-
Alkaloid	+	+	+	++	++	++	+	-	+	-
Steroid	+	++	++	+	+++	+	+	++	++	+++
Triterpenoid	++	++	+	+	+++	++	++	+++	+	+++
Carbohydrate	-	-	+	-	-	+	+	++	-	++
Flavonoid	++	++	+	++	++	++	++	-	+	++
Protein	-	-	-	+	+	++	++	-	-	+
Saponins	-	+++	+	-	+	++	++	++	++	-
Tannins	-	-	+	++	-	+++	+++	+++	-	+++
Glycosides	+	+		-	+	+	+	+++	+	+++
Anthocyanin	-	++		+	-	-	-	+	+	+
Reducing sugar	-	-	++	+	-	+	+	++	+	+
Penolic	-	-	+	+++	-	++	++	+++	+	+++

Where

1= Fritillaria cirrhosa D.Don
2= Paris polyphylla Sm.
3= Desmostachya bipinnata (L. stapf)
4= Plantago majorL.
5= Drymaria cordata L. wild ex schult
6= Swertia paniculata
7= Swertia racemous
8= Taxus myrei
9= Morchella esculenta
10= Andrographic paniculata

Note:

+ means presence in trace amount
++ means presence in moderate amount
+++ means presence in high amount
_ means absences

उपलब्धीः १० वटा वनस्पतिहरूको Phytochemical screening बाट तिनीहरूमा भएका different groups of compounds पत्ता लागेको ।

Phytochemical screening को बृस्तीत विधि (Detail method) अनुसूची १ मा उल्लेख गरिएको छ ।

Biochemical Study

अनुशन्धानशाला बाट यस आ.व.मा भुजेत्रो (Bhujetro) को पातमा antidiabetic test गरिएको छ ।

भुजेत्रो (Bhujetro)

Scientific name: *Butea buteiformis* (Voigt) Grierson & Long
Butea minor Buch.-Ham. Ex Baker

Family: Leguminosae

Description:

A shrub, 1.5 - 3 m tall with silky haired young branches; leaves large, trifoliate; leaflets broadly ovate, 15 - 38 cm, the terminal long stalked and two lateral leaflets asymmetrical, leathery, finely silky beneath.; flowers orange red in long terminal and axillary spikes likes clusters; fruits pods, densely hairy, 5 - 8 cm by 2.5 - 3 cm, usually single seeded.

Distribution in Nepal: Tropical to sub-tropical zones in between 300 and 2000 m from east to west.

१. उद्देश्य:

उपयोगमा रहेको वा नरहेको विरूवाहरुको Bio-chemical properties को बारे अध्ययन, अनुसन्धान गरी अभिलेख तयार गर्ने रहेको थियो ।

२. सामाग्रीहरु

२.१ जनावर

दुवै लिङ्गका, २०-३० ग्रा. तौल भएका जवान र स्वस्थ Mice प्रयोगमा ल्याईयो । यी Mice प्रा.स.अ.शा. को Animal House शाखाबाट प्राप्त गरिएको हो ।

२.३ रसायनहरु

२.३.१ ग्लुकोज ठेष्टको लागि आवश्यक उपकरण तथा रसायनहरु

- One Touch Ultra 2 Blood Glucose Monitoring Meter was supplied by Life Scan, a Johnson & Johnson Company.
- One Touch Ultra Soft Test Strips were obtained from the same company.
- Glipizide B.P. (GLIPIZ) was obtained from LAPEN (A division of NPL), Manufactured by Nepal Pharma Lab. Pvt. Ltd. Jeetpur, Birganj. Nepal.

३. कार्य विधि

३.१ सारतत्व निकाल्ने विधि

राम्ररी सुकाई धुलो वनाएको यसलाई Percolarater मा Ethyl alcohol (50%) ले extraction गरियो । सो सारतत्वलाई Rotavapour मा कम प्रेशर र ६००^{C} तापक्रममा सुकाई फ्रिजमा (२-८०^{C}) संचय गरियो ।

४.१ डायबिटीज टेष्ट

Antidiabetic Test on Normal Mice

६-६ वटा स्वस्थ्य Mice को ३ वटा समुहहरु वनाइयो । समूह १ को Mice लाई ५ मि.ली. पानी (+ acacia powder) मात्र खुवाइयो जुन Control group हो । समुह २ लाई १ मि.ग्रा./कि.ग्रा. Glipizide, ५ मि.लि. पानी (+ acacia powder) मा बनाई खुवाईयो जुन positive group हो । समुह ३ लाई १०० मि.ग्रा./कि.ग्रा. Alcoholic extract, ५ मि.ली. पानी (+ acacia powder) मा बनाई खुवाईयो । त्यसपछि प्रत्येक 1hr, 2hr & 4hr मा Rat को tail vein बाट रगत झिकी One Touch Glucometer बाट ग्लुकोजको मात्रा निर्धारण गरियो ।

Alloxen induced Antidiabetic Test

Alloxan was freshly dissolved in distilled water and immediately injected intraperitoneally with a single dose of 150 mg/kg in overnight fasted mice .The animals were allowed free access to 5% glucose solution to overcome the drug induced hypoglycaemia After 72 hours of alloxan injection, diabetes was confirmed by blood samples collected from the tip of the tail using a blood glucometer . The mice with a fasting blood glucose level above 150 mg/ dl were considered diabetic and were used in the experiment. The normal group served as non-diabetic control mice.

Study groups & Sampling:

Four groups of mice, six mice in each received the following treatment schedule.
Group I: Normal control
Group II: Alloxan treated control (150 mg/kg body weight i.p)
Group III: Alloxan (150 mg/kg body weight i.p)+ *Moringa olifera*
(Leaf extract at the dose of 500 mg /kg body weight).
Group IV: Alloxan (150 mg/kg body weight i.p)+ *Butea minor*
(Leaf extract at the dose of 500 mg / kg body weight).

५. Statistical Analysis:

एण्टी डायबिटीजको परिणामलाई Mean percentage मि.ग्रा./१०० मि.ली. + Standard error x t (t = student's t table) मा राखिएको छ ।

७. परिणाम :

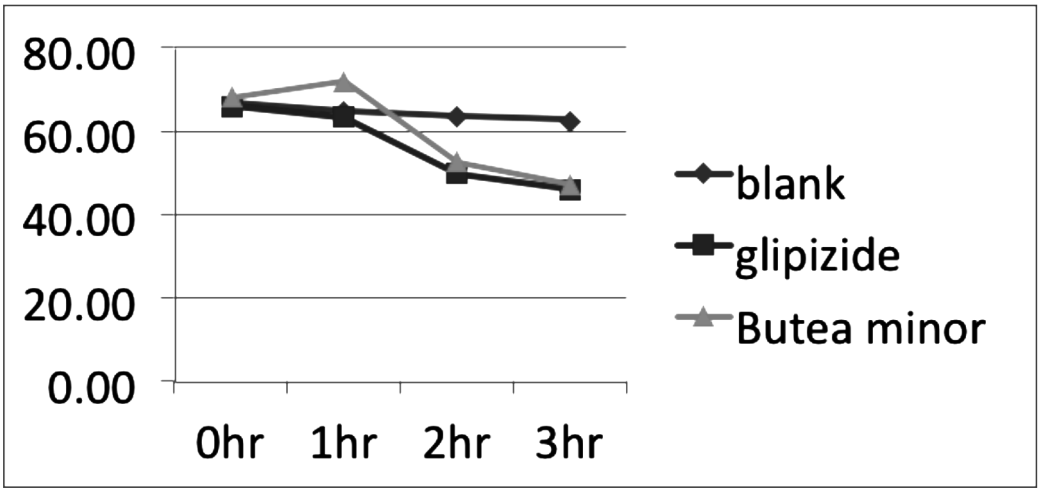
यस विरूवाको Alcoholic ext. ले Anti diabetic test मा राम्रो नतिजा देखाएको छ । यसले 24.47 % ग्लुकोजको मात्रा घटाएको पाईयो ।

८. फलफल तथा निष्कर्ष :

यस विरूवा को Alcoholic ext ले ग्लुकोजको मात्रा घटाएको पाइयो ।

Anti-diabetic test on normal mice

Test	Glucose level mg/dl at				antidiabetic effect % at 3 hrs
Time	0hr	1hr	2hr	3hr	
blank	66.83	65.00	63.67	62.67	
glipizide	66.33	63.67	50.17	46.33	26.06
Butea minor	68.50	72.33	53.00	47.33	24.47



Alloxen induced Antidiabetic effect

Test	Initial glucose level at	Glucose level mg/dl after			antidiabetic effect % at 3 hrs
Time	0hr	1hr	2hr	3hr	
blank	173	144.00	171.00	165.00	
moringa	176.00	116.60	132.80	97.00	44.89
Beutia minor	226.00	227.00	232.00	152.00	32.74

Pharmacological study

अनुशन्धानशाला बाट वार्षिक योजना अन्तर्गत परेका १० वटा विभिन्न जडीबुटीहरुको ५० प्रतिशत अल्कोहोल बाट निकालिएको सारतत्वमा फर्माकोलोजीकल स्क्रिनिगं कार्य गरिएको छ ।

उद्देश्य: १० वटा जडीबुटीमा Anti Diarrhoel activity, Anti-Convulsants test / anti-ulcer Test मा पर्ने प्रभाव बारे अनुसन्धान गर्ने ।

Pharmacological अध्यन सम्बन्धी विस्तृत विधि (Protocol) एंव प्रक्रिया निम्न अनुसार रहेको छ ।

Anti Diarrhoel activity:

The extract is tested for its effect on G.I.T motility. BALB/C mice 25-30 g are selected for this purpose and aer divided into three different groups. Group I served as negative control. Saline 10 mL/kg dose is administered to Group I. loperamide (5mg/kg) is administrated orally for positive control to Group II. The extract is administered to the Groups III at a dose of 25% of LD50 value. After 15 min of the above mentioned treatments, charcoal suspension (10% aqueous) at a dose of 0.3 mL, p.o. is administered to each mouse. Then all animals are killed by chloroform over dose after 30 min of charcoal treatment. Through dissection the small intestine is removed and movement of charcoal in small intestine is noted by calculating percent GIT motility with formula given below.

Percent Motility = Distance covered / total length of intestine × 100.

Anti-ulcer Test

Ethanol-induced ulcer:

Thirty fasted animals are used in five grous of six animals each. Groups I and II received 2 ml/kg distilled water (negative control) and 100 mg/kg p.o. sucralfate while rats in groups III is given extract at a dose of 25% of LD50 value orally (p.o) respectively. After one hour all animals received 1 ml/kg of 80% ethanol orally. The rats are sacrificed with chloroform anesthesia after one hour. The stomachs are isolated, washed gently under clean flowing water and cut open along the greater curvature. The stomachs are then fixed in 10% formalin and craters observed and ulcer scores are recorded .

ulcer index

Codes for showing extent of ulcer activity in animals

Code	Extent of ulcer activity
0	Normal stomach
0.5	Red coloration
1	Spot ulcers
1.5	Hemaorrhagic streaks
2	Ulcer > 3 mm < 5mm
3	Ulcers > 5mm

The percentage protection is calculated using the formula
percentage protection = 100-Ut/Uc ×100
Where Ut = Ulcer index of treated group
Uc = Ulcer index of control group.

OR

$$\% \textbf{ inhibition of Ulcer Index} = \frac{[\text{Control mean ulcer index-Test mean ulcer index}]}{[\text{Control mean ulcer index}]} \textbf{ X 100}$$

Anti-Convulsants Test :

In medical practice anti-convultsnts are used to control convulsions occurring in epilepsy, tetanus, eclampsia and posioning with convulsants. The greatest use is in the treatment of epilepsy. According to neurological theory "epilepsy is a self limiting, paroxysmal cerebral dysrhythmia in which there is excessive E.E.G. discharges, tonic and clonic convulsions and some time loss of consciousness.

A. Electro Shock Method:

Expt. animals are mice, animals are divided in three groups. Group I serves as control and is not given any drug and GroupII is treated with the Phenytoin. while in groups III is given extract at a dose of 25% of LD50 value orally (p.o) respectively. Maximal Electro Shock seizures are induced with a stimulus of 0.2 sec. Duration and a current of 120 m. amps. Firstly electro shock is given to the animals of control group.

Animals exhibit a seizures pattern. The tonic flexor component of the hind limbs is seen first of all, following this is the tonic extensor component, the phase of intermittent, whole body clonus is seen in the last. Now the electro shock of same intensity is given to the animals of treated group. Absence or diminisition in the intensity of convulsions indicate that the treated has protected the animals from the conculsions and has got anti-consvulsant activity.

Test Results

तालिका ३

Treatment (500mg/Kg)		Anti-Convulsions Test Various Phases of Convulsions				% of Anti-diahho-real	Anti-Ulcer
Scientific Name	Vernacular Name	Tonic	Clonic	Stupor	Death or Recover		
Paris polyphylla Sm.	Satuwa	+ + -	+ + -	+ + -	D R R	28	75
Fritillaria cirrhosa D.Don	Kaakoli	+-+	+++	+++	R R R	0	
Desmostachya bipinnata (L.) Stapf	Kush	+ + +	+ + -	+ + -	D R R	16	25
Plantago major L	Isabgol	+ + +	+ - -	+ + -	D R R	9	25
Swertia paniculata Wall.	Chiretta	+ + +	+ + +	+ + +	D R R	11	50
Drymaria cordata (L.) Wild. ex Schult.	Abhijalo	+ + +	+ + +	+ - +	D R R	0	0
Swertia recemosa	Chirreta	+ + +	+ + +	+ - +	D R R	2	0
Morchella esculenta	Guchchee chyau	+ + +	+ + +	+ - +	R R R	30	0
Taxus Mairi	Lauth salla	+ + +	+ + -	+ + +	R R R	0	0
Andrographis paniculata	Kalmegh	+ + +	+ + +	+ + +	D R D	12	0
Control		+ + +	+ + +	+ + +	D R D	4	
Phenytoin (100mg/Kg)		+ - -	- - -	- - -	RRR		
+ =Presence, - =Absance R= Recover, D= Death							

उपलब्धी:

फर्माकोलोजी स्क्रिनिङ्ग अन्तगर्त जडीबुटी, प्राकृतिक पदार्थ वा कृतिम रसायनले जीवको विभिन्न अङ्ग वा भागमा पर्ने सकारात्मक वा नकारात्मक प्रभाव बारे अध्ययन अनुसन्धान गरिन्छ । अतः माथि उल्लेखित विरूवा (जडीबुटी) को सारतत्वबाट गरिएको परीक्षणहरूले प्राप्त परिणामको आधारमा कुनै खास विरूवाबारे विस्तृत अध्ययन गरी प्रभावकारी यौगिक छुट्याउने प्रविधि लगायत त्यस यौगिकको औषधीय प्रयोगबारे प्राथमिक वैज्ञानिक आधार प्रदान गर्दछ ।

Formulation

फर्मुलेटेड प्रोडक्ट उत्पादन

प्राकृतिक सम्पदा अनुसन्धानशालाले नेपालमा भएका जडीवुटी एवं सुगन्धित तेलको प्रयोग गरी विभिन्न प्रकारका जडीवुटीजन्य सामाग्रीको उत्पादन गर्दै आइरहेको छ । यस आ. व. मा विभिन्न प्रकारका सुगन्धित तेलहरूको समिश्रणबाट कोशी र जुम्ला नामक अत्तर बनाइएको थियो । जैविक विविधताले धनी देश नेपाल प्राकृतिक सम्पदाहरूको उपयोगबाट विभिन्न प्रकारका सामाग्रीहरु उत्पादन गर्न सकिएमा स्थानीय स्तरमा जनताको जीवनस्तर उकास्नका लागी मद्दत पुग्ने देखिन्छ । नेपालको जडीवुटीका कच्चा पदार्थ सस्तो मूल्यमा विदेश निकाशी हुने र तिनै बाट बनेका महंगा सौन्दर्य लगायतका सामाग्रीहरु महंगोमा खरिद गर्ने हालको विद्यमान अवस्थामा परिवर्तन ल्याउन यस्ता Formulated Product को व्यावसायिक रूपमा उत्पादन गर्न अत्यावश्यक छ ।

अनुसन्धानशालाले आ.व. २०७५/०७६ मा नेपालमा पाईने सुगन्धित तेलहरूको प्रयोग गरी कोशी र जुम्ला नामक पफ्र्यूम तथा अत्तरको फर्मुला तयार पारि नमूनाहरु बनाएको छ । करिव ६०० नमूनाहरु वनस्पति दिवसको अवसरमा उपस्थित महानुभावहरूलाई वितरण गरिएको थियो ।

अनुसन्धानशालाले तयार पारेकको जुम्ला र कोशीको व्यवसायिक उत्पादनका लागि जडीवुटी उत्पादन तथा प्रशोधन कम्पनी लिमिटेड लाई वनस्पति दिवसको अवसरमा माननीय वन तथा वातावरण मन्त्री श्री शक्ति बहादुर बस्नेत ज्यू ले हस्तानतरण गर्नु भएको थियो । सोही अवसरमा माननीय मन्त्रीज्यू बाट Formula निर्धारण कार्यमा संलग्न कार्यालयका कार्यालय प्रमुख श्री देवी प्रसाद भणडारी, वैज्ञानिक अधिकृत श्री राजेश्वर रंजितकार र लक्ष्मण भण्डारीलाई प्रशंसा पत्र प्रदान गर्नु भएको थियो ।

Mystique Mountain Jumla and Mystique Mountain Koshi

Soothing Himalayan Essence
Soothing andenticing Himalay anessence embodied with blending of natural essential oils of Nepal based, king of Himalayas
Suitable for all

Attar (Jumla) making procedure

Materials/ Ingredients

1. Sandalwood
2. Patchouli Oil
3. Vanilla (Vanillin)
4. Rose water
5. Rosemary
6. Basil
7. Glycerin
8. Tween 20
9. Propylene glycol
10. Beaker 1000ml
11. Measuring cylinder 100ml,1000ml
12. Weighing balance
13. Glass stirrer
14. Blender

Ingredients / Functions/ Percentage

Ingredients	Function
Sandalwood	Base Note
Patchouli Oil	Base Note
Vanilla (Vanillin)	Base Note
Rose water	Middle Note
Rosemary	Middle Note
Basil	Top Note
Glycerin	Carrier
Tween 20	Fixative
Propylene glycol	Fixative

Procedure

STEP 1

Carefully measure all essential oil (Patchouli Oil, Rosemary, Basil) and mix slowly with glass stirrer one by one into sandalwood oil (Fixatives nature) in a beaker.

Add Tween 20 and mix properly

STEP 2

Carefully measure all water base (Vanilla , Rose water) and mix slowly with glass stirrer one by one into Propylene glycol in a beaker.

STEP 3

Slowly blend STEP 1 mixture into STEP 2 mixture using the blender until homogenous mixture is optained.

STEP 4

Slowly add Glycerine and blend with STEP 3 mixture until consistency of smooth mixing.

STEP 5

Leave the above mixture in refrigerator for about 2 weeks for aging.

STEP 6

Fill the above perfume attar into the bottle and store in cool and dry places.

Note: Take the amount of ingredients in a ratio as per the formula provided.

Perfume (Koshi) preparation Procedure

Materials/ Ingredients

1. Vetiver	11. Rose water
2. Cedarwood	12. Glycerin
3. Sandal wood	13. Propylene glycol
4. Patcholi Rosemary	14. Dropper
5. Palmarosa	15. Beaker 1000ml
6. Juniper	16. Measuring cylinder 10ml, 100ml, 1000ml
7. Mentha	17. Weighing balance
8. Lemon grass	18. Glass stirrer
9. Basil	19. Blender
10. Alcohol	20. Micropipette

Ingredients / Functions/ Percentage

Ingredients	Function
Vetiver	Base note
Cedarwood	Base Note
Sandalwood	Base Note
Patchouli	Base Note
Rosemary	Middle Note
Palmaroja	Middle Note
Juniper	Middle Note
Mentha	Top note
Lemongrass	Top Note
Basil	Top Note
Alcohol	Carrier
Rose water	Carrier
Glycerin	Fixative
Propylene glycol	Fixative

Procedure

STEP 1

Measure a Carrier (Fermented Alcohol) and Rose water and mix homogenously and stirrer very carefully into a beaker in desire volume.

Caution: there must be no smell of alcohol and no any precipitate, it must be clear.

STEP 2

Measure Base note, middle note and top note.Mix them in such a way that middle note is added to base note and then top note step by step carefully. While mixing observe the mixture appearance in the beaker and blend with glass stirrer.

Caution: there must be the appearance of transparent and clear liquid with little colour but no turbidity. Smell of the perfume will be appeared.

STEP 3

Slowly add Glycerine and propylene glycol into STEP 2 then blend the mixture until homogeneous mixing.

STEP 4

See the appearance, feel it and test the perfume. Check the persistency of the perfume.

STEP 5

Leave the above Perfume into the refrigerator for about 2 weeks for aging.

STEP 6

Fill the above perfume in the appropriate bottle and store in cool and dry place.

Brief Study of Ginkgo biloba

यस अध्ययनका लागि नमूना संकलन गोदावरी ललितपूरबाट गरिएको थियो ।

यस अनुसन्धानशालाबाट वनस्पति को पातको Phytochemical analysis, Total Phenolic Content, Total Flavonoid Content, Pharmacological Study Physicochemical properties को अध्ययन गरी उक्त वनस्पतिमा पाइने मुख्य रसायन Rutin isolation गरी सोको पहिचान पनि गरिएको थियो । सो को नतिजा तल तालिकामा प्रस्तुत गरिएको छ ।

1. प्रारम्भिक Preliminary phytochemical screening:

Extractive value in 40 g powder by Soxhlet extraction.
Yield: Hexane- 1.432 g, Ethyl acetate- 1.720 g, Methanol- 1.224 g

Groups	Methanol	Ethyl acetate	Hexane	50% ethanol
Alkaloids	+	-	-	+
Flavonoids	++	++	-	++
Steroids	+++	+++	+++	+++
Saponins	+	-	-	+
Reducing sugar	+	-	-	+
Terpenoids	+	+	-	+
Proteins	+	-	-	++
Carbohydrates	-	-	-	+
Phenolic	++	+	-	++
Glycosides	+	+	+	++
Diterpenes	+	+	+	+
Tannins	++	+	-	+
phytosterols	++	+	+	++
Volatile oils	-	-	-	-

2. तेल प्रतिशत निर्धारण: प्रयोगशालामा भएको Clevenger Apparatus को प्रयोग गरी तेल प्रतिशत निर्धारणका लागि १०० ग्राम नमूना लिई Hydro distillation गर्दा Ginkgo को पातमा तेल को मात्रा पाईएन ।

3. Total Phenolic Content (TPC) र Total Flavonoid content (TFC) को मात्रा

Polyphenol TPC (mg GAE/g) Mean Equivalents	Total Flavonoid content (QE mg/g) mean Equivalents
83.1±4.31	98.50±4.31

4. Antioxidant गुणको अध्ययन:

S.N.	Extracts	DPPH (%)
1	Methanol	82.1%
2	Ethanolic	75.67%

5. Pharmacological अध्ययन:

Particulars	% ulcer inhibition	% of antidiarrohoeal	Anticonvulsion activity
Ginkgo biloba leaf पातको सारत्तत्व	0	12	No effect

6. Physico-chemical properties:

Parameters	Value
Total Ash	2.81 %
Acid insoluble ash	0.09 %
Water soluble ash	0.76 %
Loss on drying	8.45 %
PH value at 1% solution	4.6 at 20°C
Solubility	Soluble in water, ethanol and methanol
% essential oil	Nil

7. Isolation of Rutin from Ginkgo powder

जिङ्गोको पातबाट Rutin छुट्याइ सो को पहिचान सम्बन्धी अध्ययन गर्दा १८३.५८ ग्राम powder बाट २०.०८ ग्राम प्राप्त भइ सोमा Rutin को मात्रा १.७६ ग्राम पाइएको थियो ।

8. उपलब्धी

Fossil Plant भनेर चिनिने यो प्रजातीको रूख संसारकै पुरानो रूख मानिन्छ । नेपालमा पाइने यो वनस्पतिको बजार अवस्था र खेती बिस्तारको अलवा यसको रासायनिक तत्त्व र यसमा पाइने रसायनका मात्राको निर्धारणले यसको महत्व र गुणस्तर सिर्जना गर्दछ । रासायनिक मात्राको तथ्याङ्क अभिलेख भइ यसमा भएका केमिकल कम्पाउण्ड, केमिकल ग्रुप, पोलिफेनोलको मात्रा, Antioxidant activity, Pharmacological study मा अल्सर, Diarrhoea र convulsion बिरूद्ध यो वनस्पतिको जनावरमा देखाएको असर तथा उपकरण को प्रयोगबाट यसको बिभिन्न physico-chemical properties को अध्ययन र बढी मात्रामा रहेको रसायन Rutin सम्म छुट्याईएको छ जसले मुल्य अभिवृद्धिमा टेवा पुर्याउछ ।

पुर्व अनुसन्धान/Literature survey बाट यसको पात मस्तिष्क विकास गर्ने Tonic supplement बनाइन्छ साथै पातलाई हरियो नै सुकाई चियाको रूपमा प्रयोगमा लाइन्छ । यो वनस्पति को संरक्षण र दिगो उपयोग आजको आवश्यकता हो ।

Study of Moringa oleifera

वनस्पतिको विस्तृत गुणस्तर, पोलीफेनोलको मात्रा, Antioxidant, Antimicrobial, Phytochemical, Nutracentrical, र Antidiabetics सम्बन्धीको अध्ययनको लागी औषधीय गुण एंव खाध गुण शितलचिनीको फल र पात फुड सप्लीमेन्ट को रूपमा प्रयोग गरिने भएकोले लम्जुङको सुन्दरबजार बाट नमूना संकलन गरिएको सो वनस्पतिको अध्ययन अनुसन्धान पछि प्राप्त नतिजा निम्न बमोजिम रहेको छ ।

1. Preliminary phytochemical screening:

Extractive value in 40 g sample leaf extracts

i) 10. 02 g in methanol extracts
ii) 9.12 g in Ethyl acetate extracts
iii) 9.34 g in hexane extracts

Phytochemical Groups	Methanol	Ethyl acetate	Hexane
Alkaloids	+++	++	++
Flavonoids	++	+	-
Terpenoids	+	+	-
Phenolic	+++	+++	-
Steroids	+	+	-
Carbohydrate	++	+++	+
Reducing sugar	+	+	-
Saponins	+	+	-
Protein	-	-	-
Volatile oils	-	-	-

2. Total Phenolic Content (TPC) and Total Flavonoid Content (TFC):

Total phenolic contents (mg GAE/ g)	Total flavonoid content (mg QE/ g)
10.02	9.12

3. Antioxidant Activity by DPPH method:

S.N.	Extracts	DPPH (%) scavenging
1	Methanolic	62.04 %
2	Ethanolic	51.34 %

4. Pharmacological Activity:

Particulars	Antidiabetics	Toxicity (LD50)	% of antidiarrohoeal	Anticonvulsion activity
Moringa leaf extract	45%	1000 mg/kg	73	No effect

5. Physico-chemical properties:

Parameters	Value
Total Ash value	5.24%
Water soluble value	71.1%
Water soluble Value	49.22%
Loss on weight on drying	6.9%
PH value at 1% solution	4.6 at 20°C
Solubility	Soluble in water, ethanol and methanol

6. Nutraceutical properties:

S.N.	Analysis Parameter	Method of test	Unit	Result	
				Leaf powder	Seed powder
1	Moisture	AOAC 20th Edition: 2016;925.10	%	14.0	7.3
2	Protein	20th Edition: 2016,950.36,920.87	%	19.7	39.2
3	Total Ash	NFFRL Manual	%	11.4	3.6
4	Fat	NFFRL Manual	%	7.0	29.0
5	Crude Fiber	NFFRL Manual	%	10.2	8.4
6	Carbohydrate	NFFRL Manual	%	37.7	12.5
7	Energy	NFFRL Manual	Kcal/1000g	293	468

निष्कर्ष:

शितलचिनीमा Alkaloids, Flavonoids, phenolic compounds को मात्रा धेरै देखिएको छ । तालिका मा देखिएको उल्लेखनीय रूपमा रहेका Total Phenolic content (10.02 mg GAE/g), Total Flavonoid content 9.12 (mg QE/g), Antioxidant activity 62.04% DPPH scavenging activity and Antidiabetic activity (45%) छन् भने जनावरमा Toxicity शितलचिनीको Extracts मा 1000 mg/kg मा देखिएको छ जसले यसको उपयोग सहि तरिकाले मात्र गर्नुपर्दछ भन्ने देखाउछ ।

Technology Development

ढटेलोको तेल दिदेश निर्यात गर्नका लागि प्रमाणीकरणका लागि उपयुक्त विधि नभएकोले प्रयोगशालाले सेवा प्रवाह गर्न सकेको थिएन । सो सम्बन्धी वनस्पतिको माग वमोजिम ढटेलोको प्रमाणीकरणको विधि पहिचान गरिएकोछ । जस अर्न्तगत ढटेलोमा भएको Marker Compond (Osmaronin) छुट्याई सोको आधारमा TLC-Technicque निर्धारण गरिएको छ ।

Isolation of Marker Compound (osmaronin) and TLC Profile Development of Prinsepia utilis (Dhatelo)

Common Name: Dhatelo
Nepali Name: Dhatelo
Botanical Name: *Prinsepia utilis* Royle
Family: Rosaceae

Dhatelo is a deciduous shrub native to Nepal that can grow up to three meters in height at altitudes of 1,800 to 3000 meters in central to western Nepal. It produces flowers from February to March and fruits from April to May and usually grows in areas exposed to sunlight on dry hillsides near water sources.

Local uses of Dhatelo:

» Raw fruits can be eaten and are especially enjoyed by children.
» Deep purple dye from the fruit can be used as paint.
» Seed oil can be used for several purposes – In cooking as a substitute to vegetable oil, as a tropical application for treatment of rheumatism, muscular pain, stomach pains, skin infections and relief of coughs and colds, in the hair as hair serum to increase shine and strength and as fuel for oil lamps.
» Seed oil residue can be used for washing clothes.

Edibility Rating	
Medicinal Rating	
Habit	Deciduous Shrub
Height	3.50 m
Pollinators	Insects
Cultivation Status	Wild

Medicinal

An oil from the seed is rubefacient. It is applied externally as a treatment for rheumatism and muscular pain caused by hard work. The oil is also applied to the forehead and temples in the treatment of coughs and colds. The heated oilcake is applied as a poultice to the abdomen in the treatment of stomach aches. A paste of this seedcake is used as a poultice to treat ringworm or eczema. The fruit is used in Chinese medicine.

Prinsepicyanoside A, osmaronin, and 4-(hydroxylmethyl)-5H-furan-2-one exhibited borderline antibacterial activity against Salmonella gallinarum, Vibrio parahaemolyticus, and Vibrio cholera with MIC values of 30.1, 20.7, and 22.8µg/mL, respectively.

Composition

Composition of fatty acids: Methyl palmitate, Methyl palmitoleate, Methyl stearate, Methyl oleate, Methyl octadecenoate, Methyl linoleate, Methyl lino-lenate, Methyl arachidate, Methyl cis-11-Eicosanoate, Methyl Béhénate, Methyl Erucate

Composition of unsaponifiable: Phytol, Neryl or géranyl farnésol, Squalène, Crinostérol, Dihydrobrassicostérol, Stigmastérol, Clionastérol, Fucostérol, Cyclo- arténol, Citrostadiénol and Cyclolaudénol

Isolation of Marker Compound: Osmaronin

Preparation of Dhatelo extract:

1. The seeds of Prtnsepia ufllrs (50g) were ground and extracted with water (x10, 500ml) for 3 hours at 70°C
2. The extract was filtered through whatman #4 filter paper.
3. Extract was concentrated on Rotaevaporator.

Preparation of Column Chromatography

1. Column was packed with Silica Gel with Methanol
2. 10gm of extract was loaded
3. Elute solvent system was Methylene chloride : Methanol (8:2)
4. Volume of elute collection was 10ml in each Test tube.
5. All fraction collected test tube were dried on room temperature.
6. TLC was conducted from all fraction collected test tube

TLC Profile Development

Preparation of Dhatelo extract:

1. The seeds of Prtnsepia ufllrs (50g) were ground and extracted with water (x10, 500ml) for 3 hours at 70°C
2. The extract was filtered through whatman #4 filter paper.
3. Extract was concentrated on Rotaevaporator.

Preparation of TLC Chromatography

TLC Plate: Merck 100390, TLC Silica gel60G F254 25 Aluminium plates
Application volume: 5 µl
Developing solvent system: Methylene chloride : Methanol (8 : 2)
Developing distance: 5 cm
Derivatization reagent : 10% Sulfuric acid in water.

Results

Column Chromatography

» Total number of fraction collection was 44 test tube
» Fraction from 1 to 17 tubes shown Absence of Osmaronin
» Fraction from 18 to 44 tubes shown presence of Osmaronin
» Among them 18 to 26 tubes shown presence of Osmaronin (only one spot)
» 19 to 29 tubes shown presence of Osmaronin with two spot
» 30 to 44 tubes shown presence of Osmaronin with multiple spot

TLC Chromatography

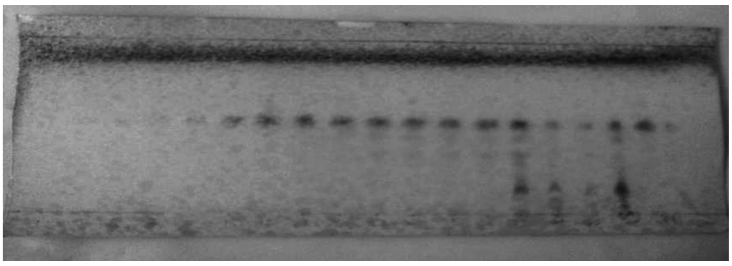
Test Method: Co-TLC with Reference
Solvent System: Methylene chloride: Methanol (8:2)

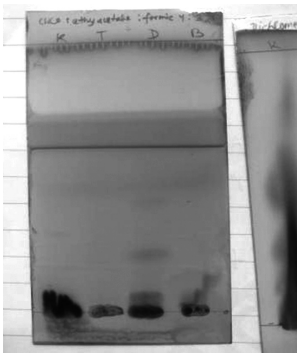
Detection: 10% Sulphuric Acid

S.N.	Rf value of ext: Prinsepia utilis	CRM Osmaronin
1.	0.87	
2.	0.76	
3.	0.60	0.60
4.	0.16	

The CFC (Chloroform:Ethyl acetate:Formic Acid :4:3:1) derivatized with anisaldehyde-sulphuric acid reagent.

S.N.	Rf value of ext: Prinsepia utilis
1	0.10
2	0.34
3	0.66





Toxicity Test of Traded Essential Oil

यस अनुसन्धानशालाले आ.व. २०७५/०७६ मा जम्मा १० वटा सुगन्धित तेलको Toxicity अध्ययन गरेको छ ।

Introduction

The term "essential oil" is defined as "an odorous product, generally of complex composition, obtained from a botanically defined raw material, either by water vapor extraction , by dry distillation, or by an appropriate mechanical process without heating.

Plants produce a wide array of secondary metabolites during their growth and development . Essential oils also known as ethereal or volatile oils are among the most important compounds of secondary metabolism of aromatic plants . Being secondary metabolites, essential oils are not vital for growth and development of the producing plant. Their role has been hypothesized to include protection against pathogens and pests by acting as antifeedants, antibacterial, antivirals, antifungals and insecticides. In a number of plants, the essential oils suppress growth of neighboring plants through allopathic effects hence offering the producing plant a competitive advantage.

Since ancient times, essential oils are recognized for their medicinal value and they are very interesting and powerful natural plant products. They continue to be of paramount importance until the present day. Essential oils have been used as perfumes, flavors for foods and beverages, or to heal both body and mind for thousands of years. Besides that the utilization of essential oil is very extensive and covers a wide range of human activity some of the important uses as; ingredients in the manufacture of soaps, cosmetics, perfumery, healthcare herbal products, confectionary, aerated water, syrups, disinfectants, insecticides, fungicides.

Most essential oil compounds have a "non-specific" toxic effect, whereby the absorption of these lipophilic compounds into cellular membranes can eventually lead to disruption of membrane permeability. The primary toxic outcome is that of the disruption of ion channel function in nerve cells, first affecting the heart and central nervous system, leading to cardiac and respiratory depression. To create such effects, however, require huge dosages, in the order of 300mL and beyond. Certain aromatic compounds, most notably 1,8 cineole (as in many Eucalyptus species), camphor (borneone) (as an isolated compound or as in Rosmarinus officinalis CT camphor and Lavandula latifolia) and methyl salicylate (as a synthetically derived compound or as in Gaultheria procumbens) have specific toxic effects at much lower doses. These compounds make up the bulk of both serious and fatal poisonings in children and adults, due not just to their toxicity, but to the common availability of products containing these compounds and their reputed beneficial properties.

With some essential oils or at least with the monoterpenes constituting them, dermal toxicity was observed, among them are the clove, eucalyptus, wintergreen, which are known for their irritability. Bergamot and angelica essential oils cause photosensitivity; D-limonene produces further irritating transdermal absorption 40; and another that tea-tree oil can cause skin allergies.

Materials and Methods

Acute Oral Toxicity Test

The Guidelines for Testing of Chemicals, Acute Oral Toxicity Acute Toxic Class Method 423 of the Organization for Economic Cooperation and Development (OECD), was used. The toxicity of substances were settle several classes as: not classified, dangerous, toxic, very toxic, and highly toxic as shown in Table 1.

Twelve hours before starting the study food was suspended while the body weigh was monitored moments before the administration of the oil. Animals were randomly assigned in two groups one was: a control group treated with physiological saline and the other was experimental group treated with the essential oil at dose of 2000 mg/kg of body weight, using an orogastric tube. Clinical observations of animals were performed four times per day, paying attention to behavior, general physical condition, nasal mucosa, changes in skin and fur, respiratory frequency, somatomotor activity, and possible occurrence of signs such as tremors, convulsions, diarrhea, lethargy, drooling, low response to stimuli, sleep, photophobia, and coma. Palpation of the abdomen was carried out as well. After 48 hours of clinical observation without any signs of toxicity, the experimental group receives 2000 mg/kg of oil. The statistical test applied was "t-Test for independent groups", implemented in the STATISTIC V. 7.0 for Windows; P values <0.05% were regarded as significant. The animals were humanely euthanized at the end of the study.

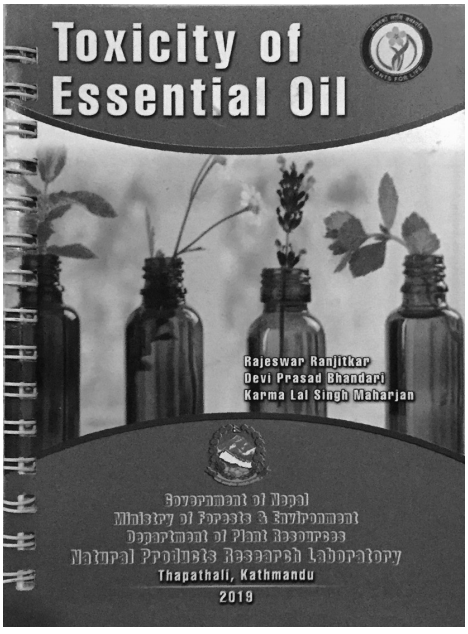
Table 1: Classification of substances according to the guideline of the Globally Harmonized system of classification and labeling of chemicals (GHS), third edition

S.N.	Ranges (mg/kg)	Category	Classification	Hazard Statement
1	> 2000mg/kg	Category 5	Not classified	May be harmful if swallowed
2	> 300 $\leq$ 2000mg/kg	Category 4	Dangerous	Harmful if swallowed
3	> 50 $\leq$ 300mg/kg	Category 3	Toxic	Toxic if swallowed
4	> 5 $\leq$ 50mg/kg	Category 2	Very toxic	Fatal if swallowed
5	< 5mg/kg	Category 1	Highly toxic	Fatal if swallowed

Median lethal dose (LD50) of Essential Oil

S.N.	Essential Oil	LD50	Hazard Statement
1	CalamusOil	350	Harmful if swallowed
2	CinnamomumOil	1400	Harmful if swallowed
3	Juniper leaf Oil	>2000	May be harmful if swallowed
4	Valerian Oil	>2000	May be harmful if swallowed
5	French basil oil	> 2000	May be harmful if swallowed
6	Palmarosa oil	1600	Harmful if swallowed
7	Mentha oil	1600	Harmful if swallowed
8	Artemisia Oil	> 2000	May be harmful if swallowed
9	Patchouli Oil	>2000	May be harmful if swallowed
10	Yellow Zedoary Oil	1950	Harmful if swallowed

अनुसन्धानशालाले माथि उल्लेख गरिएका र थप १० वटा अन्य सुगन्धित तेलहरूको Toxicity अध्यनको विवरण सहितको Hand Book तयार गरी प्रकाशन गरेको छ ।



Essential Oil Study

यस आ.व. मा Rosemary वनस्पतिबाट सुगन्धित तेल निकालि विस्तृत अध्ययन अनुसन्धान गरिएको छ । अध्ययनको विधि र नतिजा निम्नाअनुसार उल्लेख भए बमोजिम रहेको छ ।

Rosemary
Botanical name: *Rosmarinus officinalis*

Introduction:
The name is derived from the Latin "Rosmarinus" means "dew of the sea". Rosemary is an aromatic perennial evergreen shrub with needle like leaves. It is native to the Mediterranean and Asia. It grows upto 1.5 m (5 ft) tall, rarely 2 m (6 ft 7 in). The leaves are evergreen, 2–4 cm (0.8–1.6 in) long and 2–5 mm broad, green above, and white below, with dense, short, woolly hair. The plant flowers in late winter and early spring. Flowers are white, pink, purple or deep blue. The seeds are often difficult to start, with a low germination rate and relatively slow growth, but the plant can live as long as 30 years. Rosemary oil has a clear, powerful refreshing herbal smell, is clear in color and watery in viscosity. R. officinalis is cultivated worldwide in tropical and temperate regions. Outside of cultivation it grows primarily in dry, sandy or rocky soils in a temperate climate characterized by warm summers and mild, dry winters.

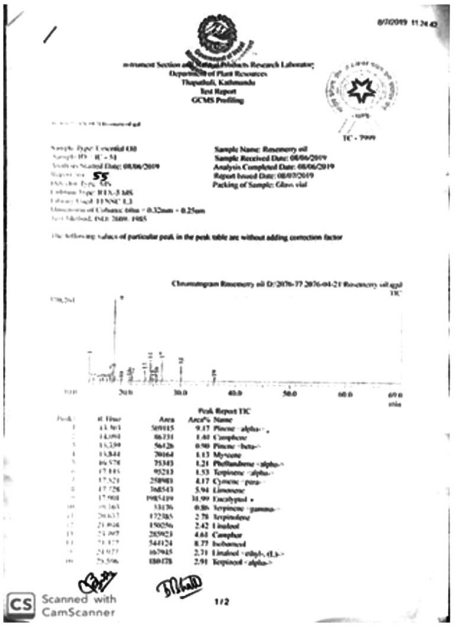
Chemical Composition:
The main chemical components of rosemary oil are á –Pinene, borneol, b-pinene, camphor, bornyl acetate, camphene, 1,8-cineole, limonene, Isoborneol, linallo, caryophyllene, verbenone, eucalyptol.

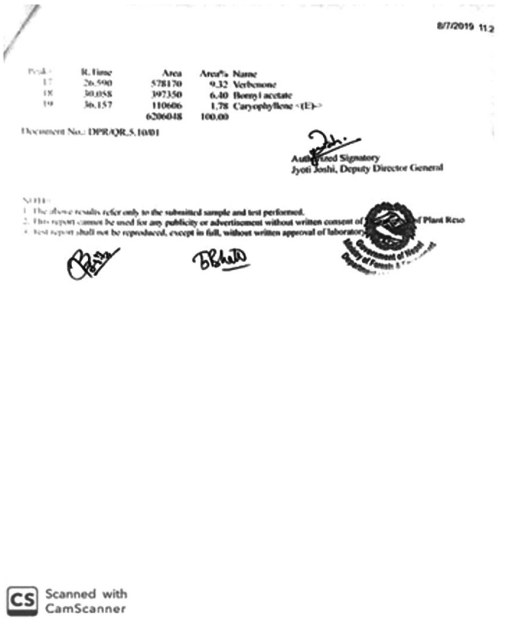
Uses:
Rosemary is used as a food additive and medicine. Common uses of Rosemary are: Boosts Immune System, Anti-inflammatory, Promotes Digestion, Alleviates Muscle And Joint Pain, Increases Circulation, Cures Headaches, Relieves Cough, Cold, And Flu, Helps To Improve Respiratory Activity, Lowers Stress, Helps Fight Cancer, Removes Bad Odor, Boosts Oral Health, Aids Liver Detoxification And Enhances Gallbladder Function, Improves Cognitive Function, Helps Reduce Nervous Tension And Fatigue, Works As An Antidepressant, Helps In Relieving Anxiety, Reduces Acne And Fights Signs Of Aging, Enhances Hair Health, Acts as Mosquito and Insect Repellent

वनस्पति अध्ययन अनुसन्धान तथा बजारीकरण कार्यक्रम अन्तर्गत वनस्पतिको फाइटोकेमिकल, फर्माकोलोजिकल (१०), सुगन्धित तेल, विस्तृत फाइटोकेमिल र वायोकेमिकल अध्ययन (३) (प्रा.स.अ.) (अध्ययन/सर्वेक्षण/अनुसन्धान) कार्यक्रम अनुसार तेजपात (हेटौडा बाट संकलित) र रोजमेरी (सल्यान बाट संकलित) को सुगन्धित तेल Hydro-distillation प्रविधि बाट निकाली सो तेलहरुको physico-chemical parameter अध्ययन नतिजा यस प्रकार रहेको छ ।

Physico-Chemical Study of Rosemary oil

Parameters	Cinnamon tamala	Rosemarry
oil %	1.8	3.8
Physical State and Appearance	liquid	liquid
Colour	pale yellow	colourless
Odour	characteristic	sweet, characteristic
Specific Gravity	0.8920 at 250C	0.8987 at 250C
Refractive Index	1.472 at 250C	1.4736 at 250C
Optical Rotation	3.03 at 250C	12.04 at 24.80C
Acid Value	3.8	1.2232
Solubility	Soluble in ethyl alcohol	Soluble in ethyl alcohol
Solubility in Water	Insoluble	Insoluble

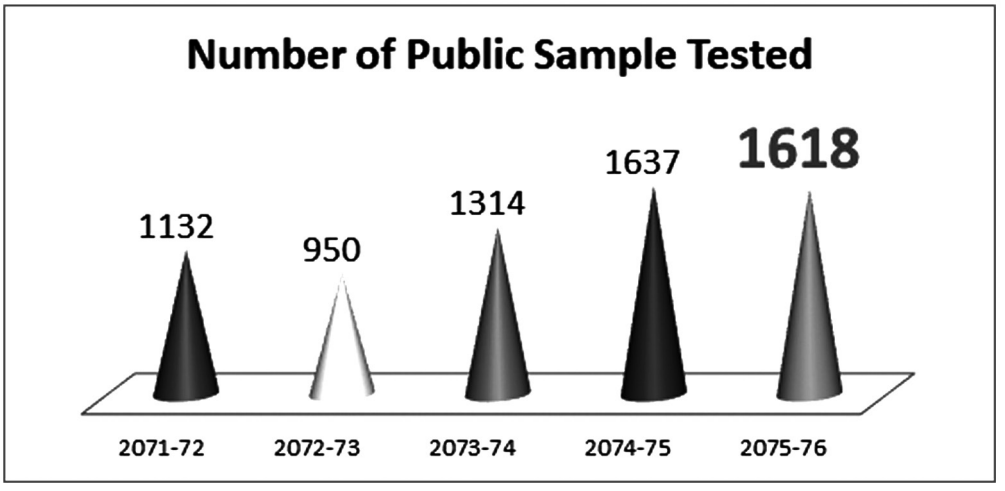




सार्वजनिक विश्लेषण

यस अनुसन्धानशालाले वनस्पति एवं जडीवुटीको अध्ययन अनुसन्धानका अलावा जडीवुटीको गुणस्तर परीक्षण, प्रमाणीकरण एवं सिफारिसको कार्य समेत गर्ने गरेको छ । जडीवुटीको सारतत्व एवं सुगन्धित तेल विदेश निर्यात गर्ने क्रममा सोको पहिचान एवं प्रमाणीकरणका लागि विगत लामो समय देखि यस अनुसन्धानशालाले सहजीकरण गर्दै आइरहेको छ । परीक्षणको कार्यलाई गुणस्तरीय एवं प्रभावकारी बनाउदै अन्तर्राष्ट्रिय गुणस्तरको सेवा प्रवाह गर्ने उद्देश्यले यस अनुसन्धानशालाले परीक्षणमा ISO/IEC 17025:2017 Accreditation प्राप्त गरेको छ । NABL, India बाट आठ वटा Parameter मा Accredited भई प्रयोगशालाले Acid Value, Refractive Index, optical Rotation, Flash Point, Saponification Value, Total Ash र Specific Gravity परीक्षणमा Accreditation लिएको हो ।

नेपालबाट विदेश निर्यात हुने सुगन्धित तेलहरूको प्रमाणीकरणको कार्य मुख्य रूपमा यस अनुसन्धानशालाबाट हुदै आएको छ । अनुसन्धानशालामा परीक्षणको लागि प्राप्त हुने नमूनाहरूको संख्या बर्षेनी बढ्दै गईरहेको छ । यस आ.व. मा १००० वटा नमूना विश्लेषण गर्ने लक्ष्य रहेकोमा जम्मा १६०० भन्दा बढी नमूनाको विश्लेषण गरिएको छ । यस प्रयोगशालामा विभिन्न उत्पादन तथा विदेश निर्यातकर्ताले सील छाप लगाई यस प्रयोगशालाको test प्रमाणपत्र प्राप्त गरेपश्चात मात्र विदेश निर्यात हुने भएकाले प्रयोगशालाको भुमिका महत्वपूर्ण रहेको छ ।



अनुसन्धानशालामा यस आ.व.मा १६१८ वटा नमूनाको पहिचान तथा बिश्लेषण गरिएको छ ।
गत तीन आर्थिक वर्षमा निर्यात गरिएका प्रमुख दश सुगन्धित तेलहरूको तालिका तल दिइएको छ ।

आर्थिक वर्ष २०७५/०७६

क्र. सं	सुगन्धित तेलहरुको नाम	परिमाण
१	Wintergreen	2515
२	Citronella	2321
३	Palmarosa	1937
४	Lemongrass	1671
५	Turmeric root	1359
६	Juniper oil	587
७	Mentha arvensis	409
८	Xanthoxylum	400
९	Dhatelo	398
१०	Chamomile	381

आर्थिक वर्ष २०७३/०७४ मा जम्मा २१६४८ केजी सुगन्धित तेल निर्यात भएको थियो भने आर्थिक वर्ष २०७४/०७५ मा २४३३६ के. जी र आर्थिक वर्ष २०७५/०७६ मा ३१३१६ केजी सुगन्धित तेल निर्यात भएको देखिन्छ ।

यस अनुसन्धानशालामा प्राप्त नमूनाहरुको आधारमा गत पाँच वर्षको सुगन्धित तेलको निर्यातको विवरण निम्नानुसार रहेको छ ।

२०७०/०७१	२०७१/०७२	२०७२/०७३	२०७३/०७४	२०७४/०७५
३२८६०.५	१३९२६.५	२६६३८	२२०६०	३०२३२

Other than essential oil							
Jatamansi Mark	146330	Kutki	111466	Jatamansi Mark	23778		
Kutki	77942	Jatamansi Mark	76314	Sugandhwal Mark	23102		
Sugandhakokila Mark	380	Sugandhwal Mark	38281	Kutki	1110		
Sugandhwal Mark	209	10-DAB III	30				
10-DAB II	50						
Total	**224911**		**226091**		**47990**		

उच्च १० निर्यातित सुगन्धित तेलहरु

2070-71		2071-72		2072-73		2073-74		2074-75	
Sample Name	**Sample Qty.(Kg)**	**Sample Name**	**Sample Qty.(Kg)**	**Sample Name**	**Sample Qty.(Kg)**	**Sample Name**	**Sample Qty.(Kg)**	**Sample Name**	**Sample Qty.(Kg)**
Wintegreen	2659	Jatamansi oil	5066	witergreen oil	9600	wintergreen oil	10368	Winter-green	8468
Jatamansi oil	2158	Wintegreen	4964	Jatamansi oil	7850	Palmarosa	3056	Dhatelo oil	4921
mentha	1271	Lemongrass	1668	Lemongress Oil	2308	Lemongrass oil	1910	Lemon-grass	4669
Dhatelo	730	chiuri butter	718	Dhatelo Oil	1727	Citronella Oil	886	Chiuri Butter	4406
Churi oil	705	juniper	360	Kutki	1110	Zanthoxylum Oil	784	Palmarosa	1500
Juniper	577	Chamomile	333	Palmarosa oil	1086	artemisia	683	Eucalyptus	1276
lemongrass	577	Zanthoxylum oil	284	Silajeet	769	Cedarwood	546	Citronella	958
Palmarosa	191	Dhatelo oil	153	juniper Oil	643	dhatelo oil	533	Zanthoxy-lum	638
Citronella	165	Citronella oil	150	Chamonile oil	484	chiuri butter	525	Antho-pogon	549
Chamomile	20	Mentha	140	Citronella oil	423	Mentha oil	394	Mentha	521

Thin Layer Chromatography (TLC)

यो एउटा सुगन्धित तेलमा भएका तत्वहरु छुट्याउने विधि हो । सेवाग्राहीबाट प्राप्त सुगन्धित तेलमा भएका विभिन्न तत्वहरूलाई हाम्रो अनुसन्धानशालामा उपलब्ध standard reference सँग TLC मार्फत तुलना गरी आएको परिणाम अनुसार प्राप्त नमूना सही भए नभएको प्रमाणीत गरिन्छ । यो विधिमा विभिन्न रंगीन spot हरु बन्दछन् जसको माध्यमबाट र Retention Factor (Rf Value) को माध्यमबाट कुनै पनि नमूनामा कति किसिमका तत्वहरु छन् र तिनीहरूको Rf Value कति हो भनी पत्ता लगाइन्छ । प्राप्त नमूनासंग हाम्रो नमूनाले दिने रंगीन spot मिलेमा मात्र यस अनुसन्धानशालाबाट प्रमाणपत्र प्रदान गरिन्छ ।

अनुसन्धानशालाबाट उपलब्ध सेवाहरूमध्ये Accredited Parameter हरु निम्नाअनुसार रहेका छन् ।

1. Acid value
2. Refractive index
3. Optical rottation
4. Flash Point
5. Saponification value
6. Total Ash value
7. Specific gravity
8. Percentage of Essential oil

Internal / External Audit / Calibration / SOP preparation

यस प्रयोगशालाले ISO/IEC 17025:2005 को प्रावधान अनुसार नियमित रूपमा Internal /External Audit को कार्यक्रम संचालन गर्दै आइरहेको छ । आ. व. २०७५/७६ मा NPRL र Instrument section का प्रयोगशालाको Internal audit र External audit को कार्य सम्पन्न गरियो ।

Internal audit: Internal audit मिति २०७६/०२/०५ देखि २०७६/०२/०७ मा सम्पन्न गरियो । Internal audit का लागि विज्ञ एवं ISO 17025:2005 का lead accessor श्री शैलेश कुमार झा मार्फत सम्पन्न गरिएको थियो । Internal audit का क्रममा विभिन्न ९ वटा Non conformities (NC) हरु निस्किएकामा प्रयोगशालाले सोको Corrective Action लिई NC हरु Close गरिएको थियो ।

External audit: ISO/IEC 17025:2005 र Accreditation Body, NABL, India को प्रावधान अनुसार External Assessment गर्न NABL India बाट Lead auditor को Team आएको थियो । मिति २०७५/०५/१७ मा ISO:17025:2017 को Survilliance audit को रूपमा भएको यसमा जम्मा ३ ओटा NC हरु निस्किएकोमा आवश्यक Corrective Action अपनाई सोको Close निर्धारित समयमा नै गरिएको थियो ।

Calibration चा Equipments: ISO 17025:2005 को प्रावधान अनुसार Accreditated प्रयोगशालाले परीक्षणमा प्रयोग हुने उपकरण तथा सामाग्रीहरुको नियमित रूपमा calibration गरिएको हुन पर्दछ । उपकरणहरुको calibration बाट गुणस्तरीय र भरोसा योग्य नतिजा प्राप्त गर्न सहयोग पुग्दछ । अनुसन्धानशालामा भएका विभिन्न उपकरणहरु, glasswares, लगायतका सामाग्रीहरुको आवश्यकता अनुसार NBSM बाट calibration गरिएको थियो । उक्त उपकरणहरुको list तालिकामा उल्लेख गरिए अनुसार रहेको छ ।

Record of Calibration

Document No: FMT/5.5/02/01/00

SN	Equipment Code	Date of calibration	Due Date	Calibrated by	Remarks
1.	Set of weights (500g-1g)	May 5, 2019	May 4, 2020	NBSM	
2.	Balance(OHAUS)	May 22, 2019	May 21, 2020	NBSM	Balance Room
3.	Balance(OHAUS)	May 22, 2019	May 21, 2020	NBSM	Biochemistry Room
4.	Thermometer	May 3,2019	May 2, 2020	NBSM	
5.	Thermometer	May 14, 2019	May 13, 2020	NBSM	
6.	Volumetric flask 500ml	April 21, 2019	April 20, 2020	NBSM	
7.	Volumetric flask 500ml	April 21, 2019	April 20, 2020	NBSM	
8.	Volumetric flask 100ml	April 21, 2019	April 20, 2020	NBSM	

9.	Volumetric flask 100ml	April 21, 2019	April 20, 2020	NBSM	
10.	Volumetric flask 25ml	April 21, 2019	April 20, 2020	NBSM	
11.	Volumetric flask 25ml	April 21, 2019	April 20, 2020	NBSM	
12.	Pipette 10ml	April 21, 2019	April 20, 2020	NBSM	
13.	Pipette 10ml	April 21, 2019	April 20, 2020	NBSM	
14.	Pipette 5ml	April 21, 2019	April 20, 2020	NBSM	
15.	Pipette 5ml	April 21, 2019	April 20, 2020	NBSM	
16.	Pipette 5ml	April 21, 2019	April 20, 2020	NBSM	
17.	Burette 2ml	May 12, 2019	May 11, 2019	NBSM	
18.	Burette 50ml	May 12, 2019	May 11, 2019	NBSM	
19.	Burette 50ml	May 12, 2019	May 11, 2019	NBSM	
20.	Measuring cylinder 50ml	April 21, 2019	April 20, 2020	NBSM	
21.	Measuring cylinder 50ml	April 21, 2019	April 20, 2020	NBSM	
22.	Measuring cylinder 10ml	April 21, 2019	April 20, 2020	NBSM	
23.	Measuring cylinder 10ml	April 21, 2019	April 20, 2020	NBSM	
24.	Pyknometer 10ml	April 21, 2019	April 20, 2020	NBSM	
25.	Pyknometer 10ml	April 21, 2019	April 20, 2020	NBSM	

प्रयोगशालाले आ.व. २०७५/०७६ मा तीन अन्य Parameter मा PT कार्यक्रममा भाग लिएको थियो । उक्त PT कार्यक्रम भारतको Aashvi Profiency Testing & Analytical services भन्ने संस्थाबाट संचालन गरिएको थियो । PT मा Moisture content, Total Ash र oil Content गरी जम्मा तीन ओटा Paramater मा भाग लिइएको थियो । जस अनुसार Moisture र oil content मा Z-score सन्तोषजनक थियो भने Total Ash मा सूधार गर्नुपर्ने देखिएको थियो ।

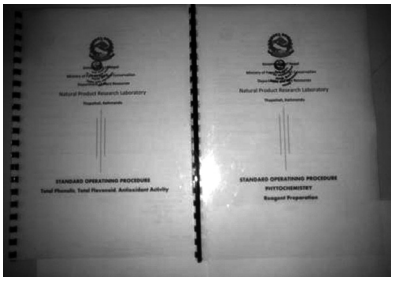
Standard Operating Procedure (SOP) preparation for phytochemical study

Topic:

1. Standard operating procedure making the chemical regents preparation in Phytochemistry
2. Standard operating procedure for Total Phenolic content (TPC)
3. Standard operating procedure for Total Flavonoid content (TFC)
4. Standard operating procedure for Antioxidant activity by DPPH method
5. Revision of the SOP of Preliminary Phytochemical Screening of Medicinal Plants

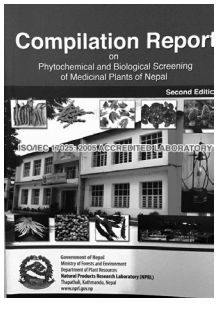
Other SOP in NPRL

S.N.	Name of SOP	Doc. No.	No. of Pages
1	Determination of acid value in essential oil	DPR/NPRL/SOP/5.4/01	4 pages
2	Determination of refractive index of essential oil	DPR/NPRL/SOP/5.4/02	3 pages
3	Determination of optical rotation of essential oil	DPR/NPRL/SOP/5.4/03	2 pages
4	Determination of specific gravity of essential oil by specific gravity bottle method	DPR/NPRL/SOP/5.4/04	4 pages
5	Determination of essential oil in Medicinal Aromatic Plants (MAPs)	DPR/NPRL/SOP/5.4/05	3 pages
6	Determination of saponification of essential oil	DPR/NPRL/SOP/5.4/06	2 pages
7	Determination of flash point of liquid	DPR/NPRL/SOP/5.4/07	4 pages
8	Sampling of materials	DPR/NPRL/SOP/5.4/08	4 pages
9	Washing of Glassware	DPR/NPRL/SOP/5.4/09	2 pages
10	Laboratory Housekeeping	DPR/NPRL/SOP/5.4/10	4 pages
11	Operation, Cleaning and Monitoring of fume hood	DPR/NPRL/SOP/5.4/11	1 pages
12	Operation and Calibration of Analytical Balance	DPR/NPRL/SOP/5.4/12	3 pages



फाइटोकेमिकल फर्म्याकोलोजिकल अध्ययनहरूको प्रकाशन गर्ने र प्रतिवेदन तथा ब्रोशर प्रकाशन

कार्यालयको जानकारी र सूचना सहितको डायरी ३०० प्रति प्रकाशनका साथै हाल सम्म यस अनुसन्धानशालामा भएका ३४५ प्रजातिका जडीबुटीहरूको फाइटोकेमिकल फर्म्याकोलोजिकल अध्ययनहरूको पुस्तक २०० प्रति प्रकाशन गरिएको छ।



Animal House व्यवस्थापन:

यस अनुसन्धानशालाबाट अनुसन्धानलाई आवश्यक पर्ने साना जनावरहरु गिनिपिग, खरायो, मुसाहरुको उत्पादन पालन पोषणको कार्य सम्पादन हुदै आएको छ । अनुसन्धानशालाले अन्य अनुसन्धान संस्था एवं कलेज तथा विश्वविधालयलाई समेत साना जनावर अनुसन्धानको लागि उपलब्ध गराउने गरेको छ । साना जनावरको उत्पदान, वितरण तथा लाभग्राही संस्थाहरुको निम्नअनुसार रहेको छ ।

क्र.सं.	साना जनावरहरुको विवरण	Stock Position							Stock out					
		Healthy	Breeding			Experiment	Total	Prod.of this 8 months	Used	Sold	Dead	Discarded	Total	कैफियत
			Mating	Mother	Litters Bunnies Puppies									
१	खरायो						27	5	-	2	2			
२	गिनिपिग						78	53	-	67	16			
३	च्याट						378	1150	113	913	187			
४	माइस						763	2829	752	1475	441	110		

भौतिक र वित्तीय प्रगति

खर्च सम्बन्धी विवरण

सि.नं.	कार्यक्रमको नाम	वार्षिक बजेट (रु. लाखमा)		हालसम्मको खर्च (रु. लाखमा)		कैफियत
		पुँजीगत	चालु	पुँजीगत	चालु	
१.	वनस्पति अध्ययन, अनुसन्धान तथा बजारीकरण कार्यक्रम	१२,००,०००	१६,४६,०००	११,९८,८४१	१६,४०,४१७	
२.	जडीबुटी विकास कार्यक्रम	५५,४५,०००	२८,७५,०००	५५,०६,१००	२६,९२,४४९	
३.	साधारण तर्फ	१,४०,१७,०००			९२,१७,६७१	

अन्य विवरणहरु:

सि.नं.	आवश्यक विवरण	प्रगति अवस्था		कैफियत
१.	बेरूजु फर्छ्यौट	जम्मा बेरूजु रकम	३,२७,९५७.९३	
		फर्छ्यौट रकम	१,९९,०५१.३१ (६०.६९५ फर्छ्यौट)	
२.	राजस्व संकलन	राजस्व	७,८०,१४०	
३.	सेवाग्राही संख्या	सेवाग्राही संख्या	१५१५	

कार्यक्रमको नाम	वार्षिक बजेट (रु. लाखमा)			बार्षिक खर्च (रु. लाखमा)			भौतिक प्रगति (प्रतिशत)	वित्तीय प्रगति (प्रतिशत)
	पुँजीगत	चालु	जम्मा	पुँजीगत	चालु	जम्मा		
वनस्पति अध्ययन अनुसन्धान तथा बजारीकरण	१२	१६.४६	२८.४६	११.९८	१६.४	२८.३८	१००%	९९.७%
जडीबुटी विकास कार्यक्रम	५५.४५	२८.७५	८४.२	५५.०६	२६.९२	८१.९८	९९%	९७.४%

अनुसूची १ (क)

सार्वजनिक विश्लेषण सम्बन्धी सेवाग्राहीहरुको विवरण

S.N.	Company name	Ph No.	Address	E- mail
1	Alternative Herbal Products Pvt. Ltd.	01-6202842	Kausaltar, Bhaktapur	ahi@infoclub.com.np
2	Annapurna Aroma Company Pvt. Ltd.	9841985608		Annapurna.aroma@gmail.com
3	Aarya Aroma Pvt. Ltd.	4427133		
4	Bahubali Herbal Asenss & Export Pvt. Ltd.	81-521102	Nepalgunj-2	jainbahubali@wlink.com.np
5	Everest Arom Pvt. Ltd.	5546743, 9851035949	Prayag Pokhari, Lag-ankhel	everestaroma@gmail.com
6	Everest Herbs Processing Pvt. Ltd.			
7	Gajurmukhi Herbal Pvt. Ltd.			
8	Ghan Herbal Products Pvt. Ltd.			
9	H. Plant Pvt. Ltd.	9841425362		
10	Herbo Nepal Enterprise Pvt. Ltd.			
11	Himalayan Bio trade Pvt. Ltd.	4386690, 9851164113	Ktm, Nepal	hbtlp@himalayanbiotrade.com
12	Jain Naturabs			
13	Kalpasanad Adhyan Pratisthan			
14	Khapted Aroma Industries Pvt. Ltd.	4414052, 9851006207		khaptararomaindustries@yahoo.com
15	Male International Pvt. Ltd.	543317, 539397		maleint@wlink.com.np
16	N.P. International	051-520513, 9845040183		
17	Naiad Nepal Pvt. Ltd.	01-4440173	Lazimpat, Ktm	wind@mos.com.np, naiadnepal@gmail.com
18	Namuna Jadibuti Proshodhan Kendra			
19	Natural Resources Industries Pvt. Ltd.	4110860	Sinamangal, Ktm	info@msinp.com
20	Organic Mountain			
21	Prima Tech Pvt. Ltd.	522871, 527370, 526894		

22	Satya International Pvt. Ltd.	9858020390		
23	Shambhala Herbal & Aromatic Pvt. Ltd.	4478359		
24	Unique Himalayan Herbs International	4494914		
25	Karnali Organic	9851118631		bpcjumla@yahoo.com
26	National Export Pvt. Ltd.	4025717		natexports@gmail.com
27	Rapti wood & Food Trades	9858026406		
28	National Organic	4359612		
29	Yesoda Jadibuti Nursery			
30	Everest aromatic Pvt. Ltd.	9841819873		
31	Natural Products Industries Pvt. Ltd.			
32	Perfect Exports Pvt. Ltd.			
33	Himalayan Special Herbs Industries Pvt. Ltd.			
34	Patan Multiple Campus			
35	Anmol Jadibuti Udhyog			
36	Ashoka Electronic and Trading			
37	New Nepal Jadibuti Sappers			
38	Green Vision	4475265	Kasturi marga-34, New-baneshwar	greenvision2222@gmail.com
39	Om Shairam Enterprises			
40	New Hayat Enterprises	523124	Nepalgunj	
41	Unique Trades			
42	Traditional Himalayan Herbs Pvt. Ltd.			
43	Jadibuti Byawasari Sang			

अनुसूची १ (ख)

जनावर उपलब्ध गराईएका सेवाग्राहीहरुको विवरण

क्र.स.	सेवाग्राहीको नाम, ठेगाना
1	Karnali Education & Health Research (KEHeR) Gausala, Kathmandu
2	Central Department of Bio Technology, TU, Kritipur
3	Himalayan College Of Agricultural Science & Technology (HICAST) Kalanki , Kathmandu
4	Manmohan Memorial Institite Of Health science (MMIoHS) Soalteemode, Kathmandu
8	Agriculture And Forestry University Rampur , Chitwan
9	Shree Medical And Technical College Bharatpur , Chitwan
10	KEHeR Gausala , Kathmandu
11	Patan Nistha Campus Bakhundole , Lalitpur
14	College Of Bio Medical Engineering & Applied Sciences (CBEAS) Hadiguan Marg, Kathmandu
15	Kathnandu College Of Science & Technology (KCST) Kamal Pokahari, Kathmandu
16	HOPE International College, Satdobato , Lalitpur
17	Golden Gate International College, Old Baneshwor , Kathmandu
18	ST. Xavier College Maite Ghar, Kathmandu
19	CBEAS Handi Guan Marg , Kathmandu
21	Little Buddha College Of Health Science Min Bhawan, Kathmandu
22	National Model College for Advance Learning Naya Bazar , Kathmandu
23	Hester Bio-Sciences Nepal Pvt. Ltd Kavreplanchowk
24	SANN International College Gairidhara, Kathmandu
25	Crimson College Of Technology Devi Nagar, Butwal
28	Dil Kumar Manandhar, Kathmandu
30	Janamaitri Foundation Institute Of Health Science Hattiban , Lalitpur
32	Central Department Bio Technology Kritipur, Kathmandu
33	National Institute Of Science Bakhundole , Lalitpur
38	School Of Health & Allied Science (PU)

39	Nobel Academy Secondary School New Baneshwor, Kathmandu
40	SHAS (POKHARA UNIVERSITY)
42	Universal Engineering & Science College
43	National Institute of Science, Lalitpur
46	Tula Bahadur Pun, Kathmandu
47	Pentagon College, Kathmandu
48	Hester Bio Science Nepal, Kathmandu
49	NARTC
51	Capital Hill Academy, Kathmandu
52	Hester Bio Science, Kathmandu
53	College of Applied Food & Dairy Technology, Kathmandu
54	Himalayan College Of Agricultureal Science & Technology (HICAST), Kathmandu
56	SOS Hermann Grainers S.S School, Bhaktapur
57	National Institute of Science, Lalitpur
58	Pinnacle Technology College, Lalitpur
59	Orient College, Kathmandu
61	Laxmi Dhakal, Kathmandu
66	Gudraj Dhungana, Kathmandu
68	Shree Medical & Technical College, Chitwan
69	Subham Mishra, Kathmandu
71	National Medical For Advance Learning, Kathmandu

Methods of Preliminary Phytochemical Screening

1. Drying and Powdering Of plant material

Select the material for drying and powder and wash the plant material if the plant material is fresh. If necessary fresh plant was firstly washed thoroughly with tap water.Label or name the plant material and mark properly for identification and distinguished from other.Spread the sample material sparsely for days and dry under shade. Keep the plant material under room temperature about 24°C. Plant should be exposed in well ventilated room with exposure of sunlight but not in direct sunlight. After complete drying of plants they have to be powdered well for further analysis. For powdering crush the dried sampled into small pieces. Put it into grinder or stamp mill to get fine powder. Weigh the Powder sample and stored in airtight plastic bags or container prior to being used for extraction.

2. Extraction procedure by using Soxhlet Apparatus

The solid sample is placed in extraction thimble, and extracted using an appropriate solvent in a Soxhlet extractor. Place the R.B. flask in a cork ring and add anti-bumping granule and solvent-Remember to hold the funnel up while doing so. Transfer the flask into a heating mantle and clamp it securely. Attach the Soxhlet to the R.B. flask and clamp it at the joint, ensuring that neither joint on the Soxhlet is greased. The sample flakes into the extraction thimble, add the internal standard and then place the thimble into the Soxhlet. Fit the condenser. Attach the water inlet tube at the bottom of the condenser and outlet at the top. Tap water enters into condenser through inlet from lower end and water out from upper part of the outlet situated in condenser. Check for leakages into the heating mantle. If any should occur. Turn on the tap. Turn on the heating mantle. Generally temperature is fixed at 60°C. Allow to continuous hot percolation for about 8 hours at steady state rate so the Soxhlet fills up. After about 30 min. the Soxhlet will be full and the solution will flush into the R.B. flask. This will repeat to several times until the solution or last extract becomes colorless.

3. Operation, Cleaning and Monitoring of Rotatory Evaporator

Remove the round bottom flask from the base of the condenser, directly above the hot bath. Inspect the flask to ensure it is clean. Load your sample into the clean dry round bottom flask. Attach the round bottom flask to the condenser. If need be, use vacuum grease located next to the rotary evaporator to create a vacuum seal between the condenser and the round bottom flask. Be sure to use a Keck clamp to secure the round bottom flask. Inspect the collection flask located to the left of the hot bath, and below the condenser. Make sure the flask is clean before use. Open the cabinet doors directly below the rotary evaporator. Since the chiller is turned sideways, the back of the chiller is on the right side of the cabinet and the front of the chiller is located on the left side of the cabinet. Make sure the tubing is securely connected to the back of the chiller and the condenser.

The condenser should fill with water or alcohol, if not already full. The chiller is normally set to 20 °C. If you need to change this temperature for some reason, do not set it below 15 °C. To change the temperature, rotate the knob located on the front of the chiller. Make sure the vacuum pump located next to the rotary evaporator is connected to the condenser. Make sure the release valve at the top of the condenser is turned to the closed position .Turn on the vacuum. The gauge on the vacuum pump should read 27 in Hg if the system is not leaking. Fill the hot bath with enough water for the round bottom flask to sit it. Lower the round bottom flask into the hot bath by either turning the condenser column, or lowering the entire setup. To turn the condenser, locate the dark grey knob located on near the top of the support. Turn the knob counter clockwise until the knob pops out about an inch. Gently turn the condenser with your hands to the satisfactory position, then push the grey knob back in, and turn clockwise to lock it back into place.To lower the entire setup, press the power button on the rotary evaporator control panel. Use the Up and Down keys to raise or lower the setup. Turn on the hot bath using the switch located on the right side of the bath towards the back. Use the dial on the hot bath control panel to set the temperature of the hot bath. Since water is typically present in the hot bath, the heating system will not heat above 100 degrees. If you have not already turned on the rotary evaporator, press the power button on the rotary evaporator control panel. Use the dial on the rotary evaporator control panel to set the desired spin speed of the condenser. If the desired evaporation should be timed, press the timer button on the rotary evaporator control panel and use the dial to set a time in minutes, or press the int button and use the dial to set a time in seconds. When all the specifications have been made, press the dial on the rotary evaporator control panel in. The rotary evaporator will begin to rotate. If the separation was successful, the higher boiling point substance will be left in the original round bottom flask, and the lower boiling point substance will be collected in the collection flask. Turn off the hot bath using the switch on the right hand side, near the back. Make sure the temperature dial is set to zero. Turn off the chiller using the power switch located in the back of the chiller. Turn off the vacuum pump. Slowly vent the system by turning the release valve at the top of the condenser to the open position. Make sure the round bottom flask is cool before removing it from the condenser.

4. PHYTOCHEMICAL SCREENING :

Screening of various phytochemical tests was carried out by following methods:

1. Volatile oils:

Oil found in plant are volatile oil and fixed oil. Volatile oil contains the mixture of hydrocarbon containing 10 to 15 carbon atoms while fixed oil contain ester of glycerol and long chain aliphatic acids. 2 ml solution in Petridis is evaporated in water bath till dryness. If the dried residue gives pleasant aromatic smell then presence of volatile oil.

a) **Spot test:** 2 ml solution was evaporated to get residue and it was mixed with 0.5 ml methanol. The solution was shaken vigorously and filtered. Few drops of filtrate were put on a filter paper by

means of a capillary tube. A yellow spot on a filter paper if not persist after evaporation indicates the presence of volatile oil.

b) 1 g medicinal plant and 10 ml of light petroleum (B.P. 40-60°c) are warmed on a water bath for 2-5 minutes. The resulting extract is filtered and concentrated. A drop of concentrated extract is then applied on the filter paper. If any translucent area is observed in the filter paper, then oil is present in the extract. Place the filter paper in an oven and heat for 15 min at temperature 105°c. If the translucent spot can still be observed, there is fixed oil otherwise volatile oil present in the extract.

2. Alkaloids (basic):

At least one basic nitrogen group in heterocyclic ring. The alkaloids have been tested by using Dragandroff's test, Wagner's test, Mayer's test and Hager's test.

6 ml ethereal solution in beaker is evaporated till dryness and thus obtained residue is dissolved in 1.5 ml of 2N HCl and filtered. Test with different regent: 2-3 drops of potassium mercuric iodide Mayer's reagent gives white yellowish precipitate, Wagner's reagent (iodine in potassium iodide) gives brown reddish precipitate, solution of potassium bismuth iodide Dragendroff reagent gives red precipitate, Hager's regent (Saturated picric acid solution) gives yellow colour precipitate then presence of alkaloids, if not then absence of alkaloids as bases.

3. Test for Tropane alkaloid:

Vitali-morin test: The chloroform extract residue is dissolved with 2 drops of fuming nitric acid. Evaporate it in fume cupboard and moist with 2 drops of alcoholic KOH solution. If transcend purple colour is observed in the resulting solution, it shows the presence of tropane alkaloid(s).

a.) Test for indole alkaloid: dissolve the CHCl3 extract residue in 2 ml of 1% H2SO4 in test tube and add from the side of the tube about an equal volume of 4-dimethylaminobenzaldehyde (Ehrlich reagent). If blue color observed in the resulting solution, it shows the presence of indole alkaloid(s).

4. Sterol and Triterpene:

a.) Extract 100mg of medicinal plant with 5 ml of alcohol. Concentrate 0.5ml alcoholic extract till it gives residue. Dissolve the residue in 1 ml acetic anhydride and 1 ml chloroform is added. The solution is then transferred in a dry test tube and 1 ml Conc. Sulphuric acid is added slowly to the resulting solution. If the solution turns bluish green or green color means presence of steroid where as red violet or purple means presence of triterpene.

b.) Test for triterpenoids was done by dissolving two or three granules of tin metal in 2 ml thionyl chloride solution and then, add 1 ml of the extract into the test tube. The formation of a pink colour indicates the presence of triterpenoids.

5. Flavonic glycosides:

Plant pigments with structure based on or like that of flavones.

a.) Shinoda test: Take 1 ml of alcoholic extract of the medicinal plant and concentrate. The resulting residue is taken in 1 .5 ml of methanol and warmed at 50˚c and add a small piece of magnesium metal or powder and 5 – 6 drops of Conc. HCl were mixed slowly to resulting solution. The appearance of solution becomes red for flavonoid, orange for flavones and violet for Flavonones (Kokate, 1994).

b.) Shibata Test: Take 1 ml of alcoholic extract, Small Piece of Zn metal and 5-6 drops of conc. HCl were mixed slowly gives red or orange colour shows the presence of flavonoid, where as appearance of violet colour shows the presence of Flavonones. In this test, flavonoid can be distinguished from flavonol and flavonol-3-glycosides from aglycones since only the former gives the deep colour (Rajaram and et al., 2013).

c.) Alkaline regent test: Alcoholic extracts were treated with few drops of NaOH solution, formation of intense yellow colour which becomes colorless on addition of dilute acid, indicates the presence of flavonoid.

d.) Lead acetate test: Extracts were treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates the presence of flavonoid.

6. Anthocyanin pigments (Anthocyanosides):

200 mg of medicinal plant is extracted with 5 ml ethyl alcohol. The alcoholic extract 1 ml is heated with equal volume of 10% HCl on water bath for 15 min. and cool. Extract the solution with 2 ml ether. If the aqueous part is red in colour and does not turn to violet at neutral pH or blue in alkaline medium, it shows the presence of Anthocyanins.

7. Anthracene glycoside:

4 ml ethereal solution in test tube is semi dried + 1-2 ml of 25% ammonia + shakes well. If gives cherish red color of the alkaline solution means presence of anthracene glycoside.

8. Tannins (Colorless, noncrystalline, colloidal solution in water, polyphenolic biomolecules that binds protein and precipitate them):

a.) FeCl3 test: To 0.5 ml of alcoholic extract add 1 ml water and 2- 3 drops of 2% FeCl3 solution. If bluish green or bluish black ppt. is formed means presence of gallic tannins and if greenish black means presence of catecholic tannins. Or it indicates the presence of phenolic compounds (Mir & Sawheny, 2013).

b.) Gelatin test: To the extract, 1% gelatin solution containing sodium chloride was added. Formation of white precipitate indicates the presence of tannins.

9. Coumarine (colorless crystalline fragrant chemical compound):

To the alcoholic extract, add 1-2 drops of distilled hot water and cooled. Divide the solution in into two test tubes A and B. Add 10% NH4OH to test tube A. The second test tube shall serve as a standard for comparison. Check both test tubes under UV light. Presence of blue or violet fluorescence UV light for alkaline solution (test tube A) deeper than that of the standard solution (test tube B) indicates the presence of Coumarins. Coumarins also react with hydroxylamine to give violet colour under UV light.

10. Glycosides: Glycosides are soluble in water.

A molecule where sugar group is bound to another functional group with glycosidic linkage. The acid hydrolysis of glycosides gives sugar and aglycones. Take about 200mg of powdered medicinal plant in a test tube and add 5 ml of water. Warm it on a water bath for 2 minutes. Centrifuge or filter the resulting solution and pipette off the supernatant liquid or filtrate. Add 0.1 ml of Fehling A solution and Fehling B solution until alkaline (test with pH paper). Warm the resulting solution on a water bath for 2 min. Note if the precipitation is formed. The formation of precipitate may be due to the presence of free reducing sugar. If the precipitation is heavier, it shows that plant contains glycosides.

11. Cardiac glycosides:

The steroids were tested by using Liebermann Bur chard test, Salkowski's test, Kedde test

Extract 500 mg of medicinal plant with 70% alcohol by heating on water bath for 2 min. cool and then centrifuge the extract. Pipette off the supernatant liquid. Add 10 ml of water and 0.5 ml of strong solution of lead acetate to the resulting solid residue. Centrifuge the resulting solution again and pipette off the supernatant liquid. Add 1% H_2SO_4 drop wise to the supernatant liquid until no precipitate forms. Extract the acidified solution with $CHCl_3$ and wash organic layer with water. Divide the extracts into 2 test tubes A and B.

Kedde test: evaporate the solvent in test-tube A. Add one drop of 90% alcohol and 2 drops of 2% 3, 5-dinitrobenzoic acid. Make the solution alkaline with 20% NaOH. Purple colour will be observed if the plant contains aglycones containing unsaturated lactones.

Keller-kilani test (cardiac glycosides): Evaporate the solvent in test tube B. The extract was mixed with 1ml of glacial acetic acid containing 1-2 drops of 2% solution of $FeCl_3$. The mixture was then poured into another test tube containing 2ml of concentrated H_2SO_4. A brown ring at the interphase indicated the presence of cardiac glycosides.

Liebermann's test: The 2 ml alcoholic extract was mixed with each of 2ml of chloroform and 2 ml

of acetic acid. The mixture was cooled in ice and then 1-2 drops concentrated H2SO4 was added carefully. A color change from violet to blue to green indicates the presence of steroidal nucleus, i.e., glycone portion of glycoside.

Salkowski's test: The extract was mixed with 2 ml of chloroform. Then 2 ml of concentrated H2SO4 was added carefully and shaken gently. A reddish brown color indicated the presence of steroidal ring, i.e., glycone portion of the glycoside.

Borntragers Test (**Anthraquinone glycosides**): To 3 ml extract dilute sulphuric acid was added, boiled and filtered. To the cold filtrate equal volume benzene or chloroform was added. The organic layer was separated and ammonia was added. Ammonical layer turns pink or red.

Legal's test: 2 ml of alcoholic extract were treated with sodium nitroprusside in pyridine and NaOH. Formation of pink to blood red colour indicates the presence of cardiac glycosides.

12. Polyurenoids:

In a test tube, 10 ml of alcohol or acetone + 2 ml aqueous extract. If a thick volume is formed, 4 – 5 drops of hematoxylin is added. The ppt. is separated by filtering and if ppt. is violet means presence of polyurenoids .

13. Polyoses (chain of monosaccharide):

2 ml aqueous extract solution is placed in a porcelain basin or in Petridis and concentrated till to yield a residue. Then 2 – 3 drops of conc. Sulphuric acid was added to the residue and allow stand for 3-5 minutes. Add 3 – 4 drops of thymol or Molish reagent. If occurrence of red color in the resulting solution denotes the presence of polyoses.

14. Saponins (Glycosides that gives foam)

a.) **Froth Test:** Extracts were diluted with distilled water to 20ml and this was shaken in a graduated cylinder for 15 minutes. Formation of 1 cm layer of foam indicates the presence of saponins.

b.) **Foam Test:** 0.5 gm of extracts was shaken with 2ml of water. If foam produced persists for ten minutes it indicates the presence of saponins.

15. Terpenoids:

Unsaturated molecule of linked isoprene's obtained from sap and tissue of certain plant and tissue. Crude alcoholic extract was dissolved in 2ml of chloroform and evaporated to dryness. To this, 2ml of concentrated H2SO4 was added and heated for about 2 minutes. A grayish colour indicated the presence of terpenoids.

16. Steroids (cardiac glycosides):

Organic compounds with 4 rings arranged in a particular configuration.1mL of extracts were dissolved in 10 ml of chloroform and equal volume of concentrated H2SO4 was added by sides of the test tube. The upper layer showed yellow with green fluorescence. This indicates the presence of steroids

17. Phytosterols:

a.) Salkowski's Test: Extracts were treated with chloroform and filtered. The filtrates were treated with few drops of Conc. Sulphuric acid, shaken and allowed to stand. Appearance of golden yellow colour indicates the presence of triterpene.

b.) Liebermann Bur chard's test: Extracts were treated with chloroform and filtered. The filtrates were treated with few drops of acetic anhydride, boiled and cooled. Conc. Sulphuric acid was added. Formation of brown ring at the junction indicates the presence of phytosterols.

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18. Diterpenes:

Copper acetate Test: Extracts were dissolved in water and treated with 3-4 drops of copper acetate solution. Formation of emerald green colour indicates the presence of diterpenes.

19. Resins, gums and mucilage:

Extracts were dissolved in acetone and pour the solution in to distilled water. Turbidity indicates the presence of resins. Test for gums were performed by hydrolyzing the 1 ml of extract using dil. HCl (3ml). Then Fehling's solution is added drop by drop till red colour is developed (Ansari, 2006). Test for mucilage's were carried out by treating 1 ml of extract with 2ml of ruthenium red solution to get red colour solution.

20. Reducing Compounds (Fehling's test):

0.5 ml alcoholic extract was added with 1 ml water and 0.5 ml Fehling's solution (A+B) then warm or gently boiled. A reddish brick precipitation denotes the presence of reducing compounds.

21. Carbohydrates (polyhydroxy aldehydes and ketones):

The carbohydrates were tested by using Benedict's test, Fehling's test and Molish test . Alcoholic extracts were dissolved in 5 ml distilled water and filtered. The filtrate is used to test for the carbohydrates.

a.) Benedict's test: Filtrates were treated with 2ml of Benedict's reagent and heated gently; a reddish orange precipitate formed which indicated the presence of the carbohydrates.

b.) Iodine test: Crude extract was mixed with 2ml of iodine solution. A dark blue or purple coloration indicated the presence of the carbohydrate.

c.) **Molisch's Test:** Filtrates were treated with 2 drops of alcoholic a-naphthol solution in a test tube. Formation of the violet ring at the junction indicates the presence of Carbohydrates.

22. Proteins (biomolecules with chain of amino acid residues):

Tests like Biuret test, Xanothoproteic test, Millions test and Ninhydrin test were used for the analysis of proteins and amino acids. a.) Million's Test: Crude extract when mixed with 2 ml of Million's reagent, white precipitate appeared which turned red upon gentle heating that confirmed the presence of protein. b.) Ninhydrin test: Crude extract when boiled with 2 ml of 0.25% w/v solution of Ninhydrin, violet blue colour appeared suggesting the presence of amino acids. c.) Xanothoproteic test: The extract was treated with few drops of conc. HNO3. Formation of yellow colour indicates the presence of proteins.

23. Starch (Polymeric carbohydrates):

Dissolved 0.015 gm of iodine and 0.075 gm of potassium iodide in 5 ml of distilled water and 2-3 ml of extract, blue color is produced.

24. Emodins (Purgative resins):

2 ml ethereal solution (yellow orange) in a tube + 1 ml 25% ammonia is added followed by shaking. If ethereal solution decolorizes and the alkaline solution becomes red means presence of emodins.

25. Fatty acids:

Ethereal solution semi dried in test tube is poured in filter paper. If oily portion persists in the paper means presence of fatty acids.

अनुसूची ३

नागरिक वडापत्र

प्राकृतिक सम्पदा अनुसन्धानशालाबाट प्रदान गरिने सेवा, लाग्ने समय तथा सेवा शुल्क

सि.नं	विवरण	लाग्ने समय	सेवा सुल्क
१	**(क) सार्वजनिक विश्लेषण सेवा**		
	❑ जडिबुटिका नमुनाहरूको पहिचान	७ दिन	३००।००
	❑ विरूवा/विउमा पाईने Fixed Oil निर्धारण	७ दिन	३००।००
	❑ MAP को Extractative value	७ दिन	३००।००
	❑ जडिबुटिका Extract को पहिचान	७ दिन	३००।००
	❑ Bitter Principle को निर्धारण	१५ दिन	३००।००
	(ख) सुगन्धित तेलका Physiochemical parameter निर्धारण (प्रति नमुना)		
	❑ Ester value after acetylation	७ दिन	२००।००
	❑ Acid value	७ दिन	२००।००
	❑ Ester value	७ दिन	२००।००
	❑ सुगन्धित तेल प्रतिशत निर्धारण	७ दिन	२००।००
	❑ Qualitative Test by TLC	७ दिन	४००।००
२	**प्रमाणिकरण (प्रति नमुना)**	७ दिन	४००।००
३	**वानस्पतिक रसायन विश्लेषण सेवा (प्रति नमुना)**		
	❑ विरूवाको Phytochemical screening	१ महिना	५००।००
	❑ विरूवाको Extract तयार गर्ने । (Bench Scale)	७ दिन	७५०।००
४	**फर्माकोलोजिकल परिक्षण**		
	❑ Acute Toxicity Test	१५ दिन	१०००।००
	❑ Isolated Tissue Test	१५ दिन	१०००।००
	❑ Antifertility Test	१५ दिन	१०००।००
	❑ Anthelmentic Test	१५ दिन	१०००।००
	❑ Cardio Vascular Test	१५ दिन	१०००।००
५	**जनावरहरू विक्रि वितरण सेवा (प्रति थान)**		
	❑ खरायो	मौज्दात भएमा	५००।००
	❑ गिनीपिग		३००।००
	❑ च्याट		१२५।००
	❑ माइस		६०।००
६	**फर्माकोग्नोसी सेवा (प्रति नमुना)**		
	❑ विरूवा तथा तिनका भागको पहिचान तथा नामाकरण	७ दिन	३००।००
	❑ पाउडर नमुना पहिचान	७ दिन	३००।००
	❑ म्युजियमको नमुनाको प्रत्यक्ष परिचय गराउने (प्रति पटक)	तुरून्त	१५०।००

सि.नं	विवरण	लाग्ने समय	सेवा सुल्क
७	**बैज्ञानिक उपकरणद्वारा परिक्षण प्रति नमुना**		
	❑ UV/Vis Spectrophotometer	७ दिन	५००।००
	❑ Polarimeter	७ दिन	२००।००
	❑ Refractometer	७ दिन	५००।००
	❑ PH परिक्षण	७ दिन	२५०।००
	❑ विविध परिक्षण (Moisture content, Total Ash, Specific gravity)	७ दिन	२५०।००
८	**भौतिक सुविधा समबन्धी सेवा**		
	❑ सेमिनार/गोष्ठीका लागि सभा कक्ष उपलब्ध गराउने	खालि भएको अवस्थामा	प्रति घण्टा २००।००
			एक दिन १०००।००
९	**विद्यार्थिहरूलाई प्रयोगशाला भिजिट तथा ब्रिफिङ्ग** (प्रति पटक प्रति ग्रुप १० जना मात्र)		
	❑ १० कक्षा सम्मका विद्यार्थी	प्रयोगशालाको कार्यक्रमको अवस्था हेरी	३००।००
	❑ स्नातक सम्मका विद्यार्थी		७५०।००
	❑ स्नातकोत्तर सम्मका विद्यार्थी		१०५०।००
१०	**विद्यार्थीहरूलाई प्रयोगशालामा भिजिट तथा ब्रिफिङ्ग**	पूर्व जानकारी अनुसारपूर्व जानकारी अनुसार	५००।००
११	**प्राविधिक सेवा शुल्क** (जडिबुटी प्रसोधन तथा विश्लेषण आदि बारे निवेदकको स्थानमा गई सेवा प्रदान गर्नु पर्ने मा-प्रति व्यक्ति)		
	❑ राजपत्रांकित जनशक्ति	जडिबुटी तथा सारतत्वको पहिचान तथा प्रमाणिकरण कार्यको लागि नमूना संकलन कार्य निवेदनकर्ताको स्थानमा गई गर्नु पर्ने भएमा	४५०।००
	❑ राजपत्र अनंकित जनशक्ति		३००।००

सम्पर्कः
सार्वजनिक विश्लेशण शाखा,
प्रशासन शाखा
प्राकृतिक सम्पदा अनुसन्धानशाला, थापाथली ।

नोटः

- ❑ उल्लेखित सेवाहरू पहिलो आउने लाई पहिले सेवा (First Come First Service) का आधारमा दिईने छ ।
- ❑ विजुली नभएको अवस्थामा यी समय अवधिमा कार्य सम्भव हुन नसक्ने ।
- ❑ Sampling ISO 212 : 1973 Guideline अनुसार गरिने जानकारी गराईन्छ ।

अनुसूची ४

आ.व. २०७५ ०७६ को क्रियाकलाप सम्बन्धी फोटोहरु

कार्यालयको स्वीकृत कार्यक्रम अनुसार यस आ.व.मा स्वदेशमै पाइने विभिन्न सुगन्धित तेलहरु मिश्रण गरी अत्तर र पर्फ्युम को फर्मुला तयार गरियो । उक्त अत्तर र पर्फ्युम को चैत्र २९ मा माननीय मन्त्रीज्यू बाट अनावरण भएको र सोको फर्मुला HPPCL लाई हस्तान्तरण गरिएको थियो ।

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in the field of

TESTING

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Issue Date 10/10/2018 Valid Until 09/10/2020

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.

Signed for and on behalf of NABL

Anil Ratia
Chief Executive Officer

NABL India बाट प्रयोगशालाको audit गराई lab को ISO-17025 Accreditation पुनः नविकरण गरिएको साथै Total Ash, Flash Point /Saponification Value को थप Accreditation लिन सफल भएको ।

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