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Comparative Studies on Existence of Human Enteric Pathogens in Instant and Local Soups

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ABSTRACT

Soups are the preparations made my combining vegetables, water, spices etc. Soups are well known as starters generally served before the lunch or dinner. Due to increase in health consciousness among peoples, soups are consumed on daily basis. However, the chances of enteric pathogens in soups can't be ignored. Hence, taking this into consideration, the present research study was initiated to find the existence of human enteric pathogens in soups. In this study, instant and local soup samples were analyzed for the determination of microbial load as well as existence of enteric pathogens. Total six soup samples were collected and subjected for analysis. The findings suggest that local soup samples show high microbial load as compared to instant soups. Nearly all the local soup samples showed existence of enteric pathogens on the other hand, some of the instant soup samples showed presence of coliforms. Hence, hot soups should be consumed to avoid food borne infections and FDA guidelines should be followed while preparing, storing and serving soups.

Key words: soups, enteric pathogens, microbial load, starters

INTRODUCTION

Soup is a primarily liquid food, generally served warm or hot (but may be cool or cold), that is made by combining ingredients of meat or vegetables with stock, milk, or water. Hot soups are additionally characterized by boiling solid ingredients in liquids in a pot until the flavors are extracted, forming a broth. Soups are similar to stews, and in some cases there may not be a clear distinction between the two; however, soups generally have more liquid (broth) than stews.

Instant soup is a type of soup designed for fast and simple preparation. Some are homemade, and some are mass-produced on an industrial scale and treated in various ways to preserve them. A wide variety of types, styles and flavors of instant soups exist.

Commercial instant soups are usually dried or dehydrated, canned, or treated by freezing. These do not contain water, and are prepared by adding water and then heating the product for a short time, or by adding hot water directly to the dry soup mix. Instant soup can also be produced in a dry powder form, such as Unilever's Cup-a-Soup. Street foods or street-vended foods are defined as foods and beverages prepared and/or sold by

vendors in streets and other public places for immediate consumption or consumption at a later time without further processing or preparation (WHO, 1996). From a travel perspective, street foods are attractive to tourists and travellers due to their convenience and as a way of experiencing local culture and food traditions. However, there are known risks associated with street food, associated with handling practices, hygiene status and presence of food safety hazards (Rakha etal., 2022). Microbiological hazards found in street foods include but are not limited to *L. monocytogenes, B. cereus, Salmonella spp. Shigella flexneri, Shigella sonnei, Staph aureus, E.coli, Cl. perfringens, and Campylobacter spp.* Chemical hazards include mycotoxins, pesticides and heavy metals, acrylamide due to overcooking and/or reuse of frying oils, and polycyclic aromatic hydrocarbons (PAHs) (Rakha etal., 2022). The present research deals with the microbiological analysis of soup samples with special reference to enteric pathogens.

Material and method:

Total six instant soup samples and local soup samples viz. tomato, mix vegetable, hot & sour, French onion, Sweet corn and Potato soup were collected respectively from super shopy and street area of washim city. The soup samples from street area were collected in sterilized and packed container. Samples were transported to the Microbiology research laboratory, post graduate section, R.A. College, Washim. The samples were serially diluted and 0.1ml sample was spread on petriplates containing different medias viz, Nutrient agar, EMB agar, BSA and XLD agar. The plates were incubated at 37 c for 24 hours. After incubation, the plates were observed for appearance of typical colonies. The enteric pathogens were purified and subjected for conventional identification viz. morphology, cultural characteristics, biochemical and IMViC classification. The conventionally identified isolates were processed for antibiotic sensitivity testing adopting Kirby- Bauer disk diffusion technique (CLSL, 2008).

Result and discussion:

Table 1 and fig 1 presents the bacterial load present in soup samples. Maximum microbial load was noted in Sweet corn soup (257.5 cfu/ml x 10^2) followed by Mix vegetable soup and tomato soup (178.5 cfu/ml x 10^2). Potato soup contains 151 cfu/ml x 10^2 count. French onion soup and Hot and sour soup contains 88 and 53 cfu/ml x 10^2 microbial count. The local soup samples showed high microbial count as compared to instant soup samples.

Table 1: bacterial load present in soup samples

Sr.No	Name of soups	Instant soups	Street soups	Mean
		No. of bacteria CFU/ ml x 10^2		
1.	Mix vegetable soup	168	189	178.5
2.	Hot and sour soup	37	69	53
3.	Tomato soup	182	175	178.5
4.	French onion soup	80	96	88
5.	Sweet corn soup	250	265	257.5
6.	Potato soup	148	154	151
	Mean CFU/ml	144.1667	158	

Fig 1: bacterial load present in soup samples

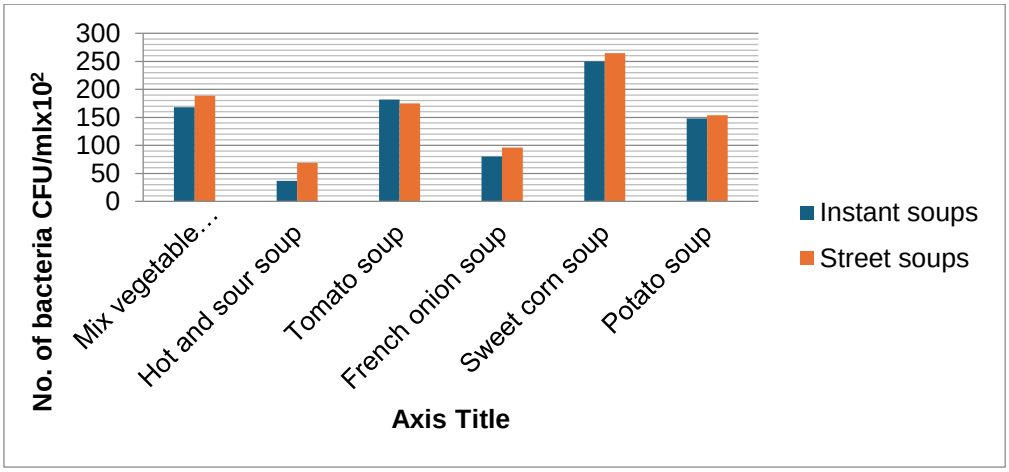


Table 2 showed the Screening of enteric pathogen in soup sample. From the table it is observed that nearly all the local soup samples showed growth of pathogens On EMB, XLD and BSA media plates indicating presence of enteric pathogens viz. *E. coli, Salmonella and Shigella*. On the contrary, instant soup showed presence of coliforms and absence of Salmonella and Shigella.

Table 2: Screening of enteric pathogen in soup sample

Sr.No	Sample	EMB		XLD		BSA	
		I.S	S.S	I.S	S.S	I.S	S.S
1.	Mix vegetable soup	+	+	-	+	-	+
2.	Hot and sour soup	-	+	-	-	-	+
3.	Tomato soup	+	+	-	+	-	+
4.	French onion soup	+	+	-	-	-	-
5.	Sweet corn soup	+	+	-	+	-	+
6.	Potato soup	+	+	-	+	-	+

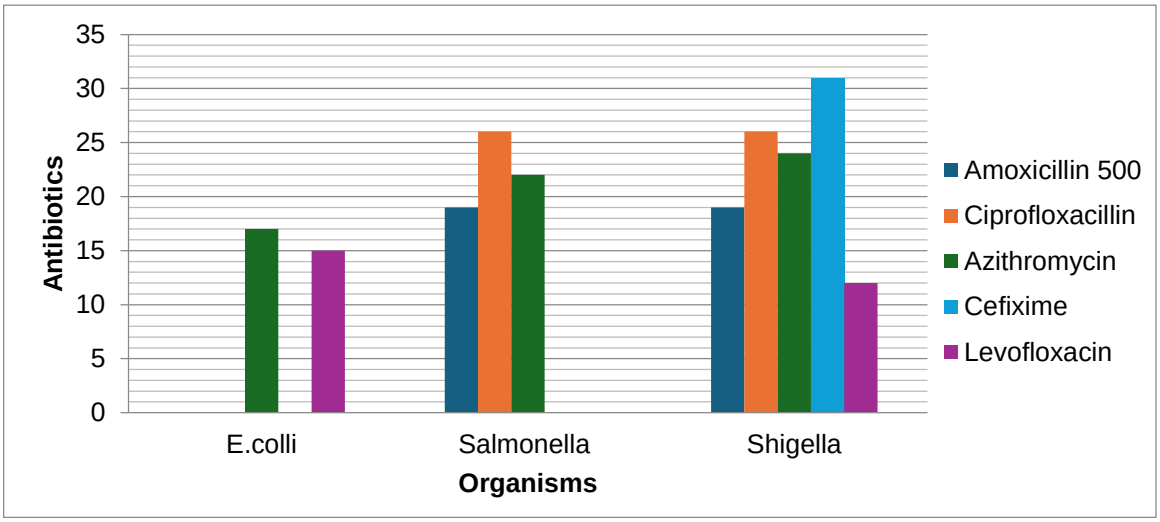
I.S- Instant soup S.S- Street soup

Table 3and fig 2 showed the antibiotic sensitivity / Resistance pattern of the isolated food borne pathogens. The S/R pattern was determined against the currently recommended antibiotic viz. Azithromycin, Amoxycillin, Ciprofloxacin, Cefixime, Levofloxacin. It was observed that all the isolates except *Shigella species* displayed resistance against more than one antibiotic, indicating that they are multiple drug-resistant strains. *E.coli* show the resistance to the three tested antibiotics viz. Amoxicillin, ciprofloxacin and Cefixime. *Salmonella* shows the resistance to two tested antibiotics viz. Cefixime and Levofloxacin. *Shigella* shows the sensitivity to all the tested antibiotics.

Table 3: Antibiotic sensitivity / Resistance pattern of the isolated food borne pathogen.

Sr.No	Organism	Antibiotics	Zone of inhibition in mm	S/R Status
1.	*E.coli*	Amoxicillin	No zone	Resistance
		Ciprofloxacillin	No zone	Resistance
		Azithromycin	17	Sensitive
		Cefixime	No zone	Resistance
		Levofloxacin	15	Sensitive
2	*Salmonella*	Amoxicillin	19	Sensitive
		Ciprofloxacillin	26	Sensitive
		Azithromycin	22	Sensitive
		Cefixime	No zone	Resistance
		Levofloxacin	No zone	Resistance
3.	*Shigella*	Amoxicillin	19	Sensitive
		Ciprofloxacillin	26	Sensitive
		Azithromycin	24	Sensitive
		Cefixime	31	Sensitive
		Levofloxacin	12	Sensitive

Fig 2: Antibiotic sensitivity / Resistance pattern of the isolated food borne pathogen



Conclusion

The presence of enteric pathogens suggests fecal contamination in the analyzed soup samples, posing a significant health risk to the public consuming food in the Washim city area. Regular monitoring of the microbiological quality of soups is crucial because outbreaks caused by contaminated food would be challenging to treat due to the presence of multidrug-resistant pathogens associated with food products.

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