$YDLODEOH RQOLQH DW ZZZ VFKRODUVUHVHDUFKOLEUDU\ FRP

6FKRODUV 5HVHDUFK /LEUDU\

$QQDOV RI ([SHULPHQWDO %LRORJ\

KWWS   ZZZ VFKRODUVUHVHDUFKOLEUDU\ FRP

,661

$)RUPXODWHG 'LHW &KDUW IRU 3DWLHQWV ZLW
&OLQLFDO 6LJQLILFDQFH

1LUDM .XPDU 6ULYDVWDYD 6RXP\DGHHS 0XNKHUMHH 5RKLW 6KDUPD

$VKRN 6RQNDU .XPDU 0DKHVKZDUL 6KDUPD

6FKRRO RI /LIH 6FLHQFHV -DZDKDUODO 1HKUX 8QLYHUVL

'HSDUWPHQW RI 1HXURORJ\ $OO ,QGLD ,QVWLWXWH RI 0HGL

'HSDUWPHQW RI 1HXURVXUJHU\ $OO ,QGLD ,QVWLWXWH RI 0H

&RUUHVSRQGLQJ $XWKRU deepak57m@yahoo.co.in

$%675$&7

2EMHFWLYH 0XVFXODU G\VWURSK\ LV D JHQHWLF GLVHDVH DQG DV
,PSDLUHG PXVFOH VWUHQJWK PD\ EH DVVRFLDWHG ZLWK QXWULWL
0RUELGLW\ DQG PRUWDOLW\ PD\ EH DOVR LQIOXHQFHG E\ SRRU GLH
QXWULWLRQDO LQWDNH DV ZHOO DV IRUPXODWLRQ RI KHDOWK\ EDO

0HWKRGV 2[LGDWLYH VWUHVV EDVHG GHJHQHUDWLRQ LV WKH PDM
G\VWURSK\ )RUPXODWLRQ RI WKH GLHW LV EDVHG RQ WKH SURWHF
G\VWURSK\ 7KH GLHW ZDV JLYHQ WR SDWLHQWV ZLWK P*XVFXODU
JOXWDWKLRQH SHUR[LGDVH &$7 FDWDODVH DQG /3 OLSLG SHUR[
SDUDPHWHUV ZDV PHDVXUHG LQ VHUXP RI SDWLHQWV ZLWK PXVFXOD
PHGLFLQDO WUHDWPHQW YV QRQ PHGLFLQDO WUHDWPHQW DQG S
FRQVXPSWLRQ YV SDWLHQWV ZLWK PHGLFLQDO WUHDWPHQW DIWHU
GHWHUPLQHG LQ SDWLHQWV ZLWK PHGLFLQDO WUHDWPHQW DQG IR
WUHDWPHQW DIWHU WZR IRXU PRQWK GXUDWLRQ

5HVXOWV /HYHO RI *3[&$7 62' DQG /3 ZDV KLJKHU LQ SDWLHQWV ZLWK PXVFX
VXEMHFWV 1R VLJQLILFDQW GLIIHUHQFH ZDV REVHUYHG LQ WKH O
PHGLFLQDO WUHDWPHQW YV QRQ PHGLFLQDO WUHDWPHQW 7KHUH
SDUDPHWHUV LQ WKH VHUXP RI SDWLHQWV ZLWK PHGLFLQDO WUH
WUHDWPHQW DIWHU WZR DQG IRXU PRQWK¶V GXUDWLRQ *UDGLQJ R
PHGLFLQDO WUHDWPHQW DQG IRUPXODWHG GLHW FRQVXPSWLRQ Y
IRXU PRQWK¶V GXUDWLRQ %XW WKHVH GLIIHUHQFHV GR QRW DSSUR

'LVFXVVLRQ 7KH IRUPXODWHG GLHW FKDUW PLJKW SURYH KHOSIXO
ZHOO NQRZQ IDFW WKDW JHQHWLF GLVHDVHV DUH QRW FXUDEOH $Y
SDWLHQWV ZLWK PXVFXODU G\VWURSK\

.H\ZRUGV 1XWULWLRQ 0XVFXODU G\VWURSK\ 'LHW '0' %0' /*0' % %DO

$EEUHYLDWLRQV 2' 6RXS 6XSHUR[LGH 'LVPXWDVH *3[*OXWDWKLRQH 3HUR[LGDV
'0' 'XFKHQQH 0XVFXODU '\VWURSK\ %0' %HFNHU 0XVFXODU '\VW
'\VWURSK\ )6+')DFLRVFDSXORKXPHUDO 0XVFXODU '\VWURSK\

INTRODUCTION

0XVFXODU G\VWURSK\ UHVXOWV IURP PXWDWLRQ LQ JHQHV UHVSRQV
ERG\ LQFDSDEOH RI PDLQWDLQLQJ >@ LQ WKH KHUHGLWDU\ PXVFXODU G\VWURSK\ '0
G\VWURSK\ %0' /LPE JLUGOH PXVFXODU G\VWURSK\ /*0')DFLRVFD
FRQJHQLWDO PXVFXODU G\VWURSK\ DUH WKH PDMRU W\SHV 7KHUH
ZHDNQHVV LQ DOO W\SHV RI PXVFXODU G\VWURSK\ >@ 6HYHUDO JHQHV KDYH EHHQ
GLIIHUHQW W\SHV RI PXVFXODU G\VWURSK\ 7KH H[DFW PHFKDQLVP EHKLQG WKH PXVFOH
LV VWLOO QRW NQRZQ 2[LGDWLYH VWUHVV PD\ EH RQH RI WKH FDXV

7KH SK\VLRORJLFDO FRQGLWLRQ RI SDWLHQWV ZLWK PXVFXODU G\V
,PSDLUHG PXVFOH VWUHQJWK PD\ DOVR EH OLQNHG E\ QXWULWLRQD
PRUELGLW\ DQG PRUWDOLW\ LQ SDWLHQWV ZLWK PXVFXODU G\VWUR
SDWLHQWV ZKLFK ZRXOG EH KHOSIXO IRU EHWWHU PDQDJHPHQW R
IRUPXODWHG WKDW FRXOG SURWHFW DJDLQVW R[LGDWLYH VWUHVV
PXVFXODU G\VWURSK\ >@ 7KH QXWULWLRQDO FRPSRQHQWV RI WKH GLH
R[LGDWLYH VWUHVV 7KH FOLQLFDO VLJQLILFDQFH RI QXWULWLRQD
62' VXSHUR[LGH GLVPXWDVH *3[JOXWDWKLRQH SHUR[LGDVH &$7
RI SDWLHQWV ZLWK PXVFXODU G\VWURSK\ DIWHU FRQVXPSWLRQ RI IR

MATERIALS AND METHODS

Blood specimens

7KHUH ZHUH WKLUW\ SDWLHQWV PDOH DQG IHPDOH ZLWK PHDQ D
IURP WKH QHXURORJ\ GHSDUWPHQW RI $OO ,QGLD ,QVWLWXWH RI 0
FRQILUPHG IRU PXVFXODU G\VWURSK\ E\ KLVWRSDWKRORJLFDO DQG SKHQ
6HYHQWHHQ 1 PDOH DQG ILYH 1 IHPDOH ZLWK PHDQ DJH RI
1HZ 'HOKL DV D FRQWURO VXEMHFWV $SSURYDO RI (WKLFDO &RPPLW
1HZ 'HOKL ZDV REWDLQHG IRU FRQGXFWLQJ WKLV VWXG\ :ULWWHQ F
FROOHFWLQJ WKHLU EORRG VSHFLPHQV %ORRG VDPSOHV ZHUH GU
ZKLFK ZDV IXUWKHU XVHG IRU WKH VHUXP VHSDUDWLRQ 7KH VHUXP

Experimental design

7KH SDWLHQWV ZHUH UDQGRPO\ GLYLGHG LQWR WZR JURXSV 2QH
PHGLFLQH DQG WKH RWKHU JURXS 1 ZHUH ZLWK SUHVFULEHG PH
ZHUH FROOHFWHG DW PRQWKV LQWHUYDO 7KH ILUVW VDPSOH ZDV FROOHFWHG EHIRUH
PHGLFDWLRQ DQG PHGLFDWLRQ DORQJ ZLWK WKH GLHW 6XEVHTXH
PRQWKV RI LQWHUYHQWLRQ $FWLYLW\ RI DQWLR[LGDQW HQ]\PHV 6
ZHUH HVWLPDWHG LQ WKH VHUXP IURP ERWK WKH JURXSV

Chemicals

$OO WKH FKHPLFDOV ZHUH SXUFKDVHG IURP 6LJPD $OGULFK 8.

Clinical examination

$OO VXVSHFWHG SDWLHQWV ZLWK PXVFOH GLVHDVHV ZHUH H[DPLQH
GLIILFXOW\ LQ FOLPELQJ WKH VWDLUV IUHTXHQW IDOOV ZKLOH PXVFXO
*RZHU¶V DQG YDOOH\ VLJQ DORQJ ZLWK FDOI PXVFOH K\SHUWURSK
SDWLHQWV 7KHVH DUH LPSRUWDQW FOLQLFDO VLJQV DQG XVHG WR
ZDV KHOSIXO WR GLDJQRVH WKH /*0' % G\VIHUOLQRSDWK\ >@

EMG (electromyography) examination

'LDJQRVWLF FRQILUPDWLRQ ZDV SHUIRUPHG E\ (0* H[DPLQDWLRQ ZLWK WKH
QHHGOH 7KH DSSHDUDQFH RI P\RSDWKLF (0* SDWWHUQ ZDV KHOSIXO

Histopathological and immune-histopathological examination

+LVWRSDWKRORJLFDO DQG LPPXQRKLVWRFKHPLFDO H[DPLQDWLRQV FRQILUPLQJ WKH GLDJQRVLV RI VXVSHFWHG SDWLHQWV ZLWK PXVFX IXUWKHU FRQILUPLQJ WKH GLDJQRVLV ZKHUHYHU IHOW QHFHVVDU\

Biochemical estimations from serum

%ORRG ZDV FROOHFWHG LQ SODLQ YLDOV IROORZHG E\ FHQWULIXJD OLTXLG QLWURJHQ IRU ELRFKHPLFDO VWXGLHV

(a) Estimation of lipid peroxidation (LP): $Q LQGLFDWRU RI OLSLG SHUR[LGDWLRQ LV VXEVWDQFH 7%$56 7KHVH VXEVWDQFHV ZHUH HVWLPDWHG E\ WKH H[SUHVVHG DV QDQRPROHV RI PJ SURWHLQ 0'$703 ZDV XVH VWDQGDUG

(b) Determination of superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx) activities: 7KH DFWLYLW\ RI DQWLR[LGDQW HQ]\PHV 62' &$7 DQG *3[ZDV GH (Q]\PH DFWLYLW\ ZDV H[SUHVVHG DV XQLWV PJ SURWHLQ

Measurement of muscle power

0XVFOH SRZHU ZDV GHWHUPLQHG EHIRUH WKH PHGLFLQDO WUHDWPH WUHDWPHQW GLHW WKHUDS\ DIWHU DQG PRQWKV GXUDWLRQ 'H WKH YDULRXV SDUDPHWHUV 7KHVH ZHUH FRPELQHG VKRXOGHU DQG ZULVW DQG DQNOH SRZHU FRPELQHG ILQJHU DQG WRH SRZHU WLPH SRVLWLRQ WLPH WDNHQ WR FOLPE VWDLUV ZLWK WKH VXSSRUW R OLIWHG XS WR VKRXOGHU DQG DUP DQG DPRXQW RI ZHLJKW WKDW F DERYH PHQWLRQHG SDUDPHWHUV WKH JUDGLQJ RI PXVFOH SRZHU ZD VFDOH LV XVHG IRU WKH JUDGLQJ RI PXVFOH SRZHU RI XSSHU H[W IRUHDUP ZULVW DQG KDQG *UDGLQJ RI PXVFOH SRZHU RI ORZHU H OHJ DQNOH DQG IRRW LV SHUIRUPHG E\ 9LJQRV¶V VFDOH > @

Statistical analysis

,QGHSHQGHQW VDPSOH W WHVW IRU WZR LQGHSHQGHQW JURXSV ZD HQ]\PH 62' *3[&$7 DV ZHOO DV DQ /3 LQ VHUXP RI SDWLHQWV V VXEMHFWV 7KH SDLUHG W WHVW ZDV XVHG IRU WKH FRPSDULVRQ RI RI SDWLHQWV ZLWKRXW DQG ZLWK WZR PRQWKV RI PHGLFDWLRQ IRU /3 LQ VHUXP RI WZR JURXSV PHGLFDWLRQ DQG PHGLFDWLRQ DORQ G\VWURSK\ ZHUH FRPSDUHG E\ LQGHSHQGHQW VDPSOH W WHVW 6W S

Diet formulation

$ VSHFLILF GLHW FKDUW ZDV IRUPXODWHG HDFK RI WKH [illegible] FRPSRQHQWV ZKLFK SUHYHQW WKH R[LGDWLYH VWUHVV LQGXFHG LQ G\VWURSK\ HQW@ $QWLR[LGDQWV FRPSRQHQWV KDYH WKH FDSDEL VWUHVV DQG PXVFOHU [illegible] SURWHLQV > @ ' HVVHQWLDO PLQHUDOV DQG YLWDPLQV LQ D ZHOO EDODQFHG7KXV IRUPXODWHG GLHW FKDUW LV GHVFULEHG EHORZ

Mung beans and black gram (100 g each) consumed in the form of sprout (Once day preferably during breakfast)

0XQJ EHDQV DQG GL/DWLOF]HN FRQWDLQV SURWHLQ FDUERK\GUDW FRQWHQW LV 0XQJ EHDQ DOVR FRQWDLQV WKH FDOFLXP PDJQHV FRSSHU DQG VHOHQLXP 7KLV LV DOVR VXSSOLHG WKH ZDWHU VROX SURYLGHV &DO > @ DV VKRZQ LQ 7DEOH

Table 1: 7KH VSURXWV PXQJ EHDQ KDV IROORZLQJ QXWULWLYH YDOXHV J

6 1R	&RPSRVLWLRQ	8QLWV	1XWULWLRQDO FRQWHQW WKDW SURYLGH EHQHI
1	Water	90.4 g	They provide essential minerals, vitamins and proteins as well as antioxidants to muscular dystrophy patients
2	Energy	30 Kcal	
3	Proteins	3.04 g	
4	Total lipid (fat)	0.18 g	
5	Carbohydrates	5.94 g	
6	Fibers	1.8 g	
7	Sugar	4.13 g	
8	Calcium	13 mg	
9	Iron	0.91 mg	
10	Magnesium	21 mg	
11	Phosphorous	54 mg	
12	Potassium	149 mg	
13	Sodium	6 mg	
14	Zinc	0.41 mg	
15	Vitamin C	13.2 mg	
16	Thiamine	0.084 mg	
17	Riboflavin	0.124 mg	
18	Niacin	0.749 mg	
19	Vitamin B6	0.088 mg	
20	Folic acid	61 µg	
21	Vitamin A	21 IU	
22	Vitamin E	0.1 mg	
23	Vitamin K	33 µg	

%ODFN JUDP LV D JRRG VRXUFH RI YLWDPLQV DQG PLQHUDOV SRWDVVLXP LURQ PDJQHVLXP FRSSHU DQG PDQJDQHVH DQG GLHW DQG VXSSRUWV WR EDODQFH WKH VRGLXP SRWDVVLXP OHYHOV LQ RX RI WKH KXPDQ ERG\ 7KH LURQ FRQWHQW RI EODFN JUDP PDLQWDLQV EODFN JUDP DUH UHTXLUHG IRU DSSURSULDWH JURZWK RI WKH KXP DSKURGLVLDF DQG QHUYH VWLPXODQW 7KH J EODFN JUDP SURYLG

Table 2: 7KH VSURXWV 9LJQD FXQJXLFXODWD FROORZLQJ QXWULWLYH YDOXHV J

6 1R	&RPSRVLWLRQ	3HUFHQWDJH	1XWULWLRQDO FRQWHQW WKDW SURYLG SDWLHQWV
1	Moisture	72.70%	They provide essential minerals, vitamins and proteins as well as antioxidants to muscular dystrophy patients
2	pH	6.78%	
3	Protein	8.50%	
4	Lipid	0.24%	
5	Total sugar	1.13%	

6	Reducing sugar	0.44%	
7	Fructose	0.27%	
8	Glucose	0.17%	
9	Sucrose	0.69%	
10	ß-carotene (µg/100 g)	57.05 + 3.46	
11	Ascorbic acid (mg/100 g)	31.41 + 0.72	
12	Total antioxidants (% DPPH inhibition per 100 g)	36.64 + 0.10	
13	Total phenol (mg/100 g)	40.96 + 1.23	
14	Flavonoids (mg/100 g)	178.6 + 2.83	

100 ml pomegranate juice consumed in daily diet (one time in a day)

3RPHJUDQDWH MXLFH LV D KXJH UHVRXUFH RI WKH DQWLR[LGDQ
DPRXQW RI SK\WRFKHPLFDOV 7KH PDMRULW\ RI SK\WRFKHPLFDOV LQ
7KHVH HOODJLWDQQLQV DUH SURGXFHG IURP WKH ELQGLQJ RI FDU
NQRZQ DV SXQLFDODJLQV > @ 'HOSKLQLGLQ F\DQLGLQ DQG SHODU
MXLFH > @ 3LJPHQWDWLRQ LQ MXLFH LQFUHDVHV GXULQJ IUXLW U
FRQWDLQV DOO WKH YLWDPLQV 0LQHUDOV DUH DOVR SUHVHQW LQ
SRPHJUDQDWH SURYLGHV .FDO > @ DV VKRZQ LQ 7DEOH

Table 3: 7KH PDMRU DQWLR[LGDQW DFWLYLW\ RI SRPHJUDQDWH MXLFH LV GXH GHVFULEHG EHORZ

6 1R	3KHQROLF FRPSRXQGV	PJ /	1XWULWLRQDO FRQWHQW WKDW SURYLGH EHQHI
1	First group: Anthocyanins		Antioxidants of pomegranate juice help to reduce oxidative-stress induced and prevent oxidative stress induced degeneration of muscle in muscular dystrophy
	Delphinidin 3,5-diglucoside	42.9	
	Cyanidin 3,5-diglucoside	53	
	Delphinidin 3-glucoside	76	
	Cyanidin 3-glucoside	128.3	
	Pelargonidin-3-glucoside	5.9	
	Total anthocyanins	306	
2	Second group: gallagy-l-type-tannins		
	Punicalagin B	12.7	
	Punicalagin D	10.1	
	Other	45.1	
	Total gallagyl-type tannins	67.9	
3	Third group: Ellagic acid derivatives		
	Ellagic acid glucoside	17.9	
	Ellagic acid	15.3	
	Total ellagic derivatives	33.2	
4	Fourth group: Other hydrolyzable tannins		
	Galloyl glucose	51.1	

	Compound C	224.5	
	Other compounds	204.1	
	Total hydrolyzable tannins	539.2	

Prepare 1 kg mixed flour with each of 100 g wheat, maize, barley, bajra and 600 g soybeans. Everyday 300 g of this mixed flour used for the preparation of bread, which should be consumed by the patients (two times in a day)

7KH ZKHDW IORXU J JLYHV &DO HQHUJ\ 3URWHLQ GLHWDU\ ILEUH &DUERK\GUDWH IRXQG LQ D VLJQLILFDQW DPRXQW LQ 9LWDPLQV % VKRZQ LQ 7DEOH

Table 4: 7KH ZKHDW IORXU J KDV WKH IROORZLQJ QXWULWLYH YDOXH GHVFU

6 1R	&RPSRQHQWV	$PRXQW	1XWULWLRQDO FRQWHQW WKDW SURYLGH EH
1	Protein	11%	This is a rich source of carbohydrates and proteins, which is required for muscle regeneration process
2	Fat	0.90%	
3	Carbohydrates	73.90%	
4	Minerals	0.60%	
5	Calcium	23 mg	
6	Magnesium	42 mg	
7	Total Iron	2.5 mg	
8	Total Phosphorous	121 mg	
9	Vitamin A	43 IU	
10	Thiamine	0.12 mg	
11	Riboflavin	0.07 mg	
12	Nicotinic acid	0.9 mg	

7KH J P=DLPD \WXEHU VNHUQHO JLYHV &DO HQHUJ\ 9LWDPLQ % SDQWRWKHQLF DFLG % DQG IROLDWH DUH IRXQG LQ D KLJKHU DP HVVHQWLDO PLQHUDOV PDJQHVLXP DQG SKRVSKRUXV DUH DOVR RE RFFXU LQ LW > @ DV VKRZQ LQ 7DEOH

Table 5: 7KH PDL]H IORXU J KDV WKH IROORZLQJ QXWULWLYH YDOXH GHVFU

6 1R	&RPSRQHQWV	$PRXQW	1XWULWLRQDO FRQWHQW WKDW SURYLGH EHQHILW
1	Protein	11.10%	This is a rich source of carbohydrates and proteins, which is required for muscle regeneration process
2	Fat	3.60%	
3	Carbohydrates	66.20%	
4	Minerals	1.50%	
5	Calcium	10 mg	
6	Magnesium	144 mg	
7	Total Iron	2.0 mg	
8	Total Phosphorous	348 mg	

9	Vitamin A	1502 IU	
10	Thiamine	0.42 mg	
11	Riboflavin	0.10 mg	
12	Nicotinic acid	1.4 mg	

,Q D J RI UDZ EDUOH\ JUDLQ WKHUH DUH HQHUJ\ FDORULHV &DO DQG LW LV D QRWDEOH V
YLWDPLQ % QLDFLQ DQG YLWDPLQ % DQG VHYHUDO GLHWDU\ PLQHU
DPRXQW 5DZ EDUOH\ FRQWDLQV FDUERK\GUDWHV IDW SURW

Table 6: 7KH EDUOH\ IORXU KDV WKH IROORZLQJ QXWULWLYH YDOXH GHVFULEHG

6 1R	&RPSRQHQWV	$PRXQW	1XWULWLRQDO FRQWHQW WKDW SURYLGH EHQ
1	Protein	11.50%	This is a rich source of carbohydrates and proteins, which is required for muscle regeneration process
2	Fat	1.30%	
3	Carbohydrates	69.60%	
4	Minerals	1.20%	
5	Calcium	26 mg	
6	Magnesium	127 mg	
7	Total Iron	3.0 mg	
8	Total Phosphorous	215 mg	
9	Vitamin A	79 IU	
10	Thiamine	0.37 mg	
11	Riboflavin	0.28 mg	
12	Nicotinic acid	1.8 mg	

7KH J EDMUD VHUYLQJ FRQWDLQV FDORULHV &DO 3URWHLQ J FDUERK\GUDWH
J YLWDPLQV DQG PLQHUDOV DUH DOVR SUHVHQW LQ LW > @ D

Table 7: 7KH EDMUD IORXU KDV WKH IROORZLQJ QXWULWLYH YDOXH GHVFULEHG

6 1R	&RPSRQHQWV	$PRXQW	1XWULWLRQDO FRQWHQW WKDW SURYLGH EHQ
1	Protein	11.60%	This is a rich source of carbohydrates and proteins, which is required for muscle regeneration process
2	Fat	5.00%	
3	Carbohydrates	67.50%	
4	Minerals	2.30%	
5	Calcium	42 mg	
6	Magnesium	125 mg	
7	Total Iron	14.3 mg	
8	Total Phosphorous	269 mg	
9	Vitamin A	220 IU	
10	Thiamine	0.33 mg	
11	Riboflavin	0.16 mg	
12	Nicotinic acid	3.2 mg	

6R\DEHDQ J FRQWDLQV SURWHLQ OLSLG DQG HQHUJ\ > @ 6R\EHDQ SURWHLQV DUH FRPSRVHG RI HLJKWHHQ DPLQ DQG UHVW DUH VHPL HVVHQWLDO DQG QRQ HVVHQWLDO DPLQR DFLG O\VLQH PHWKLRQLQH F\VWHLQH SKHQ\ODODQLQH WKUHRQLQH WU DVSDUWLF DFLG JOXWDPLF DFLG JO\FLQH SUROLQH DQG VHULQH DOVR SUHVHQW LQ VR\D SURWHLQV 3KRVSKROLSLGV DUH WKH PDMR

Table 8: 7KH VR\EHDQ IORXU KDV WKH IROORZLQJ QXWULWLYH YDOXH GHVFULEH

6 1R	&RPSRQHQWV	$PRXQW	1XWULWLRQDO FRQWHQW WKDW SURYLGH EHQHI
1	Protein	43.20%	This is the richest source of protein and phospholipids. High protein diet provides amino acids for muscle regeneration and the phospholipids are required to construct the cell membranes
2	Fat	19.50%	
3	Carbohydrates	20.90%	
4	Minerals	4.60%	
5	Calcium	240 mg	
6	Total Iron	11.5 mg	
7	Total Phosphorous	690 mg	
8	Vitamin A	710 IU	
9	Thiamine	0.73 mg	
10	Riboflavin	0.76 mg	
11	Nicotinic acid	2.4 mg	

100 g cheese and two boiled hen's eggs should be included in the diet (one time in a day)

$ VLJQLILFDQW VRXUFH RI KLJK TXDOLW\ SURWHLQV YLWDPLQV DQ FDVHLQ DQG OLWWOH DPRXQW RI ODFWDOEXPLQ DQG ODFWRJOREXO WKH DPRXQW RI ZKH\ HQWUDSSHG LQ WKH FKHHVH 7KH ORZ IDW 3RO\XQVDWXUDWHG IDWW\ DFLGV & DQG & DUH SUHVHQW L J > @ DV VKRZQ LQ 7DEOH

Table 9: 7KH FKHHVH KDV WKH IROORZLQJ QXWULWLYH YDOXH GHVFULEHG EHOR

6 1R	&RPSRQHQWV	$PRXQW	1XWULWLRQDO FRQWHQW WKDW SURYLGH EHQH
1	Protein	14.60%	This contains protein, vitamins and minerals required for, proper and regulated growth and development
2	Fat	31.20%	
3	Carbohydrates	20.50%	
4	Minerals	3.10%	
5	Calcium	650 mg	
6	Total Iron	5.8 mg	
7	Total Phosphorous	420 mg	
8	Vitamin A	273 IU	

+HQ¶V HJJV FRQWDLQ WKH ZDWHU 7KLV FRQWDLQV SURWHLQ H[FHSW YLWDPLQ & DQG PLQHUDOV FDOFLXP LURQ PDJQHVLXP]L 7KH PDMRULW\ RI HJJ FDUERK\GUDWHV DUH FRPSRVHG E\ DOEXPLQ DERXW RI WKH ZKROH HJJ)DW VROXEOH YLWDPLQV DUH SUHVHQW

PRUH WKDQ RI YLWDPLQ ' ULERIODYLQ DQG SDQWRWKHQLF D
PRQR XQVDWXUDWHG IDWW\ DFLGV SRO\XQVD
SKRVSKDWLG\OFKROLQH DQG SKRVSKDWLG\OHWKDQRODPLQH > @ 7K
JOXWDPLF DFLG JO\FLQH KLVWLGLQH ,VROHXFLQH OHXFLQH P
WU\SWRSKDQ W\URVLQH DQG YDOLQH ,W FRQWDLQV .FDO HQHUJ\

Table 10: 7KH KHQ¶V HJJ KDV WKH IROORZLQJ QXWULWLYH YDOXH GHVFULEHG EH

6 1R	&RPSRQHQWV	$PRXQW	1XWULWLRQDO FRQWHQW WKDW SURYLGH EHQ
1	Carbohydrate	0 g	This is the rich source of phospholipids and cholesterol required for formation of the muscle membrane
2	Fat	81 g	
3	Saturated fat	51 g	
4	Mono unsaturated fatty acid	21 g	
5	Poly unsaturated fatty acid	3 g	
6	Protein	1 g	
7	Vitamin A	684 µg	
8	Vitamin D	60 IU	
9	Vitamin E	2.32 mg	
10	Cholesterol	215 mg	

Include 20 g of butter in daily diet (one time in a day)

%XWWHU FRQWDLQV WKH IDW ZDWHU DQG RI QRQ IDW PLON
> @ DV VKRZQ LQ 7DEOH

Table 11: 7KH EXWWHU J KDV WKH IROORZLQJ QXWULWLYH YDOXH GHVFULEH

6 1R	&RPSRQHQWV	$PRXQW	1XWULWLRQDO FRQWHQW WKDW SURYLGH EHQHILW
1	Protein	13.30%	This contains higher dioleo-monounsaturated fatty acids which are required for development of strong immune system in muscular dystrophy patients
2	Fat	13.30%	
4	Minerals	1.00%	
5	Calcium	60 mg	
6	Total Iron	21 mg	
7	Total Phosphorous	220 mg	
8	Vitamin A	1200 IU	
9	Thiamine	0.30 mg	
10	Riboflavin	0.18 mg	
11	Nicotinic acid	0.1 mg	

Drink the warm cow's milk of 100 ml with 5 g turmeric added to it, before going to sleep (one time at night)

&RZ¶V PLON FRQWDLQV DOO WKH HVVHQWLDO QXWULHQWV 7KLV LV
TXDOLW\ SURWHLQ DQG WKH YLWDPLQV % FRPSOH[,W JLYHV .FDO

Table 12: 7KH FRZ¶V PLON KDV WKH IROORZLQJ QXWULWLYH YDOXH GHVFULEHG

6 1R	&RPSRQHQWV	$PRXQW	1XWULWLRQDO FRQWHQW WKDW SURYLG SDWLHQWV
1	Protein	3.20%	The cow's milk contain essential dietary component (protein, fat and minerals) for growth and development of muscular dystrophy patients
2	Fat	4.10%	
3	Carbohydrate	4.40%	
4	Minerals	0.80%	
5	Calcium	149 mg	
6	Total Iron	2.3 mg	
7	Total phosphorous	96 mg	
8	Vitamin A	150 IU	
9	Thiamine	0.05 mg	
10	Riboflavin	0.18 mg	
11	Nicotinic acid	0.10 mg	
12	Vitamin C	2 mg	

7XUPHULF &XUFXPD /RQJD XVHG DV GULHG UKL]RPH SRZGHU RU ZKROH SURWHLQ IDW FDUERK\GUDWH PDLQO\ VW SRWDVVLXP FDOFLXP LURQ VRGLXP DQG SKRVSKRURXV DVFRU DUDELQRVH FXUFXPLQRLGV DQG HVVHQWLDO RLO 7KH HVVH FXUFXPHQH]LQJLEHUHQH DQG VDELQHQH 7KH \HOORZ FRORU L JLYHV .FDO HQHUJ\ SHU J > @

Take 50 g of groundnut soaked overnight in 200 ml cow's milk. In morning, grind it properly and boil for a few minutes. Drink after adding sugar to it

*URXQGQXW $UDFKLV K\SRJDHD J SURYLGHV &DO HQHUJ\ DQG D FKLH FRPSOH[YLWDPLQ (PDQJDQHVH PDJQHVLXP DQG SKRVSKRUXV DQG J SURWHLQ DQG .FDO HQHUJ\ > @ DV VKRZQ LQ 7DEOH

Table 13: 7KH JURXQGQXW RU SHDQXW KDV WKH IROORZLQJ QXWULWLYH YDOXH G

6 1R	&RPSRQHQWV	$PRXQW	1XWULWLRQDO FRQWHQW WKDW SURYLGH SDWLHQWV
1	Protein	26.70%	This is the richest source of mono-unsaturated fatty acids and this is required for the development of the immune system. This also contains protein and minerals which is more important for growth and development
2	Fat	40.10%	
4	Carbohydrate	20.30%	
5	Minerals	1.90%	
6	Calcium	50 mg	
7	Total Iron	1.6 mg	
8	Total phosphorous	390 mg	
9	Thiamine	0.90 mg	
10	Riboflavin	0.30 mg	
11	Nicotinic acid	14.1 mg	

RESULTS

Clinical examination

$OO FDVHV RI PXVFOH GLVHDVHV FRXOG EH VXVSHFWHG RI KDYL
H[DPLQDWLRQ LQFOXGLQJ V\PSWRPV VLJQV DQG IDPLO\ KLVWRU\

EMG (electromyography) examination

$OO WKH FDVHV RI PXVFOH GLVHDVHV VKRZHG D P\RSDWKLF (0
LQWHUIHUHQFH SDWWHUQ YDQG $0SV RZ PXDSOLWXGH DFWLYLW\ ZDV
DQG ZKHUH PRVW RI WKH SRO\SKDVLD

Histopathological and immunohistopathological examination

%DVHG RQ KLVWRSDWKRORJLFDO DQG LPPXQRKLVWRFKHPLFDO H[DPL
PXVFOH GLVHDVHV ZHUH FRQILUPHG WKH HLJKW FDVHV 1 RI '0'
/*0' % VKRZQ LQ)LJXUH

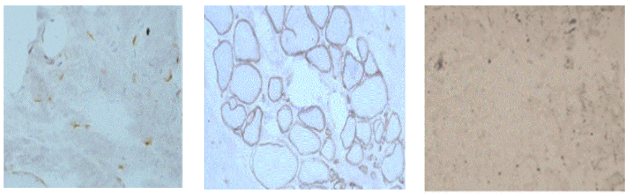

Figure 1: +LVWRSDWKRORJLFDO DQG LPPXQRKLVWRSDWKRORJLFDO H[DPLQDWLR
ORVV RI G\VWURSKLQ LQ G\VWURSKLQ VWDLQLQJ % %0' UHGXFH DQG GLV
G\VIHUOLQ VWDLQLQJ

Biochemical estimations of serum

Antioxidant enzymes (SOD, GPx & CAT) activity and LP content in serum of patients with muscular dystrophy as compared to control subjects: $FWLYLW\ RI DQWLR[LGDQW HQ]\PHV 62' *3[
KLJKHU S LQ WKH VHUXP RI SDWLHQWV ZLWK PXVFXODU G\VWU
VXEMHFWV 7KH OHYHO RI /3 LV DOVR VLJQLILFDQWO\ KLJKHU S
Q DV FRPSDUHG WR FRQWURO KHDOWK\ Q VXEMHFWV DV VKRZ

Level of antioxidant enzymes (SOD, GPx & CAT) and LP in serum of patients with muscular dystrophy (before medication) as compared to two months medication: 62' *3[&$7 DFWLYLW\ LV QRW
GLIIHUHQW S! LQ WKH VHUXP RI SDWLHQWV ZLWK PXVFXODU G\V
WR ZLWKRXW PHGLFDWLRQ 7KH OHYHO RI /3 LV QRW VLJQLILFDQWO\
G\VWURSK\ Q ZLWK WZR PRQWKV PHGLFDWLRQ DV FRPSDUHG WR

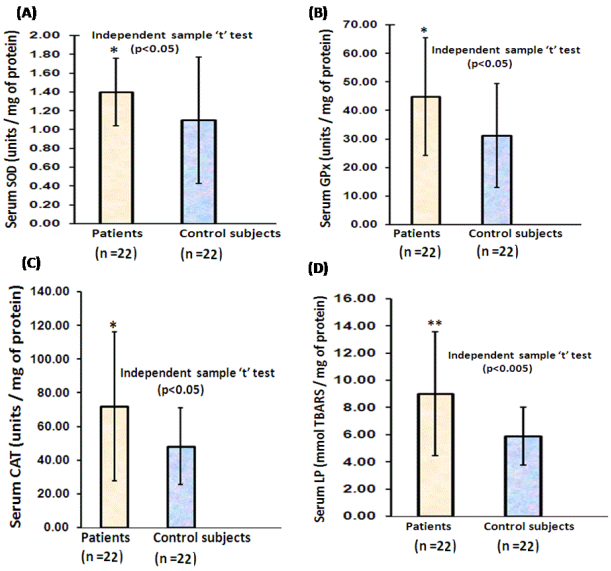

Figure 2: 7KH OHYHO RI HQ]\PH DFWLYLW\ 62' *3[&$7 LV VLJQLILFDQWO\ K PXVFXODU G\VWURSK\ Q DV FRPSDUHG WR FRQWURO KHDOWK\ Q VXEM LQ WKH VHUXP RI SDWLHQWV ZLWK PXVFXODU G\VWURSK\ Q DV FRPSDU DFWLYLW\ H[SUHVVHG DV PHDQ 6'

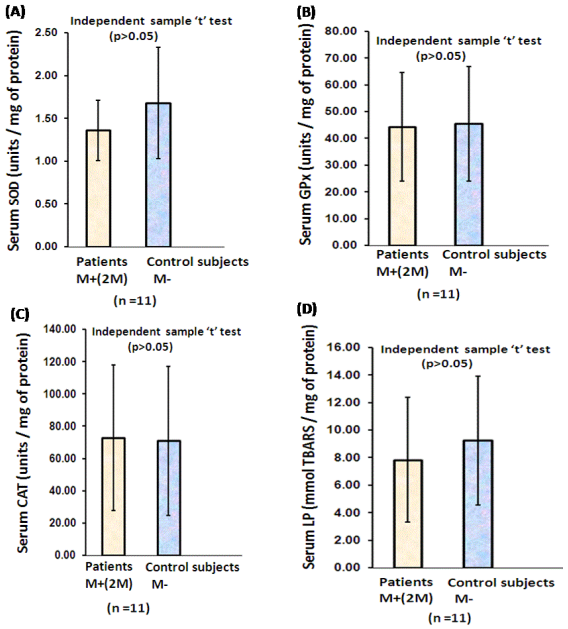

Figure 3: 7KH OHYHO RI HQ]\PH DFWLYLW\ 62' *3[&$7 LV VLJQLILFDQWO\ K PXVFXODU G\VWURSK\ Q DV FRPSDUHG WR FRQWURO KHDOWK\ Q VXEM LQ WKH VHUXP RI SDWLHQWV ZLWK PXVFXODU G\VWURSK\ Q DV FRPSDU DFWLYLW\ H[SUHVVHG DV PHDQ 6'

/HYHO RI DQWLR[LGDQW HQ]\PHV 62' *3[&$7 DQG /3 LQ VHUXP PHGLFDWLRQ DQG GLHW FRQVXPSWLRQ DV FRPSDUHG WR SDWLHQWV PRQWK¶V GXUDWLRQ

7KH DQWLR[LGDQW HQ]\PH DFWLYLW\ 62' *3[&$7 LV VLJQLILFDQ PXVFXODU G\VWURSK\ SDWLHQWV Q WUHDWHG ZLWK PHGLFDWLR FRPSDUHG WR SDWLHQWV Q WUHDWHG RQO\ ZLWK PHGLFDWLRQ

S LQ VHUXP RI PHGLFLQH DQG GLHW WUHDWHG PXVFXODU G\V
SDWLHQWV DIWHU WZR IRXU PRQWKV WUHDWPHQW GXUDWLRQ VKRZ

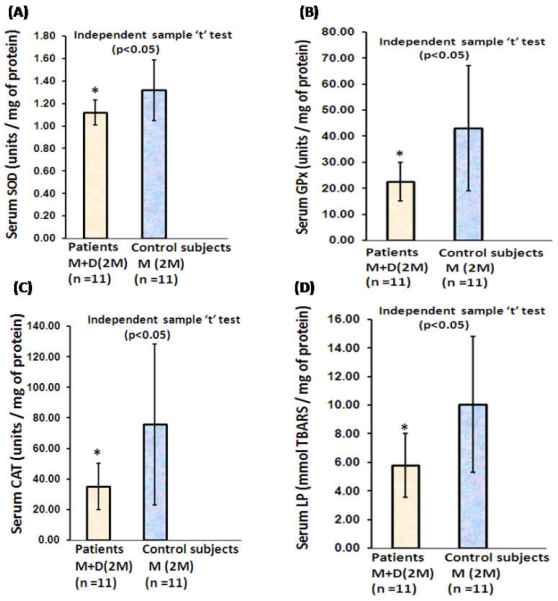

Figure 4: 7KH OHYHO RI HQ]\PH DFWLYLW\ 62' *3[&$7 LV QRW VLJQLILFDQWO PXVFXODU G\VWURSK\ Q ZLWK WZR PRQWKV PHGLFDWLRQ DV FRPSDUHG GLIIHUHQW S! LQ WKH VHUXP RI SDWLHQWV ZLWK PXVFXODU G\VWURSK\ PHGLFDWLRQ /HYHO RI HQ]\PH DFWLYLW\ H[SUHVVHG DV PHDQ 6'

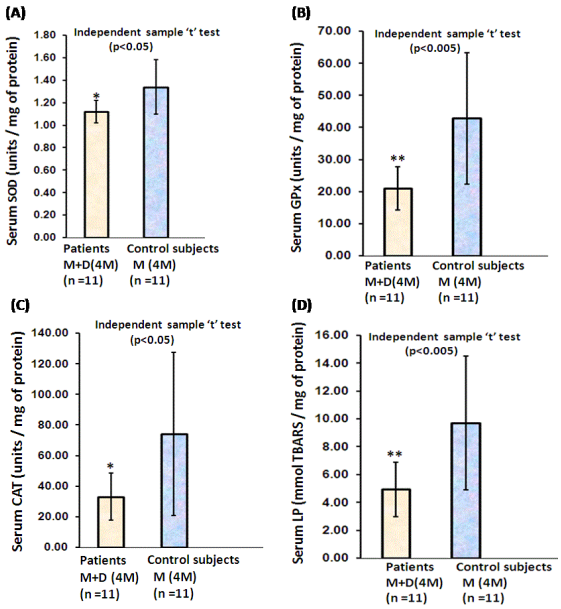

Figure 5: 7KH OHYHO RI HQ]\PH DFWLYLW\ 62' *3[&$7 LV VLJQLILFDQWO\ UH ZLWK PXVFXODU G\VWURSK\ Q ZLWK PHGLFDWLRQ DQG GLHW RI WZR P G\VWURSK\ Q ZLWK PHGLFDWLRQ RI WZR PRQWKV GXUDWLRQ /HYHO RI VHUXP RI SDWLHQWV ZLWK PXVFXODU G\VWURSK\ Q ZLWK PHGLFDWLRQ D PXVFXODU G\VWURSK\ Q ZLWK PHGLFDWLRQ RI WZR PRQWKV GXUDWLRQ /

Measurement of muscle power

*UDGLQJ RI PXVFOH SRZHU RQ %URRNH DQG 9LJQRV¶V VFDOHV VKR PHGLFLQDO WUHDWPHQW YV RQO\ ZLWK PHGLFLQDO WUHDWPHQW

VLJQLILFDQW DV GHVFULEHG LQ WKH)LJXUHV $ DQG % 6LPLODUO\ VFDOHV VKRZHG WKH GLIIHUHQFH IRU WKH SDWLHQWV ZLWK GLHW D DIWHU IRXU PRQWKV GXUDWLRQ 7KH REVHUYHG GLIIHUHQFH GRHV Q

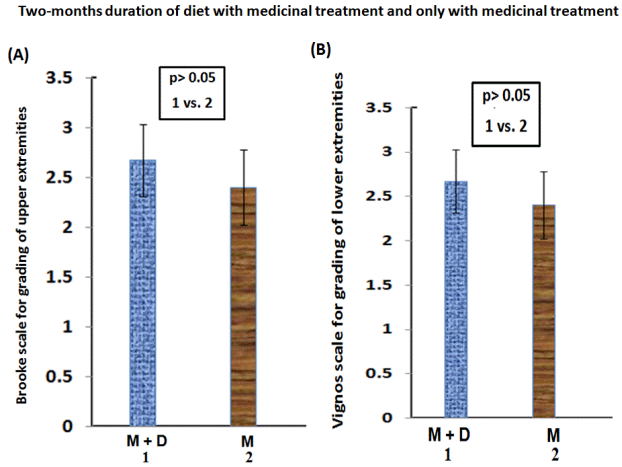

Figure 6: 7KH JUDGLQJ RI PXVFOH SRZHU RQ $ %URRNH DQG % 9LJQRV¶V VFD DQG PHGLFLQDO WUHDWPHQW YV RQO\ ZLWK PHGLFLQDO WUHDWPHQW DIW PHÐQ 6' S!

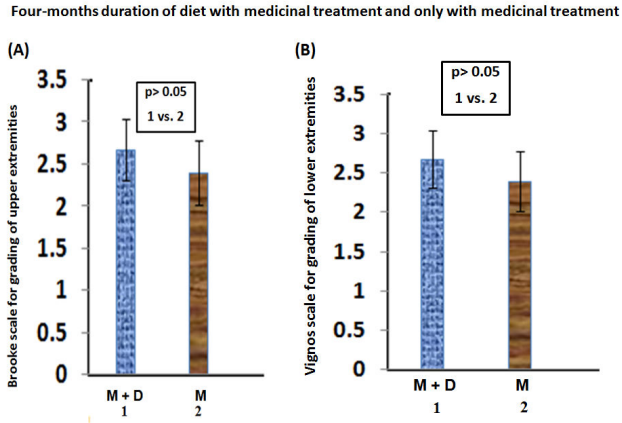

Figure 7: 7KH JUDGLQJ RI PXVFOH SRZHU RQ $ %URRNH DQG % 9LJQRV¶V VFD DQG PHGLFLQDO WUHDWPHQW YV RQO\ ZLWK PHGLFLQDO WUHDWPHQW DIW PHÐQ 6' S!

DISCUSSION

(DUOLHU VWXGLHV SURYH WKDW R[LGDWLYH VWUHVV DQG LQFUHDVH UROH LQ SDWKRJHQHVLV RI PXVFXODU G\VWURSKLHV > @ %DVHG Q QXOOLI\ WKH HIIHFW RI UHDFWLYH R[\JHQ VSHFLHV 7KH FRQWULEXW UROH LQ PDQDJHPHQW RI PXVFXODU G\VWURSK\ KDV EHHQ GHVFULEH QXWULWLRXV 6SURXWLQJ DOVR HQKDQFHV WKH GLJHVWLELOLW\ DF DFWLYDWHG GXULQJ VSURXWLQJ SURWHLQV DUH GHJUDGHG LQWR D %RXQGHG PLQHUDOV FDOFLXP]LQF DQG LURQ DUH IUHH\ DYDLO LQFUHDVHG 6SURXWLQJ DOVR LQFUHDVHV WKH HVVHQWLDO IDWW\ D 7KXV VSURXWHG EODFN JUDP DQG PXQJ EHDQV SURYLGH HVVHQWLDO WR PXVFXODU G\VWURSK\ SDWLHQWV

3RPHJUDQDWH MXLFH FRQWDLQV D GLYHUVH UDQJH RI ELRDFWLYH FRPSRXQGV 7KHVH ELRDFWLYH FRPSRXQGV DUH DFWLYH DQWLR[LGD

7KHVH DQWLR[LGDQWV RI SRPHJUDQDWH MXLFH KHOS WR UHGXFH R[L
GHJHQHUDWLRQ RI PXVFOH LQ PXVFXODU G\VWURSK\

7KH GLHW UHFRPPHQGV PL[HG IORXU FRPSRVHG RI ZKHDW PDL]H ED
ULFK VRXUFH RI FDUERK\GUDWHV DQG SURWHLQV > @ 6R\D EHDQ
+LJK SURWHLQ GLHW SURYLGHV DPLQR DFLGV IRU PXVFOH UHJHQHU
FHOO PHPEUDQHV > @ *HQLVWHLQ DQG LVRIODYRQH DOVR IRXQ
SUR LQIODPPDWRU\ PHGLDWRUV (IIHFWLYHQHVV RI JHQLVWHLQ LQ
IRUHOLPE VWUHQJWK RI PG[PLFH VKRZHG LPSURYHPHQW DIWHU WUH
GHFUHDVHG ZLWK WKH GHFOLQH LQ WKH OHYHO RI VHUXP &. LQ W

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DOVR FRQWDLQ YLWDPLQV DQG PLQHUDOV UHTXLUHG IRU SURSHU
\RON LV ULFK VRXUFH RI SKRVSKROLSLGV DQG FKROHVWHURO UHTX
SUHSDUHG IURP FRZ PLON FRQWDLQV KLJKHU GLROHR PRQRXQVDWX
VWURQJ LPPXQH V\VWHP > @ %HVLGHV &RZ PLON GHULYHG EXWWH
VXFK DV YLWDPLQ % FRPSOH[YLWDPLQ ' YLWDPLQ (DQG YLWDPLQ .

&RZ PLON LV D EDODQFHG GLHW DQG FRPSOHWH GLHWDU\ UHTXLU
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LQKLELWLQJ WKH WUDQVORFDWLRQ RI WKH S VXEXQLW RI 1) ¸% WR
NH\ FRQWULEXWRU WR '0' SDWKRJHQHVLV DQG 1) ¸% LV D SUR LQIO
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SKRVSKROLSLGV ZKLFK LV DOVR KHOSIXO IRU WKH UHJHQHUDWLR
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SDWLHQWV ZLWK PXVFXODU G\VWURSK\ > @ 7KH SURSRVHG GLH
HIIHFWLYH PDQDJHPHQWV RI G\VWURSK\ SDWLHQWV

CONCLUSION

7KH IRUPXODWHG GLHW FKDUW IRU SDWLHQWV ZLWK PXVFXODU G\VW
UHVXOWV VKRZHG WKH VLJQLILFDQW UHGXFWLRQ RI R[LGDWLYH VWU
RI IRUPXODWHG GLHW 7KLV LV ZHOO NQRZQ IDFW WKDW WKHUH LV
GLVHDVH LV RQO\ RQH RSWLRQ LQ WKH KDQG RI WKH FOLQLFLDQV
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ACKNOWLEDGEMENT

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,QVWLWXWH RI 0HGLFDO 6FLHQFHV $,,06 1HZ 'HOKL IRU WKHLU K
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REFERENCES

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