Phytochemical Screening and in vitro Activity of *Allium cepa. L*. Ethanol Extract Against Bacteria Isolated from Hawked *Moringa oleifera* Meal Sold within Kaduna Metropolis

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ABSTRACT

The study was aimed at determining the in vitro activity of Alluim cepa L. ethanol extract against some bacteria isolated from hawked Moringa oleifera meal within Kaduna Metropolis. Samples of Moringa meal were bought randomly from hawkers in two markets located in Kakuri (Kaduna south) and Kawo (Kaduna North) within Kaduna metropolis Phytochemical analysis of Allium cepa L. ethanolic extract revealed the presence of Saponins, Tanins, flavonoids and alkaloids while steroids were not detected. Bacteriological analysis of Moringa Oleifera meal showed the presence of gram positive bacteria identified as Staphylococcus aureus, Streptococcus species and Bacillus species. The in vitro activity of Alluim cepa L. ethanolic extract was tested against the isolates using agar well diffusion method at a concentration of 100, 50, 25 and 12.5mg/ml. The result showed a significant activity of the extract at all concentration against the bacterial isolates. Staphylococcus aureus had a zone of inhibition range of 18-7mm, Streptococcus species 32-20mm while Bacillus species had a range of 20-10mm. The minimum inhibitory concentration of the extract was 25mg/ml for all the isolates. This indicates that Allium cepa can serve as a good antibacterial agent against certain gram positive pathogenic bacteria.

Keywords: *Allium cepa*, ethanolic extract, *Moringa oleifera*, phytochemical

INTRODUCTION

Allium cepa L. know as onion belongs to the family *Alliacea*. It is one of the oldest cultivated vegetable in History[1]. Folk healers traditionally use onion to prevent infection and is among the oldest cultivated plants used as food and for medical application[2]. Onion bulb contain a number of Phytochemicals most of which are hydrocarbons and their derivatives[3.] The pharmaceutical activity of *Allium cepa L*. including antitumor, antidiabetic, antioxidant anti-allergy, microbial and molluscidal activity have been reported by several workers[1,4]. *Moringa oleifera* is the most widely cultivated species in the family *Moringaceae*, genus *Moringa*[5]. The plant has been praised for its health benefit. It is very rich in antioxidant and bioactive plant compounds. Almost all parts of the plant can be eaten and is used as an ingredient in traditional herbal medicines. The leaves are the most nutritive part of the plant, being a

significant source of vitamin B, vitamin C, provitamin A as beta-carotene, Managanese and protein being among the essential nutrients[6,7]. Phytochemicals such as vanillin, omega fatty acids and the ascorbets have been reported from the flower, roots fruits and seeds[5]. The plant is also rich in compounds containing simple sugar, such as hexoses and is rich in compounds such as glucosinolates and isothiocycinates[8]. Special components of *Moringa* preparation have been reported to have hypotensive, anti cancer and antibacterial activity[8]. Despite all these, Moringa can be contaminated with microorganism if not properly handled when processed.

The study is aimed at evaluating the in vitro activity of *Allium cepa L.* ethanol extract against bacteria isolated from hawked *Moringa oleifera* meal sold within Kaduna metropolis.

MATERIALS AND METHODS

Sample collection

Allium cepa (onions) were purchased from Sheikh Abubakar Gumi Market in Kaduna metropolis while *Moringa oleifera* meal were purchased from hawkers in Kakuri (Kaduna South) and Kawo (Kaduna North) within Kaduna metropolis, Nigeria.

Extraction of Allium cepa

This was carried out according to the method described by[9].

Phytochemical screening

Phytochemical analysis of the onion extract was conducted according to the method described by[10] for the presence of alkaloids, Tannins, flavonoids, steroids and saponins.

Bacteriological analysis of *Moringa oleifera* meal.

Stock of *Moringa oleifera* meal was prepared and was serially diluted by pipetting 1ml of the stock to 9ml of sterile distilled water in test tubes to achieve dilution 10^{-1} to 10^{-6} · Aliquote 0.1ml each of 10^{-4} – 10^{-5} and 10^{-6} dilutions were pipette into a sterile petri dish, Plate Count Agar was then aseptically poured onto the Petri dish containing the samples. It was then swirled gently for even distribution and allowed to gel. It was then incubated at 37^0c for 24 hours.

Identification of isolates

- Macroscopic identification
  Colonies formed on agar plates were carefully observed for cultural characteristics as described by[11].
- Gram staining
  Gram staining was performed and the stained preparations were examined under x40 objective and x100 oil immersion objective.

Biochemical Test

The following biochemical tests were carried out accordingly to the methods described by[12]. Coagulase test, indole test, catalase test, oxidase test

Antibacterial activity testing

The antibacterial activity of the ethanolic extract was conducted using agar well diffusing method as described by[13]. This was carried out by the method described by[14]. This indicates the lowest concentration that prevent bacterial growth

RESULTS

Table 1 Shows that saponins, tannins, flavonoids and alkanoids were the Phytochemical presence in *Allium cepa* while steroids were not detected.

Table 1: Phytochemical constituents of *Allium cepa*

Phytochemical	Test Result
Saponins	+
Tanins	+
Steroids	–
Flavonoids	+
Alkanoids	+

Key
+ Present
- not detected

Table 2 Shows the antibacterial activity of ethanolic extracts of *Allium cepa* on isolated bacteria from *Moringa oleifera* meal. It shows that *Streptococcus* species was the most susceptible bacterial isolate to the extract with zone of inhibition range of 32-20mm followed by *Staphylococcus aureus* with a range of 18-7mm while *Bacillus* species has a range of 20-10ml.

Table 2: Antibacterial activity of ethanolic extracts of *Alluim cepa* on isolates of bacteria from *Moringa oleifera* meal.

Zone of inhibition (mm)				
Concentration (mg/ml)	**100**	**50**	**25**	**12.5**
Test organisms				
Staphylococcus aureus	18	15	10	7
Streptococcus spp.	32	30	26	20
Bacillus spp	20	15	12	10
Ciprofloxacin (control)	20	15	11	10

Table 3 Shows the minimum inhibitory concentration of ethanolic extracts of *Allium cepa* on isolated bacteria from *Moringa oleifera* meal. The MIC value for the bacterial isolates was 25mg/ml for all the isolates.

Table 3: Minimum inhibitory concentration of ethanolic extracts of *Allium cepa* on isolated bacteria from *Moringa oleifera* meal.

Minimum inhibitory concentration (mg/ml)				
Concentration (mg/ml)	**100**	**50**	**25**	**12.5**
Test organisms				
Staphylococcus aureus	–	–	–	+
Streptococcus spp.	–	–	–	+
Bacillus spp	–	–	–	+
Ciprofloxacin (control)	–	–	+	+

Key
+ Turbidity
- No turbidity

DISCUSSIONS

The study evaluates the in vitro activity of *Allium cepa* ethanolic extract against bacteria isolated from *Moringa oleifera* meal. *Staphylococcus aureus*, *Streptococcus* species and *Bacillus* species were the bacteria isolated from *Moringa oleifera* meal. This is in conformity with bacteria commonly isolated from vegetables like *Moringa oleifera* as stated by various workers[10,15,16].

The phytochemicals obtained in *Allium cepa* from this study were slightly different with that of[17] (Table 1). The observed difference could be attributed to the difference in variety of *Allium cepa* used. However, noting the presence of flavonoid and alkanoids in the both work

compliments the fact that *Allium cepa* contain active phytochemicals.

The results of antibacterial activity of ethanolic extracts of *Allium cepa* on the isolated bacteria from *Moringa oleifera* meal as shown in Table 2 support the findings that *Allium cepa* possess antibacterial property[18,19]. *Streptococcus* species proved to be the most susceptible bacteria to *Allium cepa* extract followed by *staphylococcus aureus*. This is in conformity with the work of[20] who recorded higher susceptibility to ethanolic extract of *Allium cepa* in *streptococcus sp*. and *staphylococcus aureus* among the Gram positive bacteria used in their work. This further strengthens the fact that *Allium cepa* being rich in flavonoid makes it an antibacterial agent with various health benefits which include but not limited to its effectiveness against common cold, heart disease, diabetes, osteoporosis, coughs and sore throat and also act as bacteriostatic agent[21].

The minimum inhibitory concentration of ethanolic extracts of *Allium cepa* been recorded as 25mg/ml against that of ciprofloxacin (used as control) which was 50mg/ml. This showed the efficacy of *Allium cepa* over certain synthetic antibiotics used against some pathogenic bacteria. This is similar to the findings of[22] that had an MIC of 20mg/ml of ethanolic extract of *Allium cepa* on *Streptococcus pneumonia.*

CONCLUSIONS

Ethanolic extract of *Allium cepa L.* revealed the presence of bioactive materials (phytochemicals) which include saponins, Tannins, Flavonoids and Alkaloids. *Staphylococcus aureus*, *Streptococcus spp* and *Bacillus* spp were the bacteria isolated from *Moringa oleifera* meal. *Streptococcus spp* was the most susceptible bacterial isolate to the extract of *Allium cepa* with zone of inhibition range of 32-20mm followed by *Staphylococcus aureus* having zone of inhibition range of 18-7mm while *Bacillus* species had the least zone of inhibition with a range of 20-10mm. The MIC value was found to be 25mg/ml for all the bacterial isolates.

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