

An Exploration of Salt Content in Herbs "Mbigiri" for Animal Feed

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Abstract:

This study aim to investigate the salt content from local herb called 'mbigiri'. The word mbigiri originates from Pogoro tribe. It is well known that domestic and wild animals need salt just as man does. Most plants provide insufficient sodium and chloride for animal feeding. Animals have a much greater appetite for sodium and chloride than other minerals. A continuous low salt intake affects the health of animals through a loss of appetite and weight. Therefore salt supplementation is a critical part of a nutritionally balanced diet for animals.

The plant has adapted to have very sharp and long thorns which prevent it from being eaten by herbivores. We are finding out the salt available in those plants and the percentage of salt contained in the plant. We hope that the plant could be processed and its by-products could be used as a source of micro-nutrients in animal feeds without using commercial salts obtained from sea water. By the end of this study, what was presumed to be useless and waste will be useful and turned into cash.

Method:

In this study the methodology used are categorized into two stages. Firstly, extraction of the suspected salts from the herbaceous plant called "mbigiri". Secondly, qualitative analysis was done to analyse the salt sample in order to identify the cations and anions present in the salt sample.

Procedure

Salt extraction

The matured "mbigiri" plants were harvested, well dried in the sun

The dried plants were incinerated to get ashes

The ash extract (solution) was made using distilled water

Filtration of the extract was carried out using a clean piece of cloth then to get clear filtrate the filter paper were used

The filtrate was evaporated using evaporating dish. almost three quarters of the solution were evaporated

The contents was poured into a petri dish for crystallization process to get salt crystals

The sample of salt crystals was taken for qualitative analysis experiment

Results:

In the second stage, qualitative analysis was carried out on the salt sample produced to reveal the cations and anions present. The experimental procedures are indicated in the table.

1. Ions identified from the salt sample

The cation(s) present in the salt sample was sodium ions Na^+

The anions present were sulphate ions SO_4^{2-} and chloride ions Cl^-

The presence of sodium, chloride and sulphate ions in the salt sample indicates the mbigiri herbaceous contains double salt, sodium chloride and sodium sulphate.

Conclusion:

The result of the study proved that the salt sample contained sodium ions Na^+ , sulphate ions SO_4^{2-} and chloride ions Cl^- . Most plants provide insufficient sodium and chloride for animal feeding but for this plant is vice versa. It is having alot of salt as we can see the pie Chart above, Fig 10, It shows that 18 % of those ashes was salt. So long as domestic and wild animals need salt just as man does then this plant, could be harvested then crushed into powder to be suitable for domestic animal feed supplement. Presence of those salts in "mbigiri" plant brings way forwards for further research so that the plant could be useful in animal feeds industry.

References:

NECTA - O level qualitative guide sheet

SCSU & MoEVT-Zanzibar(2010). *Chemistry for Secondary School*. Rev. Ed. Oxford University Press. Dar es Salaam. Tanzania.

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Stages of salt extraction

Figure 2: Preparation for incineration process



Dried mbigiri plants

Ignition of fire

Figure 3: Incineration process



EXPERIMENT	EXPERIMENT	INFERENCE
1. Appearance of the sample	White crystalline	Probably NH_4^+ , Na^+ , Ca^{2+} and Pb^{2+} may be present
1. Flame test	A yellow flame is formed	Na^+ present
1. Action of heat on the sample	The salt is resistant to strong heat	CO_3^{2-} or NO_3^- are absent
1. Solubility	The salt is soluble in water	NH_4^+ , Ca^{2+} , Zn^{2+} or Na^+ may be present
1. Action of dilute hydrochloric acid (HCl) on the dry solid sample	No effervescence occurs	CO_3^{2-} or HCO_3^- may be absent
1. Action of concentrated Sulphuric acid (H_2SO_4) on the dry solid sample	A colourless gas which turns a blue litmus red is formed	Cl^- may be present
1. To a little solid sample put MnO_2 powder in a test tube and then add a few drops of conc. H_2SO_4	A gas which bleaches a damp blue litmus paper is formed on adding manganese (IV) oxide	Cl^- present and confirmed
1. To a sample solution add AgNO_3	A white precipitate is formed	Cl^- present and confirmed
1. To a sample solution add $\text{Ba}(\text{NO}_3)_2$ or BaCl_2	A white precipitate is formed	SO_4^{2-} present and confirmed

