



Preparation and Properties of Antibacterial Natural Rubber Latex Foam

Presented by

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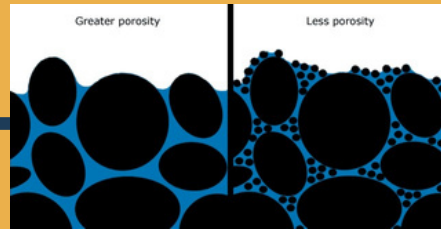
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Background & Rationale





Objective

To study the potential use of natural rubber foam as antibacterial materials



Expected benefit

Rubber latex foam antibacterial based on natural rubber latex is successfully prepared



Scope of Study

1. Characterization of latex properties

- TSC
 - DRC
 - Alkalinity
 - MST
-

2. Effect of HPQM contents at 0-10 phr on the antibacterial performance of natural rubber latex foam



Methodology

1. Characterization of Latex Properties

The HA type centrifuged latex was evaluated according to ISO 2004

1

Total Solid Content (TSC)

2

Dry Rubber Content (DRC)

3

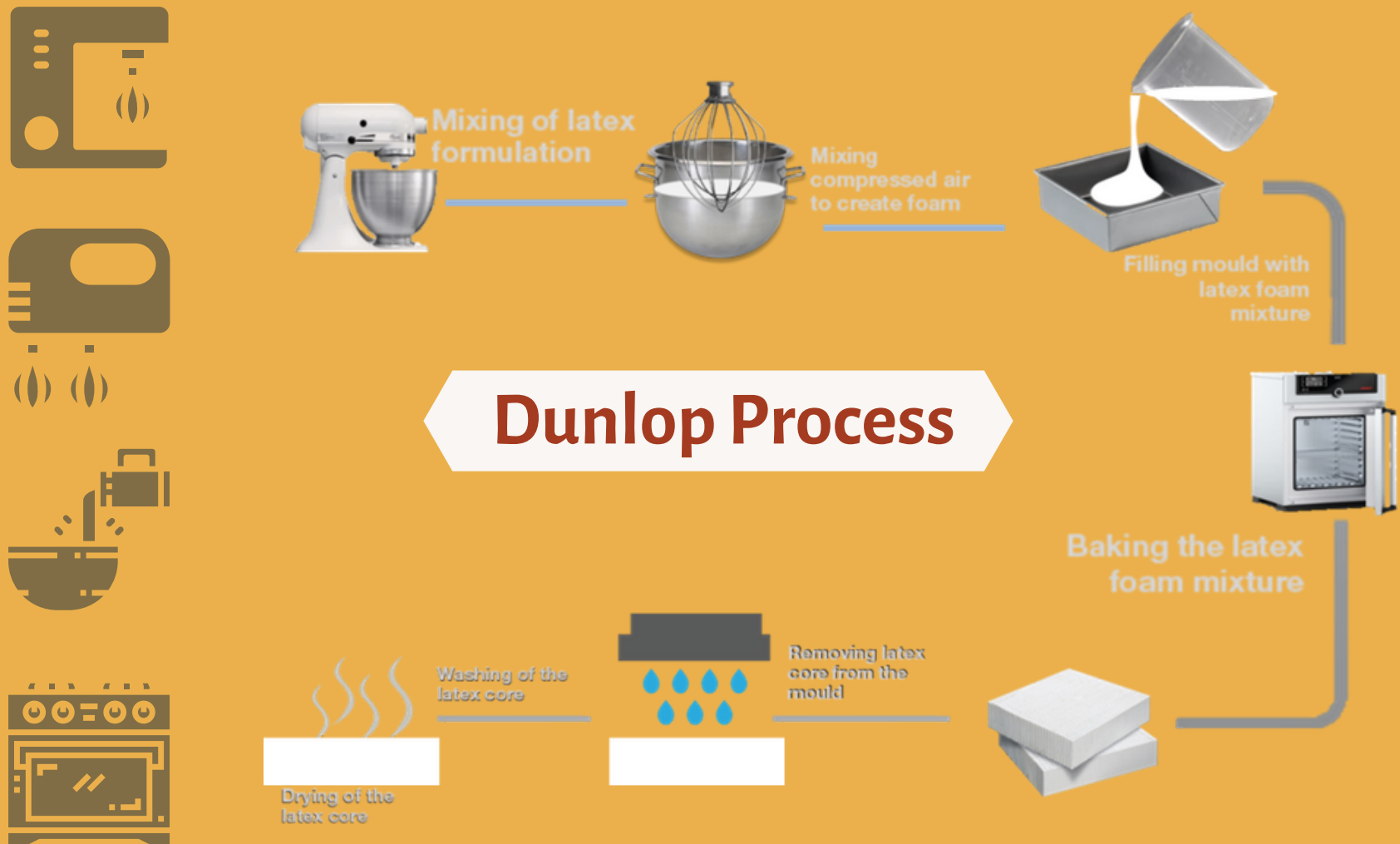
Alkalinity

4

Mechanical Stability Time (MST)



2. Effect of HPQM contents on the antibacterial performance of NRLF



2. Effect of HPQM contents on the antibacterial performance of NRLF

Physical Properties

Density



Compression set



Compressive strength

Antibacterial Performance

Disk diffusion test



E.coli

S.aureus





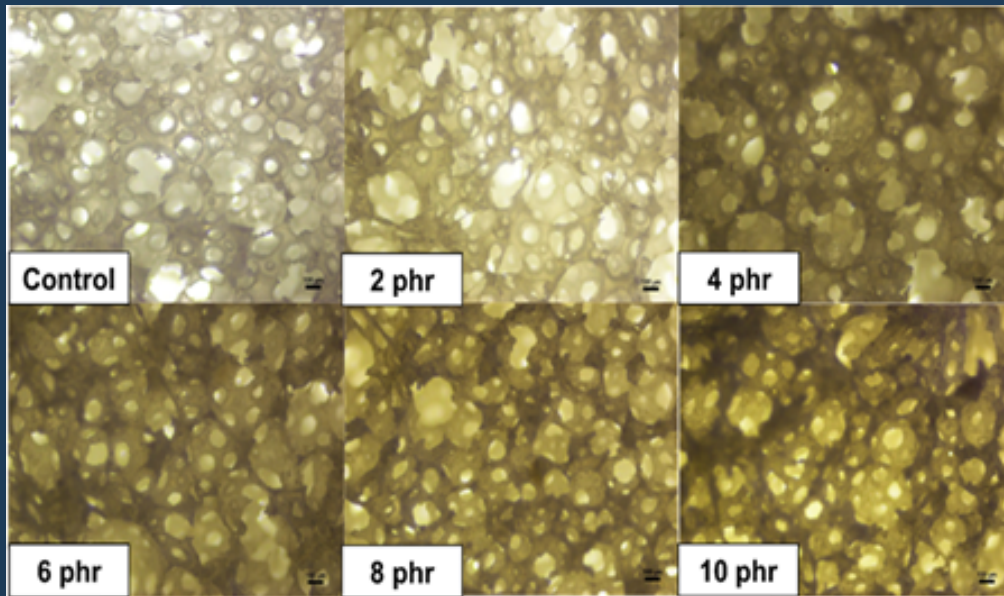
Results & Discussion

Characterization of Latex Properties

Table 1 Properties of HA type of Natural rubber latex

Properties	Standard ISO 2004	Results
TSC	61.50 %	62.55 %
DRC	60.00 %	60.65 %
Alkalinity	≥ 0.60 %	0.64 %
MST	> 650.00 sec	1288.80 sec

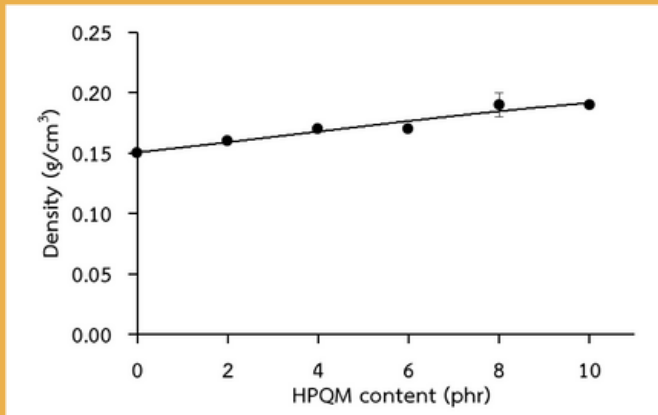
Effect of antibacterial agent on the antibacterial performance of natural rubber latex foam



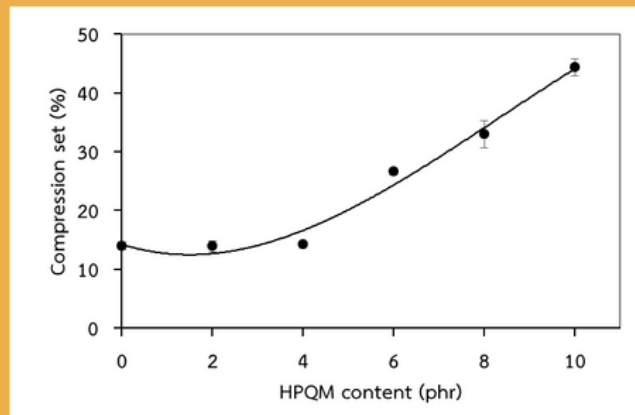
Effect of HPQM (phr)	Cell size (μm)
HPQM 0 phr	133.56 ± 20.68
HPQM 2 phr	139.62 ± 12.32
HPQM 4 phr	132.47 ± 08.70
HPQM 6 phr	126.61 ± 30.12
HPQM 8 phr	116.47 ± 20.72
HPQM 10 phr	109.72 ± 07.93

Effect of HPQM contents on the antibacterial performance of NRLF

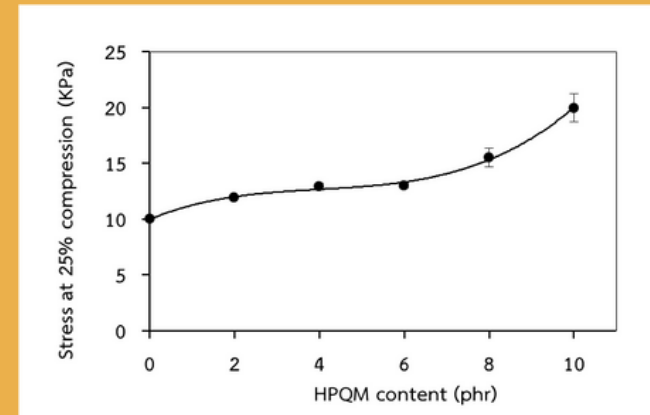
(Physical Properties)



Density of the sponge and the amount of HPQM.



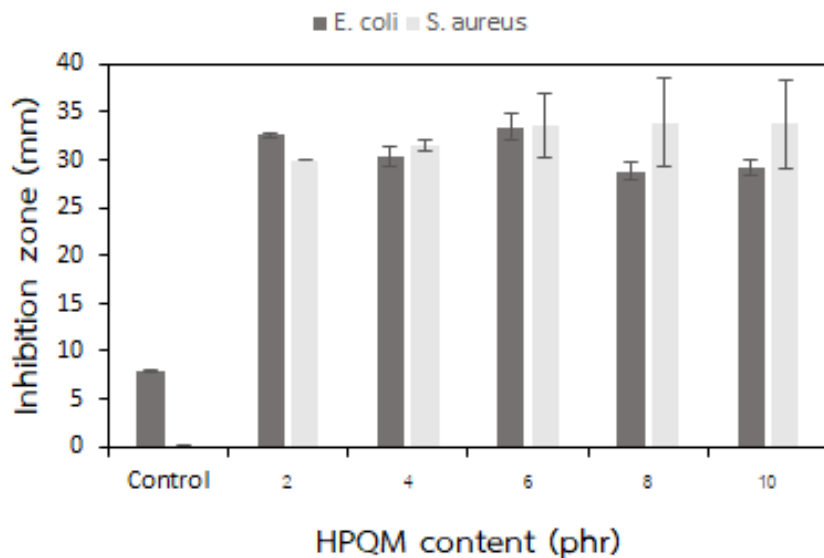
Compression set of the sponge and the amount of HPQM.



Compressive strength of the sponge and the amount of HPQM.

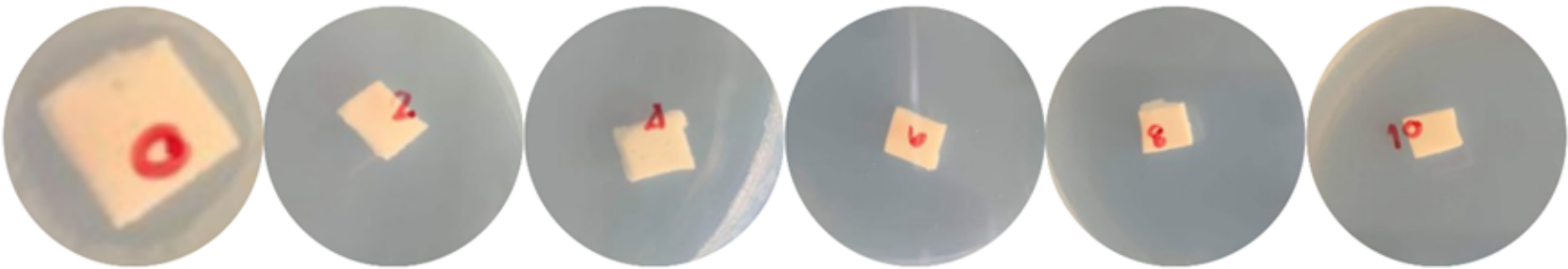
Effect of HPQM contents on the antibacterial performance of NRLF

(Antibacterial Performance)

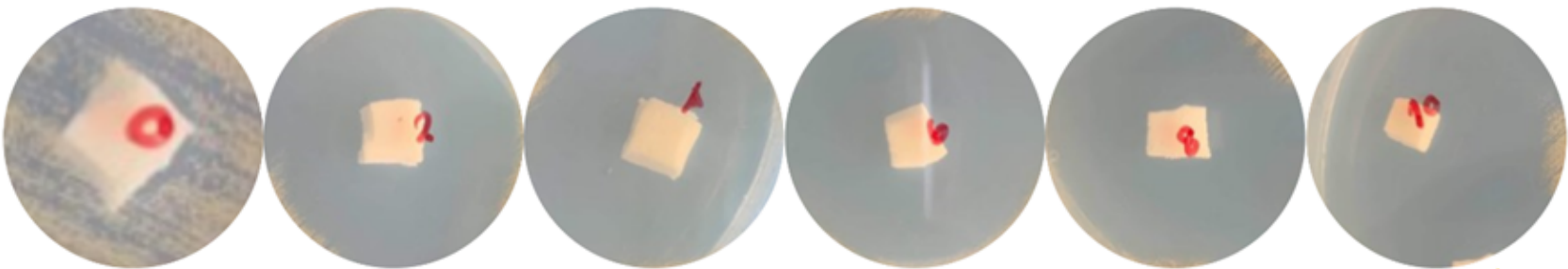


Effect of HPQM (phr)	Clear zone (mm)	
	E.coli	S.aureus
Control	7.95 ± 0.25	0
2	32.61 ± 1.03	29.90 ± 0.54
4	30.40 ± 1.41	31.45 ± 3.37
6	33.38 ± 0.93	33.59 ± 4.62
8	28.77 ± 0.89	33.85 ± 4.60
10	29.17 ± 0.32	33.74 ± 3.59

E. coli



S. aureus



0 – 10 phr of HPQM

References

- Larry M. Bush. Staphylococcus aureus Infections (Staph Infections). Msdmanuals Consumer Version. 1998. Available at: <https://www.msdmanuals.com/home/infections/bacterial-infections-gram-positive-bacteria/staphylococcus-aureus-infections>. Accessed July 9, 2019.
- Larry M. Bush. Escherichia coli infections. Msdmanuals Consumer Version. 1998. Available at: <https://www.msdmanuals.com/home/SearchResults?query=escherichia>. Accessed July 9, 2019.
- H. G. Dawson .1950.Mechanical Stability Test for Hevea Latex. Rubber Chemistry and Technology: , Vol. 23, No. 4, pp. 981-994.
- Kajornchaikul ,W.,Thanakornnithikul,M.2552.Natural rubber latex concentrate. Thai Industrial Standard. 908-2552, 3-6.
- Robert ,W. Evans.2019.Staphylococcal scalded skin syndrome. British Association of Dermatologists. No. 258474, pp. 1-4.
- Tuptim ,K.,Ansarifar ,A.,Sombatsompop ,N.2014. Effect of Organoclay and Silver-Substituted Zeolite on the Mechanical and Antibacterial Properties of a Silicone Rubber Filled with 2-Hydroxypropyl-3-Piperazinyl-Quinoline Carboxylic Acid Methacrylate. POLYMER ENGINEERING AND SCIENCE.23631,932-941.

Thank
you

