

\$YDLODEOH YRQOEQENDUTGUGCTEJNKDTCT[EQO

5EJQNCTU 4GUGCTEJ .KDTCT[

%GPVTCN 'WTQRGCP ,QWTPCN QH 'ZRGTKOGPVCN \$KQNCI[
KWW S ZZZ VFKRODUVUHVH DUFKOLEUDU\ FRP

+550

\$KQFGITCFCVKQP CPF &GEQNQTK\CV#KQPGQTHKAVO
CPZGPKK5RAGE/KOU +UQNCVGF HTQO 6GZVK

0CMCFG &\$

(OSKLQVWRQH &ROOHJH 'U +RPL %KDEKD 6WDWH 8QLYHUVLW\
&RUUHVS RQGLQND\$MWRU (OSKLQVWRQH &ROOHJH 'U +RPL %KDE
ODKDUDVKWUD ,QGLD 7HO (PDLO QDNDGH

\$%675\$&7

7KH 3UHVHQW LQYHVWLJDWLRQ IRFXVHG RQ LVRODWLRQ DQG FK
GFRORUL]H WH[WLOH G\H H H P D F W L V S O % Z D W 0 5 R O O L H V I W D C O I U R K W K H
LQ LFKDONDU D H Q W I H Q D S O B Z K M H D Q D O \ V H G I R U W K H L U S K \ V L F R F K H P L F
ZHUH LVRODWHG DQG GFRORUL]DWZROH F D S Y D E L X D L W L H G V R R U I W K H F W M L X
LQ PLQLPDO PHGLXP XQGHU RSWLXP FRQGLWLRQV ,W ZDV IRXQG V
GFRORQL]DWLRQ FDSDELOLWLHV DIWHU KRXUV RI LQFXEDWLR
ELRUHPHGLDWLRQ

-G[YQT H U F R O R U L V D W L R Q 7 H [W L O H \$ V S H S H U H D O L X P H O D Q X P 0 5

INTRODUCTION

'\H SURGXFWLRQ LQ ,QGLD LV HVWLPDWHG WR EH DURXQG WRQC
DURXQG YDULHWLHV RI G\HV DQG G\H LQWHUPHGLDWHV SURGXFH
DQG SLJPHQWV > @ 7KH ZRUOGZLGH DQQXDO SURGXFWLRQ RI G\HV
WH[WLOH LQG XVULHV 7KHVH G\HV KDYH QRW EHHQ WHVWHG IRU LW
RI IDEULF UHTXLUHV DERXW OLWHUV RI ZDWHU IRU GLIIHUHQW S
ZDWHU ERGLHV GLPLQLVK WKH ZDWHU TXDOLW\ > @

\$Q DYHUDJH WH[WLOH PLOO SURGXFHV î P RI IDEULF DQG GLVFI
GD\ LQ ,QGLD > @ 7KHVH HIOXHQWV FRQWDLQ D FRQVLGHUDEOH
VXUIDFWDQWV FDUFLQRJHQLF DPLQHV IRUPDOGHK\GH KHDY\ PHWD
FRPSOH[FRORUDWLRQ DUH WKH PDLQ FKHUDFWHUV RI WH[WLOH HII
ZDWHU ERGLHV > @

&RPPRQO\ DSSOLHG WUHDWPHQW PHWKRGV IRU FRORU UHPRYDO IU
LQYROYLQJ YDULRXV FRPELQDWLRQV RI ELRORJLFDO SK\VLFDQ DG
PHWKRGV KDYH FHUWDLQ GUDZEDFNV WKH\ KDYH OLPLWHG HIIFLH
%LRORJLFDO WUHDWPHQW PHWKRGV DUH PRUH GHVLUDEOH DV WKH
SROOXWDQWV DQG KDYH D KLJKHU SRVVLELOLW\ RI ZLGHU DSSOLFDM

+RZHYHU YLDEOH ELRORJLFDO WUHDWPHQW XVLQJ PLFURRUJDQLVPV
ELRORJLFDO SURFHGXUHV ZHUH FRPELQHG ZLWK FKHPLFDO RU SK\VL
7KHVH PLFUR RUJDQLVPV KDYH WKH DELOLW\ WR GFRORUL]H GHJUD
HIIHFWLYH DOWHUQDWLYH PHWKRGV IRU GHJUDGLQJ G\HV SUHVHQW L
DQG PHWDEROL]H G\HV > @ DQG LQ VRPH FDVHV KDYH WKH SRW
VKRUWHU WLPH > @ 7KH SUHVHQW VWXG\ GHDOV ZLWK WKH LVRODW
WR GFRORUL]H UHDFWLYH EOXH 05 %DFWHULD ZLOO EH LVROD

'HFRORULVDWLRQ DELOLW\ RI RUJDQLVPV ZLOO EH WHVWHG E\ XVLQ
EOXH 05

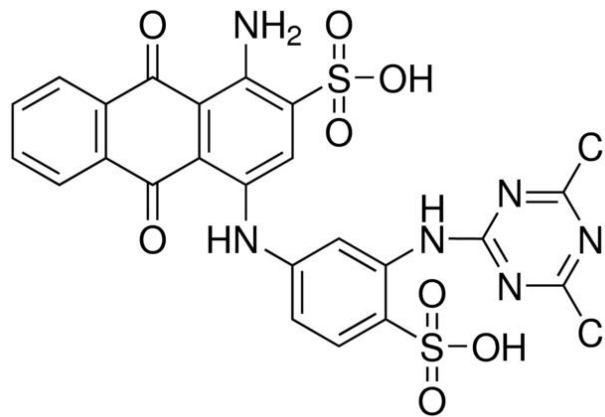
MATERIALS AND METHODS

Sampling

7KH VDP SOHV XVHG IRU LQYHVWLJDWLRQ ZHUH WH[WLOH LQG XVWU\ H
WKH ODERUDWRU\ IRU IXUWKHU DQDO\VLV %HIRUH XVH ILOWUDWLRQ
PDWWHU SUHVHQW LQ WKH HIOXHQW

Dye

,Q WKH SUHVHQW LQYHVWLJDWLRQ WH[WLOH G\H 5HDFWLYH %OXH O
IURP LFKDONDUDQML WH[WLOH PLOOV



(KIWT&KHPLFDO VWUXFWXUH RI 5HDFWLYH %OXH 05

Chemicals

\$OO PHGLD FRPSRQHQWV DQG FKHPLFDOV XVHG LQ WKH SUHVHQW LQ
+L 0HGLD /DERUDWRULHV ,1', \$

The medium used (minimal salt medium)

0LQLPDO VDOW PHGLXP XVHG LQ SURFHVV VKRZH G LQ 7DEOH

6CDN0LQLPDO VDOW PHGLXP

Component	Weight in gm/ml
K ₂ HPO ₄	0.7
KH ₂ PO ₄	0.3
Sodium citrate	0.05
MgSO ₄ .7H ₂ O	0.01
Di-ammonium sulphate	0.1
Trace salt solution	0.5 ml
Glucose	0.1
DW	100 ml

Trace salt solution

7UDFH VDOW VROXWLRQ XVHG LQ WKLV SURFHVV LV VKRZQ LQ 7DEOH
6CDNGLVW RI 7UDFH VDOW VROXWLRQV LQYROYHG

Component	Weigh in gm/ml
FeSO ₄ .7H ₂ O	0.05
ZnSO ₄ .7H ₂ O	0.05
MnSO ₄ .3H ₂ O	0.05
D/W	100 ml

Physicochemical analysis effluent

7KH HIOXHQW RI WKH WH[WLOH G\H LQG XVWU\ ZDV ILOWHUHG WKU
GLIIHUHQW FKDUDFWHUV VXFK DV FRORU WH[WXUH WRWDO GLVVRQ
DQG ELRORJLFDO R[\JHQ GHPDQG

Determination of absorption maxima of reactive Blue MR

7KH DEVRUSWLRQ PD[LPXP RI 5HDFWLYH %OXH 05 ZDV GHWHUPLQHG I
G\H VROXWLRQ LQ ZDWHU ZDV REVHUYHG DW D GLIIHUHQW ZDYHOHQJ
LV WDNHQ DV DEVRUSWLRQ PD[LPXP RI G\H IRU 5HDFWLYH %OXH 05 I

Enrichment, isolation, and identification of dye decolorizing fungi

&ROOHFWHG HIOXHQW ZDV XVHG DV LQRFXOXP WR LVRODWH G\H GH
LQRFXODWHG DVHSWLFDOO\ WR WKH VWHULOH PLQLPDO EURWK DQG
SHULRG RI WLPH)RU WKH LVRODWLRQ RI IXQJDO VSHFLHV PLQLPDO
ZDV VWUHDNHG RQ D VWHULOH PLQLPDO DJDU SODWH DQG LQFXEDWH
\$IWHU LQFXEDWLRQ IXQJDO VSHFLHV ZLWK GLIIHUHQW JURZWK SDW
PLQLPDO DJDU VODQWV DW f & UHIULJHUDWRU DQG ZHUH VHUYHG DV
RI JURZWK SDWWHUQV VWDLQLQJ ELRFKHPLFDO UHDFWLRQV E\ XVLO

Decolorization assay

7KH DELOLW\ RI IXQJDO VWUDLQV WR GHFRORUL]H WH[WLOH G\H ZDV
05 6WHULOH WHVW WXEHV FRQWDLQLQJ PO RI VWHULOH PLQLPDO P
ZLWK IXQJDO VSHFLHV VHSUDUDWHO\ 7KH WXEHV ZHUH LQFXEDWHG D
UHPRYHG DVHSWLFDOO\ FHQWULIXJHG DW USP IRU PLQ DQG
QP RQH FRQWURO ZDV DOVR PDLQWDLQHG FRQWDLQLQJ PO RI PL
SHUFHQWDJH RI GHFRORUL]DWLRQ ZHUH FDOFXODWHG E\ DSSO\LQJ I
'HFRORUL]DWLRQ \$ \$W \$ i
:KHUH
\$ LV WKH LQLWLDO DEVRUEDQFH RI WKH VDPSOH
\$W LV WKH DEVRUEDQFH DW D GLIIHUHQW WLPH LQWHUYDO

RESULTS AND DISCUSSION

Physicochemical characterization of textile effluent

7KH HIOXHQW RI WKH WH[WLOH LQG XVWU\ ZDV EODFNLVK EOXH LQ F
YDULRXV G\H DQG FKHPLFDOV XVHG LQ WKH WH[WLOH LQG XVWU\ T
ELRORJLFDO R[\JHQ GHPDQG PJ / FKHPLFDO R[\JHQ GHPDQG PJ

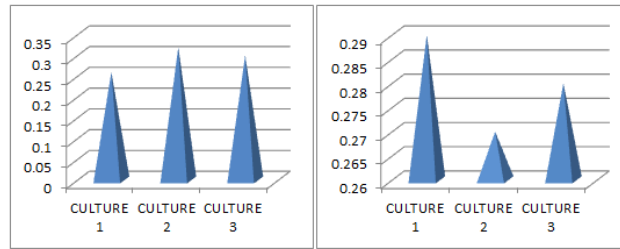
By *Penicillium* spp.

6CDN2S WLFDO GHQVLW\ RI VDP SOHV DIW HU KRXUV)LJXUH

Culture	O.D.
1	0.34
2	0.37
3	0.38

Optical density after 12 hours

2SWLFDO GHQVLW\ RI FXOWXUHG VDP SOHV DIW HU KRXUV)LJXUH



(KIWT2S WLFDO GHQVLW\ RI VDP SOHV DIW HU KRXUV

By *Aspergillus* spp.

6CDN2S WLFDO GHQVLW\ RI VDP SOHV DIW HU KRXUV

Culture	O.D.
1	0.26
2	0.32
3	0.30

By *Penicillium* spp.

6CDN2S WLFDO GHQVLW\ RI VDP SOHV DIW HU KRXUV

Culture	O.D.
1	0.29
2	0.27
3	0.28

Optical density after 36 hours

2SWLFDO GHQVLW\ RI FXOWXUHG VDP SOHV DIW HU KRXUV)LJXUH

- > @ 6DU5WDOHW DO (QKDQFHG GHFRORUL]DW]RGQH DGGUOLRWG HJUEDO
 GHYHORSHG PLFUREP *BioScience Resource Project* 2009 P *5 S
- > @ -DG-KBY HW DO 5DSLGE LRGHJUDGDWLRQ DQG GHFRORUL]DWLRQ
 EDFWHULXP 3VHXGRPRQDV *Biodegradation* 2010 PVD VWUSDLQ %&+
- > @DOLQGR .DOVQ89 +R[LGDWDFRGVROV DTXHRXV PHGLD HYLGHQFH
 GHJUDGDELOL *Mass and Energy* 1999 VKLS S
- > @RELQVRQ 7 HW DO 5HPHGLDWLRQ RI G\HV LQ WH[WLOH HIOXH
 ZLWK D SURSR *BioScience Resource Project* 2001 LYH S
- > @ \$]EDLRQDU DQGLRJOX RPSDULVRQ RI YDULRXV DGYDQFHG R[LG
 WUHDWPHQW PHWKRGV *Journal of Microbiology and Biotechnology*
 HIOX *China* 2004 S
- > @)RUJDFVHUKDW *Journal of Microbiology and Biotechnology*
International 2004 S
- > @ 5DJKXNXPDXQJL IURP PDULQH KDELWDWV *Mycological Research* 2000
 S
- > @FOXOODQ * HW DO 0LFURELDO GHFRORX *Applied Microbiology and
 Biotechnology* 2001 S
- > @ \$(EGDKLP : 0 0R *Journal of Microbiology and Biotechnology*
 PHGLD VXSSOHPHQWHG ZLWK *Journal of Microbiology and Biotechnology*
on Biochemistry, Physiology, Genetics, Morphology, and Ecology of Microorganisms 2003 S