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## ABSTRACT

The water extract from *Banisteriopsis caapi*, *Psychotria vidris* and *Brugmansia ap.*, generally known in the jungle as Ayahuasca, a potion, constitutes the central axis of *curanderismo* (shamanism), in the whole of the Amazon basin, due to the purgative and psychotropic effects.

Anthropological, psychological and phytochemical studies demonstrate that it can be used to advantage in the treatment of chemical dependences and psychopathology, if it is properly administered.

Our Ayahuasca observations enable us to reach some conclusions regarding improvements in its method of preparation.

Treatment of patients also indicates that curative sessions are affected not only by the active ingredients ( $\beta$ -carbolines and tryptamines), but also by the psychosomatic condition of the patient, by natural environmental factors, and finally by other factors controlled by the therapist.

## 1. ANTECEDENTS

We have carried out research on traditional medicines in Tarapoto and the surrounding Province of San Martín (Peru) since 1986. The central objective has been to evaluate alternative therapies proposed by the ancestral, autochthonous medicines, primarily in the treatment of addiction to cocaine basic paste.

From the very beginning, this required dealing with empirical medicine with great respect, considering ourselves as essentially ignorant on the subject, mere students of healers and shamans.

After initial local contacts were made, it rapidly became evident that the Ayahuasca potion constituted the key to empirical knowledge, and therefore an obligatory route in attempting to understand something about what turned out to be a very complex and elaborate traditional body of knowledge. We accordingly decided to re-initiate our medical studies in that other university: the jungle.

We focused our attention on Ayahuasca: its preparation, uses and therapeutic results. Learning about its uses also implied surrendering direct control, accepting auto-experimentation and guidance from the more experienced local healers.

Ayahuasca is a purgative decoction of a mixture of psychotropic plants (*Banisteriopsis caapi*, *Psychotria vidris* and *Brugmansia sp.*) Its use by autochthonous jungle-dwelling groups has therapeutic and ritual purposes. It is ingested in collective, nocturnal sessions directed by a “maestro”.

To date, we have participated in over 300 nocturnal Ayahuasca sessions, after following the related initiatory procedures indicated by the “maestros”, such as diets, isolation in the jungle, fasts, sexual abstinence, learning songs, etc. We have finally reached the state of directing therapeutic sessions ourselves, administering Ayahuasca to others. In total, this adds up to first hand observations of over 2000 persons under the effects of Ayahuasca.

Several investigators from different disciplines joined together in a multi-disciplinary group: Prof. Julio

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## 2. METHODOLOGY AND JUSTIFICATION

Given the peculiarities of the problem, we had to redefine the basic axioms and fit them to an atypical scientific situation. With the advice of the healer “*maestro*” specialized in this subject, we decided to explore Ayahuasca *in situ*, under the empirical conditions in which Ayahuasca is administered, committing ourselves to **systematic auto-experimentation**.

Our decision to proceed in this manner was based on the following premises:

### 2.1. Defective indirect studies

- 2.1.1. In the abundant literature on Ayahuasca (we have more than 500 items), less than 10% of the authors were able to self-experiment and had therefore to use second-hand information.
- 2.1.2. Among the authors that did self-experiment, less than 10 refer to more than 5 curative sessions, and none that we know of, affirms to have followed the classic steps of apprenticeship (diets, isolation, abstinence). The “*maestros*”, meanwhile, continue to insist in the rigorous and indispensable nature of strict rules, as well as on a relatively long apprenticeship, before one can learn or understand anything. The validity of this insistence has been constantly reaffirmed over time and space.
- 2.1.3. The preparation generically called Ayahuasca, contains *β-carboline* and *tryptamine alkaloids*, which are perfectly identified. Alkaloids present in the plants, however, are not present in the potion, as pointed out by some researchers (Rivier and Lindhren 1972). Studies made of the pure alkaloids, therefore, cannot reflect the realities of a session, since the potion is not identical in content.
- 2.1.4. Experiments with pure alkaloids require doses of 300-500 mgms. of alkaloids (*harmine*, *harmaline* or *tetrahydroharmine*) to secure threshold effects (Pennes and Hoch, 1957) (Naranjo, C. 1967), while the use of the potion prepared by local healers requires doses of only 10-30 mgms. of the same alkaloids; this suggests possible synergetic effects in the empirical combination of the potion (McKenna, Johns, Ryall, 1990).
- 2.1.5. Under autochthonous conditions of ingestion, the therapist accompanies and guides the patients “from the inside”, becoming attuned with them by taking the brew himself. In the few clinical attempts made by a small number of modern therapists, they have not ingested the potion themselves, and guide their patients “from outside”, furthermore using pure alkaloids (Naranjo, C. 1973).

This clearly indicates that the ethno-anthropological studies, as well as the medico-pharmacological ones, are lacking a fundamental requirement, which consists of direct observation under natural conditions.

### 2.2. Validity of the empirical approach

It seemed to us that to study Ayahuasca phenomenology *in situ* would be quite valid, for the following reasons:

- 2.2.1. Healers often demonstrate an evident knowledge of unexplained therapeutic methods hitherto unheard in modern science, which can nevertheless be proven concrete, observable events, subject to scientific understanding:
  - ✓ Field observations show addicts cured by healers or shamans using their therapeutic arts.

- ✓ The mixture of plants constituting the Ayahuasca brew responds to the precise need to combine *tryptamine-type alkaloids*, orally inactive, with *mono-amine oxidase* inhibitors, such as *β-carboline inhibitors*. Those conditions do not occur in nature, so knowledge about them must derive from a finely honed and efficient technology. Neither random incidents (Naranjo, P. 1983), nor observation of animal behavior, can account for this remarkable invention. An amazed D. McKenna wonders "...how these practitioners have drawn the connection between the properties of the *Banisteriopsis* plant and its ability to potentiate and render orally active still other plants containing DMT or other tryptamines" (McKenna, D. 1990)
- ✓ The "Ayahuasca science" has an unusual diffusion in geography (throughout most of the Amazon basin), as well as in time. Plutarco Naranjo mentions that the oldest known object related to the use of Ayahuasca, is a ceremonial cup, hewn out of stone, with engraved ornamentation, which has been found in the area of Pastaza culture (Amazonian Ecuador), forming part of the collection of the Ethnological Museum of the Central University (Quito). This culture covers the period 500 B.C. to 50 A.D. (Naranjo, P. 1983). Under a diverse variety of names (*ne'pe'*, *xono*, *date'm*, *kamarampi*, *pilde*, *natema*, *yaje'*, *caa-pi*, *mihi*, *iona*, *mii*, *nixi*, *pae*, etc.) tribes extremely separated from one another manifest an intimate knowledge of Ayahuasca use.

Under the pragmatism that characterizes primitive cultures does not allow conceiving that such a practice could be maintained over such a long time, in an immense area, despite persistent opposition by Western Christian culture, without a very solid foundation based on proven curative effects, empirically demonstrated.

2.2.2. We have also found and previously pointed out (Mabit, J. 1988) another similarity between traditional knowledge and modern science: possible common logical foundations, which permit autochthonous wisdom to be qualified as "science". Both are based in concrete, observable events (for example, the case of a sick patient who had been treated and cured); both proceed rigorously; both demand results, i.e. the knowledge must "work"; both lean on a coherent body of facts; use a precise, structured methodology; define the conditions that allow experimental verification of observations; determine a methodology for the transmission of the knowledge.

This empirical wisdom then reveals itself as accessible to the student and manifests compatibility with the criteria of modern science.

### 2.3. The observer's attitude

Common sense, as well as practicality, indicates that the best way to study any subject is to receive knowledge from those specialized in it, in this case, the shamans or healers.

This demands that the observer abandon prejudices, go beyond the inhibitions normally afflicting a "serious scientist" and follow all necessary paths in order to be responsive to the peculiarities of the subject. In this case, one needs above all plenty of time, a personal surrender, an acceptance of the need to place derogatory or critical pretensions in suspense at least temporarily, opting rather for humility and respect.

In this area, one confronts too many taboos from the academic community, which have little or nothing to do with scientific progress and mainly reveal an unconscious fear of directly facing the unknown. In fact, one deals with no stopping at what is "normal", or what can be made normal, but daring to risk one's ego in a process of observation, which demands personal surrender.

Kabire Fidaali, in his studies of Bangré in Africa, found these same resistances, and says: "the structure of the human self is not reducible to the normal, which differentiates it from scientific origins: the observer in science is a conception of the normal" (Fidaali, K. 1991:39).

### 3. RESULTS

Once we agree to consider different sciences as equal, both having:

- ✓ foundations, through with differing procedures and manners of explanation
- ✓ common objectives (knowledge of nature and of human beings, development of solutions for collective welfare), then it seems we can establish a fruitful interchange between them.

Lets point out 2 examples of reciprocal enrichment and mutual comparison of facts:

#### 3.1. From traditional knowledge to modern science

The Ayahuasca brew takes its name from the Ayahuasca plant (*Banisteriopsis caapi*), which therefore assumes a key function in the brew as in the therapeutic ritual. Among the different ingredients of the botanic mixture (which varies according to each healer and geographic area), the malpighinaceous vine Ayahuasca always plays the central role, according to the “maestros”. It is she who creates teaching visions, who allows “seeing”, who concentrates the greatest hallucinogenic effects.

Chemists and pharmacologists, however, insists that the dimethyltryptamine (DMT) containing *Psychotria vidris* (chacruna) is the main hallucinogen in the mixture and that which provides the visions, while the *Banisteriopsis* acts only as an MAO inhibitor. McKenna and Towers affirm in 1984 that their experiments “provide strong evidence for the hypothesis that the **hallucinogenic properties of Ayahuasca** are due to the visceral inactivation of MAO and the **subsequent oral activation of DMT** in the potion”. (McKenna, Jons, Ryall, 1990).

In 1990, however, McKenna himself recognizes the hallucinogenic function of *Banisteriopsis* alone: “numerous tribes of the same region prepare an hallucinogenic drink based of *Banisteriopsis caapi* or other members of the *malpighiaceae*. This drink, which contains higher levels of *β-carboline alkaloids*, MAO inhibitors, is by itself hallucinogenic, and is sometimes taken alone” (McKenna, Jons, Ryall, 1990).

The initial contradiction with the empirical knowledge is thus resolved: modern researchers always derive advantages by considering reliable, a priori, any information provided by legitimate Ayahuasca “maestros”. That kind of information can often orient research and permit many shortcuts to be made.

#### 3.2. From modern science to traditional knowledge

There is an extreme diversity in the methods of preparation of the Ayahuasca brew among the different indigenous Amazonian groups. For our purpose of studying applications in the treatment of drug addicts, we had to identify a preparation suitable for those purposes.

We used data supplied by shamanism through ethnographic literature, direct observation, and finally, personal experimentation. In this last phase, we were greatly helped on pharmacodynamic advice.

It is a fact no special method of preparation to treat addicts exists within autochthonous therapeutic tradition. Pharmacodynamic technology led us to gradually introduce improvements in methods of preparation to obtain greater extraction of alkaloids. We were then able to determine amounts to use, most desirable containers, best ways to preserve vines during the time between harvest and preparation, optimum cooking time and intensity, highest quality vines and most desirable ways to preserve the finished potion.

We have found that is better to let the harvested pieces of vine dry out for several days prior to cooking, then to soak them in water for one full day, to cook them in a two steps process, to refrain from de-barking the vine, to construct an oven to concentrate the heat, to use gentle simmering during the cooking process, to avoid exposing the finished potion to light, *etc.*

Our latest batches have allowed the development of crystals in the laboratory, due to the high concentration of alkaloids; this had not been possible with our previous batches, nor with batches made by others.

#### 4. LIMITATIONS OF PHYTOCHEMICAL RESEARCH

At the risk of over-simplification, one can, for didactic purposes, group Ayahuasca studies in two categories, leaving aside any journalistic narratives. Western dichotomy between the sciences and the humanities is reflected in the dualistic approach taken towards Ayahuasca. On the one hand, those anthropologists, ethnologists and sociologists who zero-in on the cultural context, seek primary explanations in social dynamics. In both cases, reality becomes fragmented, reduced to the particular field of expertise of the researcher.

In any case, the moment the healer and the patient come under the influence of Ayahuasca, this artificial discontinuity is dissolved, and the analytic separation of the observer is no longer valid. Ayahuasca creates the healer and vice versa.

Dance is born with the movements of the dancer, who ceases to be a dancer with the end of the dance. Both are extinguished together, after which there is neither dancer nor dance.

In other words, Ayahuasca and healer mutually reveal themselves, and are inseparable. To proceed as separate entities would impoverish the subject, if not totally dissolve it.

Similarly, chemical analysis shows the presence of alkaloids in the brew, which may account for the existence of visions, but remain powerless to explain their “content”. An ultra-materialistic explanation may pretend that all mental phenomena are determined by chemical mechanisms, to which Haldane replies: “if materialism is true, then it seems to me that it is impossible to determine that it is, in fact, true. If my opinions are the result of chemical processes occurring in my brain, then they are determined by the laws of chemistry, and not by the laws of logic” (Haldane, J.B.S., 1937:157).

Karl Popper outlined the limits of deterministic theories which attempt to maintain the “casual linking of the physical world”: “they are all self-destructive to the degree that they establish – certainly without wanting to – the inexistence of their proofs” (Popper, K. 1953: 103 ff.). Later on, he adds that this can be applied to scientific determinism: “Taking as a starting point man’s capacity to predict the world – a capacity which sees itself as unlimited in principle –, its conclusion leaves no further room for logical argument” (Popper, K. 1984: 71).

He concludes that if scientific determinism is true, it is impossible to rationally know that it is: “One believes in it or not, not because one freely judges that the arguments and reasons in its favor are well founded, but because one is determined to believe it, and also because one is convinced that this matter can be settled rationally”. (Popper, K. 1984: 72)

We base our statement that the active principles can never pretend to explain by themselves the effects of an Ayahuasca session, not only on epistemological arguments, but also on the frequent and repeated observation of the following phenomena:

- ✓ With the same brew, dose and session, we can observe totally different effects among the participants, ranging from no effects at all, to that of a “historical intoxication!”
- ✓ With the same brew and dose, a subject may experience amazing variation in responses to Ayahuasca ingestion in different sessions.
- ✓ Taking a second dose may have either no effect at all, compared to the first one, or the opposite effect.
- ✓ One can observe an hallucinogenic intoxication in subjects present in the session who have not ingested the brew and who have not been predisposed toward effects (such as people accompanying a patient, or persons who live in the house where the session is taking place, etc.)
- ✓ On the other hand, the shaman can, by means of certain techniques, cause strong intoxication effects to disappear in a matter of seconds or minutes, without physical elimination of the brew.
- ✓ The same shaman, after ingesting ayahuasca for years, may experience no hallucinogenic effects upon drinking the brew. He also may require smaller doses than his patients to experience effects, and in certain cases attain similar effects without drinking the brew.

To summarize, the composition of the brew is insufficient to explain the enormous variation in effects upon

different subjects in different sessions. There is no strictly proportional response in the subject, corresponding to the dose ingested, or to the alkaloid concentration of the brew.

These facts clearly define the limits of any phytochemical investigation. The raw material (the potion), becomes a key element in curative sessions, but there are many other intervening factors, which must be studied, without which a comprehensive understanding of ayahuasca shamanism would not be possible. Linear, scientific, casual logic, by itself, appears inadequate in this case.

## 5. CONDITIONING FACTORS

### 5.1. Psychomatic states

If the quality and the quantity of the brew are evident conditioning factors, so is the psychosomatic state of the patient at the time of the session.

The emotional, affective state of the patient will potentiate or neutralize the effects of ayahuasca, either consciously or unconsciously.

A voluntary and trusting surrender, the nearness of an emotional or traumatic complex, or a commitment within a therapy group, are all factors, which help induce effects and responses to ayahuasca ingestion. Conversely, a bad diet, use of other drugs or pharmaceuticals, mentioned by way of illustration, may interfere in a contrary manner to that generally expected. Once again, we cannot isolate the parts, or define strict cause and effect relationships.

In principle, one can generally say that psychosomatic conditions are optimal for a “good session”, when the patient has confidence in the therapist and follows his advice, which usually includes some basic rules about living (avoid eating pork, chili, or drinking alcohol; do not engage in sexual intercourse prior to a session, etc.)

### 5.2. Environmental factors

In addition to factors related to the brew or to the patient, there are other external factors, which powerfully affect the results of an ayahuasca session. These belong in one of two phases: perception by the senses, integration at the core level.

In the **first phase**, perceptions by the five senses become manifest. Depending on their intensity, frequency and origin, their stimulus may or may not surpass the perceptual threshold of the individual. We will then have conscious supra-liminal perceptions, or unconscious infra or sub-liminal perceptions.

The conditions under which ayahuasca is taken therefore require a control of lighting, sounds, odors, posture, etc. Each of these elements can deeply modify ayahuasca effects, even to the degree of provoking an hallucinogenic intoxication or neutralizing it, to provide visions of paradise or of terror, to lead to vomiting or to pacify body and mind.

One must mention the immense field of conditioning factors on the ayahuasca effects represented by subliminal perceptions. Depending on the degree of familiarity with ayahuasca lore, one develops a sort of extrasensory perception, which in most cases may be visualized as a sharpening of ordinary senses. The perceptive spectrum is amplified, and this allows for capture of stimuli which were previously subliminal.

Other stimuli remain subliminal, even with the perceptual amplification excited by ayahuasca. Nevertheless, even without becoming conscious, they affect the hallucinogenic experience and the maestro will be quite aware of them.

We consider as beyond the possibility of perception by the 5 ordinary senses these internal perceptions as well: the sense of bodily balance or equilibrium in the internal ear, the sense of internal temperature (which may be different or dissociated from the external one), and the sensation which allows us to perceive our body and its spatial location.

In a **second phase**, integration at the core level of supraliminal or subliminal perceptions leads us, for example, to define lateralization (right-left, above-below), positioning within time and space, identification of what is ours and what is somebody else's (the identity of understanding what is real and differentiating what is unreal, the sense of our presence of ourself and to the world, discrimination of forms, movements, volumes, consistencies, *etc.*)

Neurophysiology suggests that ayahuasca would provoke an excitation of certain cerebral centers such as the temporal lobes (integrative zones) or the limbic system. In this case, we would forecast an increase in emotion as well as sensorial intensification, since such are the functions supposedly pertaining to those parts of the brain.

From another angle, one can look at ayahuasca as a disinhibitor. As Sacks points out, inhibition "acts at the most elementary perceptual level, as if it were necessary to inhibit the primordial and that which is full of hedonic quality, that which is protopathic, if the goal is to allow the surfacing of the epicritic (Head, 1920), complex, categorizing, and bereft of affect" (Sacks, O. 1985). Ayahuasca would disinhibit, toning down the epicritic, allowing the protopathic to flower.

For example, the hyperosmia, which is often manifested during an ayahuasca session, probably corresponds to a stimulation of the ancient olfactory lobe (rhinocephalus), functionally associated with the limbic system to which the function of emotional tone regulator is assigned. Odors that are normally subliminal, can subsequently affect the emotional state of a participant in a session.

An integrating level assumes the existence of a "human being", an emotional being. Sacks insist therefore, on an "essentially personal dimension inherent in all mnesis, gnosis, or praxis", and on the "essentially *melodic* and *scenic* nature of inner life" (Sacks, O. 1985: 191).

The principal consciousness of the self derives from this "awakening" at a superior integrative level, with the consequent possibility of discovering and correcting errors of codification. In this sense, the ayahuasca experience can be a semantic one: it consists of creating and discovering meanings (Bulla de Villaret, 1973: 123). This presence of the self to itself and to the world, determines what we name a state of consciousness.

Environmental factors can thus powerfully shape the states of consciousness of a subject under the effects of ayahuasca.

### 5.3. Interferences between participants

Observation of, and auto-experimentation with, ayahuasca, also allows us to understand the reciprocal influence between different participants in a session. Subtle exchanges become manifest, which we can only describe as "energies".

Within the darkness and silence of a session, a pattern of perceptions is created, and the habitual continuity of relationships between individuals is decreased. Without extinguishing the unique sense of the ego, the participant influences and is influenced by his companions.

A certain "energetic quality" emanates from each participant and this is diffused within the space of the session, sometimes encountering a welcome opening in another participant. These emotions can be received and integrated pleasantly or unpleasantly, in a benevolent or a malignant manner. In the latter case, it is not unusual for a participant to induce vomiting in another, due to transmission of an unacceptable influence. Such an event, extraordinary by any current rational approach, is nevertheless frequently observed: facts are stubborn!

The power of suggestion is not enough to explain these instances, since,

- ✓ Effects of ayahuasca ingestion are almost always very surprising, unpredictable, and contrary to the pre-conceived notions of the participants.
- ✓ Animals demonstrate great sensitivity to those "energies", which cause them to come closer, or to flee in an unusual manner (dogs, cats, birds, spiders, snakes, insects, frogs, etc.). Upon contact with a patient with "negative" energy, a dog's body may begin to tremble, or it may become suddenly aggressive, or vomit. All of these events have been observed.

#### 5.4. Influence of the therapist

We must now point to the last and perhaps the central conditioning factor: the healer or shaman that presides over the session.

He acts as the orchestra conductor. His role consists of modulating, regulating, controlling, and this complex dance of factors, harmonizing the energies in play. Without a doubt, the quality of his own energy determines the result of the session. The basic energetic modulation is transmitted through the sacred songs. His body is the therapeutic instrument par excellence, beyond constituting the element of his own initiation (Mabit, J. 1988 b).

We are here at the very limits of conventional conceptual formulations. We need to forge new conceptual instrumentation, new vocabularies which permit description of phenomena beyond ordinary experience. Meanwhile, we resort to the term “energy” to deal with the experience: a “bad” energy tires the patient, a “good” energy tonifies him; the same energy may be perceived by different patients through different senses (for some through lights, smells for others, and yet through sounds or body tremors for still others, *etc.*) The purgative effects consist on ejecting “bad” energies by vomiting, and by other more subtle emanations. At a personal level, the ego experience concomitantly and inseparably the eviction of those energies at a mental level (“bad ideas”), at an emotional level (“bad feelings”), and at physical level (vomit, diarrhea, hypersalivation, copious sweating, *etc.*)

The energetic concept is foremost among all conditioning factors in ayahuasca ingestion, in accordance with the empirical tradition, compatible with the most advanced concepts of modern science, and experimentally proven at an individual level, which is why it is critical to perform further studies in this direction.

#### 6. CONCLUSION

The ayahuasca session becomes a controlled manipulation of the energies of each of the participants, the surroundings, and the maestro, performed by the latter. It is a dishinibitor of energy blockages, perceived as thoughts at a mental level, and as symptoms in the physical body. In the reverse sense, it acts as an amplifier and stimulant of latent vital energies. The intended result is to harmonize those energies, leading to an improved psychosomatic/ somatopsychic dynamic.

The body contains and represents individual memory, a biographical engram, and furthermore, it contains universal or collective memory. The body represents “the somatic essence of consciousness” (Fidaali, k. 1991: 23). Ayahuasca authorizes the manifestation of the unconscious, the a-conscious, to consciousness.

That is why the traditional function of ayahuasca is simultaneously therapeutic to the individual and mystic to the collective.

If one does not reject patent and observable facts, we are inevitably led by these considerations on ayahuasca, to a necessary epistemological revision of modern science, specially medicine. Conceptual frameworks, experimental models, classic paradigms, are all here revealed inadequate to explain such an experience. Aristotelian thought, the foundation of modern science, provides an inadequate system of coordinates.

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