Comparative Efficiency of Different Surfaces for Drying Fish

SUBRATA BASU, D. IMAM KHASIM and P. SRINIVASA RAO
Research Centre of Central Institute of Fisheries Technology, Kakinada - 533 003

The efficiency of four different drying surfaces, namely, cement platform, palmyrah leaf mat, aluminium tray and stretched net for drying fish were studied using sciaenids, mullet and perch. All the drying surfaces were found to be equally efficient. The cheaper and locally available palmyrah leaf mat or stretched net can replace costly cement platform and aluminium tray for efficient drying of fish.

A good amount of marine catch in and around Kakinada is marketed as dried product. These include ribbon fish *(Trichiurus savala)*, white sardine *(Escualosa thoracata)*, anchovy *(Anchoviella)*, mackerel *(Rastrelliger kanagurta)*, perch *(Mullidae)* and other miscellaneous varieties of fishes. Some quality fishes like seer, mullet, pomfret etc. are also available as dried product. One main drawback with all these dried products is that these are dried not very hygienically. Sometimes these are dried on the side of the road or on the seashore directly on the sand. Sand content of these products is very high, sometimes exceeding 20% in few samples, 10% being a common occurrence. In order to reduce the contamination of sand and other unwanted materials to improve the overall hygienic condition of the dried products, this work was taken up to study the efficiency in terms of rate of drying on four different drying surfaces namely, cement platform, palmyrah leaf mat, aluminium tray and stretched net.

Materials and Methods

Fish of a particular species were collected from the local market. The fish were then washed, eviscerated, split open and again thoroughly washed. The adhering moisture was removed by wiping the surface of the fish with filter paper. After taking initial weight, the fish were distributed in four different surfaces namely, cement platform, palmyrah leaf mat, aluminium tray and stretched net in such a way that each drying surface contained various sizes of the fish. The fish were then dried in the sun. At regular hourly interval the weights of the fish were taken and moisture lost per 100 g of wet fish was calculated. The experiment was repeated with same species of fish. In this way several sets of data were collected. After first day's drying the fish were stored overnight in a tray and covered with iron mesh to allow circulation of air. Next morning before putting the fish again in sun, weights were taken. The moisture loss during this period was also calculated. Then again, weights were taken at hourly/two hourly intervals as done in the previous day and drying rate calculated. The percentage of moisture loss calculated in the experiment is the cumulative moisture loss and not the moisture loss of the particular intervals only. For each drying surface average drying rate was calculated taking only those fish into consideration having almost same initial weight and total moisture content. Last values in Tables 1, 2, & 3 show the average total moisture content of the individual fish (AOAC, 1975). The experiments were carried out with three different species of fishes namely scienids *(Johnius dussumieri)*; mullet *(Mugil kelaarti)* and perch *(Mullidae)*.

Results and Discussion

The average moisture loss on wet basis on four different surfaces for sciaenids, mullet and perch are shown in Tables 1, 2 and 3 respectively. The data pertained to the 3 species of fish with different drying surfaces were analysed statistically by using the analysis of variance techniques. As the data (hourly moisture loss) were given in percentage, angular transformation was applied before carrying out the analysis. In the case of

Table 1. *Average percentage of moisture removed during drying on different drying surfaces for sciaenids*

RH = 60–62%
Temperature = 36.5–37.5°C

Interval between two consecutive reading	h	Cement platform	Palmyrah leaf mat	Aluminium tray	Stretched net
Drying during	1	18.20	17.46	20.58	14.69
first day	1	27.60	27.27	29.74	22.65
	1	35.55	33.35	36.97	30.13
	1	41.13	38.69	42.06	35.62
Value after overnight storage		48.20	46.18	48.77	43.28
Drying during	1	56.38	56.45	57.97	53.08
2nd day	1	61.99	62.04	62.50	58.80
	1	65.75	65.82	65.75	63.00
	1	67.62	67.55	67.25	65.26
Average total moisture content of the fish		76.27	75.75	75.02	76.38

Table 2. *Average percentage of moisture removed during drying on different drying surfaces for mullet*

RH = 58–60%
Temperature = 34.5–35.5°C

Interval between two consecutive reading	h	Cement platform	Palmyrah leaf mat	Aluminium tray	Stretched net
Drying during	1	20.53	20.53	19.55	15.75
first day	1	30.50	30.55	27.78	23.97
	1	37.48	37.48	34.02	30.84
	1	44.94	44.65	40.53	38.83
Value after overnight storage		52.83	52.91	47.82	48.92
Drying during					
2nd day	2	61.41	61.68	56.46	57.27
	2	68.68	66.04	60.90	61.82
	2	70.29	67.71	62.82	63.86
	2	71.29	68.83	64.36	65.63
Average total moisture content of the fish		75.27	73.76	70.91	72.04

Table 3. *Average percentage of moisture removed during drying on different surfaces for perch*

RH = 69–71%
Temperature = 35.5–36.5°C

Interval between two consecutive readings	h	Cement platform	Palmyrah leaf mat	Aluminium tray	Stretched net
Drying during first day	1	23.27	18.93	23.34	18.82
	1	34.83	29.98	34.67	30.32
	1	42.17	37.78	42.37	38.63
	1	49.46	43.81	48.99	45.05
Value after overnight storage		61.16	57.03	62.40	56.77
Drying during 2nd day	2	67.72	64.99	68.87	65.47
	2	70.16	68.25	70.83	68.10
	2	70.87	68.46	71.37	68.96
Average total moisture content of the fish		74.83	74.08	75.10	74.81

mullet and perches, the percentage moisture loss was calculated at hourly interval during the first day and two hourly interval during the second day. The two sets of data for the above two species of fish were pooled for the purpose of analysis by taking hourly moisture loss on the second day from the graph.

It could be seen from the Tables 4, 5 and 6 that the difference between the drying surfaces in each species of fish were not found to be significant at 5% level of probability ($p<0.05$). As expected the difference between the hours of drying were found to be highly significant at 1% level of probability ($P<0.01$).

Table 4. *ANOVA - Sciaenids*

Source of variation	D.F.	S.S.	M.S.	F
Between drying surfaces	3	0.30	0.10	0.10
Between hours of drying	7	734.74	104.96	106.02**
Error	21	20.79	0.99	—
Total	31	755.83		

**Indicates highly significant ($p<0.01$)

Table 5. *ANOVA - Mullets*

Source of variation	D.F.	S.S.	M.S.	F
Between drying surfaces	3	4.30	1.43	1.40
Between hours of drying	7	1227.06	175.29	171.85**
Error	21	21.45	1.02	
Total	31	1252.82		

**Indicates highly significant ($p<0.01$)

Table 6. *ANOVA - Perches*

Source of variation	D.F.	S.S.	M.S.	F
Between drying surfaces	3	0.78	0.26	0.29
Between hours of drying	6	1477.22	246.20	276.63**
Error	18	16.09	0.89	
Total	27	1494.09		

**Indicates highly significant ($p<0.01$)

As the drying surfaces are equally efficient so far rate of drying is concerned, the cheaper and locally available old stretched net and palmyrah leaf mat can replace costly cement platform and aluminium tray for efficient drying of fish.

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Reference

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