



**PACIFIC
INFORMAT-
ION
SERVICE
ON
STREET-
DRUGS**

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: editors

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1 Fable or Fact?

The following is an account of the intoxication produced after the ingestion of A. muscaria, as described by W. I. Jochelsen* who in 1900-01 carried out a study of the Koryak tribe of Kamchatka.

"The Koryak say that three fresh fungi suffice to kill a person. Accordingly, fly-agaric is dried in the sun or over the hearth after it has been gathered. It is eaten by men only; at least, I never saw a women drugged by it. The method of using it varies. As far as I could see ... the men, before eating it, first let the women chew it, and then swallow it ... the alkaloid of fly-agaric produces intoxication, hallucinations, and delerium. Light forms of intoxication are accompanied by a certain degree of animation and some spontaneity of movements. Many shamans, previous to their seances, eat fly-agaric in order to get into ecstatic states ... Under strong intoxication, the senses become deranged; surrounding objects appear either very large or very small, hallucinations set in, spontaneous movements, and convulsions. So far as I could observe, attacks of great animation alternate with moments of deep depression. The person intoxicated by fly-agaric sits quietly rocking from side to side, even taking part in the conversation with his family. Suddenly his eyes dilate, he begins to gesticulate convulsively, converses with persons whom he imagines he sees, sings, and dances. Then an interval of rest sets in again. However, to keep up the intoxication additional doses of fungi are necessary. Finally a deep slumber results, which is followed by headache, sensation of nausea, and an impulse to repeat the intoxication ...the urine of persons intoxicated with fly-agaric is not wasted. The drunkard himself drinks it to prolong his hallucinations, or he offers it to others as a treat. According to the Koryak, the urine of one intoxicated by the fly-agaric has an intoxicating effect like the fungus, though not to so great a degree ... From three to ten dried fungi can be eaten without deadly effect."

* Through: Ramsbottom, J. 1953. Mushrooms & Toadstools. Collins, London, pp. 43-48.

THE FLY AGARIC

Amanita muscaria (Fr.) Hook.

"The passionate desire which consciously or unconsciously leads man to flee from the monotony of everyday life, to allow his soul to lead a purely internal life even if it be for a few short moments, has made him instinctively discover strange substances."

Lewin, L. 1964. Phantastica: Narcotic and Stimulating Drugs, E. P. Dutton & Company, New York, p. 123.

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Amanita muscaria: What about it!



Amanita muscaria, the fly-agaric -- what do we know, truly, about this fascinating but perplexing mushroom? For centuries, reports of the unusual physiological effects attributed to the ingestion of this fungus have been forthcoming. However, intense efforts by many laboratories throughout the world have failed to identify the agents responsible for the total physiologic effects repeatedly associated with A. muscaria. What then is fact and what is

fiction? It is beyond the scope of this writing to evaluate all that is written about this fungus. Consequently, the focus will be on that information deemed to be fact -- it is easier to evaluate! This does not mean that all other information is fiction. But much of it is still equivocal.

First the facts --

Although much is known about the chemistry of A. muscaria, this information cannot account in full for the physiological effects noted after ingestion (1).

It is a fact that the deadly bicyclic peptide toxins, the so-called Amanita toxins, known to occur in A. phalloides (2,3) and certain Galerina species (4), have never been found in A. muscaria (5,6).

Muscarine does occur in A. muscaria(1). However, all recent quantitative attempts indicate that the concentration of this compound, on a fresh weight basis, does not exceed 0.0003 percent when calculated as its chloride (1). It must be concluded,

therefore, that muscarine cannot very well account for any appreciable physiological activity since the concentration does not approach clinically significant levels (7,8), barring, of course, the ingestion of enormous quantities of the mushroom.

Bufotenine, a centrally-acting substance only when administered parenterally, has been reported in several Amanita species including A. muscaria (1). Relatively recent investigations have failed to detect this compound in the fly-agaric. In any event, the psychotropic actions of this compound do not occur after it is administered orally, thereby precluding the involvement of this compound in the physiologic actions of this mushroom.

One investigator (9) has reported the existence of tropane alkaloids (atropine and hyoscyamine) in A. muscaria. Several laboratories have not been able to substantiate these findings (10,11).

The occurrence of isoxazole derivatives, particularly muscimol and ibotenic acid, in A. muscaria has been well established (12, 13,14). Indeed, these represent the very first truly psychotomimetic agents isolated from this mushroom (14). The toxic psychosis (15) is exemplified by confusion, disturbed visual perception and hearing disorientation in situation and time followed by drowsiness and sleep. With regard to the overall toxicity of this fungus, the aforementioned symptoms are preceded by a state closely resembling alcohol intoxication. Muscimol is more potent than ibotenic acid and both of these substances do potentiate the effect of certain known hypnotic/sedative agents (15). It should be well noted that muscimol and ibotenic acid act similarly to atropine. Consequently, atropine MUST NOT be used in the treatment of A. muscaria

toxicity. These then are the facts. But we are left with many inconsistencies.

Many other compounds (16), in addition to those mentioned previously, have been isolated from A. muscaria. However, none can account for total spectrum of physiologic actions either observed or reputed to occur following the ingestion of this mushroom. On the other hand, it has been known that some people eat this mushroom with impunity, especially after the red tissue is removed from the cap. Some credence is lent in that it has been shown in some studies that the bulk of the isoxazoles (ibotenic acid, muscimol) occur in the superficial layers of the cap (1). Also, these compounds are relatively unstable and the cooking process may well inactivate them.

Certainly, A. muscaria can cause a variety of physiologic responses (15). It is not deadly poisonous except for certain insects. It is toxic. Perhaps one could state that it is hallucinogenic (17). It does remain to be determined, however, whether or not the total "toxicity" caused by this mushroom is due to heretofore undiscovered substances, or if the combined actions of several substances prove to be the answer or if we are overly concerned with what might be in reality wives-tales. My pharmaceutical background prompts me to ask -- "is there a fly in the agaric?"

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If you are interested in more detail concerning the chemistry of A. muscaria see references 1 and 16. Reference 1 will lead you to all of the pertinent literature. Reference 15 is a fascinating publication and does give a wide variety of information on various natural products as well as A. muscaria.

Wasson (17) is available in "paperback" from Harcourt, Brace, Jovanovich, Inc. 757 Third Avenue, New York, N. Y. 10017. Approximately \$8.00 and well worth the money.

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