Technical Data Report

for

MULUNGU

Erythrina mulungu
Erythrina cristi-galli
Mulungu

**Family:** Fabaceae

**Genus:** Erythrina

**Species:** mulungu, crista-galli

**Synonyms:** Erythrina verna, Coralloidendron mulungu

**Common Names:** Mulungu, corticeira, murungu, muchocho, murungo, totocero, flor-de-coral, árvore-de-coral, amerikadeigo, ceibo, chilichi, chopo, hosoba deiko, pau-imortal, mulungu-coral, capa-homem, suiná-suiná,

**Part Used:** Bark

Mulungu is a medium-sized, well-branched tree that grows 10–14 m high. It produces a profusion of pretty, reddish-orange flowers that are pollinated by hummingbirds at the ends of the tree’s many branches. The tree is sometimes called “coral flower,” as the flowers resemble the color of coral. It produces black seed pods containing large, red-and-black seeds, which are sometimes used by indigenous peoples to make necklaces and jewelry. Mulungu is indigenous to Brazil, parts of Peru, and tropical areas in Latin America and, typically, is found in marshes and along riverbanks. The *Erythrina* genus comprises more than 100 species of trees and shrubs (mostly all heavily armed with spines or thorns) in the tropical and subtropical regions of both hemispheres. The mulungu tree (first recorded in 1829) is known by two botanical names, *Erythrina mulungu* and *Erythrina verna*. Another closely-related species, *E. crista-galli*, is used interchangeably in South American herbal medicine systems and is found farther south on the South American continent. The flower of *E. crista-galli* is considered the national flower of Argentina.

Several *Erythrina* tree species are used by indigenous peoples in the Amazon as medicines, insecticides, and fish poisons. Mulungu has long been used in Brazil by indigenous peoples as a natural sedative: it has been used to calm an overexcited nervous system and promote a restful sleep.

In both North and South American herbal medicine systems it is considered to be an excellent sedative to calm agitation and nervous coughs and to treat other nervous system problems including insomnia and anxiety. It also is widely used for asthma, bronchitis, gingivitis, hepatitis, inflammation of the liver and spleen, intermittent fevers, and to clear obstructions in the liver. In both Brazil and Peru mulungu is used for epilepsy. Herbalists and practitioners in the United States use mulungu to quiet hysteria from trauma or shock, as a mild, hypnotic sedative to calm the nervous system, to treat insomnia and promote healthy sleeping patterns (by sedating overactive neurotransmitters), to regulate heart palpitations, and to treat hepatitis and liver disorders. Positive regulatory effects on heart palpitations and decreased blood pressure have been reported; Dr. Donna Schwontkowski, a chiropractor who has used Amazonian plants in her practice, recommends mulungu for hemias, stomachaches, and epilepsy—and to help augment milk flow as well.

The phytochemicals in mulungu have been studied extensively; they have been found to comprise large amounts of novel flavonoids, triterpenes, and alkaloids. Much research has been performed on *Erythrina* alkaloids in the last decade, as they represent a group of very active chemicals with various properties and are almost always present in *Erythrina* species. Thus far, alkaloids have been found in 78 of 107 species in the genus *Erythrina*; mulungu is documented with 20 isoquinoline alkaloids. Many of these have demonstrated piscicidal, anti-inflammatory, cardioactive, narcotic, and hypnotic activities. One novel alkaloid discovered in mulungu is called cristamidine. Its positive effect on the liver was demonstrated in a 1995 clinical study with rats.
Mulungu’s hypotensive and heart-regulatory activities were studied and attributed to a group of alkaloids. Another alkaloid in mulungu (and other Erythrina plants), erysodine, has been documented with neuromuscular transition-blocking effects characteristic of curare arrow poisons. Two studies also indicate that it might be useful as an anti-nicotine drug, as it demonstrated actions as a competitive antagonist and to block nicotine receptors. Interestingly, both of these studies were published by major (and competing) pharmaceutical companies!

The traditional use of mulungu for anxiety and stress has been validated by researchers in a recent (2002) study, where it was shown to alter anxiety-related responses. An animal model (correlating to human generalized anxiety disorder, as well as panic disorder) was undertaken on a water-alcohol extract of mulungu. The researchers reported that the mulungu extract had an effect similar to the commonly-prescribed anti-anxiety drug diazepam. It was suggested in this study that the alkaloids in Erythrina “may alter GABAergic neurotransmission.” GABA (gamma-amino butyric acid) acts as a neurotransmitter in the brain; abnormalities with its function is implicated in diseases including epilepsy, anxiety, and depression. Further research has validated the traditional use of mulungu as an antimicrobial agent for throat and urinary infections; mulungu has demonstrated antibacterial activity in two studies against Staphylococcus aureus, and antimycobacterial activity against Mycobacterium fortuitum and Mycobacterium smegmatis.

Mulungu is not very widely known or used in North America; mostly appearing as a synergistic ingredient in only a few herbal formulas for anxiety or depression. It is a wonderful rainforest medicinal plant that is deserving of much more attention in herbal medicine systems outside of South America.

**Documented Properties and Actions:** Analgesic, antianxiety, antibacterial, antimycobacterial, anodyne, anti-inflammatory, hepatotonic, hypnotic, hypotensive, nerveine, sedative, soporific

**Traditional Remedy:** One-half cup of a standard bark decoction or 1–2 ml of a 4:1 tincture once or twice daily.

**Main Phytochemicals:** Alanine, arginine, aspartic acid, cristacarpin, cristadine, crystamidine, dimethylmedicarpin, erybidine, erycristagallin, erycristanol, erycristin, erydotrine, erysodienone, erysodine, erysonine, erysopine, erysotrine, erysovine, erystagallin A–C, erythrabysin II, erythralines, erythramine, erythratine, eryvariestyrene, gamma-amino butyric acid, glutamic acid, hypaphorine lectins, n-nor-orientaline, oleanolic acid, oleanonic acid, phaseollidins, proteinases, sandwicensis, ursolic acid, vitexin

**Contraindications:**
- In large doses the plant is soporific and may cause drowsiness.
- In traditional medicine the plant is used to lower blood pressure. Clinical research with animals has documented hypotensive actions. It is recommended that those on medications to lower blood pressure (and those with low blood pressure) use mulungu with caution and monitor their blood pressure accordingly.

**Drug Interactions:** None documented; however, mulungu may potentiate some antianxiety drugs (such as diazepam) and antihypertensive drugs.
## WORLDWIDE ETHNOBOTANICAL USES

<table>
<thead>
<tr>
<th>Country</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>Antiseptic, diarrhea, hemorrhoids, narcotic, piles, respiratory infections, urinary infections</td>
</tr>
<tr>
<td>Brazil</td>
<td>Agitation, antimicrobial, anxiety, asthma, astringent, bronchitis, cicatrizant, CNS disorders, convulsions, cough, cuts, epilepsy, fever, gingivitis, hepatitis, hypnotic, hysteria, inflammation, insomnia, liver, menopause, muscle pain, neuralgia, nervous tension, rheumatism, sedative, spleen, stress, throat, whooping cough</td>
</tr>
<tr>
<td>Colombia</td>
<td>Diuretic, sedative</td>
</tr>
<tr>
<td>Peru</td>
<td>Cystitis, epilepsy, eye irritations, hysteria, insomnia</td>
</tr>
<tr>
<td>U.S.</td>
<td>CNS disorders, epilepsy, heart, hepatitis, hernia, high blood pressure, hysteria, insomnia, lactagogue, liver, stomachache</td>
</tr>
<tr>
<td>Venezuela</td>
<td>Diuretic, piscicide</td>
</tr>
<tr>
<td>Elsewhere</td>
<td>Cardiotonic, diuretic, epilepsy, eye, headaches, heart, hepatitis, hernia, hydropsy, hypertension, hypnotic, hysteria, insomnia, lactagogue, liver, narcotic, palpitations, piscicide, rheumatism, sedative, spasm, stomachache, stomach cancer</td>
</tr>
</tbody>
</table>

### References


The information contained herein is intended for education, research, and informational purposes only. This information is not intended to be used to diagnose, prescribe or replace proper medical care. The statements contained herein have not been evaluated by the Food and Drug Administration. The plant described herein is not intended to diagnose, treat, cure, mitigate, or prevent any disease.
# Ethnomedical Information on Mulungu (Erythrina mulungu)

<table>
<thead>
<tr>
<th>Plant Part / Location</th>
<th>Documented Ethnomedical Use</th>
<th>Type Extract / Route</th>
<th>Used For</th>
<th>Ref #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bark Amazonia</td>
<td>Used for insomnia, hysteria, heart palpitations, hepatitis and liver dysfunction.</td>
<td>Decocction or Tincture Oral</td>
<td>Not stated</td>
<td>ZZ1016</td>
</tr>
<tr>
<td>Bark Amazonia</td>
<td>Used to quiet hysteria from trauma or shock, to balance neurotransmitters and promote peaceful sleep. Used for hepatitis and liver dysfunctions. Considered to help regulate heart palpitations and excess heart yang.</td>
<td>Not stated</td>
<td>Human Adult</td>
<td>ZZ1015</td>
</tr>
<tr>
<td>Bark Argentina</td>
<td>Used against diarrhea.</td>
<td>Decocction Oral</td>
<td>Human Adult</td>
<td>K17523</td>
</tr>
<tr>
<td>Bark Argentina</td>
<td>Used to treat respiratory tract infections.</td>
<td>Decocction Oral</td>
<td>Human Adult</td>
<td>K17523</td>
</tr>
<tr>
<td>Bark Argentina</td>
<td>Used to treat urinary tract infections.</td>
<td>Decocction Oral</td>
<td>Human Adult</td>
<td>K17523</td>
</tr>
<tr>
<td>Stembark Argentina</td>
<td>Used as a narcotic.</td>
<td>H2O Ext Oral</td>
<td>Human Adult</td>
<td>K03244</td>
</tr>
<tr>
<td>Stembark Argentina</td>
<td>Used as an antiseptic.</td>
<td>H2O Ext External</td>
<td>Human Adult</td>
<td>K03244</td>
</tr>
<tr>
<td>Leaf Argentina</td>
<td>Used as an antihemorrhoidal agent.</td>
<td>Not stated External</td>
<td>Human Adult</td>
<td>K03244</td>
</tr>
<tr>
<td>Bark Brazil</td>
<td>Used in gargles against sore throat.</td>
<td>H2O Ext Gargle</td>
<td>Human Adult</td>
<td>ZZ1099</td>
</tr>
<tr>
<td>Bark Brazil</td>
<td>Used to treat cuts.</td>
<td>H2O Ext External</td>
<td>Human Adult</td>
<td>ZZ1099</td>
</tr>
<tr>
<td>Bark Brazil</td>
<td>Used for rheumatism and hepatitis.</td>
<td>H2O Ext Oral</td>
<td>Human Adult</td>
<td>ZZ1099</td>
</tr>
<tr>
<td>Bark Brazil</td>
<td>Used for fevers.</td>
<td>Decocction Oral</td>
<td>Oral Human Adult</td>
<td>K07977</td>
</tr>
<tr>
<td>Bark Brazil</td>
<td>Used to calm an excited nervous system and to combat insomnia.</td>
<td>Extract External</td>
<td>Human Adult</td>
<td>ZZ1002</td>
</tr>
<tr>
<td>Bark Brazil</td>
<td>Used for bronchitis, asthma, inflammation of the liver and intermittent fevers. Used gingival abscesses.</td>
<td>Infusion Oral</td>
<td>Human Adult</td>
<td>ZZ1002</td>
</tr>
<tr>
<td>Bark Brazil</td>
<td>Used as a hypnotic and sedative to calm the nervous system, combat hysteria and insomnia. Used for rheumatism, liver affections, chronic neuralgia, bronchitis, asthma and whooping cough.</td>
<td>Infusion Oral</td>
<td>Human Adult</td>
<td>ZZ1007</td>
</tr>
<tr>
<td>Bark Brazil</td>
<td>Considered an astringent, cicatrizant, deobstruant and hypnotic. Used for hepatitis and chronic rheumatism.</td>
<td>Infusion Oral</td>
<td>Human Adult</td>
<td>ZZ1079</td>
</tr>
<tr>
<td>Bark Brazil</td>
<td>Used for anxiety, nervous tension, insomnia, rheumatism, muscle pain and liver affections. Used to calm and relax, for rheumatism and muscular aches and to relieve stress.</td>
<td>Infusion Oral</td>
<td>Human Adult</td>
<td>ZZ1081</td>
</tr>
<tr>
<td>Bark Brazil</td>
<td></td>
<td>Infusion Bath</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant Part / Location</td>
<td>Documented Ethnomedical Use</td>
<td>Type Extract / Route</td>
<td>Used For</td>
<td>Ref #</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
<td>---------------------------</td>
<td>--------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Leaf + Stem Brazil</td>
<td>Used as an antimicrobial. Used as an astringent in wound healing. Used for throat infections.</td>
<td>Not stated External</td>
<td>Human Adult</td>
<td>L05437</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not stated External</td>
<td>Human Adult</td>
<td>L05437</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not stated Oral</td>
<td>Human Adult</td>
<td>L05437</td>
</tr>
<tr>
<td>Leaf + Stem Brazil</td>
<td>Used as a sedative to combat insomnia, for convulsions and menopause.</td>
<td>Infusion Oral</td>
<td>Human Adult</td>
<td>ZZ1096</td>
</tr>
<tr>
<td>Leaf + Bark Brazil</td>
<td>Used to calm agitation and other disorders of the nervous system such as insomnia.</td>
<td>Decoction or Tincture</td>
<td>Human Adult</td>
<td>AX1004</td>
</tr>
<tr>
<td></td>
<td>Said to be calming. Used for agitations, nervous coughs and other disturbances of the nervous system. Used for asthma, hepatitis and liver obstruction.</td>
<td>Not stated Oral</td>
<td>Human Adult</td>
<td>ZZ1013</td>
</tr>
<tr>
<td>Seed Brazil</td>
<td>The seeds are poisonous.</td>
<td>Not stated Oral</td>
<td>Human Adult</td>
<td>ZZ1002</td>
</tr>
<tr>
<td>Seed Brazil</td>
<td>Contain poisonous alkaloids.</td>
<td>Not stated External</td>
<td>Human Adult</td>
<td>ZZ1079</td>
</tr>
<tr>
<td>Flower Colombia</td>
<td>Used as a sedative and diuretic.</td>
<td>Infusion Oral</td>
<td>Human Adult</td>
<td>ZZ1093</td>
</tr>
<tr>
<td>Plant Peru</td>
<td>Used for magic.</td>
<td>Not stated External</td>
<td>Not stated</td>
<td>ZZ1093</td>
</tr>
<tr>
<td></td>
<td>Used for eye irritations.</td>
<td>Infusion External</td>
<td>Human Adult</td>
<td>ZZ1093</td>
</tr>
<tr>
<td></td>
<td>Used for headaches.</td>
<td>Infusion Not stated</td>
<td>Human Adult</td>
<td>ZZ1093</td>
</tr>
<tr>
<td></td>
<td>Used for the heart, epilepsy, hydropsy. Can cause paralysis of the motor nerves.</td>
<td>Not stated</td>
<td>Human Adult</td>
<td>ZZ1093</td>
</tr>
<tr>
<td></td>
<td>Can cause paralysis of the motor nerves.</td>
<td>Not stated</td>
<td>Human Adult</td>
<td>ZZ1093</td>
</tr>
<tr>
<td>Seed Peru</td>
<td>Used for cystitis.</td>
<td>Decoction Oral</td>
<td>Human Adult</td>
<td>ZZ1093</td>
</tr>
<tr>
<td></td>
<td>Used to alleviate irritation of the eye.</td>
<td>Decoction Ophthalmatic</td>
<td>Human Adult</td>
<td>ZZ1093</td>
</tr>
<tr>
<td>Bark U.S.</td>
<td>Used as a hypnotic and sedative to calm the nervous system, for hysteria and insomnia. Used for epilepsy.</td>
<td>Decoction or Tincture</td>
<td>Human Adult</td>
<td>ZZ1067</td>
</tr>
<tr>
<td></td>
<td>Used as a mild hypnotic sedative to calm the nervous system, eliminate hysteria, decrease insomnia and promote healthy sleep pattern. Also used for rheumatism, pain in the liver, hepatitis, liver dysfunction, heart palpitations, hypertension, epilepsy, stomach ache and hernia. Considered a lactagogue.</td>
<td>Decoction or Tincture</td>
<td>Human Adult</td>
<td>ZZ1014</td>
</tr>
</tbody>
</table>
## Presence of Compounds in Mulungu (Erythrina mulungu)

<table>
<thead>
<tr>
<th>Compound</th>
<th>Chemical type</th>
<th>Plant Part</th>
<th>Plant Origin</th>
<th>Quantity</th>
<th>Ref #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alanine</td>
<td>Proteid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>J09666</td>
</tr>
<tr>
<td>Arginine</td>
<td>Proteid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>J09666</td>
</tr>
<tr>
<td>Aspartic Acid</td>
<td>Proteid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>J09666</td>
</tr>
<tr>
<td>Butyric acid, gamma-amino-</td>
<td>Proteid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>J09666</td>
</tr>
<tr>
<td>Cristacarpin</td>
<td>Flavonoid</td>
<td>Wood</td>
<td>Japan</td>
<td>0.001%</td>
<td>H20235</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leaf</td>
<td></td>
<td></td>
<td>N07061</td>
</tr>
<tr>
<td>Cristadine</td>
<td>Isoquinoline Alkaloid</td>
<td>Leaf</td>
<td>Japan</td>
<td>Not stated</td>
<td>N00599</td>
</tr>
<tr>
<td>Crystamidine</td>
<td>Isoquinoline Alkaloid</td>
<td>Seedling</td>
<td>Australia</td>
<td>Japan</td>
<td>Not stated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leaf</td>
<td></td>
<td>0.00006%</td>
<td>K00691</td>
</tr>
<tr>
<td>Erybidine</td>
<td>Isoquinoline Alkaloid</td>
<td>Leaf</td>
<td>Japan</td>
<td>0.036%</td>
<td>K00691</td>
</tr>
<tr>
<td>Erycristagallin</td>
<td>Flavonoid</td>
<td>Root</td>
<td>Bolivia</td>
<td>0.00980%</td>
<td>M05541</td>
</tr>
<tr>
<td>Erycristanol A</td>
<td>Oxygen Heterocycle</td>
<td>Heartwood</td>
<td>Japan</td>
<td>0.000333%</td>
<td>H14534</td>
</tr>
<tr>
<td>Erycristanol B</td>
<td>Benzenoid</td>
<td>Heartwood</td>
<td>Japan</td>
<td>0.00004%</td>
<td>H14534</td>
</tr>
<tr>
<td>Erycristanol C</td>
<td>Oxygen Heterocycle</td>
<td>Heartwood</td>
<td>Japan</td>
<td>0.00026%</td>
<td>H14534</td>
</tr>
<tr>
<td>Erycristin</td>
<td>Flavonoid</td>
<td>Stem bark</td>
<td>Bolivia</td>
<td>0.00954%</td>
<td>H03771</td>
</tr>
<tr>
<td>Erydotrine</td>
<td>Isoquinoline Alkaloid</td>
<td>Leaf</td>
<td>Japan</td>
<td>0.0018%</td>
<td>K00691</td>
</tr>
<tr>
<td>Erysodienone</td>
<td>Isoquinoline Alkaloid</td>
<td>Entire Plant</td>
<td>Not stated</td>
<td>Not stated</td>
<td>J07704</td>
</tr>
<tr>
<td>Erysodine</td>
<td>Isoquinoline Alkaloid</td>
<td>Leaf</td>
<td>Japan</td>
<td>0.0072%</td>
<td>K00691 A05062</td>
</tr>
<tr>
<td>Erysonine</td>
<td>Isoquinoline Alkaloid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>A05062 A05062</td>
</tr>
<tr>
<td>Erysopine</td>
<td>Isoquinoline Alkaloid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>A05062</td>
</tr>
<tr>
<td>Erysotine</td>
<td>Isoquinoline Alkaloid</td>
<td>Seedling</td>
<td>Australia</td>
<td>Not stated</td>
<td>K22434</td>
</tr>
<tr>
<td>Erysovine</td>
<td>Isoquinoline Alkaloid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>A05062</td>
</tr>
<tr>
<td>Erystagallin A</td>
<td>Flavonoid</td>
<td>Wood</td>
<td>Japan</td>
<td>0.000407%</td>
<td>H20235</td>
</tr>
<tr>
<td>Compound</td>
<td>Chemical type</td>
<td>Plant Part</td>
<td>Plant Origin</td>
<td>Quantity</td>
<td>Ref #</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------</td>
<td>------------</td>
<td>--------------</td>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Erystagallin B</td>
<td>Flavonoid</td>
<td>Wood</td>
<td>Japan</td>
<td>0.000087%</td>
<td>H20235</td>
</tr>
<tr>
<td>Erystagallin C</td>
<td>Flavonoid</td>
<td>Wood</td>
<td>Japan</td>
<td>0.00014%</td>
<td>H20235</td>
</tr>
<tr>
<td>Erythrabyssin II</td>
<td>Flavonoid</td>
<td>Stembark</td>
<td>Bolivia</td>
<td>0.05417%</td>
<td>H03771</td>
</tr>
<tr>
<td>Erythraline</td>
<td>Isoquinoline Alkaloid</td>
<td>Leaf Seedling Flowers</td>
<td>Japan Australia India</td>
<td>0.053% Not stated 0.11000%</td>
<td>K00691 K22434 H03756</td>
</tr>
<tr>
<td>Erythraline, 11-beta-methoxy-n-oxide-</td>
<td>Isoquinoline Alkaloid</td>
<td>Flowers</td>
<td>India</td>
<td>0.05000%</td>
<td>H03756</td>
</tr>
<tr>
<td>Erythraline, 11-beta-methoxy-</td>
<td>Isoquinoline Alkaloid</td>
<td>Flowers</td>
<td>India</td>
<td>0.64000%</td>
<td>H03756</td>
</tr>
<tr>
<td>Erythraline, 8-oxo:</td>
<td>Isoquinoline Alkaloid</td>
<td>Seedling Leaf</td>
<td>Australia England</td>
<td>Not stated Not stated</td>
<td>K22434 N19334</td>
</tr>
<tr>
<td>Erythramine</td>
<td>Isoquinoline Alkaloid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>A05062</td>
</tr>
<tr>
<td>Erythratine</td>
<td>Isoquinoline Alkaloid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>A05062</td>
</tr>
<tr>
<td>Erythrinate, 11-methoxy-</td>
<td>Isoquinoline Alkaloid</td>
<td>Flowers</td>
<td>India</td>
<td>0.04000%</td>
<td>H03756</td>
</tr>
<tr>
<td>Erythrina chresta-galli proteinase</td>
<td>Proteid</td>
<td>Seed</td>
<td>Uruguay</td>
<td>Not stated</td>
<td>M14029</td>
</tr>
<tr>
<td>Inhibitor DE-1 Erythrina chresta-galli proteinase</td>
<td>Proteid</td>
<td>Seed</td>
<td>Uruguay</td>
<td>Not stated</td>
<td>M14029</td>
</tr>
<tr>
<td>Inhibitor DE-2 Erythrina chresta-galli proteinase</td>
<td>Proteid</td>
<td>Seed</td>
<td>Uruguay</td>
<td>Not stated</td>
<td>M14029</td>
</tr>
<tr>
<td>Inhibitor DE-3 Erythrina chresta-galli proteinase</td>
<td>Proteid</td>
<td>Seed</td>
<td>Uruguay</td>
<td>Not stated</td>
<td>M14029</td>
</tr>
<tr>
<td>Inhibitor DE-4 Erythrina chresta-galli proteinase</td>
<td>Proteid</td>
<td>Seed</td>
<td>Uruguay</td>
<td>Not stated</td>
<td>M14029</td>
</tr>
<tr>
<td>Inhibitor DE-5 Erythrina chresta-galli proteinase</td>
<td>Proteid</td>
<td>Seed</td>
<td>Uruguay</td>
<td>Not stated</td>
<td>M14029</td>
</tr>
<tr>
<td>Inhibitor DE-6 Erythrina chresta-galli proteinase</td>
<td>Proteid</td>
<td>Seed</td>
<td>Uruguay</td>
<td>Not stated</td>
<td>M14029</td>
</tr>
<tr>
<td>Inhibitor DE-7 Erythrina chresta-galli proteinase</td>
<td>Proteid</td>
<td>Seed</td>
<td>Uruguay</td>
<td>Not stated</td>
<td>M14029</td>
</tr>
<tr>
<td>Inhibitor DE-8 Erythrina chresta-galli proteinase</td>
<td>Proteid</td>
<td>Seed</td>
<td>Uruguay</td>
<td>Not stated</td>
<td>M14029</td>
</tr>
<tr>
<td>Erythrinine, 8-oxo-</td>
<td>Isoquinoline Alkaloid</td>
<td>Flowers</td>
<td>India</td>
<td>0.20000%</td>
<td>H03756</td>
</tr>
<tr>
<td>Eryvariestyrene</td>
<td>Benzenoid</td>
<td>Heartwood</td>
<td>Japan</td>
<td>0.00033%</td>
<td>H14534</td>
</tr>
<tr>
<td>Glutamic Acid</td>
<td>Proteid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>J09666</td>
</tr>
<tr>
<td>Compound</td>
<td>Chemical type</td>
<td>Plant Part</td>
<td>Plant Origin</td>
<td>Quantity</td>
<td>Ref #</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------</td>
<td>------------</td>
<td>--------------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>Hypaphorine</td>
<td>Indole Alkaloid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>A05062</td>
</tr>
<tr>
<td>Lectin, <em>Erythrina cristagalli</em></td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>AX1006</td>
</tr>
<tr>
<td>Medicarpin, dimethyl-</td>
<td>Flavonoid</td>
<td>Leaf</td>
<td>Not stated</td>
<td>Not stated</td>
<td>N07061</td>
</tr>
<tr>
<td>Olean-12-en-28-oic acid, 3-beta-acetoxy-</td>
<td>Triterpene</td>
<td>Leaf</td>
<td>Taiwan</td>
<td>Not stated</td>
<td>L02848</td>
</tr>
<tr>
<td>Olean-12-ene-3-beta-28-diol</td>
<td>Triterpene</td>
<td>Leaf</td>
<td>Taiwan</td>
<td>Not stated</td>
<td>L02848</td>
</tr>
<tr>
<td>Oleanolic acid</td>
<td>Triterpene</td>
<td>Leaf</td>
<td>Taiwan</td>
<td>Not stated</td>
<td>L02848</td>
</tr>
<tr>
<td>Oleanonic Acid</td>
<td>Triterpene</td>
<td>Leaf</td>
<td>Taiwan</td>
<td>Not stated</td>
<td>L02848</td>
</tr>
<tr>
<td>Orientaline, n-nor-</td>
<td>Isoquinoline Alkaloid</td>
<td>Leaf</td>
<td>Japan</td>
<td>0.083%</td>
<td>K00691</td>
</tr>
<tr>
<td>Ornithine, delta-acetyl-</td>
<td>Proteid</td>
<td>Seed</td>
<td>Not stated</td>
<td>Not stated</td>
<td>J09666</td>
</tr>
<tr>
<td>Phaseollidin</td>
<td>Flavonoid</td>
<td>Leaf</td>
<td>Not stated</td>
<td>Not stated</td>
<td>N07061</td>
</tr>
<tr>
<td>Phaseollidin, 6-alpha-hydroxy-2-(gamma-gamma-dimethyl-allyl)</td>
<td>Flavonoid</td>
<td>Wood</td>
<td>Japan</td>
<td>0.000048%</td>
<td>H20235</td>
</tr>
<tr>
<td>Sandwicensin</td>
<td>Flavonoid</td>
<td>Stembark</td>
<td>Bolivia</td>
<td>0.01458%</td>
<td>H03771</td>
</tr>
<tr>
<td>Urs-11-alpha-12-alpha-epoxy-13-beta-28-olide, 3-beta-hydroxy</td>
<td>Triterpene</td>
<td>Leaf</td>
<td>Taiwan</td>
<td>Not stated</td>
<td>L02848</td>
</tr>
<tr>
<td>Ursolic Acid</td>
<td>Triterpene</td>
<td>Leaf</td>
<td>Taiwan</td>
<td>Not stated</td>
<td>L02848</td>
</tr>
<tr>
<td>Vitexin</td>
<td>Flavone</td>
<td>Leaf</td>
<td>Taiwan</td>
<td>Not stated</td>
<td>L02848</td>
</tr>
</tbody>
</table>

**OTHER PHYTOCHEMICAL SCREENING:**

- Alkaloids Present: Leaf K03244
- Coumarins Present: Seed T00485
### Biological Activities for Extracts of Mulungu (Erythrina mulungu)

<table>
<thead>
<tr>
<th>Plant Part – Origin</th>
<th>Activity Tested For</th>
<th>Type Extract</th>
<th>Test Model</th>
<th>Dosage</th>
<th>Result</th>
<th>Notes/Organism Tested</th>
<th>Ref #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flowers Not Stated</td>
<td>Antimutagenic Activity</td>
<td>MEOH Ext</td>
<td>Agar Plate</td>
<td>50.0 mcl/Disc 50.0 mcl/Disc</td>
<td>Inactive Inactive</td>
<td>Bacillus subtilis, NIG-1125 HIS MET Escherichia coli, B/R-WP2-TRP</td>
<td>T08867</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MEOH Ext</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T08867</td>
</tr>
<tr>
<td>Inflorescence Brazil</td>
<td>Antianxiety Activity</td>
<td>H2O-ETOH Ext</td>
<td>Oral Rat</td>
<td>100 mg/kg 200 mg/kg 400 mg/kg</td>
<td>Active</td>
<td>In the T-maze, an animal model that correlates to human generalized anxiety disorder and panic, avoidance latencies were impaired, without altering escape. Activity similar to drug diazepam.</td>
<td>AX1002</td>
</tr>
<tr>
<td>Inflorescence Brazil</td>
<td>Antianxiety Activity</td>
<td>H2O-ETOH Ext</td>
<td>Oral Rat</td>
<td>100 mg/kg 200 mg/kg 400 mg/kg</td>
<td>Active</td>
<td>Number of transitions was increased (light/dark transition model). Activity similar to drug diazepam.</td>
<td>AX1002</td>
</tr>
<tr>
<td>Inflorescence Brazil</td>
<td>Antianxiety Activity</td>
<td>H2O-ETOH Ext</td>
<td>Oral Rat</td>
<td>100 mg/kg 200 mg/kg 400 mg/kg</td>
<td>Inactive</td>
<td>Behavioral responses in the cat odor test were resistant to all forms of treatment.</td>
<td>AX1002</td>
</tr>
<tr>
<td>Stem + Bark Brazil</td>
<td>Antianxiety Activity</td>
<td>H2O-ETOH Ext</td>
<td>Not stated Mice</td>
<td>Not stated</td>
<td>Active</td>
<td>Increased the number and entries and time spent by mice in the open arms of the elevated plus-maze model of anxiety.</td>
<td>AX1003</td>
</tr>
<tr>
<td>Leaf + Stem Brazil</td>
<td>Cytotoxic Activity</td>
<td>MEOH (75%) Ext</td>
<td>Cell Culture</td>
<td>IC50 = 1000 mcg/ml</td>
<td>Inactive</td>
<td>Vero cells.</td>
<td>L05437</td>
</tr>
<tr>
<td>Not stated Argentina</td>
<td>Antitumor Activity</td>
<td>Not stated</td>
<td>Cell Culture</td>
<td>Not stated</td>
<td>Active</td>
<td>Inhibited the growth of crown gall tumors.</td>
<td>AX1001</td>
</tr>
<tr>
<td>Bark Argentina</td>
<td>Antibacterial Activity</td>
<td>Decoction</td>
<td>Agar Plate</td>
<td>Not Stated 1.0 mg/ml 62.5 mg/ml 62.5 mg/ml</td>
<td>Inactive Inactive Inactive</td>
<td>Pseudomonas aeruginosa, Salmonella typhi, Escherichia coli, Staphylococcus aureus.</td>
<td>K17523</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H2O Ext</td>
<td>Agar Plate</td>
<td></td>
<td>Inactive Inactive</td>
<td></td>
<td>J11153</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hot H2O Ext</td>
<td>Agar Plate</td>
<td></td>
<td>Inactive Inactive</td>
<td></td>
<td>K14683</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hot H2O Ext</td>
<td>Agar Plate</td>
<td></td>
<td>Inactive Inactive</td>
<td></td>
<td>K14683</td>
</tr>
<tr>
<td>Root Bolivia</td>
<td>Antibacterial Activity</td>
<td>ETOH (95%) Ext</td>
<td>Agar Plate</td>
<td>Not Stated</td>
<td>Active</td>
<td>Staphylococcus aureus.</td>
<td>M05541</td>
</tr>
<tr>
<td>Leaf Egypt</td>
<td>Antibacterial Activity</td>
<td>ETOH (70%) Ext</td>
<td>Agar Plate</td>
<td>Not Stated</td>
<td>Active</td>
<td>Bacillus cereus, Bacillus megaterium, Staphylococcus albus, Staphylococcus aureus.</td>
<td>T06729</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ETOH (70%) Ext</td>
<td>Agar Plate</td>
<td>Not Stated</td>
<td>Active</td>
<td></td>
<td>T06729</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ETOH (70%) Ext</td>
<td>Agar Plate</td>
<td>Not Stated</td>
<td>Active</td>
<td></td>
<td>T06729</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ETOH (70%) Ext</td>
<td>Agar Plate</td>
<td>Not Stated</td>
<td>Active</td>
<td></td>
<td>T06729</td>
</tr>
<tr>
<td>Stembark Bolivia</td>
<td>Antibacterial Activity</td>
<td>ETOH (95%) Ext</td>
<td>Agar Plate</td>
<td>1.0 mg/ml</td>
<td>Weak Activity</td>
<td>Staphylococcus aureus.</td>
<td>H03771</td>
</tr>
<tr>
<td>Stembark Bolivia</td>
<td>Antimycobacterial Activity</td>
<td>ETOH (95%) Ext</td>
<td>Agar Plate</td>
<td>100.0 mcg/ml</td>
<td>Active</td>
<td>Mycobacterium fortuitum.</td>
<td>H03771</td>
</tr>
</tbody>
</table>

GI = Gastric Intubation   IG = Intragastric   IP = Intraperitoneally   IV = Intravenously   PO = Oral   SC = Subcutaneously   IM = Intramuscular
<table>
<thead>
<tr>
<th>Plant Part – Origin</th>
<th>Activity Tested For</th>
<th>Type Extract</th>
<th>Test Model</th>
<th>Dosage</th>
<th>Result</th>
<th>Notes/Organism Tested</th>
<th>Ref #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root Bolivia</td>
<td>Antimycobacterial Activity</td>
<td>ETOH (95%) Ext</td>
<td>Agar Plate</td>
<td>Not Stated</td>
<td>Active</td>
<td><em>Mycobacterium smegmatis.</em></td>
<td>M05541</td>
</tr>
<tr>
<td>Leaf Egypt</td>
<td>Antifungal Activity</td>
<td>ETOH (70%) Ext</td>
<td>Agar Plate</td>
<td>Not Stated</td>
<td>Inactive</td>
<td>Several fungi.</td>
<td>T06729</td>
</tr>
<tr>
<td>Leaf + Stem Brazil</td>
<td>Antiviral Activity</td>
<td>MEOH (75%) Ext</td>
<td>Cell Culture</td>
<td>Not Stated</td>
<td>Inactive</td>
<td><em>Adenovirus</em> (unspec.) in vero cells.</td>
<td>L05437</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MEOH (75%) Ext</td>
<td>Cell Culture</td>
<td>ED50 = 400.0 mcg/ml</td>
<td>Inactive</td>
<td><em>Herpes simplex</em> 1 virus in vero cells.</td>
<td>L05437</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MEOH (75%) Ext</td>
<td>Cell Culture</td>
<td>ED50 = 400.0 mcg/ml</td>
<td>Inactive</td>
<td><em>Herpes simplex</em> 2 virus in vero cells.</td>
<td>L05437</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MEOH (75%) Ext</td>
<td>Cell Culture</td>
<td>ED50 = 666.0 mcg/ml</td>
<td>Inactive</td>
<td>Vesicular stomatitis virus in vero cells.</td>
<td>L05437</td>
</tr>
<tr>
<td>Bark Argentina</td>
<td>Antifungal Activity</td>
<td>Hot H2O Ext</td>
<td>Agar Plate</td>
<td>62.5 mg/ml</td>
<td>Inactive</td>
<td><em>Aspergillus niger.</em></td>
<td>K14683</td>
</tr>
<tr>
<td>Fresh Fruit + Leaf + Stem Greece</td>
<td>Antiphage Activity</td>
<td>H2O Ext</td>
<td>Agar Plate</td>
<td>0.1 g/Plate</td>
<td>Inactive</td>
<td>Bacteriophage MS2.</td>
<td>L15988</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H2O Ext</td>
<td>Agar Plate</td>
<td>0.1 g/Plate</td>
<td>Inactive</td>
<td>Bacteriophage Phi-Chi-174.</td>
<td>L15988</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H2O Ext</td>
<td>Agar Plate</td>
<td>0.1 g/Plate</td>
<td>Inactive</td>
<td>Bacteriophage T-7.</td>
<td>L15988</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H2O Ext</td>
<td>Agar Plate</td>
<td>0.1 g/Plate</td>
<td>Inactive</td>
<td>Bacteriophage T2.</td>
<td>L15988</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H2O Ext</td>
<td>Agar Plate</td>
<td>0.1 g/Plate</td>
<td>Inactive</td>
<td>Bacteriophage T4.</td>
<td>L15988</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H2O Ext</td>
<td>Agar Plate</td>
<td>0.1 g/Plate</td>
<td>Inactive</td>
<td>Bacteriophage 0PS7.</td>
<td>L15988</td>
</tr>
<tr>
<td>Leaf + Stem Germany</td>
<td>Repellent Activity (Animal)</td>
<td>Leaves</td>
<td>Not Stated</td>
<td>Variable</td>
<td>Active</td>
<td><em>Helix pomatia.</em></td>
<td>T07907</td>
</tr>
<tr>
<td>Seed Uruguay</td>
<td>Chymotrypsin Inhibition</td>
<td>Chromatographic Fraction Saline Ext</td>
<td>Not Stated</td>
<td>4040 Units Per mg Protein</td>
<td>Active</td>
<td></td>
<td>M14029</td>
</tr>
<tr>
<td>Seed Uruguay</td>
<td>Trypsin Inhibition</td>
<td>Chromatographic Fraction Saline Ext</td>
<td>Not Stated</td>
<td>3740 Units Per mg Protein</td>
<td>Active</td>
<td></td>
<td>M14029</td>
</tr>
</tbody>
</table>
# Biological Activities for Compounds of Mulungu (*Erythrina mulungu*)

<table>
<thead>
<tr>
<th>Compound</th>
<th>Activity Tested For</th>
<th>Test Model</th>
<th>Dosage</th>
<th>Result</th>
<th>Notes/Organism tested</th>
<th>Ref #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erysodine</td>
<td>Neuronal Nicotinic Receptor Inhibition</td>
<td>IV Rat</td>
<td>0.3-10 mg/kg</td>
<td>Active</td>
<td>Blocked nicotine receptors; competitive antagonist. Reduced nicotine self-administration and lowered</td>
<td>AX1007</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.32-32 mg/kg</td>
<td>Active</td>
<td>break points.</td>
<td></td>
</tr>
<tr>
<td>Erysodine</td>
<td>Neuronal Nicotinic Acetylcholine Receptor Inhibition</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Active</td>
<td>Inhibited cytisine binding at neuronal nicotinic acetylcholine receptors. A competitive reversible</td>
<td>AX1008</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>antagonist of nicotine-induced dopamine release from striatal slices and nicotine-induced 86Rb+ efflux</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>from IMR-32 cells.</td>
<td></td>
</tr>
<tr>
<td>Erysodine</td>
<td>Neuronal Nicotinic Acetylcholine Receptor Inhibition</td>
<td>Oral Mice</td>
<td>Not stated</td>
<td>Active</td>
<td>Attenuated nicotine’s hypothermic effects and its anxiolytic-like effects in the elevated plus-maze test.</td>
<td>AX1008</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Prevented early developing decrease and the late-developing increase in locomotor activity produced by</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>nicotine. Crosses the blood brain barrier.</td>
<td></td>
</tr>
<tr>
<td>Erycristagallin</td>
<td>Antibacterial Activity</td>
<td>Agar Plate</td>
<td>MIC=3.13-6.25 mcg/ml</td>
<td>Active</td>
<td>Staphylococcus aureus, methicillin-resistant.</td>
<td>AX1005</td>
</tr>
<tr>
<td>Lectin</td>
<td>Neurotransmitter Inhibition</td>
<td>Bound to clostridial neurotoxin Cell Culture</td>
<td>Not stated</td>
<td>Active</td>
<td>Selective for nociceptive afferents.</td>
<td>AX1006</td>
</tr>
<tr>
<td>Lectin</td>
<td>Neurotransmitter Inhibition</td>
<td>Bound to clostridial neurotoxin. In vivo</td>
<td>Not stated</td>
<td>Active</td>
<td>Attenuated sensory transmission from nociceptive afferents through the spinal cord.</td>
<td>AX1006</td>
</tr>
<tr>
<td>Lectin</td>
<td>Agglutination Activity</td>
<td>in vitro</td>
<td>Not stated</td>
<td>Active</td>
<td>Agglutination of sperm.</td>
<td>AX1016</td>
</tr>
<tr>
<td>Oleanolic acid</td>
<td>Antitumor Activity</td>
<td>Cell Culture</td>
<td>IC50=60 micromol/L</td>
<td>Active</td>
<td>Human colon carcinoma cell line HCT15.</td>
<td>AX1009</td>
</tr>
<tr>
<td>Oleanolic acid</td>
<td>Hepatoprotective Activity</td>
<td>Mice</td>
<td>Not stated</td>
<td>Active</td>
<td>Pre-treatment protected against CCl(4)-induced hepatotoxicity.</td>
<td>AX1013</td>
</tr>
<tr>
<td>Oleanolic acid</td>
<td>Anti-ulcer Activity</td>
<td>Oral Rat</td>
<td>50 mg/kg</td>
<td>Active</td>
<td>Inhibited gastric lesions induced by ethanol, aspirin and pylorus ligature; comparable to ranitidine (50</td>
<td>AX1011</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100 mg/kg</td>
<td>Active</td>
<td>mg) and omeprazole (100 &amp; 200 mg). Inhibited HCl-ethanol-induced ulcers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200 mg/kg</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200 mg/kg</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oleanolic acid</td>
<td>Activity Type</td>
<td>Model</td>
<td>IC50/MC100</td>
<td>Activity</td>
<td>Description</td>
<td>AX</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------------</td>
<td>----------------</td>
<td>------------</td>
<td>----------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>Anti-inflammatory Activity</td>
<td>Mice</td>
<td>Not stated</td>
<td>Active</td>
<td>Vs. 12-deoxyphorbol-13-phenylacetate induced ear edema. Vs. TPA-induced dermatitis. Vs. bradykinin and phospholipase A2-induced paw edema.</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cell Culture</td>
<td>IC50=17 microM</td>
<td>Active</td>
<td>Inhibited the production of leukotriene B4.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(rat leukocytes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nuclear factor-kappa B</td>
<td>Cell Culture</td>
<td>Not stated</td>
<td>Active</td>
<td>Activated the protein/DNA binding of NF-kappaB resulting in increased production of nitric oxide and TNF-alpha.</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Activation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Antirypanocidal Activity</td>
<td>in vitro</td>
<td>MC100=250 mcg/ml</td>
<td>Active</td>
<td>Trypanosoma cruzi.</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Urease Inhibition</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Inactive</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Beta-lactamase Inhibition</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Inactive</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Acetyl cholinesterase Inhibition</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Inactive</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Alpha-glucosidase Inhibition</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Active</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>
## Literature Cited for Mulungu (Erythrina mulungu)

<table>
<thead>
<tr>
<th>Code</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A05062</td>
<td>ALKALOID BEARING PLANTS AND THEIR CONTAINED ALKALOIDS. WILLAMAN, JJ; SCHUBERT, BG: ARS, USDA, TECH BULL 1234, SUPT DOCUMENTS, GOVT PRINT OFF, WASHINGTON DC, 1961: - (1961) (NO ADDRESS GIVEN)</td>
</tr>
<tr>
<td>H03756</td>
<td>ALKALOIDAL CONSTITUENTS OF ERYTHRINA CRISTA-GALLI FLOWERS. CHAWLA, AS; GUPTA, MP; JACKSON, AH: J NAT PROD 50 6: 1146-1148 (1987) (DEPT PHARM SCI PANJAB UNIV CHANDIGARH UT 160 014 INDIA)</td>
</tr>
<tr>
<td>H03771</td>
<td>ERYCRISTIN, A NEW ANTIMICROBIAL PETROCARPAN FROM ERYTHRINA CRISTA-GALLI. MITSCHER, LA; GOLLAPUDI, SR; GERLACH, DC; DRAKE, S; VELIZ, EA; WARD, JA: PHYTOCHEMISTRY 27 2: 381-385 (1988) (DEPT MED CHEM COLL PHARMACY UNIV KANSAS LAWRENCE KS 66045 USA)</td>
</tr>
<tr>
<td>H14534</td>
<td>THREE NEW CINNAMYLPHENOLS IN HEARTWOOD OF ERYTHRINA CRISTA-GALLI. IINUMA, M; OKAWA, Y; TANAKA, T: PHYTOCHEMISTRY 37 4: 1153-1155 (1994) (GIFU PHARM UNIV GIFU 502 JAPAN)</td>
</tr>
<tr>
<td>J09666</td>
<td>DISTRIBUTION OF AMINO ACIDS AND CERTAIN ALKALOIDS IN ERYTHRINA SPECIES. ROMEO, JT; BELL, EA: LLOYDIA 37 4: 543- (1974) (DEPT BOT UNIV TEXAS AUSTIN TX 78712 USA)</td>
</tr>
<tr>
<td>J11153</td>
<td>IN VITRO ANTIBACTERIAL ACTIVITY OF ARGENTINE FOLK MEDICINAL PLANTS AGAINST SALMONELLA TYPHI. PEREZ, C; ANESINI, C: J ETHNOPHARMACOL 44 1: 41-46 (1994) (CATEDRA FARMA FAC ODONTOLOGIA UNIV BUENOS AIRES BUENOS AIRES ARGENTINA)</td>
</tr>
<tr>
<td>K00691</td>
<td>STUDIES ON THE ERYTHRINA ALKALOIDS. XI. ALKALOIDS OF ERYTHRINA CRYSTAGALLI. STRUCTURE OF A NEW ALKALOID, CRYS TAMIDINE. ITO, K; HARUNA, M; JINNO, Y; FURUKAWA, H: CHEM PHARM BULL 24: 52- (1976) (FAC PHARM MEIJO UNIV NAGOYA JAPAN)</td>
</tr>
<tr>
<td>K03244</td>
<td>SURVEY OF ARGENTINE MEDICINAL PLANTS. FOLKLORE AND PHYTOCHEMICAL SCREENING. II. BANDONI, AL; MENDIONDO, ME; RONDINA, RVD; COUSSIO, JD: ECON BOT 30: 161-185 (1976) (DEPT BIOQUIM VEGETAL FAC FARM BIOQUIM UNIV BUENOS AIRES BUENOS AIRES ARGENTINA)</td>
</tr>
<tr>
<td>ID</td>
<td>Reference</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>L02848</td>
<td>Constituents of erythrina crista-galli. Huang, KF; Liou, LF; Chih Pharm J(Taipei) 49 5/6: 305-314 (1997) (Inst Appl Chem Provid Univ Taichung 43301 Taiwan)</td>
</tr>
<tr>
<td>N07061</td>
<td>Identification of the Erythrina phytolexin cristacarpin and a note on the chirality of other 6α-hydroxypterocarpans. Ingham, JL; Markham, KR; Phytochemistry 19: 1203-1207 (1980) (Dept Botany Phytochemical Unit Univ Reading Reading RG6 2AS England)</td>
</tr>
<tr>
<td>T00485</td>
<td>Search for coumarin compounds in seeds and fruit. II. Seeds of the family Papilionaceae-fabaceae. Kaminski, B; Glowniak, K; Majewska, A; Petkiewicz, J; Szaniawska-Dekundy, D; Farm Pol 34: 351- (1978) (Dept Pharmacog Acad Med Lublin Poland)</td>
</tr>
<tr>
<td>T06729</td>
<td>Studies for determining antibiotic substances in some Egyptian plants. Part I. Screening for antimicrobial activity. Ross, SA; Megalla, SE; Bishay, DW; Awad, AH; Fitoterapia 51: 303-308 (1980) (Department of Pharmacognosy Assiut University Assiut Egypt)</td>
</tr>
<tr>
<td>ZZ1007</td>
<td>MANUAL DE FITOTERAPIA, 2ND ED. COIMBRA, RAUL. SAO PAULO, BRAZIL: DADOS INTERNACIONAIS DE CATALOGACAO NA PULICACAO (1994)</td>
</tr>
<tr>
<td>ZZ1015</td>
<td>WORLD PRESERVATION SOCIETY. POWERFUL AND UNUSUAL HERBS FROM THE AMAZON AND CHINA. GAINESVILLE, FL: THE WORLD PRESERVATION SOCIETY, INC (1993)</td>
</tr>
<tr>
<td>ZZ1016</td>
<td>TRADITIONAL USES OF RAINFOREST BOTANICALS. EASTERING, J: (1993)</td>
</tr>
<tr>
<td>ZZ1067</td>
<td>HERBAL TREASURES FROM THE AMAZON, PARTS 1, 2 AND 3. SCHWONTKOWSKI, DONNA. HEALTHY AND NATURAL JOURNAL (1996)</td>
</tr>
<tr>
<td>ZZ1093</td>
<td>PERU EL LIBRO DE LAS PLANTAS MAGICAS, 2ND ED. ZADRA, DE ADRIANA ALARCO. LIMA: CONCYTEC (2000)</td>
</tr>
<tr>
<td>AX1004</td>
<td>INDICACAO, PARTE E PREPARO DE PLANTAS MEDICINAIS. RODRIGUES VEG: CARVALHO, DA (EDITORS): PLANTAS MEDICINAIS DO CERRADO. UFLA, LAVRAS, MG, BRAZIL (2001)</td>
</tr>
<tr>
<td>AX1015</td>
<td>URSOLIC ACID AS A TRYPANOCIDAL CONSTITUENT IN ROSEMARY. ABE, F; YAMAUCHI, T; NAGAO, T; KINJO, J; OKABE, H; HIGO, H; AKAHANE, H: BIOL PHARM BULL 25 11: 1485-7 (2002) (FACULTY OF PHARMACEUTICAL SCIENCES, FUKUOKA UNIVERSITY, FUKUOKA, JAPAN)</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>AX1016</td>
<td>METHOD OF USING LECTINS FOR CONTRACEPTION AND PROPHYLAXIS AGAINST DISEASES TRANSMITTABLE BY SEXUAL CONTACT AND CONDOM CONTAINING LECTINS. OLDHAM, MJ; ROSE, BF; KRIVAN, HC: LEGERE PHARMACEUTICALS, LTD. US PATENT #6,074,671 (2000)</td>
</tr>
</tbody>
</table>
Clinical Research


**Effect of acute treatment with a water-alcohol extract of Erythrina mulungu on anxiety-related responses in rats.**

Onusic GM, Nogueira RL, Pereira AM, Viana MB.
Laboratorio de Psicofarmacologia, Faculdade de Filosofia, Ciencias e Letras de Ribeirao Preto, Universidade de Sao Paulo, Ribeirao Preto, SP, Brasil.

We investigated the effect of acute oral treatment with a water-alcohol extract of the inflorescence of Erythrina mulungu (EM, Leguminosae-Papilionaceae) (100, 200 and 400 mg/kg) on rats submitted to different anxiety models: the elevated T-maze (for inhibitory avoidance and escape measurements), the light/dark transition, and the cat odor test. These models were selected for their presumed capacity to demonstrate specific subtypes of anxiety disorders as recognized in clinical practice. Treatment with 200 mg/kg EM impaired avoidance latencies (avoidance 1 - 200 mg/kg EM: 18 +/- 7 s, control group: 40 +/- 9 s; avoidance 2 - 200 mg/kg EM: 15 +/- 4 s, control group: 110.33 +/- 38 s) in a way similar to the reference drug diazepam (avoidance 1: 3 +/- 0.79 s; avoidance 2: 3 +/- 0.76 s), without altering escape. Additionally, the same treatments increased the number of transitions (200 mg/kg EM: 6.33 +/- 0.90, diazepam: 10 +/- 1.54, control group: 2.78 +/- 0.60) between the two compartments and the time spent in the lighted compartment in the light/dark transition model (200 mg/kg EM: 39 +/- 7 s; diazepam: 61 +/- 9 s; control group: 14 +/- 4 s). The dose of 400 mg/kg EM also increased this last measurement (38 +/- 8 s). These results were not due to motor alterations since no significant effects were detected in the number of crossings or rearings in the arena. Furthermore, neither EM nor diazepam altered the behavioral responses of rats to a cloth impregnated with cat odor. These observations suggest that EM exerts anxiolytic-like effects on a specific subset of defensive behaviors, particularly those that have been shown to be sensitive to low doses of benzodiazepines.

**J Ethnopharmacol 2000 Jul;71(1-2):145-51**

**Cytotoxic and DNA interaction activities of extracts from medicinal plants used in Argentina.**

Mongelli E, Pampuro S, Coussio J, Salomon H, Ciccia G.
Departamento de Quimica Organica, Facultad de Ciencias Exactas y Naturales, Ciudad Universitaria, Pabellon 2, 1428, Buenos Aires, Argentina.

Eight crude extracts from seven Argentine plants with cancer-related ethnobotanical uses have been subjected to a bioscreening study to detect cytotoxic activity. The plants studied were: Aristolochia triangularis, Baccharis grisebachii, Bolax gummifera, Eupatorium hecatanathum, *Erythrina crista-galli*, Pterocaulon polystachium and Salpichroa originifolia. Crown gall tumour inhibition, DNA interaction and cytotoxicity towards KB cells were assayed using the potato disc, the DNA-methyl green (DNA-MG) and the KB cells cytotoxicity bioassays respectively. The results obtained indicate that A. triangularis (ED50=47 microg/ml), B. gummifera (ED50=32 microg/ml) and E. hecatanathum (ED50=35 microg/ml) contained cytotoxic compounds against KB cells. All of the plants studied inhibited the growth of crown gall tumours, showing correlation between the experimental data and the uses reported for these plants. Moreover, the results obtained for the extracts of E. hecatanathum and P. polystachium indicate the presence of compounds that interact with DNA (48 and 22% of absorbance decrease, respectively). The results obtained suggest that cytotoxicity could play an important role in the activities claimed for the plants under study.

**Phytochemistry 1999 Oct;52(3):373-82**

**Biosynthesis of Erythrina alkaloids in Erythrina crista-galli.**

Maier UH, Rodl W, Deus-Neumann B, Zenk MH.
Institut fur Pharmazeutische Biologie, Ludwig-Maximilians-Universitat Munchen, Germany.

A precursor application system was developed to allow the study of Erythrina alkaloid formation in *Erythrina crista-galli*. Fruit wall tissue of this species was recognized as the major site of alkaloid biosynthesis. The application of radioactively and 13C-labelled potential precursors showed that the hitherto assumed precursor (S)-norprotosinomenine was not incorporated into the Erythrina alkaloids. In contrast,
(S)-coclaurine as well as (S)-norreticuline were metabolized to erythrinaline and erythrine, respectively, suggesting that a coclaurine-norreticuline pathway is operative in Erythrina alkaloid formation. Feeding of [1-13C]-labelled (S)-norreticuline with subsequent NMR spectroscopy demonstrated that the resulting erythrinaline was exclusively labelled at position C-10. Therefore, the participation of a symmetrical intermediate of the diphenoquinone type in Erythrina alkaloid biosynthesis can be excluded.

**Psychopharmacology (Berl) 2000 Feb;148(3):234-42**

Effects of the competitive nicotinic antagonist erysodine on behavior occasioned or maintained by nicotine: comparison with mecamylamine.

Mansbach RS, Chambers LK, Rovetti CC.

Department of Neuroscience, Pfizer Central Research, Groton, CT 06340, USA.

RATIONALE: The cellular effects of nicotine underlying its addictive liability are thought to be mediated by neuronal nicotinic receptors (nACHRs) in the central nervous system. It is believed that densely expressed beta32-containing nACHRs in the central nervous system are responsible for these actions, but few data are available that can directly assess subtype mediation of nicotine's acute subjective and reinforcing effects.

OBJECTIVE: The present study compared the effects of the competitive nACHR antagonist erysodine and the noncompetitive antagonist mecamylamine in rats trained to discriminate or self-administer nicotine.

METHODS: Adult male rats were trained to discriminate 0.4-mg/kg injections of nicotine from vehicle in a two-lever procedure of food-maintained behavior, or to self-administer 0.03-mg/kg injections of nicotine under fixed-ratio 5 or progressive-ratio schedules of reinforcement. Additional rats were trained under a food-maintained procedure of lever pressing.

RESULTS: Erysodine (0.3-10 mg/kg) and mecamylamine (0.1-1.0 mg/kg) blocked nicotine discrimination, although only erysodine produced the rightward shift that would be predicted of a competitive antagonist. Erysodine (0.32-32 mg/kg) and mecamylamine (0.32-3.2 mg/kg) also selectively reduced nicotine self-administration on a fixed-ratio schedule and lowered break points on a progressive-ratio schedule.

CONCLUSIONS: Based on the known affinity of erysodine for alpha4beta2 nACHRs and its selectivity relative to alpha7 and alpha1beta1gammadelta receptors, the present data support a critical role of beta2-containing nACHR constructs in the discriminative and reinforcing actions of nicotine.


Erysodine, a competitive antagonist at neuronal nicotinic acetylcholine receptors.

Decker MW, Anderson DJ, Brioni JD, Donnelly-Roberts DL, Kang CH, O'Neill AB, Piattoni-Kaplan M, Swanson S, Sullivan JP.

Pharmaceutical Products Division, Abbott Laboratories, Abbott Park, IL 60064-3500, USA.

Erysodine, an erythrina alkaloid related to dihydro-beta-erythroidine, was found to be a more potent inhibitor of [3H]cytisine binding at neuronal nicotinic acetylcholine receptors but a less potent inhibitor of [125I]alpha-bungarotoxin binding at muscle-type nicotinic acetylcholine receptors than dihydro-beta-erythroidine. Erysodine was a competitive, reversible antagonist of (-)-nicotine-induced dopamine release from striatal slices and inhibited (-)-nicotine-induced 86Rb+ efflux from IMR-32 cells. Erysodine was equipotent with dihydro-beta-erythroidine in the dopamine release assay but 10-fold more potent in the 86Rb+ efflux assay, suggesting differential subtype selectivity for these two antagonists. Erysodine, systemically administered to mice, entered the brain and significantly attenuated nicotine's hypothermic effects and its anxiolytic-like effects in the elevated plus-maze test. There was greater separation between antagonist and toxic doses for erysodine than for dihydro-beta-erythroidine, perhaps because of erysodine's greater selectivity for neuronal receptors. In rats, erysodine prevented both the early developing decrease and the late-developing increase in locomotor activity produced by (-)-nicotine. The potent and competitive nature of erysodine's antagonism together with its ability to enter the brain after systemic administration suggest that erysodine may be a useful tool in characterizing neuronal nicotinic acetylcholine receptors.