Abstract:
Skin is the first line of defense which protects us from external pathogens and protection of its natural health is very important. Herbal therapy, unlike Ayurvedic or allopathic therapy (medicine), is one of the best means to maintain the natural condition of the skin without any side effects and adverse reaction. In contrast to the regular herbs like Tulsi (Ocimum tenuiflorum/holy basil), Haldi (Curcuma longa), Aloe vera etc, the current work involves the analysis of therapeutic role of Onion and garlic in treating skin ailments. There has been very less information on the use of these components in treating the skin wounds and allergies. In the present study, ethanolic and chloroform extracts of these two plants were prepared. The pathogenic bacteria were collected from the infected region (specify infection) of the skin and were plated on nutrient agar. This master plate was used for the preparation of pure cultures which were further identified using Burgey’s manual. The bacteria thus identified were used to test their resistance against the extracts of both onion and garlic. The inhibition zones were measured and recorded. Based on the results, the garlic extract proved to be more efficient in acting against skin pathogens than onion extract. Thus it can be said that these compounds could be used in therapies against skin infections.

Keywords:
Ethanolic Extracts, Onion, Garlic, Antibacterial Activity, Bergey’s Manual

Introduction
India is a country of rich history and with this history, come things like tradition, yoga and many such benefits. Among such things is ancient medication. People of India have been and are still using such methods with or sometimes without their notice. Indians are not susceptible to many of the diseases that the western world is susceptible to. This can be attributed to their food habits, which happen include various spices and herbs. These spices and herbs have compounds which protect them from the diseases that are causing a great deal of health issues in the western world. Onion and garlic are an integral part of the Indian diet, which surprisingly have many health benefits. Onions are a very good source of vitamin C, B1, B6, biotin, folic acid, chromium, calcium, dietary fibre, large amounts of sulfur and vitamin K. They also have flavonoids, which act as anti-oxidants, have a direct anti-tumor effect and also enhance the immune system. Garlic is a rich source of vitamin A, B1, B2 B6, C potassium, zinc, selenium, copper, manganese, calcium and also sulfur like onion. Both onion and garlic contain sulfur containing enzymes like allicin and diallyl sulfide. Together they boost the immune system and also they are known for anti-tumor (anti-cancer) properties. M.N. Ogbuagu and C. Nedolisa (2010) – reported the abilities of Onion and Garlic extracts to inhibit lipid oxidation (Rancidity). The extracts were separately added to each of Crude Soyabean and Corn Oil samples and left to stand in open containers for 10 weeks. The Free Fatty Acid (FFA) and the Peroxide Values (PV) of both the pure and mixed oil samples were determined bi-weekly. The FFA and PV of the pure samples of the oils increased as time progressed showing marked deterioration (rancidity) of the oils, while the FFA and PV of the oil/extract samples decreased showing marked inhibition of lipid deterioration (rancidity) within the period of the experiment. Amir N, Al Dhaheri A, Al Jaberi N, Al Marzouqi F, Bastaki SMA (2011) – reported protective roles of raw and boiled garlic (Allium sativum) and onion (Allium cepa) in comparison with black seed (Nigella sativa) on acidified ethanol-induced gastric ulcers and gastric acid secretion in rats in vivo. The results of this study demonstrate the protective role of raw Nigella sativa, garlic, and onion against ethanol-induced gastric ulcers and gastric acid secretion. Consumption of Allium vegetables has been associated with decreased risk of cancer, particularly cancers of the gastrointestinal tract. The majority of supportive evidence on Allium vegetable’s cancer preventive effects comes from mechanistic studies [Holly L. Nicastro, Sharon A. Ross, and John A. Milner (2012)].

Onion (Allium cepa L.) and garlic (Allium sativum L.) are the most important commercial crops grown all over the world and consumed in various forms. When a crop is grown so widely and accepted worldwide, there are bound to be some pathogens attracted to it. Apart from reduction in crop yield, the disease and insect pests also poses harmful effects during harvesting, post harvesting, processing and marketing stages, which lower the quality and export
potential of the crops that significantly causes the economic loss.

Current garlic preparations available on the market, including garlic powder, garlic oil, raw or cooked garlic and aged garlic extract and onion extracts possess many therapeutic properties including anti-microbial, anti-viral, anti-fungal, anti- protozoan, hepato-protective, cardio-protective, anti-inflammatory, neuro-protective, anti- amnesic, anti-carcinogenic, anti-mutagenic, anti-asthmatic, immunomodulatory, hypolipidemic, anti-hypertensive, anti-diabetic and antioxidant. These therapeutic properties are caused by the combination and biological activity of organo-sulphur compounds such as S-allyl- l-cysteine, diallyl disulfide, diallyl trisulfide, ajoene, and allicin [Prakash S. Bisen, Mila Emerald. (2015)]. The effects of garlic and onion allicin extracts on the lowering of cholesterol in egg. The effects of garlic and onion allicin extracts on the proximate compositions of both raw and boiled eggs were significant. This study reveals that an increase in the allicin content leads to a decrease in the dietary cholesterol level [Oguntoyinbo Segun Isaac, Bello Temitope Kayode, Oguntoyinbo Yetunde Grace And Majekodunmi D. Michael (2016)].

**Materials and Methods:**

**Sample collection of onion and garlic:** Selection of plants was at random, however, if compositing varieties and container sizes, ascertain that a sample include roots and soil from all varieties and container sizes within a lot, include soil and roots from any plant that may appear less thrifty in growth than the remaining plants and display off-color, stunting, or other above ground symptoms indicative of an impaired root system. Do not limit sample to only plants that look “unhealthy”.

**Compound extraction:** The onion and garlic bulbs were washed with freshly prepared sterile distilled water. The outer covering of the bulbs was manually peeled off and the fleshy part of the onion and garlic was rewashed with freshly prepared sterile distilled water. A part of 50 grams of the onion and garlic bulbs was cut in to small parts and squashed. The squashed preparation soaked in 50 ml of methanol for 8 hours with gentle shaking at regular 10 minutes interval. The extract was filtered using muslin cloth and then Whatman no: 1 filter paper. The filtrate was evaporated at 45° c to dryness and the dried substances were kept in sterile bottle under refrigerated condition until uses.

**Isolation of skin pathogens - Master plate preparation:**

50ml of agar medium was prepared with 0.25gm of peptone, 0.15gm of yeast, 1.5gm of agar, 0.25 gm of Nacl and 50ml of water. The medium is sterilized in autoclave and allowed to cool. The medium was poured into the petri dishes in a laminar air flow chamber and allowed to solidify, after which the wound sample was spread onto the plates and incubated overnight. After the incubation, microbial colonies are formed.

**Pure culture preparation:** Petri plates with agar medium were again prepared and the colonies formed on the incubated plates were selected and streaked onto the newly poured plates and allowed to incubate overnight. This produces pure culture plates of the sample.

**Zone of Inhibition:** Bacterial colonies were suspended in 1ml of distilled water. Fresh petri dishes were prepared with agar medium and 100 µl of the sample were spread onto the plates in a laminar air flow chamber. Small wells were made on the agar medium and the onion and garlic extract were poured into them and allowed to incubate overnight. The inhibition zones around the wells were recorded.
Identification of isolated skin pathogens: Various staining and biochemical tests, such as Gram’s staining, catalase test, starch hydrolysis test, citrate test were performed to identify the isolated skin pathogens. All the biochemical tests were performed following the Bergey’s Manual.

Results and Discussion
Isolation of Skin pathogens and Pure culture preparation:
The sample was collected with the swab from the infected skin source and was spread onto the Nutrient agar plates. These plates were again used after 24hrs to obtain the inoculum and prepare pure cultures. The fig 2 shows the pure cultures produced from the master plate.

Fig 2 Pure culture plates obtained from the master plate

Zone of Inhibitions obtained in the plates against Garlic and onion extracts:

Table 1 shows the details about the Zones obtained for various Extracts against different bacteria

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Onion chloroform</th>
<th>Onion propanol</th>
<th>Garlic Chloroform</th>
<th>Garlic propanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gram positive bacteria (with spore)</td>
<td>0</td>
<td>0.1</td>
<td>0.8</td>
<td>1</td>
</tr>
<tr>
<td>Gram positive bacteria (no spore)</td>
<td>0</td>
<td>0.2</td>
<td>1.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Gram positive bacteria (no spore)</td>
<td>0.1</td>
<td>0.2</td>
<td>0.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Gram positive bacteria (with spore)</td>
<td>0</td>
<td>0.1</td>
<td>0.7</td>
<td>0.9</td>
</tr>
</tbody>
</table>

From the above table it can be inferred that the Garlic extracts exhibited maximum inhibition when compared to the Onion extracts. Further the Gram positive bacteria without spore exhibited sensitivity to these extracts much than other bacteria.

The Fig 3(a, b, c, d) shows the Zones of inhibitions obtained for all the 4 bacterial cultures

Gram positive bacteria (with spores)

Gram positive bacteria (no spores)

Gram positive bacteria (no spores)

Gram positive bacteria (with spores)

Catalase test result:
The following results were obtained for the cultures when tested for catalase activity. Gram positive bacteria (with spore) - Negative (no bubbles); Gram positive bacteria (without spore) - positive (with bubbles); Gram positive bacteria (without spore) - positive (with bubbles); Gram positive bacteria (with spore) - Negative (no bubbles)
Starch hydrolysis test result:
When starch hydrolysis test was performed for the bacteria in the process of identification the following results were obtained. Gram positive bacteria - *Corynebacterium kusceri*; Gram positive bacteria - *Corynebacterium kusceri*; Gram negative bacteria - *Corynebacterium xerosis*; Gram negative bacteria – *Corynebacterium xerosis*

Citrate test result:
The bacteria may be *Corynebacterium xerosis* (-ve) as it gave a negative result with Simmons Citrate Media.

After performing all the biochemical tests the bacteria were identified as a *Corynebacterium xerosis* (-ve), *Coryne bacterium kusceri* (+ve), *Coryne bacterium kusceri* (+ve), *Coryne bacterium xerosis* (-ve)

Conclusion:
From the above experimental results it can be inferred than the Garlic extraction had an effective inhibitory activity against skin pathogen than onion extracts. Among the Garlic extracts the chloroform extracts were less effective than propanol extracts. As evidenced by the above experiment, the onion and garlic extracts could provide a successful ingredient in the formulations for treating skin ailments. Further research is required to identify the exact compounds responsible for their therapeutic uses. Further these bacteria were tested for their sensitivity against the extracts of both Onion and Garlic. The zones of inhibitions were observed and recorded. The results indicate that Garlic had a greater inhibitory effect against these bacteria when compared to the Onion extracts.

Bibliography
breeding programs in the U.S. Plant Breeding Reviews, 20:67–103.


