

# **TRAINING MANUAL**

## **VALUE ADDED FISH PRODUCTS FROM FRESH WATER FISH**

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## Message



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Fish contributes immensely to the human nutrition. In today's competitive world, where both men and women are working, the demand for ready-to-eat food products is increasing day-by-day. The growing demands also necessitate development of new food products as well as popularization of the existing products. In view of this, Post-harvest Technology Department at Central Institute of Fisheries Education, Mumbai has developed a series of value added fish products from fish muscles. While doing this, they have aimed to utilise the low-cost fish with simple and easy to follow processing techniques.

In order to popularize the technology, the institute has organized a training program on "Value added fish products from fresh water fish" at Directorate of Fisheries, Mizoram during 10-11 March, 2014. I give my good wishes to Dr. B. B. Nayak, Dr. A. K. Balange, Mr. Avinash Sable and Mr. B.T. Phande for successful conduct of the program in very important north eastern state of Mizoram.

I am hopeful that the program would be very effective and the participants would gain enough practical knowledge and skills and would be able to put them in practice.

A handwritten signature in black ink, appearing to read "W.S. Lakra".

(W.S. Lakra)

## **1. MIHRING TANA SANGHA EI PAWIMAWHNA (IMPORTANCE OF FISH IN HUMAN DIET)**

Chaw tha hi mihring ten kan nunna atan kan mamawh .Tun hma atang in sa leh sangha hi mihring te ei nasat ber ber a nit a zel a ni.Mihring kan lo pian chhuah a,nausen kan lo nih hian,nu hnute tui a chawm len ngai kan ni a. Nu hnute tui hian, nausen tana chaw tha tinreng a pai tel a ni.

Science thiamna hmang in kan ei leh in tur thlai te pawh nasa tak a kan thar chhuah theih na tur in chu thiamna chuan min pui nasa em em a ni.Chutiang in thiamna sangzel ah,sangha tangkai na leh that nate an hmuchhuak thar zel a.Sangha hian kan taksa leh tihrawl siam na atan a pawimawh em em mai “Protein” a pai hnem em em a ni tih te an hmu chhuak zel bawk a ni.

Ram hausakna chu a mihring cheng te hrisel leh hrisel loh a thui tak i innghat a.Ram mipui ten intluk tlang tak a kan taksa tan a tha tur leh tangkai tur kan dawn theuh hi a pawimawh em em a ni.Chaw tha chu a rawng leh rim atang te a teh a ni ber lo a,heng kan taksa tana tangkai tur protein te,Fats(thau leh mawm) te,Minerals leh vitamins a awm kim em tih hi chaw tha teh na chu a ni.

Chuvang chuan,sangha hian chung chu a pai em tih kan tarlang dawn a ni.

Chungte chu:

- 1.Moisture**
- 2.Protein**
- 3.Lipid (thau)**
- 4.Vitamins leh Minerals.**

### **FATS/LIPIDS (thau):**

Kan ram a kan hmuh a kan ei thin te hian thau leh mawm an pai tlem em em

a.Heng sangha te leha n thau paizat te chu:

Catla-1.66% , Rohu-1.45% , Mrigal-1.62% leh Pangasius-1.48% te a ni.

Mithiamte chuan sangha thau hi lung natna nei tan a tha em em tih an hmuchhuak tawh bawk a ni.Chutiang an zirna ah chuan tuipui kama cheng,tuifinriat sangha ei nasa te hian lung natna an nei tlem bik ani tih an zir chhuak bawk a ni.Tin,sangha thau hian kan taksa a thauchhia awm te a titlem thei bawk a ni.

### **MINERALS leh VITAMINS:**

Minerals hi kan taksa hnathawh tichak tu a tan an pawimawh em em a.Kan

ram a sangha kan hmuh leh an minerals pai zat te chu:

Mrigal-1.55% , Rohu-1.23% , Catla-1.22% , Pangasius-1.40% anni.

Vitamins te- vit A,D, leh E te an pai bawk a ni.Chumai bakah Calcium leh

Potassium tam tak,kan taksa tana tha tur an pai hnem em em bawk a ni.

## **2. SANGHA MAN HNU A DAHTHAT/VAWNTHAT DAN**

Sangha ah hian hnawng a tam avang leh natna hrik leh enzymes te an pai avang in,sangha thi hi a chhe chak em em a.Tin,hnawng ah hian an chhe chak zual em em bawk ani.

Chuvang chuan man an nih vel ah a rang thei ang ber a dahthat/vawnthat thuai hi tih makmawh a ni.

Lui emaw dil atang emaw a sangha chu man a nih vel ah silfai a,thermocol bawm ah vur nen a dahthat thuai tur ani a.Sangha kg1 ah vur kg1 ang hisap ah dah pawlh thin tur a ni.Vur chu tihnawi emaw tih sawm tur a ni a,chu chu hrik leh enzymes te hnathawh tur a ti thuanawp dawn a ni.

Thermocol bawm chhung ah hian vur nawi leh sangha chu inchherchhuan a dah tur a ni a.Chumi awmzia chu vur chung ah sangha chumi chung ah vur ,chutiang a rem thin tur ani.

Chumi zagh a tha tak a chhin a kan zawrh na tur a kalpui tur a ni.

Hetiang a dahthat hian ni 10 -12 te a dahthat theih bawk a ni.Kan sawngbawl na hmun leh a sawngbawl tute pawh a fai thei ang ber a awm hian a thianghlim bik a,a leitu tan hmuh a nuam bawk a ni.

### **3. AWLSAM TAK A SANGHA DAHTHAT DAN**

Sawi tawh angin sangha hi thil chhe hma tak a ni avang in awlsam tak leh hmanrua em em pawh ngai lo a kan dahthat hi a pawimawh em em a.Chumai nilo in sangha van lai a ei chak phuhruk na tha tak a ni bawk a ni.

Chung hmanrua lian leh tha tam tak ngai lo a kan dahthat theih dan te chu:-

- 1.Phoro (Drying)**
- 2.Chi hman (Salting)**
- 3.Repro (Smoking)**
- 4.Um (Pickling)**

#### **1.Phoro (Drying)**

A hma a kan sawi tawh ang khan,tui pai hnem sangha chu phoro chuan a chhiat theih na tam tak a pumpelh theih dawn a n.

He tihdan hi hmanlai atnag tawha tihdan phung a neih a ni a.Sangha te deuh te chu a pum a phoro mai tur a ni a.Sangha lian te erawh chu silfai a,a vun,samkhuih,leh kawchhung te paikh tur a ni a,chumi hnu chuan nisa hnua i a phoro mai tawh tur a ni. Chung phoro na tur chu cement a plaster,inch 1-3 vel a sang ni se,sava leh rannung dang ten an ei a an bawm mail oh na tur in those len ang net a khuh ni bawk se.

Hetiang a pho hian nisa tha panngai ah chuan ni 3 hnu vel ah duhthusam in a ro thei a ni.A ro hnu ah chuan saraqng emaw bawm phui a dahthat tur a ni.

#### **2.Chi hman (Salting)**

Chi hmang a vawnthat pawh hi hman tan na a rei tawh hle a ni.Chi hian sangha taksa a tui leh hnawng awm te chu hip chhuak in,natna hrik leh enzymes te hnathawh tur a titheuanawp ta thin a,chu chuan sangha chhe hma tur a veng ta thin a ni.

Sangha lian sawngbawl dawn chu a vun,samkhuih,pumpui te paikh fai a ,tui a sill eh tur a ni a.Sangha kg3 ah chi kg 1 ang hisap a pawlh thin tur a ni.Nithum chhung chutiang a dahu hnu ah,silfai a,nisa a phoro leh tur a ni.  
Hetiang a dahthat hian thla3 atang a thla 4 te a dahthat theih bawk a ni.

### **3.Repro (Smoking)**

Sangha chu sifai a,a vun,samkhuih leh kawchhung te paikh fai tur a ni a. Chi tui (10%) ah minute 15 vel chiah hnu ah rap ah emaw,meikhu hmang a tiho theih na ah dah tur a ni a.Meikhu hian phenols,cellulose leh lignin te a pai a chu chu sangha ah khan bet in sangha tichhe hma tu natna hrik leh enzymes te hnathawh a ti thuanawp dawn a ni.Chumai nilo in sangha hmel a ti mawi in a ti rimtui bawk a ni.

Germany,England,Russia leh Scandinavia ah te a lar in an uar em em a ni.

### **4.Um (pickling)**

Theihai pickle leh ser pickle siamdan nen a danglam lo a,heng chi,vinegar,chini leh gram masala te hi telh tur a ni.Hei hian natna hrik intlahpung tur a dal a ni.Sangha pickle hi thal 6 chhung vel siam atnag in a dahthat theih a ni.

#### **4. TUNLAI THIAM NA HMANG A SANGHA DAHTHAT/VAWNTHAT DAN(Modern methods of fish preservation)**

Sangha tam tham tak tharchhhuah anih hian a chhiat mai loh nan dahthat/vawnthat a ngai thin a, tih makmawh pawh a ni reng ani. A hmalam ah khan pi le pute,hmanlai atanga sangha vawn that dan tlangpui kan sawi tawh a . Tun dinhmun ah , thiam na te a lo sang chhozel a, khawl hmang a dahthat/vawnthat te pawh kan lo uar ta deuh deuh a. Kan India ram ah ngei pawh kan lo hmang uar ta hle ani.

India ram a kan hman tlanglawn pahnihte chu:

- 1)Vur hmang a dahvawh(Freezing).
- 2)Sangha tin a siam ( Canning)

##### **1) VUR HMANG A DAHVAWH (Freezing)**

He tah hian sangha taksa chu vur hmang in kandahvawt thin ani. Ni 6 atanga ni 7thleng a dahthat theih bawk ani.

Sangha taksa chu degree 20°C aia sang lo ah dah ani thin a.Tichuan, sangha taksa a tui awm te tikhali in natna hrik leh enzymes hnathawh turte a dal ta ani.

Vurbawm (freezer) lian tak erawh mamawh ani ve thung a. Chung vur siam na atan a an khawl hman te chu:-

Plate freezer, Tunnel freezer leh Blast freezer te anni.

Plate freezer ah hian sangha kg 2000-3000 minute 80 chhung dahvawh/dahkhali theih a ni.

Tunnel leh Blast freezer ah hian kg 7000-10000 darkar 7 atang 8 thleng dah theih ani bawk ani .

Chung sangha dahvawh techu la chhuak in sarangip a khung a, lehkhakhawng bawm ah dah a, dahvawhna in (cold room) a vawhzawng degree -20 °C ah an dah khal leh thin ani.

Heting a sangha dahkhal hian kum 1 atang a kum 2 thleng te ei theih in a dahthat theih bawk. He khawl hmang a sangha dahkhal hi India ram tuifinriat kam a cheng te chuan an uar hle ani.

Hetiang khawl hmang a dahthat hi to hle mahse, a hlawkna lam ah erawh chuan a hlawk em em si ani. Heng sangha dahkhalte hi ram hrang hrang ah thawnchhauh ani thin.

## 2) SANGHA TIN A SIAM(Canning):-

Hetiang a tin a siam hian,sangha kha,kan chhumhmin ta a,chu chuan natna hrik te leh enzymes te kha hnathawk thei lo in a siam ta ani.Hetiang hmang hian kum 1atanga kum 2 thleng te a vawn that theih ani.

Sangha man sa te chu uluk takin an silfai a,aluminium emaw Tin bur ah tel leh a bawlhlo ten en an dah ta a, a thlangpui in he bur hian gm 200 atang 500 thleng a dawng thei ani.

Chutiang a an thun khah hnu ah chuan an chin ta a, pressure cooker lian taka a bur chawp chuan an chhum ta a. He bur te hi 121 °C ah minute 60 chhung an chhum thin ani.

An chhum zawh hnu chuan la chhuak in a vawng daileh a, eitheih a lo ni ta ani. Hetaing a siam hian dahvawh emaw chhum sat leh tawh chuan angai lo a, a ei nghal theih ani. Kum1 hnu anih erawh chuan, tui tlem leih a chuan lum a tha ber ani.

He pawh hi sum tam tak ngai mahse help a tha em em ani.

Heng a hnuai a kan tarlan te hi sangha, tunlai thiam na hmang a dahthat dan hrang hrang te anni:-

- 1) Irradiation 2) high pressure processing 3)freeze drying 4)ohmic heating.

Heng ho erawh hi chu India ram ah hman ala ni lo.

## 5. SANGHA SIAM DAN LEH TUL TE

### 1) Sangha pickle:

Sangha pickle siam dawn hien sangha chi hrang hrang, entirnan: catla, rohu, mrigal,pangasius te a hman theih ani.

A hmasaber ah chuan, sangha chu fai tak a sil tur ani a.A lu, vun, samkhuuh leh pumpui te then fai hnu ah silfai leh tur ani. Chumi hnu ah pressure cooker a chhum hmin tur a ni a.A hmin hnu ah chuan a ruh then fai leh tur ani. A ti chuah kha hman tawh tur ani.

#### Hmanraw ngai te:

#### Ngaizat:

1)Sangha ti chum hmin (ruhpaih)-	1kg
2) Antam chi -	4gm
3)Methi -	4gm
4)Purunvar-	100gm
5)Sawhthing-	25gm
6)Hmarchate hring-	30gm
7)Hmarcha dip-	30gm
8)Aieng-	5gm
9)Vai masala dip-	30gm
10)Chi-	80gm
11) Chini-	5gm
12)Tel-	500ml
13)Vinegar-	400gm
14) Benzoic acid-	240gm

## Siam dan

- 1.Sangha ti ah chi gm 40 telh la, darkar 1 atang a chanve thleng dah rawh.
2. Purunvar, sawhthing leh hmarchate hring chu rawtsawm la.(Chawhpawl -1)
3. Hmarcha dip, aieng, vai masala dip leh chi gm 40 te chu tui ah chiar la.(Chawhpawl - 2)
- 4.Tel 250 ml ah sangha ti, chi nen a chawh pawlh chu kang hmin ang che. La chhuak leh la.
5. chumizawhah thildang kan leh nan Tel 250 ml belh leh tur ani.
- 6.Antham chi leh methi (masala) te chu kang ang che.
7. Chawhpawl (1) leh chawhpawl(2) te chu kan pawlh ang che.
8. Khing kan ah khian chini pawlh ang che.
9. Sangha ti kan chu,thlak tawh ang che,mei alh a na lutuk tur a ni lo.
- 10.Ahmin rim a nam thleng in kang ang che.
- 11.Chumi hnu ah suan la, dah dai ang che.
- 12.Vinegar leh Benzoic acid te pawlh ang che.
- 13.Tichuan, pickle chu i siam zo ta.
14. 200 gm vel pickle Bur ah emaw sarang ah emaw phui tak in dah ang che.
15. Pickle hming leh a tul dang bel la.
16. Hetiang a pickle siam hi thla 7 chhungte a dah theih ani.

## 2. KAIKUANG PICKLE

A hmanrua leh siamdan chu sangha pickle nen khan a inang a. Sangha aiah kaikuang kan hmang chauh zawk ani.Kaikuang kawrte chu paikh la silfai ang che.

Kaikuang pickle ah hian tel(oil) 250 ml leh vinegar 300 gm te telh tur ani.

### 3. SANGHA PAPAWR

Papawr hi kan hre theuh awm e. Papawr slam nan hian Urad Dal hman ani a. Chutah chuan sangha ti, a hma a kan sawi tak ang kha pawlh in, a ti tui in, protein a siam bawk ani.

Hmanraw ngai:	Ngai zat:
Urad dal dip	100gm
Chi	6gm
Sangha ti	80 gm
Sodium bicarbonate(soda)	1.5gm
Sawhthing	0.5gm
Purunvar	0.5gm

#### Siam dan

1. Sangha engpawh entir nan; catla, Rohu. Mrigal emaw pangasius te la la.
2. Faitak in sil ang che. Chumi hnu ah a lu, van, Samkhuuh leh a kawchhung te paihfa i ang che, chumi hnu chuan fai tak a sil leh tur ani.
3. Tichuan, sangha chu mins 10-15 vel chhum la.
4. Chumi zawh ah, a ti leh ruh ti thliar hrang ang che.
5. Sangha ti chu chiar la.
6. Sawhthing leh puranvar dip tak in den pawlh ang che.
7. Sangha ti chiar gm 80, urad dal gram 100, chi, soda, sawhthing-purunvar den sawm techu ball ang in hlawm ang che.
8. Chumi I hlawm chu tel tlem ten nen nawr phek angche. Tichuan, phoro turani.
9. A ro hnu ah sarang ip ah phui tak in I dah dawn ania.
10. Hetiang a sangha papawr siam hi thla 6 chhung a dah theih ani.

#### **4.Sangha chakali/Sangha sev siamdan**

Hetiang siam hi India ram ah a lar em em a, chhangphut, Hmarcha dip, chi, sawhthing leh parunvar te hmang in ball ang a siam tur ani a. Chumi hnu ah a landan tih danglam nan leh a ruangam tihdanglam na tur hmanrua hman leh tur ani.

<b>Hmanraw ngai</b>	<b>Ngai zat</b>
1.Changphut	100gm
2.Sangha ti	70gm
3.Sodium bicarbonate(soda)	1gm
4.Hmarcha dip	2.0gm
5.Chi	2.5gm
6. Sawhthing	1.5gm
6.Purunvar	0.5gm

#### **Siam dan**

- 1.Sangha la ang che.
- 2.Fai tak a sil hnu ah, a lu, vun, samkhuih leh kawchhungte then fai tur ani.
3. Sangha chu chhum hmin tur ani a, min 10-15 thleng chhum a tawk.
- 4.Sangha ti leh ruh te thliar hrang ang che.
5. Tichuan sangha ti chu l chiar dawn nia.
- 6.Sawhthing leh purunvar te chu dengsawm la.
7. Sanghachiar gm 80, chhangphut gm 100, soda, hmarcha dip, chi, sawhthing leh purunvar te chu tui tlem leih a chawhpawlhturani a. Chumi hnu ah hrual hlawm tur ani .
8. Chumi hlawm chu chakli leh sev siamna hmanrua ah a ruangam turang a siam tur ani.

9. Mei sa ah hem ro tur ani a.
10. Polythene ip ah dah that tur ani.
11. Thla 1 chhungte a dahthat theih ani.

#### **4.Sangha sandwich**

Sangha ti chiar a, chumi chu changthawp zai phek pahnih inkar a dah a,eipawlh tur a ni.

Hmanraw ngai	Ngai zat
1. Sangha ti	1kg
2. Antam chi	4gm
3. Methi	4 gm
4. Purunvar	100gm
5. Sawhthing . hring denpawlh	25gm {purunvar,sawhthing leh hmarchate tur.chawhpawlh-1}
6. Hmachate hring	20 gm
7. Hmarcha dip	15 gm
8. Aieng dip	3gm {Hmarcha dip,aieng dip,Masala dip chawhpawlh tur,chawhpawlh-2}
9. Masala dip	30gm
10.Chi	28gm
11.Chini	5gm
12.Tel	500 ml
13.Dal dip	4gm
14.Elaichi dip	2gm {Dal leh elaichi chawhpawlh tur,chawhpawlh-3}
15.Butter	200gm
16.Ser	4gm
17.Bahkhawr	Duh zahzah

## Siam dan

1. Sangha I hmantur la angche.
2. Silfai hnu ah, a vun, samkhuuh leh kawchhung te thianfai la.
3. Minute 15-20 chhum turani.
4. A ti leh ruh te thliar hrang la.
5. Sangha ti chu chiar ang che.
6. Thirbel ah tel leih la, Antam chi leh methi te khi, mins 1-2 vel kang ang che.
7. Chumi zagh ah chawhpawlh(1) khi mins 3-4 kang ang che. Chawhpawlh(2) khi pawlh la, a hmin rim a nam tleng kan tur ani.
8. Tichuan chini khi telh tur ani.
9. Chawhpawlh-(3) khi telh leh la, min 1-2 tleng kang ang che.
10. Chumi hnu chuan sangha ti chiar chu I tlak tawh dawn nia, mei na lutuk lo a kan tur ani a. A rim ah a hmin rim a nam hun ah suan tur ani.
11. A hmin hnu chuan suan la, Butter telh in chawh pawlh ang che.
12. Chhangthawp zai lep karah a awmtawk in I dah dawn a nia.
13. Bahkhawr pawh duh ang zat dah tel nghal tur ani.
14. Darkar 18 vel dah that theih a ni.
15. Fridge a dah in ni 4 tleng te dah that theih bawk a ni.

## **Organizing Committee**

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