COMPARATIVE STUDY

Transpek-Silox's Hydros D V/S Hydro 'Imported'

Transpek-Silox

Transpek-Silox Industry Private Limited

Indian Roots. Global Mindset

TRANSPEK-SILOX'S HYDROS D

An effective replacement
to Hydro (imported) for Indigo Dyeing!

A Comparative Study between Hydros D (Brand of Transpek-Silox, India) And Hydro (imported) comprises following aspects:

- Comparison of Routine Chemical Analysis
- Comparison of ORP
- Comparison of Application in Indigo Dyeing
- Comparative Analysis of Effluent generated

A) COMPARISON OF ROUTINE CHEMICAL ANALYSIS

SN	PARAMETER	HYDROS D	HYDRO (IMPORTED)
1	Appearance	White powder	White powder
2	Assay as $Na_2S_2O_4$	89.1	88.31
3	Sodium Sulphite (Na_2SO_3)	7.18	7.39
4	Sodium Carbonate (Na_2CO_3)	1.9	3.50
5	pH (1% solution)	9.4	9.15
6	Sodium Sulphate (Na_2SO_4)	0.88	0.35
7	Sodium Thio Sulphate ($Na_2S_2O_3$)	0.5	-
8	Clarity (10%)	Colourless, slightly turbid	Colourless, Clear
9	Powder (200 BSS) passes through	3.5%	27%

Data from Transpek-Silox's NABL approved QA lab

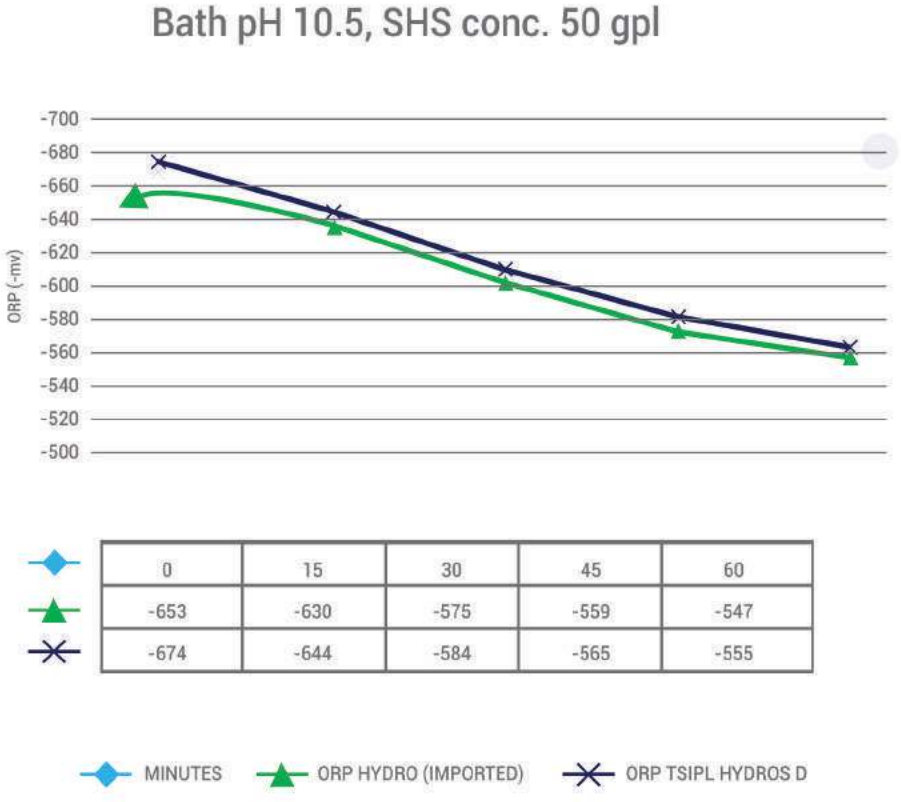
INTERPRETATION BASED ON CHEMICAL ANALYSIS (A):

- Chemical analysis shows that both **Hydros D** and Hydro (imported) are equivalent. Hydros D has slightly higher purity i.e. 89.1% as against 88.3% of Hydro (imported) (during the sample study).

- **Hydros D** has lower powder content leading to lower dusting while handling.

    - More crystalline & less dusty.
    - Free flowing , no chance of choking hydro feeder.

B) COMPARISON OF ORP

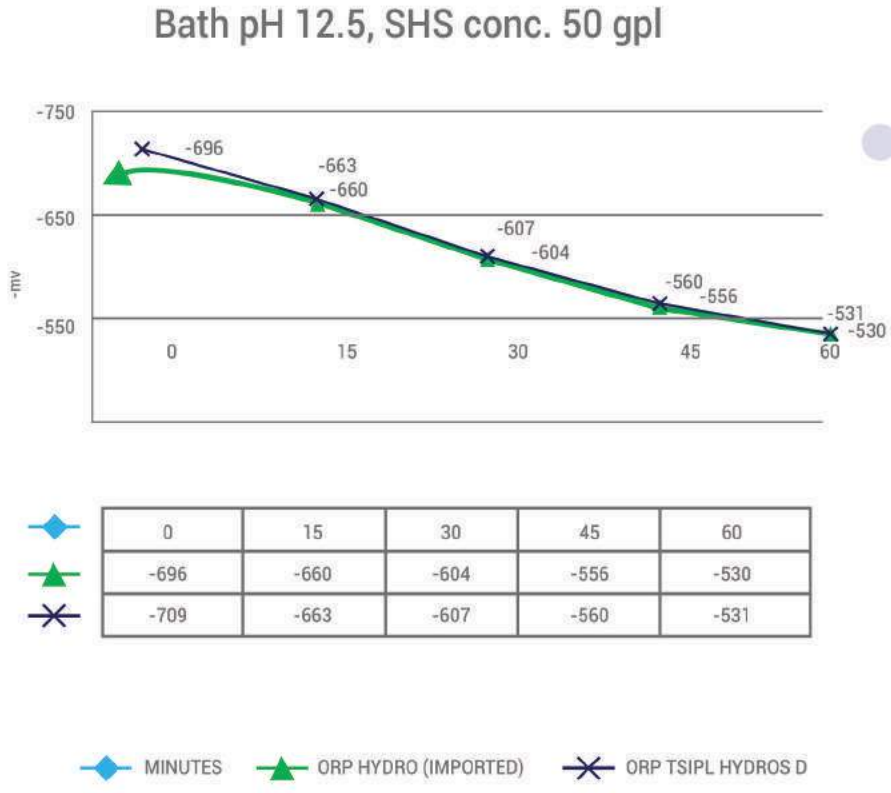


0	15	30	45	60
-653	-630	-575	-559	-547
-674	-644	-584	-565	-555

Comparison of ORP at Bath pH 10.5 shows Redox Potential of both these products is almost same

Data from Transpek-Silox's NABL approved QA lab

B) COMPARISON OF ORP



Comparison of ORP at Bath pH 12.5 shows Redox Potential of both these products is almost same

Data from Transpek-Silox's NABL approved QA lab

C) COMPARATIVE APPLICATION IN INDIGO DYEING

ROPE DYEING with below Facility and Condition

MACHINE	MORRISON, 24 ROPE DYG
QUALITY	OE + RS 9 count sort no. 61413 / 15000 meters
WT. OF YARN	639 g / L.M.
NO. OF ENDS	24 ropes x 405 ends = 9720 ends, 9 counts.
% SHADE	2.9 SBIT
DWELLING TIME IN DYE BATH	8 m / 20 secs
TOTAL LIQUOR	2950 ltrs. X 8 dips = 23,600 ltrs.
CAUSTIC GPL	0.5 - 0.6 gpl (for maintaining pH)
FEEDER HYDRO DOSAGE	335 g / min. (details in observations sheet)
DYE CLASS	LIQUID INDIGO (Blue connection), 30% solution
NO. OF MANGLES USED FOR DYEING	8 - NIP, 8 - DIP , Airing Time: 45 sec.
NO. OF WASHING COMPARTMENTS	3
PRE-TREATMENT	Yes (with caustic, wetting agent, dispersing agent etc.)
INDIGO GPL	1.5
INDIGO DOSAGE / MIN.	1380 ml
MACHINE SPEED	26 mtr. / min.

Data from Mill trial (bulk run)

C) COMPARATIVE APPLICATION IN INDIGO DYEING

OBSERVATIONS OF TRIAL

To achieve 0.2 g/l of free hydro in bath (required to keep dye in Lueco form), **Hydros D** dosage is lower by approx. 10% as compared to Hydro (imported) found during following trial study.

HYDROS D				
Reading	hydro dosage g/min	pH	free hydro (g/l)	ORP (Redox potential)
1	337	12.38	0.27	-740
2	337	12.4	0.25	-748
3	337	12.41	0.26	-730
4	325	12.36	0.27	-731
5	325	12.34	0.22	-732

HYDRO (IMPORTED)				
Reading	hydro dosage g/min	pH	free hydro (g/l)	ORP (Redox potential)
1	325	12.26	0.17	-733
2	345	12.31	0.15	-730
3	345	12.31	0.11	-727
4	364	12.35	0.16	-728
5	364	12.34	0.20	-730

Data from Mill trial (bulk run)

C) COMPARATIVE APPLICATION IN INDIGO DYEING

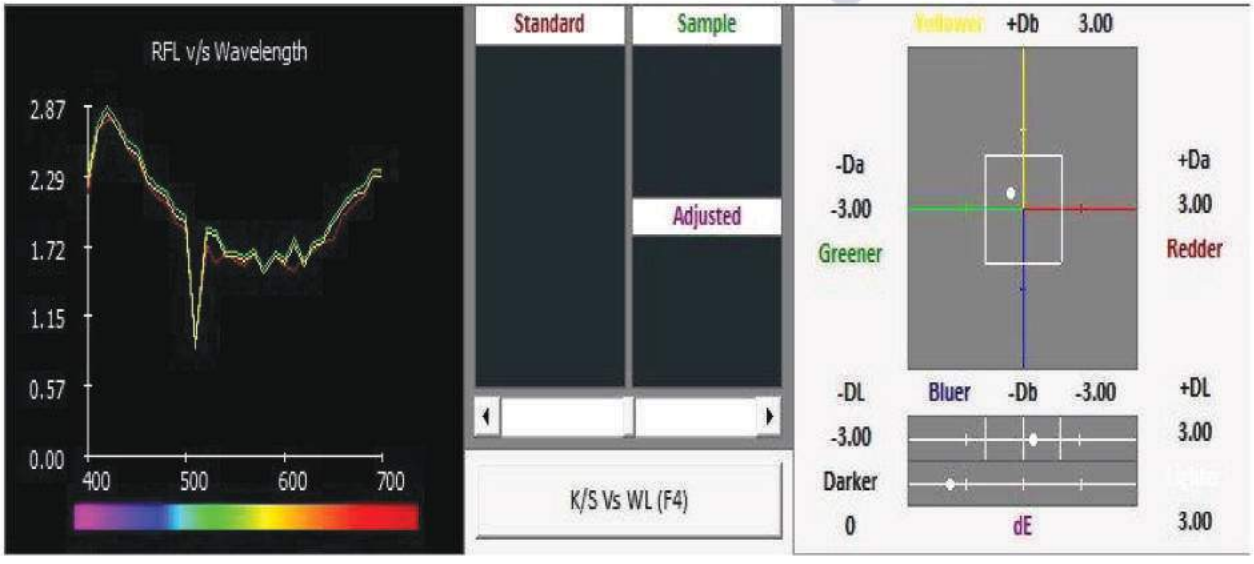
TEST REPORT

SAMPLE DESCRIPTION:	Indigo dyed yarn
INSTRUMENT:	Spectrophotometer
MODEL:	HUNTER (5100H CRH)
ILLUMINANT:	D 65, UV included
OBSERVER:	10'
COLOUR SPACE:	CIELAB (1976)
APPERTURE SIZE:	MAV (22 mm)
TEST REQUIREMENT:	CIE l*, a*, b*, dE & colour strength

SR. No.	SAMPLE (Hydro)	CIE L*	CIE a*	CIE b*	Colour difference (dE)	% Strength
1	HYDRO (imported)	13.745	2.825	-6.22	0.527	**97.54**
2	HYDROS D	13.478	3.177	-6.507	--	**100**

C) COMPARATIVE APPLICATION IN INDIGO DYEING

TEST REPORT



Standard : TSIPL Hydros D
Sample : Hydro (Imported)

C) COMPARATIVE APPLICATION IN INDIGO DYEING

ROPE DYED YARN

DYED WITH HYDROS D

DYED WITH HYDRO (imported)

INTERPRETATIONS BASED ON TRIAL & SPECTROPHOTOMETRY ANALYSIS

- In order to maintain free hydro levels of < 0.2 gpl during the trial, a slightly higher amount of Hydro (imported) was consumed. Also, dosage of caustic soda needed to be increased.

- The Spectrophotometer readings indicate that ΔE was 0.52 and the colour strength of Indigo observed while using Hydros D was 100% as compared to 97.5 % with Hydro (imported).

- Both Hydro gave consistent results in the open bath (minimum shade variation).

D) COMPARISON OF EFFLUENT GENERATED

Results of Effluent Water collected from Denim Mill

Sr.No	Parameter	Water used in trial	Hydro (imported) Effluent sample	Hydros D, Effluent sample
1	SO_3	Nil	3400 ppm	3000 ppm
2	COD	21 ppm	3200 ppm	2800 ppm
3	pH	6.93	11.96	11.96
4	Sulphate (SO_4)	Nil	0.46%	0.46%
5	TDS	165 ppm	9586 ppm	9006 ppm
	Metallic Impurities:			
1	Fe	ND	0.37 ppm	0.34 ppm
2	Pb	Below Detection Limit	ND	Below Detection Limit
3	Cd	0.02 ppm	0.03 ppm	0.04 ppm
4	Cu	Not Detected	Not Detected	Not Detected
5	Mn	Not Detected	Not Detected	Not Detected
6	Zn	3 ppm	2.44 ppm	2.42 ppm

Effluent analysis reveal more SO_3, COD and some metal impurities in Dyeing with Hydro (imported) as compared to dyeing with Hydros D.

INTERPRETATIONS BASED ON EFFLUENT WATER ANALYSIS

- It can be seen from the effluent water analysis report that SO_3, COD & TDS are higher in Hydro (imported) water sample.
- pH & sulphate (SO_4) is constant.
- Metallic impurities (copper, lead, zinc, cadmium, manganese) are not detected.

CONCLUSION

Based on above comparative aspects, conclusions follow:

- Chemical Analysis shows that **Hydros D** has higher purity, is less dusty and more free flowing as compared to Hydro (imported).
- Comparative study ORP shows that **Hydros D** & Hydro (imported) exhibit almost same REDOX Potential at given point of time.
- ΔE shows colour strength of Indigo with **Hydros D** is slightly better as compared to Hydro (imported).
- Analysis of Effluent shows that **Hydros D** generates less effluent in terms of COD, SO_3 and TDS than Hydro (imported).

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Hydros D

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