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***Risks associated with the increase in consumption of
Amanita muscaria***

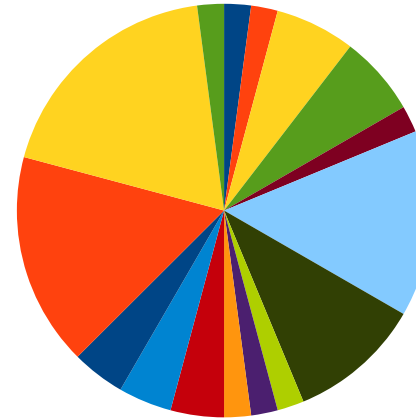
Presentation for StaDG-ER 08.11.2023, Brussels –
Rimma Ishimbaeva DVM, PhD in Vet Sc, *AVC President*

AVC – role and activities



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- AVC is a non-profit non-government organisation created in 1995 in Belgium
- All qualified veterinarians, > 50 in number, international in geography and scope (fig.1)
- All working in small independent consultancies or SMEs



- Providing advice and support to enterprises such as feed additive, pharmaceutical, vaccines, food production companies & governments
- Organising laboratory, pre-clinical and clinical studies for new animal health and nutrition products
- Experienced with all types of animals including pets, farm, aquaculture and bees, epidemiology, disease management
- Some also involved in other aspects of applied biosciences eg human biotechnology, biomaterials, market strategy, communication and education
- AVC is a recognised Interested Party at EFSA, EMA and HMA and provides responses to consultations and expert advice
- AVC is a long-term member of EFSA Stakeholder Bureau and StaDG-ER

AVC and Emerging Risks - Topics



- ◆ **1) Conscious consumption:**
 - ◆ *Magic mushrooms: consumption of *Amanita muscaria* for psychotropic properties*
 - ◆ *Food supplements with undemonstrated health claims (mental health)*
- ◆ **2) Accidental poisoning:**
 - ◆ *AI technologies as a driver for poisoning incidents (misidentification of plants and of fungi)*

Magic mushrooms: consumption of Amanita muscaria for psychotropic properties

π Magic mushrooms, mainly Psilocybe, are used in Europe for their hallucinogenic properties. In some countries the use of such substances has become much more common (2023 European Drug Report, EMCDDA).

• - Is Amanita muscaria «magic»? - Legally, no!

A different species of mushroom, Amanita muscaria (fly agaric), produces a state of delirium that also includes hallucinations, but its primary active agents are muscimol and ibotenic acid.

✦ Most of countries do not have laws against the use of Amanita muscaria. Following the outlawing of psilocybin containing mushrooms, an increased quantity of Amanita species have been sold and consumed.



Magic mushrooms: consumption of Amanita muscaria for psychotropic properties

- ❖ **Growing interest in the wellness, therapeutic and “spiritual” uses**

There are signs of unregulated activities in the European Union and elsewhere, in which the use of psychedelic substances is included as part of a wellness, therapeutic or spiritually oriented intervention (source EMCDDA).

In some cultures, Amanita mushrooms have been used in traditional religious ceremonies and rituals for centuries (shamanic rituals in Siberia).



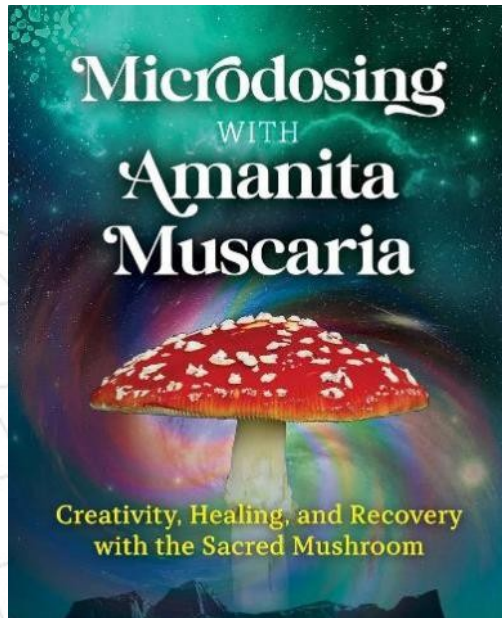
Food supplements with undemonstrated health claims (mental health)



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After the pandemic, the world is facing the consequences of social isolation on mental health. Social media bloggers advise foraging, processing and consuming fly agarics to reduce stress and maintain a mental health balance.



The market for gummies, powders, tinctures and capsules containing extracts of *Amanita muscaria* is raising eyebrows, though, amid concerns from the FDA and in the absence of clinical trials.



Food supplements with undemonstrated health claims (mental health)



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Amanita muscaria ingredients are not listed as controlled substances under the US Controlled Substances Act (CSA) & are not approved by FDA as food additives or as a drug.

Currently, Amanita muscaria supplement products fall into the Dietary Supplement Health and Education Act of 1994 (DSHEA), regulating vitamins, minerals, herbs and other botanicals which can be sold without FDA approval.

Per DSHEA regulations, labels must be accompanied by a boldface statement: **“This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.”**

AI technologies as a driver for poisoning incidents (misidentification of plants and of fungi)



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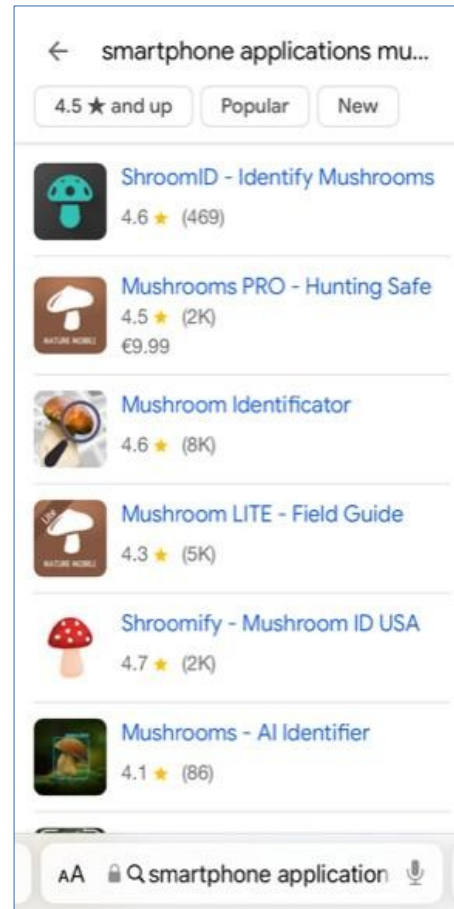
Why? - Growing use of uncontrolled AI in our daily life.

The integration of AI in botanics and mycology has accelerated the process of identifying and classifying plants and fungi.

The number of various AI-based identification apps grows like *mushrooms after rain*.

Number of downloads has exceeded millions.

The accuracy rate declared by developers is 80-90%, and people are being used it to identify edible mushrooms and accidentally exposed to the risk of poisoning from toxic substances.



AppBrain | Apps Search apps or develi Q

Next Vision Limited is an Android developer that has been active since 2019. The current app portfolio contains 10 apps. In the Google rankings, Next Vision Limited's apps appear in the top 100 in more than 10 countries. Some important apps are CoinSnap - Coin Identifier, Picture Bird - Bird Identifier, Picture Insect: Bug Identifier, Picture Mushroom - Mushroom ID, and Rock Identifier: Stone ID. All of them are highly ranked on Google Play and have been installed more than 1 million times. More

Overview

2019 October	10	20 million	PREMIUM Recent d/loads
Active since	App count	Downloads	Top 1%

4.43	120 thousand
Average rating	Rating count
	Top 1%

Address

RM D 10/F Tower A Billion CTR 1 Wang Kwong RD Kowloon Bay KL Hong Kong

Websites

- <https://www.rockidentifier.com>
- <http://pictureinsect.com>
- <https://coinidentifierai.com/>

appbrain.com

AI technologies as a driver for poisoning incidents (misidentification of plants and of fungi)

Between 1 July and 31 December 2022, 1923 cases of poisoning were reported to Poison Control Centres in France. Among these cases, **30 people had used smartphone identification apps** compared to 6 people in 2021.

Find out more:
ANSES REPORT of July 2023 on the seasonal monitoring of accidental mushroom poisoning cases (in French)



A comparison of the accuracy of mushroom identification apps using digital photographs*



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- ✦ 3 smartphone apps: *Picture Mushroom*, *Mushroom Identifier*, *iNaturalist*
- ✦ 3 independent researchers
- ✦ 78 specimens (digital photos) were sent to the Victorian Poisons Information Centre and Royal Botanic Gardens Victoria
- ✦ Mushroom identification was confirmed by an expert mycologist



Results:

- ✦ Accuracy rate of identification of all specimens — 35-49%%
- ✦ Accuracy rate of identification of **poisonous** mushrooms - 30-44%%
- ✦ **Amanita phalloides** was falsely identified, twice by *Picture Mushroom* and once by *iNaturalist*.



Conclusions:

- ✦ Mushroom identification apps are not reliable to exclude exposure to potentially poisonous mushrooms.



* Clinical Toxicology, Volume 61, Issue 3 (2023)

Poisoning incidents of pets



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- ❖ Dogs and cats are curious creatures. Unfortunately, their curiosity sometimes gets them into trouble, especially if they decide to nibble on mushrooms
- ❖ Storage of picked fly agarics in the area accessible to pets increases the risk of poisoning. Amanita muscaria has a fishy odor attractive to dogs. Cats are particularly attracted to dried mushrooms
- ❖ The ibotenic acid and muscimol affect the central nervous system. Symptoms usually begin 30 minutes to 2 hours after ingestion (possibly earlier in cats) and include the loss of coordination, lethargy, panting, vomiting, tremors, seizures, coma and death



Summary – contributors to ER

- Outlawing of psilocybin-containing magic mushrooms has led to increased consumption of other psychoactive substance such as *Amanita muscaria*
- Using *Amanita muscaria* as a food supplement “to relieve stress, reduce insomnia, keep mental balance, etc.» is increasing due to high demand, also driven by influencers, availability and lacunae in regulation
- Existing plants & mushrooms identification apps are declared by AI developers as educational only. Despite that fact, many of them are used for identification of wild herbs, berries and mushrooms for consumption purpose.

Thoughts and suggestions for RM

- Harmonising legal status of *Amanita muscaria* active ingredients and compounds in Europe (EMA, EFSA)
- Improved monitoring of more-novel and less well-known substances (EMCDDA)
- Education of population about the dangers in consuming *Amanita*, encouraging report of incidents (EFSA, NCAs)
- Need of regulation for AI technologies & apps, datasets applied in the areas of food & feed consumption and safety (EFSA, EC, EDPS, EAIB, NCAs).



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😊 *Thank you!*

Dr Rimma Ishimbaeva,
Alternate Member of StaDG-ER