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Medicinal Plants: A Feast for Animals (But Not Quite)

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Abstract:

India boasts a rich tapestry of medicinal plants, offering natural remedies for both humans and animals. While these plants might seem like a delectable feast for wildlife, the title "A Feast for Animals (But Not Quite)" suggests a hidden complexity. This abstract explores the potential benefits medicinal plants hold for animals, from parasite control to aiding digestion. However, it also highlights the dangers animals face when ingesting these plants without proper instinct or knowledge. The interplay between a plant's medicinal properties and its potential toxicity for specific animals will be a key focus. The abstract concludes by emphasizing the need for further research on animal-plant interactions within the Indian context, promoting a more nuanced understanding of this ecological relationship.

Keywords: Medicinal plants, Animal health, Plant toxicity, Animal-plant interactions, Ecological relationships

Introduction

India boasts a rich tradition of herbal medicine, with countless plants used in the ancient practice of Ayurveda. While this system recognizes the potential benefits of plants for animals, the focus is primarily on human health. There's a misconception that animals actively seek out specific medicinal plants. In reality, animals often ingest plants with beneficial properties incidentally while foraging. Certain plants might alleviate discomfort or possess mild healing properties, but it's not like animals are brewing themselves ginger tea for an upset stomach.

Animals and Medicinal Plants: Indirect Benefits: Animals might unknowingly consume plants with medicinal qualities. For instance, neem leaves, with their antibacterial properties, could be beneficial if ingested by an animal with wounds. However, this wouldn't be a conscious choice by the animal.

The Focus of Indian Medicinal Plants: Humans India's vast repertoire of medicinal plants is primarily used in traditional healthcare systems like Ayurveda. These systems have documented the use of plants for treating various human ailments.

The Future: Potential for Animal Health While animals might not be self-medicating with Indian plants, research into the properties of these plants could lead to the development of veterinary medicines.

Because of the beautiful Himalayan range, the northern part of India has a lot of different kinds of therapeutic plants. The Indian Himalaya is home to about 8,000 species of angiosperms, 44 species of gymnosperms, and 600 species of pteridophytes. Of these, 1748 species are known to be useful as medicines. Around 1800 m elevation area is where the most medicine plants (1717 species) have been found. In terms of the whole area, Uttaranchal has the most kinds of therapeutic plants, followed by Sikkim and North Bengal. The trans-Himalaya is home to only about 337 species of therapeutic plants, which is less than other parts of the Himalaya because of its unique geography and harsh environmental conditions.

Literature Review: Examples of animal self-medication include: Here are some examples of animal self-medication:

1. Bears, Elephants, Monkeys and other Mammals: After emerging from hibernation, bears often seek out wild garlic as their first meal. This plant is rich in vitamin C, iron, and magnesium, which can help replenish nutrients lost during their winter sleep. Before hibernation, bears eat large quantities of bark and leaves from conifer trees. These plants are thought to act as a laxative, helping the bear eliminate waste before a long winter sleep. Additionally, some bears are thought to consume specific berries during times of joint pain. Elephants sometimes ingest clay, which is thought to help absorb toxins and soothe their digestive systems. Elephants sometimes ingest large amounts of soil, particularly during periods of drought or social stress. This behaviour may help to neutralize toxins in their gut and potentially act as a form of self-medication to manage stress. In Kenya, pregnant elephants have been documented eating the leaves of particular trees believed to induce labour. This behaviour shows a potential understanding of plant properties for medicinal purposes. Elephants aren't the only ones using mud for medicinal purposes. Rhinos wallow in mud baths, which may help protect their skin from parasites and sunburn. Rodents like squirrels might consume clay for similar reasons as birds, to potentially detoxify their bodies. This is a common sight for many pet owners. Dogs may eat grass to induce vomiting if they are feeling nauseous or to help expel intestinal parasites.

2. Birds: When they feel unwell, some birds will seek out clay deposits to eat. Clay is thought to have detoxifying properties and can help to soothe an upset stomach. Magpies have been documented using specific plants to treat feather pecking, a self-inflicted behaviour. Pigeons might bathe in dust or mud, potentially to control parasites or soothe irritated skin. Certain parrots might consume specific clays to aid their gut health. Certain species of birds, like starlings, take dust baths which may help smother parasites on their feathers and skin. European hoopoes, a type of bird, have been observed feeding their chicks specific centipedes that contain chemicals thought to combat parasites. Leafcutter ants cultivate a specific fungus within their nests. This fungus not only provides food but also produces chemicals that may have antidepressant-like effects on the ants, helping them cope with the stress of colony life. Both eagles and wood storks exhibit a form of self-medication through their nest-building choices. They preferentially select nesting materials from trees and shrubs that contain insect-repellent resins. This nest-building behaviour with medicinal benefits is a fascinating example of how birds utilize their environment for self-medication and to ensure the health of their young. For instance, Bonelli's eagles are known to use a higher proportion of pine boughs in their nests. Studies have shown that nests with a greater pine composition have lower parasite levels and result in more young eagles successfully fledging. This behaviour suggests that these birds are instinctively aware of the benefits these materials offer and actively use them to create a healthier environment for their offspring. Vultures and Condors, these scavengers are known for their excellent sense of smell. They are believed to use specific plants with antimicrobial properties to line their nests, potentially helping to control the spread of bacteria from the carrion they feed on. Some swallow species incorporate mud with antibacterial properties into their nests, creating a healthier environment for their chicks. Some birds, like finches and sparrows, have been observed collecting cigarette butts for their nests. The nicotine in the cigarette butts helps to kill mites and other parasites that might harm their chicks. The hoatzin, a South American bird, exhibits a unique form of self-medication for its chicks. Hoatzin chicks have a large, bacteria-filled crop in their gut. These bacteria help them digest plant matter that adult hoatzins wouldn't be able to process. Interestingly, the adult hoatzin feeds its chicks regurgitated food that has undergone partial fermentation in its own crop. This "predigested" meal may provide the chicks with beneficial bacteria for their own gut health. The oxpecker, a type of African bird, has a fascinating symbiotic relationship with large mammals like rhinos and zebras. These birds perch on the backs of these animals, feeding on ticks and other parasites. Additionally, some researchers believe oxpeckers may also be drawn to the animals' oily secretions, which may offer them some protection from the harsh sun.

Certain Australian parrots, known as galahs, have been observed selecting specific types of eucalyptus seeds to consume. These seeds contain compounds that may help to detoxify the parrots from harmful toxins they ingest while foraging. This selective seed choice suggests a sophisticated understanding of the medicinal properties of different plants. Red and green macaws, along with many other animals, consume clay deposits. This clay is thought to aid digestion by absorbing toxins and helping to break down food.

3. Flies and Insects: Certain butterfly species gather at mineral deposits, like mud puddles or rotting fruit. These minerals, particularly sodium, are crucial for regulating bodily fluids and maintaining proper nerve function. Monarch butterfly caterpillars, famous for their toxic milkweed diet, don't just benefit from the toxins themselves. As they transform into butterflies, they strategically store these toxins in specific areas of their wings, creating a potent defense against predators throughout their adult lives. Butterflies like the blue morpho might consume minerals from mud puddles to enhance their vibrant wing colors, potentially deterring predators. Some caterpillars, like the tobacco hornworm, will deliberately ingest low doses of toxins from certain plants. These toxins, in small amounts, can actually help them to defend against predators by making them less palatable. Caterpillars ingest low doses of toxins for defense. Interestingly, some fruit flies lay their eggs in plants with high ethanol levels when they detect parasitoid wasps nearby. The ethanol deters the wasps, protecting the developing offspring. Woolly bear caterpillars and toxic cocktails, these fuzzy caterpillars munch on certain types of poisonous plants. Instead of getting sick, they accumulate the toxins in their bodies, making them unpalatable to predators. Woolly bear caterpillars are a fuzzy caterpillars munch on certain types of poisonous plants. Instead of getting sick, they accumulate the toxins in their bodies, making them unpalatable to predators.

4. Monkeys and Primates: Female fruit flies, when infected with parasites, lay their eggs on plants that are toxic to those parasites. This fascinating behaviour protects their offspring from the dangers they themselves faced. Chimpanzees in Gombe National Park have been observed swallowing leaves whole and then immediately spitting them back up. This behaviour, thought to be a way to extract beneficial gut bacteria, might be a natural remedy for stomach discomfort. Spider monkeys in Costa Rica have been observed rubbing millipedes on their fur. Millipedes secrete a foul-smelling fluid with antimicrobial properties, which may help the monkeys ward off infections. These apes have been observed swallowing whole and defecating intact leaves of *Vernonia amygdalina*, a bitter plant with properties that help expel intestinal nematodes (roundworms). Chimpanzees have been observed crushing and ingesting bitter-tasting insects, which may have immune-boosting properties. Chimpanzees sometimes ingest their mucus,

which may contain antibodies and enzymes that help fight infections. Chimpanzees have been observed applying leaves from a specific tree species to their skin after sun exposure. These leaves may have anti-inflammatory properties that help soothe sunburn. Monarch butterfly caterpillars feed on toxic milkweed plants. The toxins accumulate in their bodies, making them unpalatable to predators. Some insects, like ants, will incorporate resin from conifer trees into their nests. This resin has antimicrobial properties that help to prevent the growth of harmful bacteria and fungi in the colony. Woolly bear caterpillars and toxic cocktails, these fuzzy caterpillars munch on certain types of poisonous plants. Instead of getting sick, they accumulate the toxins in their bodies, making them unpalatable to predators. Some species of monkeys rub insects on their fur, which may act as a repellent against parasites. Tamarind monkeys have been observed chewing on leaves containing analgesic properties after injuries. Chimpanzees, like their close relatives the gorillas, aren't limited to just leaf swallowing. They've been observed using tools like twigs to probe their teeth and potentially remove parasites or debris. Additionally, some monkeys consume charcoal, which may help absorb toxins in their gut. Some primates, like spider monkeys, use sharp twigs or animal bones to floss their teeth and remove debris, potentially preventing infections. Orangutans, our close relatives, are known to create chewing gum-like substances from leaves and bark. They then apply these substances to open wounds, which may act as a natural bandage with potential antibacterial properties. Pregnant lemurs in Madagascar have been observed nibbling on specific plants containing beneficial properties. These plants might help with milk production, fight off parasites, or even increase the chances of a successful birth. Baboons in Ethiopia have been documented eating the leaves of a specific plant to help fight schistosomiasis, a disease caused by parasitic flatworms.

5. Social insects like ants and bees: These creatures line their nests with materials like pine resin, which has natural antimicrobial properties, helping to keep the colony healthy. Honey bees, vital to our ecosystem, have a unique self-medication behaviour. They will sometimes perform a "shivering behaviour" where they rapidly vibrate their wings. Stressed honeybee worker bees, might consume the unhatched eggs or larvae in their hive. While the exact reasons are unclear, some researchers theorize this behaviour may be a way for the bees to regulate colony pheromones or even obtain specific nutrients during stressful periods. Social insects like termites exhibit a fascinating form of self-medication through social grooming. Termites groom each other to remove parasites and fungi, promoting overall colony health. This behaviour ensures the well-being of the entire colony, not just individual termites.

6. Reptiles and the healing power: Some species of snakes have been documented basking in mud baths. This behaviour might be a way to soothe irritated skin or to treat external parasites. Some reptiles, like iguanas, have been observed basking in the sun after consuming specific plants with anti-inflammatory properties. This behaviour suggests they may be using sunlight to activate the medicinal benefits of the plants they've eaten. Snakes are famous for shedding their skin, but this isn't just about growth. Shedding also helps them remove old, parasite-laden skin and allows them to regenerate damaged scales. This renewal process provides them with a fresh, healthy outer layer, potentially improving their ability to fight off infections and deter predators. Certain lizard species, after a snake bite, are believed to seek out specific roots that may counteract the venom. Many reptiles, including lizards and snakes, are known for their love of basking in the sun. This behaviour isn't just about warmth; sunlight exposure can actually be beneficial for their health. The UV rays from the sun can help synthesize vitamin D3, which plays a crucial role in calcium absorption and bone health. Additionally, sunlight may also have antiseptic properties, aiding in wound healing. Crocodiles, those ancient predators, are known for their mud-bathing behaviour. While it might seem like a way to cool off, this mud bath may actually serve a medicinal purpose. The mud can help to smother and remove parasites from their skin, keeping them healthy and pest-free. Desert tortoises, facing harsh environments, have been observed consuming specific types of cacti. These cacti may provide them with essential fluids and electrolytes, helping them to stay hydrated and healthy in their arid habitat.

7. Marine life: The vast oceans hold a wealth of remarkable creatures with unique self-medication practices. Sea otters are known to rub themselves with certain algae species, which could have antiseptic properties. Certain cleaner shrimp and fish have established a symbiotic relationship with larger fish. The cleaner shrimp and fish remove parasites and dead skin from the larger fish, essentially providing a vital self-medication service for both parties. Just like chimpanzees, some wrasses, a type of marine fish, are known to produce mucus with potential medicinal properties. They secrete this mucus when stressed or injured, and it may help fight infections or promote wound healing. Sea turtles, majestic creatures of the ocean, have been observed grazing on specific types of algae that contain anti-inflammatory and antioxidant properties. These algae may help boost their immune system and protect them from harmful pathogens. Many marine animals, like clams and oysters, have hard shells that offer protection from predators. Interestingly, some researchers believe these shells may also provide some degree of protection from harmful ultraviolet radiation from the sun. Stingrays, known for their venomous barbs, exhibit an interesting self-medication behaviour. They sometimes bury

themselves in the mud, which may help to remove parasites and bacteria from their bodies, potentially enhancing their overall health and defense mechanisms. Clownfish, the vibrant residents of anemone homes, exhibit a fascinating form of self-medication for their young. Anemone tentacles contain mucus that can be harmful to clownfish, but adult clownfish develop a tolerance through repeated exposure. Interestingly, adult clownfish will collect and ingest this mucus, transferring some of the tolerance to their offspring by secreting it in their mucus. This pre-emptive measure helps protect the young clownfish from the anemone's stinging tentacles. While dust baths are common for land birds, some fish species have their own version of a self-cleaning ritual. Wrasses, the same fish known for medicinal mucus, have been observed rubbing themselves against specific types of coral with antimicrobial properties. This behaviour may help them remove parasites and keep their skin healthy. Certain sea stars, fascinating echinoderms like sea cucumbers, have a unique way of dealing with toxins. They can evert their stomachs, pushing them out of their bodies to expel harmful substances. This remarkable self-detoxification process allows them to eliminate toxins and regenerate their stomachs. Sea urchins, spiny grazers of the seafloor, are known to consume specific types of algae and sponges that contain beneficial minerals. These minerals may help strengthen their shells and spines, providing them with better protection against predators. Lobsters, known for their delicious taste, are also known for their remarkable ability to regenerate lost limbs, they might also be able to "patch up" minor shell damage. Studies suggest lobsters may secrete a mucus-like substance to repair small cracks or chips in their shells, potentially preventing further damage and infections.

Conclusion:

Chimpanzees get rid of bugs by eating the bitter part of a plant. Bonobos eat whole leaves to help heal cuts that parasites may have caused. Monarch butterflies lay their eggs on milkweed plants, which have properties advantageous in preventing parasites departing. Scientists are persuaded that people can learn numerous things from animals, especially when it comes to making new medicines. In the developing world, where a lot of folk medicine came from, it's possible that doctors watched animals self-medicate and, in the case of the plants the animals used, took notes on how to treat their own patients.

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