

# Studies on the Effectiveness of Tejpata (*Cinnamomum tamala* Nee) Leaf Extract on Dried Kachki (*Corica soborna*) Fish Preservation in Laboratory Condition

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**Abstract** The present study was conducted by the effectiveness of tejpata leaves extract on dried control & experimental kachki fish. The microbiological parameters have been measured by application of standard plate count (cfu/g), total coliform (MPN/g), total Fungi (cfu/g), *E. coli* (MPN/g), *Salmonella*/25g, *S. aureus* (cfu/g) during the study period. Simultaneously the biochemical composition has been also determined. Before use of tejpata leaves extract, control & experimental kachki contained total coliform bacteria 110 MPN/g & >240 MPN/g. After using of extract, total coliform bacteria were decreased 23 & 46 MPN/g. In addition, before using extract control kachki & experimental kachki contained total Fungi  $4.9 \times 10^2$  cfu/g &  $3.8 \times 10^2$  cfu/g. Total Fungi were decreased after using extract that is 40 cfu/g & 100 cfu/g. In the mean time, another microbiological parameter *E. coli* (MPN/g), *Salmonella* /25g, *S. aureus* were also determined in both two treatments. Both of the treatments, all of them are absent. it may be concluded that tejpata leaves extract constitute a feasible treatment option for use in dried fish due to their natural antimicrobials, easy availability in tropical countries and low cost to the consumer.

**Keywords:** drying, Tejpata leaves extract, Kachki fish, proximate composition, microbiological parameter

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## 1. Introduction

Fish is one of the most important sources of animal protein in the diets of people in the world [1]. Especially the small fish are quickly subject to spoilage after catching. To retard the spoilage of fish, different methods of processing and preservation have been developed over times [2]. Smoking, Drying, Dehydration, Salting etc are the most conventional method of fish preservation in our country though most of the time drying is the most method used in our country [3]. Dried fish product is used as a means of prolonging shelf –life after capture. As spoilage is a metabolic process, it causes food to be undesirable or unacceptable for human consumption during changes in sensory and nutritional characteristics [4]. Spoilage agents like microorganisms, insects and other pests multiply tremendously and cause considerable damage to dried fish during handling, transportation and storage. The high temperatures of the tropics, lack of basic infrastructures and the unsanitary production conditions prevailing in most developing countries predispose fish to spoilage [3]. In the global food industry today, 'natural' is a powerful force as there is increasing resistance at regulatory and consumer levels against chemical food preservatives [5]. Numerous natural occurring antimicrobials are present in animal and plant tissues.

Various studies have evaluated the antimicrobial activities of several plant extracts, including *Sesamun radiatum* [6], Olives [7], Chardonnay grapes and black raspberries [8] and orange essential oils [9].

*Kachki* (*Corica soborna*) is an available small indigenous fish species found almost everywhere in Bangladesh. Being a small fish, it is very hard to keep for a long time without preservation. It contains a lot of Protein and other necessary essential amino acid compared to other small fishes of the country [10].

*Cinnamomum tamala* or *Tejpatta* Cinnamon was first used by Indies and Arabians as a spice, tea, and then prescribed as a cure for respiratory disorders including flu, sinus, asthma and chronic inflammation of the mucous membrane. It possesses anti-spasmodic, antifungal, antibacterial and carminative agents. It is useful in treating gastritis, chronic fatigue, poor circulation, rheumatism, diarrhea, menstrual problems, and leucorrhoea ([http://www.aminaherbs.com/product.php?id\\_product=490](http://www.aminaherbs.com/product.php?id_product=490))

The present study was carried out to evaluate the potential of tejpata leaves extracts as natural antimicrobials for use in dried kachki fish preservation. This will help the people of our country to keep dried kachki for a long time after drying with tejpata that will help to meet our nutritional demand. Besides to see the effectiveness of *tejpata* than other preserve material used in the drying method.

## 2. Materials and Methods

Fresh looking of kachki fish were selected as raw materials for present study and the fish sample were collected from the fish processor and was brought to the Fish Technology Research Section, Institute of Food Science and Industrial Research (BCSIR), Dhaka to carry out the investigation. The fish was washed with tap water and the fishes were dried by sun-light. This fish samples named as control fish samples. Another dried Kachki fish samples were collected from different local markets. These fish samples named as experimental dried samples. Then these two categories of samples were treated with tejmeta leaves extract.

### 2.1. Collection of Plant Materials and Preparation of Plant Extracts

These tejmeta leaves were collected from BCSIR Campus, Dhanmondi, Dhaka. After collecting these plants, firstly these plants were separated from unwanted substances. Then these leaves were washed properly and dried over night in oven at 40°C. After drying, these leaves were powdered by Blender Machine. This is the prepared sample for extraction. These prepared powders were dissolved in 70% ethanol for 72 hours. Then these categories of extract were collected.

### 2.2. Microbiological Test and Proximate Composition

The microbial analysis was done by standard plate count (cfu/g), Total coliform (MPN/g), *E. coli* (MPN/g)

and Total Fungi (cfu/g) [11]. The moisture and ash contents of the fish were determined by AOAC method [12]. The protein content of the fish samples were determined by Kjeldhal method. The fat content of the fish samples was determined by Bligh and Dyer method [13].

## 3. Results & Discussion

Fish is a highly perishable food and necessary conservation for future use [14,15]. There are various methods of preservation are still in the world for the conservation of fish. Objective of all these methods is the same to extend the useful life of the fish so that the fish can be used properly in the future. One such method is the "dry", which is the oldest known method of preserving non-perishable food such as fish. In Bangladesh, sun drying is the preferred method for preserving fish. This method is also considered as the least expensive method of preservation. The biochemical parameters like proteins, lipids, carbohydrates and moisture content of controlled Kachki and experimentally kachki fish were estimated and the results are presented in Figure 1 and Figure 2.

From Figure 1, it shows that control kachki contained moisture 7.74%, protein 69.83%, fat 15.09%, ash 9.24%. And experimental kachki contained moisture 11.28%, protein 63.67%, fat 10.83% and ash 11.04%. This results was found to have more or less similarities with the findings of Gopalan *et al.* [16] in the report of nutritive value of Indian Foods. Begum and Minar [10] observed the protein percentage was  $17.31 \pm 4.3$  which is less than the dried kachki fish.

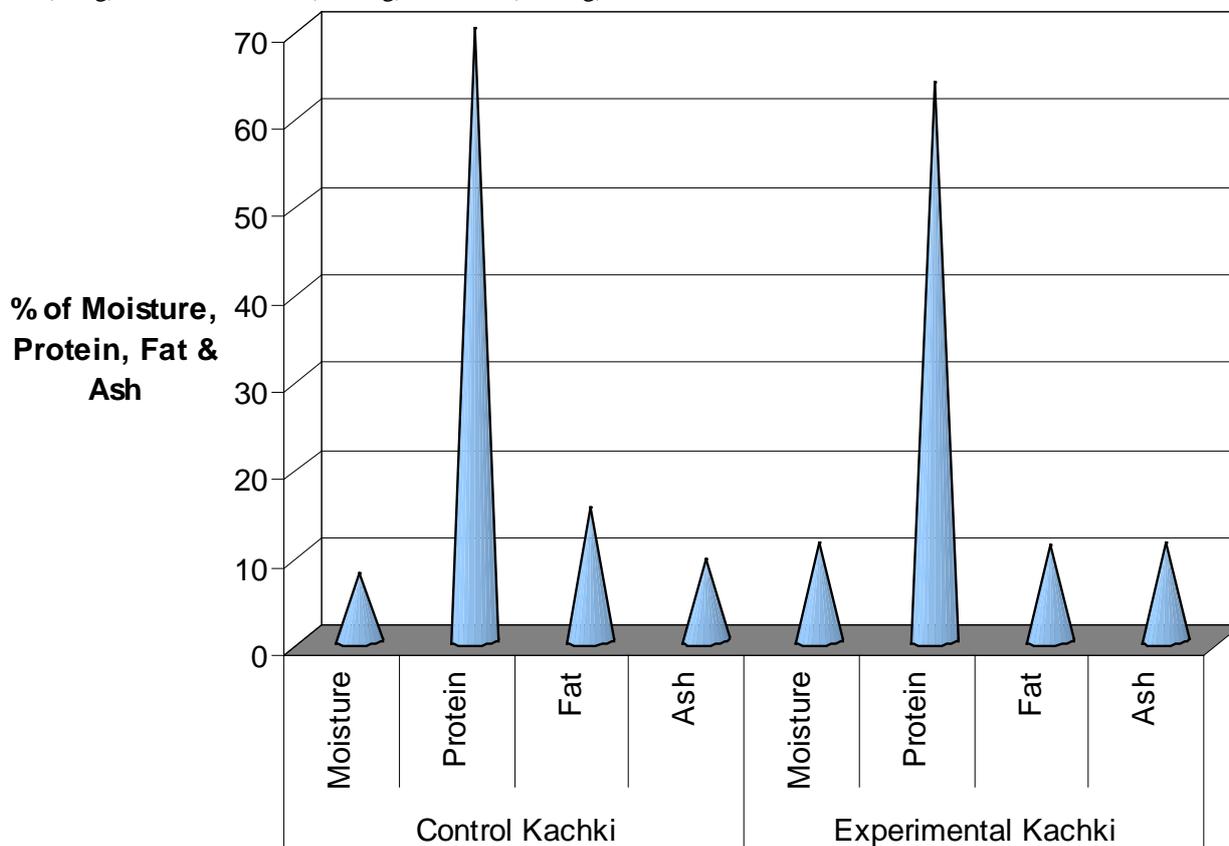


Figure 1. Proximate composition of control kachki & experimental kachki

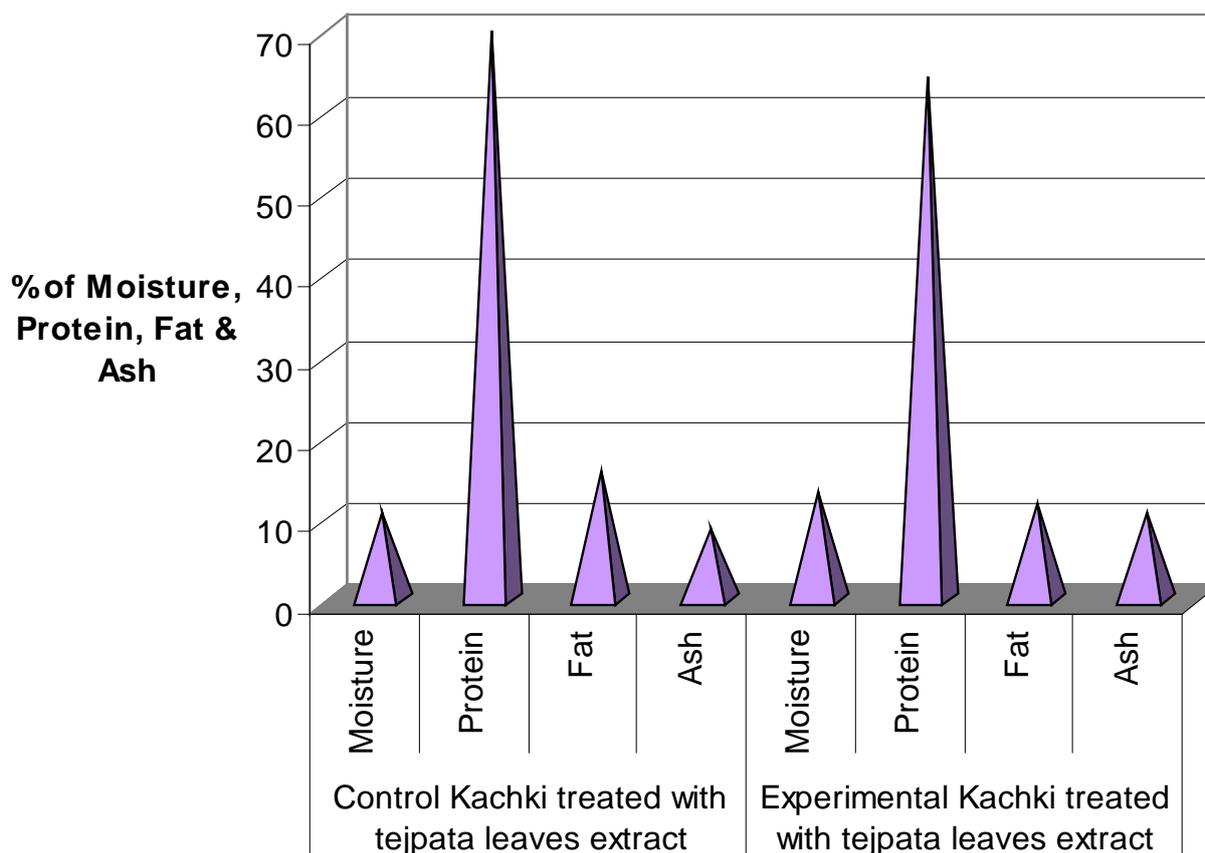


Figure 2. Proximate composition of control kachki & experimental kachki with tejapata leaves extract

From Figure 2, control kachki treated with tejapata leaves extract shows moisture 10.66%, protein 69.98%, fat 15.71%, ash 8.76% & experimental kachki treated with tejapata leaves extract shows moisture 13.03%, protein 64.13%, fat 11.81% and ash 10.65%.

Protein content was found to be high in fish controlled experimentally dried fish Sun. The increase in drying time and the loss of moisture content leads to denaturation of the protein. The protein content was higher in the fish raw fish sun dried and is mainly due to protein denaturation reducing moisture level reference [2,3].

The Microbiological test on control kachki & experimental kachki are shown in Table 1. Before use of tejapata leaves extract, control & experimental kachki contained standard plate count (cfu/g) were  $2.0 \times 10^{-3}$  &  $6.24 \times 10^4$ , total coliform bacteria 110 MPN/g &  $>240$  MPN/g and Total Fungi (cfu/g) contained  $4.9 \times 10^2$  &  $3.8 \times 10^2$ .

Table 1. Microbiological test on control kachki & experimental kachki

Microbiological Parameter	Control Kachki	Experimental Kachki
1. Standard plate count (cfu/g)	$2.0 \times 10^{-3}$	$6.24 \times 10^4$
2. Total Coli form (MPN/g)	110	$>240$
3. Total Fungi (cfu/g)	$4.9 \times 10^2$	$3.8 \times 10^2$
4. <i>E. coli</i> (MPN/g)	Absent	Absent
5. <i>Salmonella</i> /25g	Absent	Absent
6. <i>S. aureus</i>	Absent	Absent

Table 2 indicates that after using of extract, control & experimental kachki contained Standard plate count (cfu/g) were decreased 330 & 1310, total coliform bacteria were decreased 23 & 46 MPN/g and Total Fungi (cfu/g) were decreased 40 & 100.

Table 2. Microbiological test on control kachki & experimental kachki treated with tejapata plant extract.

Microbiological Parameter	Control Kachki	Experimental Kachki
1. Standard plate count (cfu/g)	330	1310
2. Total Coli form (MPN/g)	23	46
3. Total Fungi (cfu/g)	40	100
4. <i>E. coli</i> (MPN/g)	Absent	Absent
5. <i>Salmonella</i> /25g	Absent	Absent
6. <i>S. aureus</i>	Absent	Absent

From Table 1 & Table 2, it shows that another microbiological parameter *E. coli* (MPN/g), *Salmonella* /25g, *S. aureus* were absent in both of the two treatments. Begum *et al.* [3] and Hossain *et al.* [2] showed that if the fish is treated with several preservation method, they are more suitable to eat or for preserve a long time.

Plants product specially spices and extracts of various plant parts have been used extensively as natural antimicrobials and antioxidants. In the commercial preservation of fish and fish products, natural antioxidants from plant sources have been found to extend shelf life and prevent fishy taste and flavor [7,8,9]. We have done

our total drying process in hygienic condition. As a result, no infestation occurred by insects, microbes, air, etc. From overall observation, we found that our treated control dried *kachki* fish is better than treated experimental dried *kachki* fish.

This study reveals that the fish is dried fish clothesline had good nutritional and health qualities. The results were remarkable, so this simple but effective method of sun drying with some plant extracts could be popularized among local coastal population to increase the efficient use of marine resources in a better and more hygienic to increase local value and market export.

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