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Article

OBTAINING EXTRACTS FROM MORNING GLORY. PHARMACOTOXICOLOGY

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ABSTRACT

In the early 1930s, Japanese researchers made the first genetic map of plants using flowers with variations in color from the genus *Ipomoea*. Recent studies have placed eyebrows as a model for understanding the genes involved in flower color. Current work with *Ipomoea* species raises a series of evolutionary questions that apply to many biological organisms and processes. There is a great appreciation of this kind of flowers because it is very versatile in terms of studies on their systems.

Keywords: morning glory, bio-active compounds, toxicity

1. INTRODUCTION

The genus *Ipomoea* along with its species, the most famous of which are the cornflowers, raised many questions over time about its evolution. The genre presents a wide diversity in environmental tolerance, flower color, form of growth, and research has been very intense over the past 80 years.
The term "buckwheat" refers to the fact that these plants have an impressive start, but which fades quickly, supported by the fact that the flowers open early in the morning, but wither until the afternoon. This aggressive feature does not, however, affect the production of flowers or seeds, so the plant is easy to grow in both greenhouses and fields. All these qualities have led to the use of the *Ipomoea* genus in organic genetics. Current studies on zorls began in 1970, but continue today, and their commemoration in literature is about 80 years. The current work with the owls and the rest of the *Ipomoea* species raises many questions about evolution, questions about many organisms and biological processes. These questions are diverse, from the evolution of the reproductive system, to the interaction with herbivores and parasitic plants (Baucom et al. 2011; Wang et al. 2017; Kinori et al. 2018).

1.2 Botanical description of morning glory

The *Convolvulaceae* family, of which the morning glory belong, has many representatives, from those with very tall vines and woody linden trees in tropical forests to perennial plants. Morning glory are appreciated and cultivated by humans for the beautiful trumpet flowers and their very attractive leaves.

The species of corolla are the most common in Asia and tropical America, but because they spread so easily they are also found in temperate and subtropical areas. Vine and clover grow at a very high speed and usually begin at the edge of the forests or near the lakes where the trees fell and the sun penetrates vigorously. Having a lot of competition for light and space, they grow very fast, even to the top of the trees, to facilitate photosynthesis, special adaptation of some species.

Although there are dozens of different genus types, with slightly different floral features, leaves and fruits are also slightly different, all have the same thing in common: their flowers are funnel-shaped and colors like purple, blue, white, yellow or red. We have forgotten to mention a very important representative, *Ipomoea aquatica* or water spaniel, which originated in China. It is often cultivated in China, India, Malaysia, Central America, the West Indies and Brazil, and is a green vegetable. Some Asian restaurants serve customers and are also found on Asian markets in Southern California.

Being a tasty plant was naturalized in Australia and some countries in Africa, South America and the Pacific. It can replace native plants, thus destroying habitats of wild fish and animals.

Perhaps the most famous representative of the *Convolvulaceae* family is *Ipomoea batatas* (sweet potato). Probably brought by Christopher Columbus from America is highly appreciated for its sweet-tasting root.

The Mexican horns *Ipomoea violacea* and *Turbina corymbosa* were taken by the Aztec priests and drunk to communicate with their gods.

Due to the extremely fine line between the lethal effect and the desired effect, they were only used by the experienced ones. The effect is given by the ergoline alkaloid. Before it was discovered, the ergin was known only from ergot (*Claviceps purpurea*), a rust fungus that infects the beans. In the Middle Ages, thousands of people in Europe were affected by ergotism, a malady characterized by madness, cangrene and seizures. Maladia started because they ate infected bread with *Claviceps purpurea*. (Petruzzello 2019)

1.3 Bio-active compounds from morning glory

Until now, in *Ipomoea purpurea* was identified 25 volatile compounds, of which 17 had retention times for GC-MS methods. No benzenoid or volatile phenpropanoid have been identified in the studies, although some Ipomoea species such as Ipomoea langifolia and *Ipomoea Alba* emit aromatic compounds such as methylsilicate and methylbenzonate.

Subsequently, extracts from leaves and dried seeds were made from *Ipomoea Alba*. These extracts have been found to exhibit a complex of oligosaccharides, monohydroxy and dihydroxy C-14 and C-16 which are some fatty acids which are zorrel-specific secondary metabolites.

Another representative of the *Ipomoae* genus that causes many deaths in Brazil is *Ipomoea asarifolia*. Previous studies show that lectin may be involved in toxic effects. To reinforce this hypothesis a lectin fraction of *Ipomoea asarifolia* was isolated and its effects evaluated. The leaves were removed from the plant, kept in a room with a relative humidity of approximately 100% at 25 +/- C for 72 hours in the dark.

The in vivo toxicity of the leaves was tested by intraocular injection of the mice. They showed uncontrollable, clumsy movements, but without death. Toxin reduces the ability of muscles to contract up to 50%, which affects the inhibition of neurotransmitters.
It was injected into the kidney of the mice, with no visible effects on vascular resistance and pressure, but with an increase in glomerular filtration. In addition, the percentage of tubular transport, and decreased. After a histological examination of the kidneys, minor alterations were reported, which proved the toxic nature of lectin. (Rice & Genest, 1965)

1.4 Aspects of pharmacology and pharmacotoxicology of bio-active compounds from morning glory

The potential for sharing biochemical pathways between pigments and volatile substances has received particular attention. There are at least two independent sources of biosynthetic connections among these floral characters. One of the greatest importance in medicine is *Convulvulus pluricaulis*, an important representative of the Convolvulaceae family, recognized for its versatility and treatments.
It is a good cure against high blood pressure, vomiting, ulcer, epilepsy and neurodegenerative diseases. It is also used to lower cholesterol and improve memory. In traditional practices it is even used as a memory supplement. Reduces mental tension and acts as an anesthetic, "tranquilizer". We're talking about a tranquilizing effect because recent pharmaceutical studies suggest that. (Kumar 2007)
Clinical studies of *Convulvulus pluricaulis* show that it has beneficial effects on patients with anxiety. Induce a sense of calm and tranquility, tranquil sleep, relieving stress and eliminating mental fatigue. Phytochemical screening performed on the ethanol extract from *Convulvulus pluricaulis* showed the presence of phytoco constitutions such as alkaloids, glycosides, sterol, mucilages, carbohydrates and protein. (Gupta et al. 2005)
The various pharmacological and structural properties show that alkaloids and steroids have been found in compounds that can explain the traditional therapeutic effects. Some preparations have been subjected to clinical tests, the preparations being administered as syrup and tablets. (Agarwa et al. 2014)

1.5 Suicide cases with morning glory

There is a famous suicide case with seeds containing LSA. Two men aged 29 (deceased) and 25 (witness who survived). The seeds were soaked in water for about 2.5-3 hours and then ingested by the subjects. The witness ingested six seeds, and he could not remember how much he had consumed. Shortly afterwards, both subjects consumed cannabis (Ahimsa-Mueller et al. 2007)
Approximately 40 minutes after ingestion, the witness had feelings of well-being, but also the sense that time passed very quickly. Approximately 3 hours after ingestion, the 29-year-old subject (deceased) showed very intense agitation and jumped off the window falling on 4 floors. (Schultes & Hofmann 1980)
At autopsy, the toxicological analysis was done 13 hours after ingestion. The report specified cranial contusions, multiple fractures of the pelvis and ribs, lacerations of the right lung, cardiac contusion, rupture of the artery and arteriosclerosis. Blood and urine of the witness were taken 9 hours after ingestion (Klinke et al. 2010)

The more LSA-containing seeds are found in stores and marketed online. Some buy them for legitimate purposes and others strictly for hallucinogenic effects. LSA is classified as a precursor to LSD. (Cohen 1964)

2. METHOD/MODEL

For the extract, dry material was used, namely Ipomoea purpurea seeds and *Ipomoea tricolor* seeds. The extraction method used was cold maceration, carried out at room temperature (17-24 ° C). As solvents I used water for *Ipomoea purpurea*, namely alcohol for Ipomoea tricolor. The powder of Ipomoea purpurea weighed 1.8222 mg, and the Ipomoea tricolor powder had the weight of 2.0611 mg.
After crushing, the powder was placed in the solvent, each in its solvent, and then filtered under vacuum. The preparations were for a period of 24 hours, after which filtration was performed. The obtained extract was processed by IR and UV spectroscopic methods for the identification of bioactive compounds in the gills.
It has been preferred to use cold maceration since this avoids the precipitation of the bioactive substances obtained from the extract. If we had used methods such as infusion or decoction, there was a good chance that substances would precipitate. As this process is carried out at room temperature, it can only be an advantage for making the preparation.
The extracts were made in 98% ethyl alcohol. The only disadvantage of cold maceration is that sometimes if it is made with a solvent other than water or alcohol, such as oil, wine, vinegar, etc., the separation time is prolonged a lot and can even reach a few weeks.

2.1. Theoretical Method/Model

Heat precipitates extracted bioactive substances, which is why cold extraction is preferred in exchange for decoction or infusion. It has many advantages in terms of being at room temperature and, besides, it is the simplest way to extract. It also implies the presence of a solvent, which is usually water or a mixture of water and alcohol. The plant product to be macerated is kept in constant contact with the chosen solvent and has to be agitated at different time intervals. The maceration time is variable; at the end of the process the extract is separated.

2.2. Experimental Method/Model

Cold maceration is performed at room temperature (C). The product and solvent remain in contact for a determined period, for example if the solvent is water for 8-12 hours. If the maceration had occurred warm it would have been done at a temperature of C. Separation of the product can be done by filtration or decantation. Exit and macerate which is made in other solutions, eg vinegar, oil, wine. If the maceration is done with one of these solutions, the separation is much longer, in some cases reaching a few weeks.
If we have to relate to the process, we have simple, double or repeated maceration. The simple one was not very efficient because it had low yields, so it was repeated and doubled maceration. In this case contact with solvent is unique. The double maceration is somewhat more complex; the extracted product is mixed with the solvent in a ratio of 1/2 to 2/3. The resulting residue is pressed and the liquid is separated. A new amount of extractive solution resulting from the contact between the pressed residue and the solvent residue will be obtained.
Once the liquids are joined and run for 24 hours, they will be filtered. Repeated maceration is the most complex. The product is treated with a variety of solvents, all after being cut, and then stored in closed containers all the time. After pressing the plant product, it is in contact with

what remains of the solvent until the total volume of the extractive liquid is completely exhausted.
After that the portions to be obtained are mixed. This method avoids the scattering of the active principles that can remain in the maceration residue, as happens for simple maceration. Macerata should be kept in a refrigerator, preferably in closed glass pots.
The maximum storage life is 2-3 days. If the retention period is prolonged, the development of microorganisms is likely. Besides this there is the risk of degrading the active principles in an irrecoverable way (Paun et al. 2011)

3. IR & UV ASSESMENT

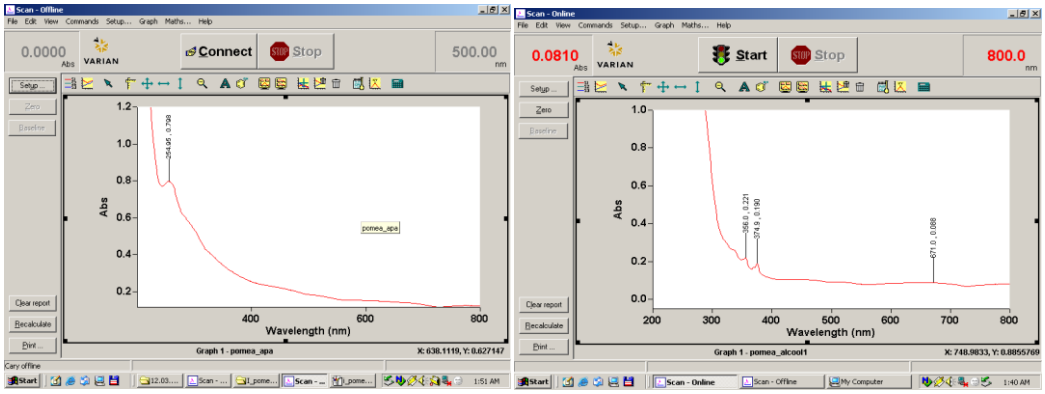
IR spectroscopy or infrared spectroscopy is a technique that involves tracking interactions between matter and infrared radiation. Assume the absorption of wavelengths in the infrared range. However, the absorption is carried out in accordance with the characteristics of the chemical structures.
IR spectroscopy utilizes wavelengths ranging between 750nm-100µm. Frequencies that match the transition energy of a link or the vibration of a group within a molecule are called resonant frequencies. An n-atom molecule normally has 3n-6 normal ways in which it can vibrate. In the case of 3n-5 we have a linear molecule, that is, the rhorthole around its molecular axis can not be detected.
Generally, radiation studies the photons strictly, but if we relate to spectroscopy, we can see that it also deals with electrons, phonons, or protons. If it also refers to these aspects, it automatically refers to the state of aggregation of the product that will interact with the radiation emitted. (Stef 2017)
UV spectroscopy analyzes quantitatively and qualitatively everything related to UV absorption spectra (UV-visible). This is only the case if the substances are in a solid or liquid state and only if we refer to organic and inorganic substances. One thing to note in UV spectroscopy is that the focus falls on quantitative analysis rather than on qualitative analysis. This is due to the fact that not all spectra of substances have clear maxima. The Lambert-Beer Law established a correlation between absorbance A, length of radiation pathway and sample concentration C. (Andu Jothi & Geetha 2017)

3.1. Results

The results obtained are represented (see Figures 1 and 2) and analyzed. The specimen was used to identify the bioactive compounds present in both Ipomoea purpurea and Ipomoea tricolor.
Within the IR spectrum for species of the genus Ipomoea, the compounds and lengths of them may be:
-the wavelength 3405.75 shows a 44% transmittance corresponding to the prolonged N-H leg of pyrolites
- at wavelength 2920.56, a 12% transmittance corresponding to the elongated C-H bond in the alkanes
- at the wavelength 2850.95, a 20% transmittance of the elongated C-H bond from the alkanes
- the wavelength of 1647.72 shows an 18% transmittance of the elongated N-H bond of the secondary amines
- at the wavelength of 1544.87 there is a 28% transmittance corresponding to the elongated bond from the nitro tertiary compounds
-the wavelength of 1384.45 shows a 25% transmittance corresponding to the alkane deformed bond

- at the wavelength 1320.12 there is a 36% transmittance corresponding to the elongated S = O bond of the sulfur compounds
-the wavelength of 1255.05 shows a 10% transmittance corresponding to the elongated O-R bond from aliphatic esters (CH3COOR)
- at the wavelength 1155.75 there is a 32% transmittance corresponding to the S = O elongation from the sulfones
-the wavelength 1051.63 shows a 22% transmittance corresponding to the S = O elongation from the sulfonic acid
- at a wavelength of 919.94, a 68% transmittance of the deformed C-H bond from mono-substituted alkanes
- at the wavelength of 618.99 there is a 40% transmittance corresponding to the elongated C-Cl bond of the halides
At the wavelength of 532.06, a 42% transmittance of the elongated C-Br bond from the bromides
- the wavelength 445.08 shows a 55% transmittance of the iodine elongated C-I bond
(Andu Jothi & Geetha.2017)

Fig 1. *Ipomoea purpurea* in water **Fig2.** *Ipomoea tricolor* in alcohol



In the UV spectrum, the results show that:
-for Ipomoea purpurea, at a wavelength of 254.95, 0.798, there is a 0.9 nm absorbance corresponding to the Cy2C4G component
- for *Ipomoea tricolor*, at a wavelength of 356.0, 0.221 there is a 0.3 nm absorbance corresponding to the Pg3C5G component
- for *Ipomoea tricolor*, at a wavelength of 374.9, 0.190, there is a 0.25 nm absorbance corresponding to the Pg3C4G component
- for *Ipomoea tricolor*, at a wavelength of 671.0, 0.088 there is an absorbance of 0.2 nm corresponding to the Cy3C5G component
(Chandran et al. 2012)

3.2. Discussion

There have been reports of mental degradation after harvesting of the seabuckthorn, publicized cases for population prevention. Mental degradation has often led to suicide cases from subjects who have ingested semen seeds. Studies have shown that plants have developed methods of insect defense, and insects require a natural selection of plants. Furthermore, insecticide treatments have shown that plants have developed more seeds in the absence of insects, and insecticide treatment has not produced genetic or evolutionary variations. For this purpose, it has been found that using empirical data and theories, the understanding of evolution can be made by understanding the tolerance and resistance of plants of this genre.

4. CONCLUSIONS

Morning glory is an extremely diverse family, being the most known members of the genus *Ipomoea*, highly appreciated in all corners of the world for their beauty.
With a very fast growth rate and pleasant appearance are grown on a large scale, having an important economic role. Perhaps the most important role of alkaloids in their seeds, being much studied for their properties.
It has a very large variety, *Ipomoea tricolor* and *Ipomoea purpurea* (both ornamental), *Ipomoea violacea* (used in religious ceremonies*), Ipomoea Alba* (used in the rubber industry), *Ipomoea leptophylla* and *Ipomoea arborescens* (present in the form of trees or shrubs) and even *Ipomoea batatas* (sweet potato).
The most important bioactive compounds in the eyebrows are alkaloids, which give the seeds different properties, from reducing blood pressure, stopping vomiting or neorodegenerative diseases to effects and conditions similar to LSD consumption.
Morning glory have LSA, an LSD-like alkaloid, which leads to the testing of seeds in different forms by many people.
The most notorious case of death in corn consumption occurred in the US, where two men of 24 and 25 years of age consumed seed water, and after a few hours the 29-year-old died.
In the present work I made cold extracts in ethyl alcohol 98% of the seeds of the corn.
The obtained extracts were by IR and UV spectroscopic methods. The following types of bioactive compounds have been identified: alkaloids in particular
In terms of toxicity, doses higher than 200 mg / kg are fatal.
Due to the compounds present in *Ipomoea purpurea* and *Ipomoea tricolor*, but also in the rest of *Ipomoea* representations, they are of great pharmacological and pharmacotoxicological interest.

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