Flavour migration through capsule shell

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Agenda

- Objectives
- Design of the study
- Results and discussion
- Conclusions

Objectives

- Determine menthol migration through the capsule shell
- Test influence of menthol quantity on migration
- Compare pork gelatin based capsules with vegetarian
- Evaluate influence of flavour type on menthol migration

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Design of study

Capsule code	Origin	Menthol per capsule, mg	Hardness, N	Weight, mg	Quantity of capsules in 50g
CM3.7	Pork	3.7mg	13.01	21.4	2336
CM6.8	Pork	6.8mg	12.37	21.25	2353
CM8.13V	Vegetarian	8.13mg	13.31	20.47	2443
CB3.1	Pork	3.1mg	11.58	21.8	2294
CM3.8V	Vegetarian	3.8mg	16.15	21.27	2351
CO0.62	Pork	0,6mg	9.87	20.61	2426
CL5.0	Pork	5.0mg	13.3	21.73	2301

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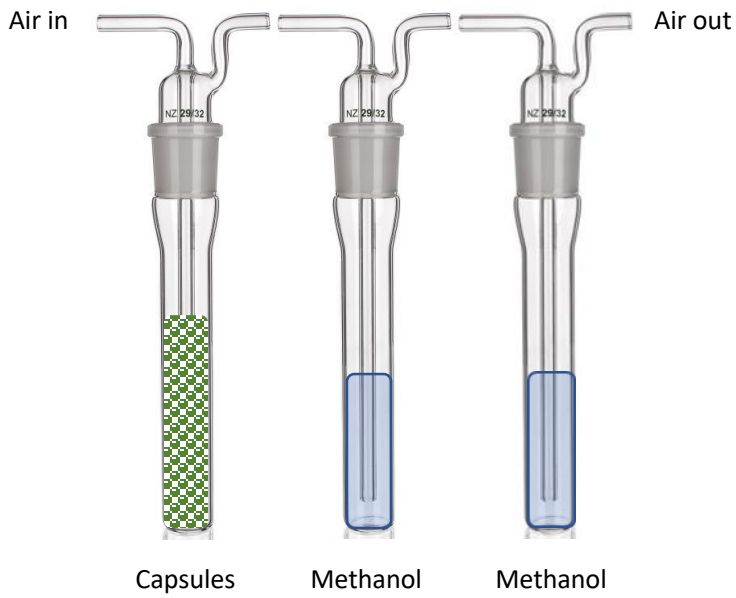
Design of study



Air flow 100ml/min
50g of capsules
25ml of methanol in 1st impinger
25ml of methanol in 2nd impinger

Measured with 24h intervals to 96h

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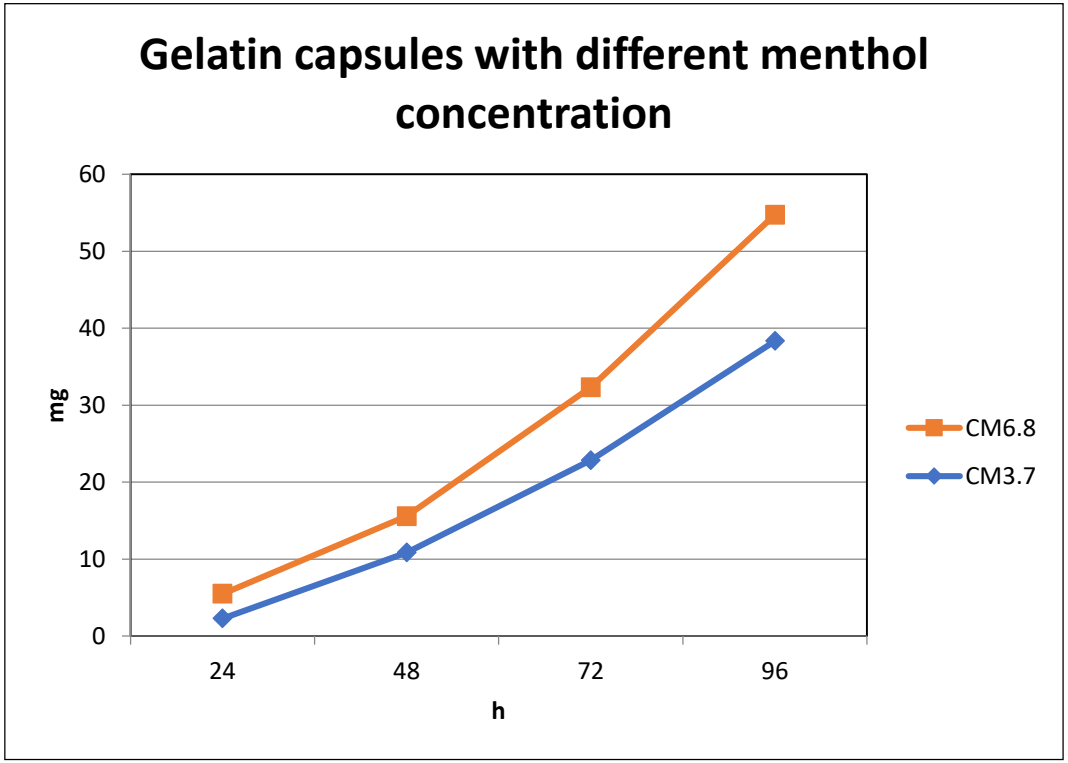
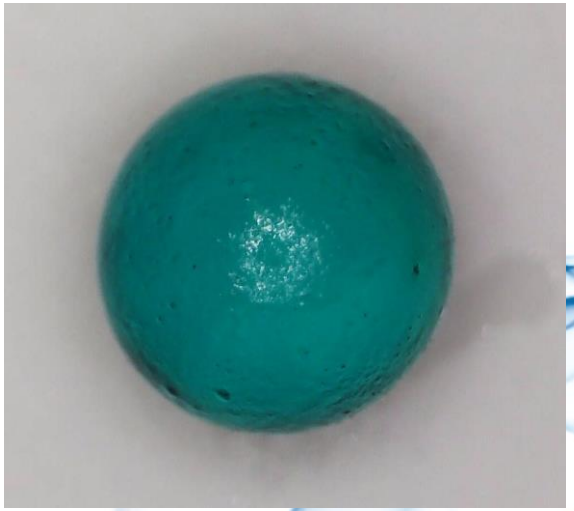
Results and discussion



After 24h capsules became „wet“ but no cracks were observed on the surface.

“Wet” CM6,8 capsule.



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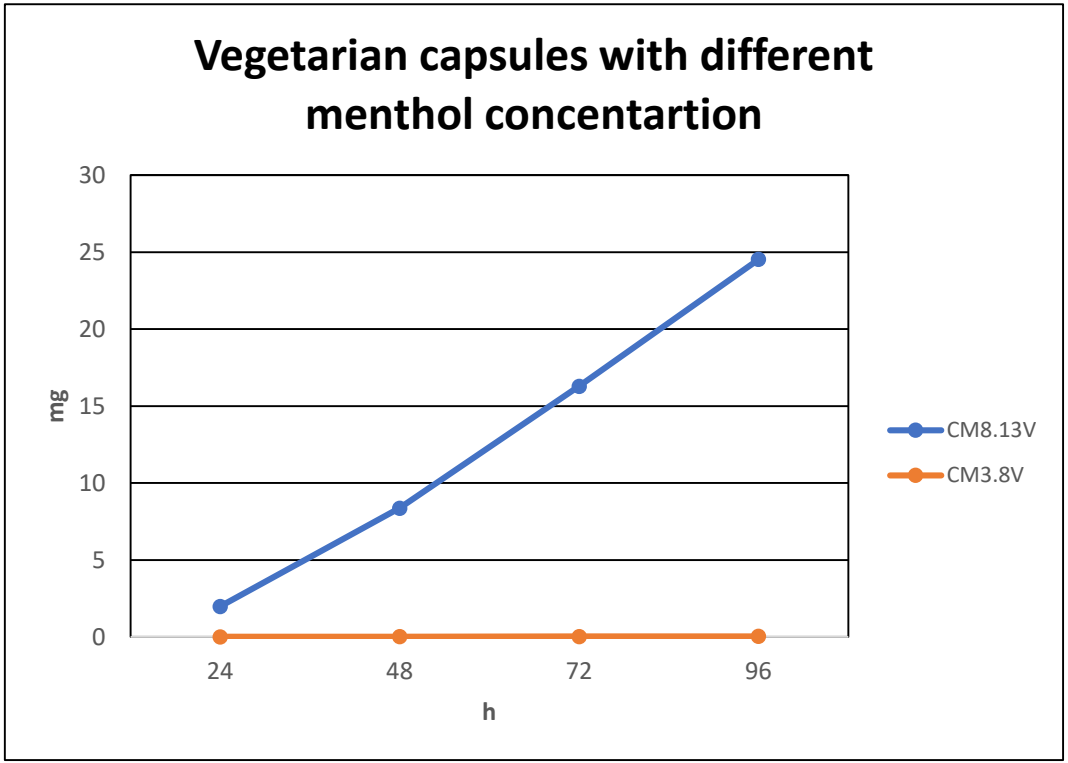
Results and discussion



After 48h CN8.13V capsules partly became „wet“ without cracks.

CM3.8V didn’t show any changes through 96h.

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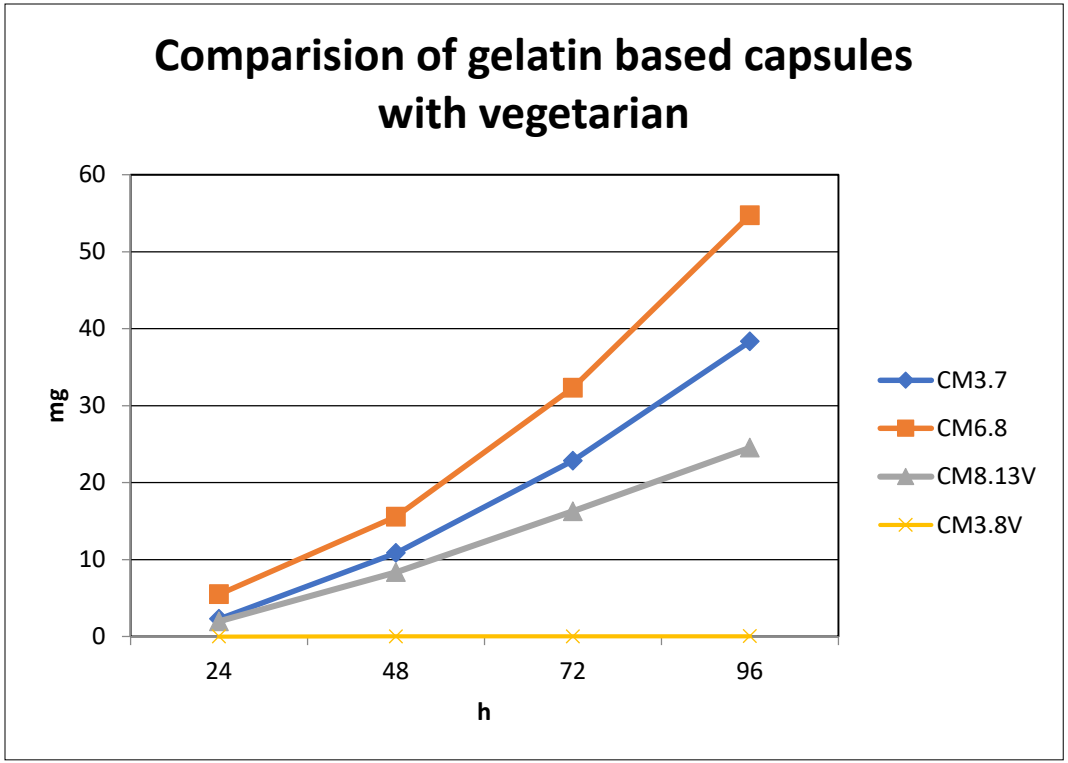
Results and discussion



Veggie based capsules have more than twice lower menthol migration compared to gelatin versions.

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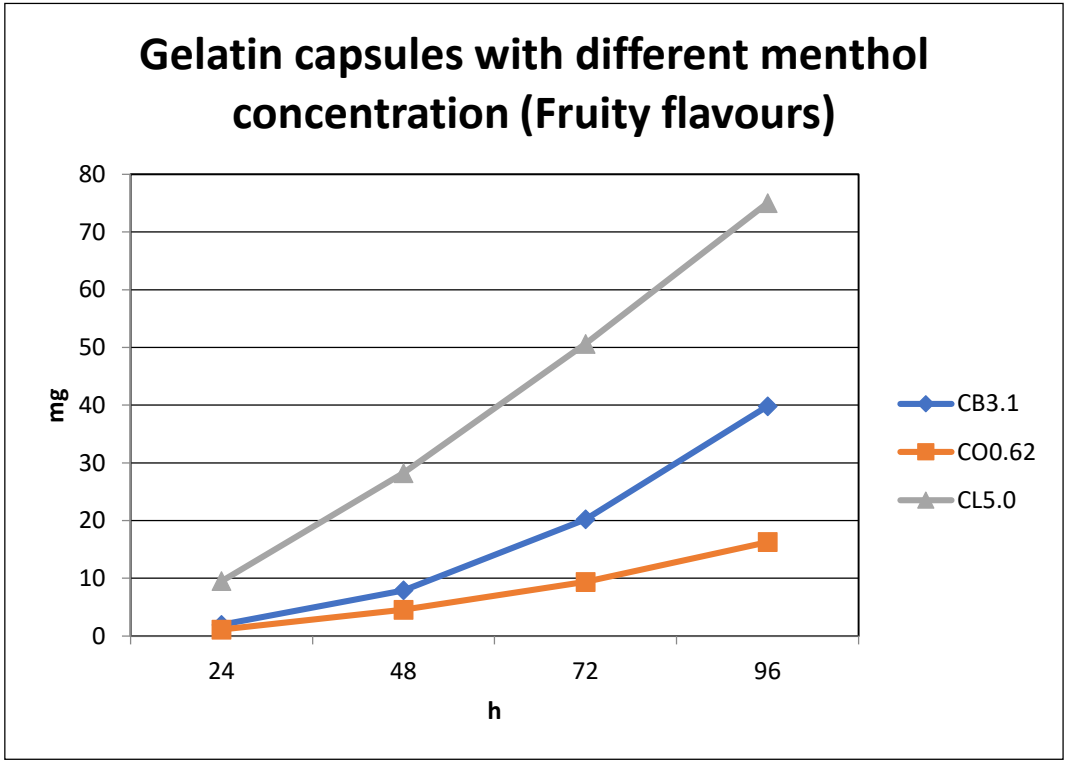
Results and discussion



CO0.62 capsules show very low migration, but menthol concentration in capsule is only 0.62mg.

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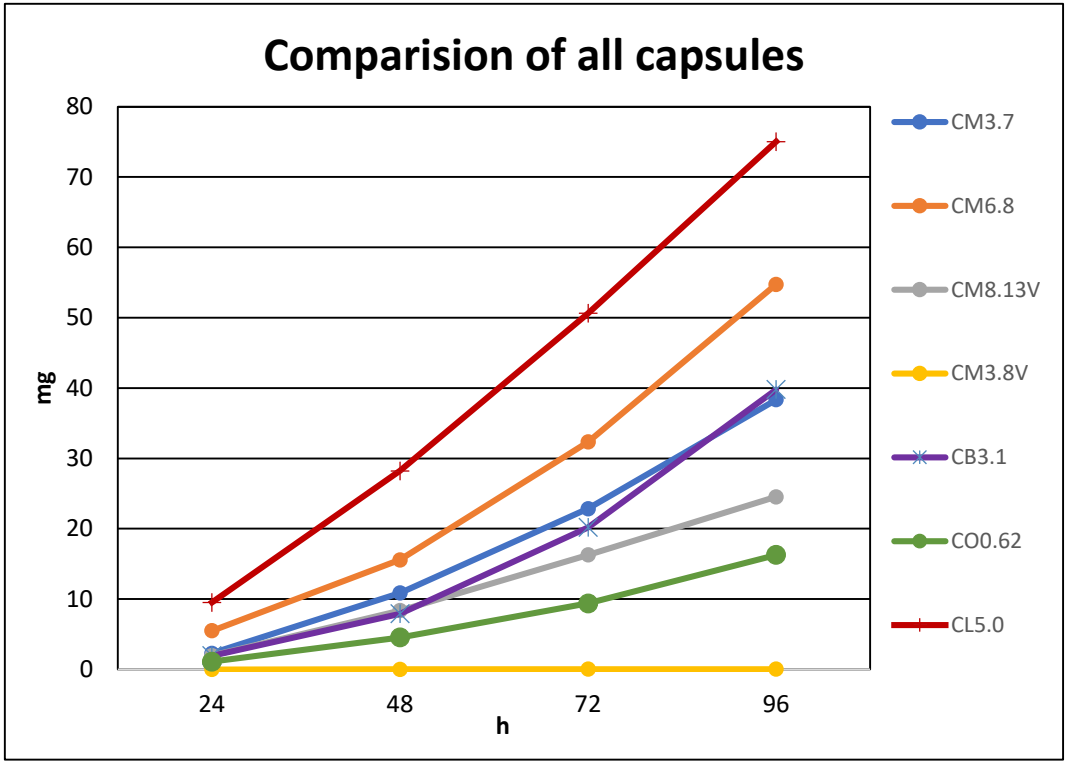
Results and discussion



Capsules CM3.7 and CB3.1 show similar results there is no effect of flavour type.

CL5.0 has higher flavour migration compared to all capsules, despite the fact that in CL5.0 is not highest menthol concentration.

CO0.62 compared to menthol quantity in CM3.7 and CB3.1 has high migration.

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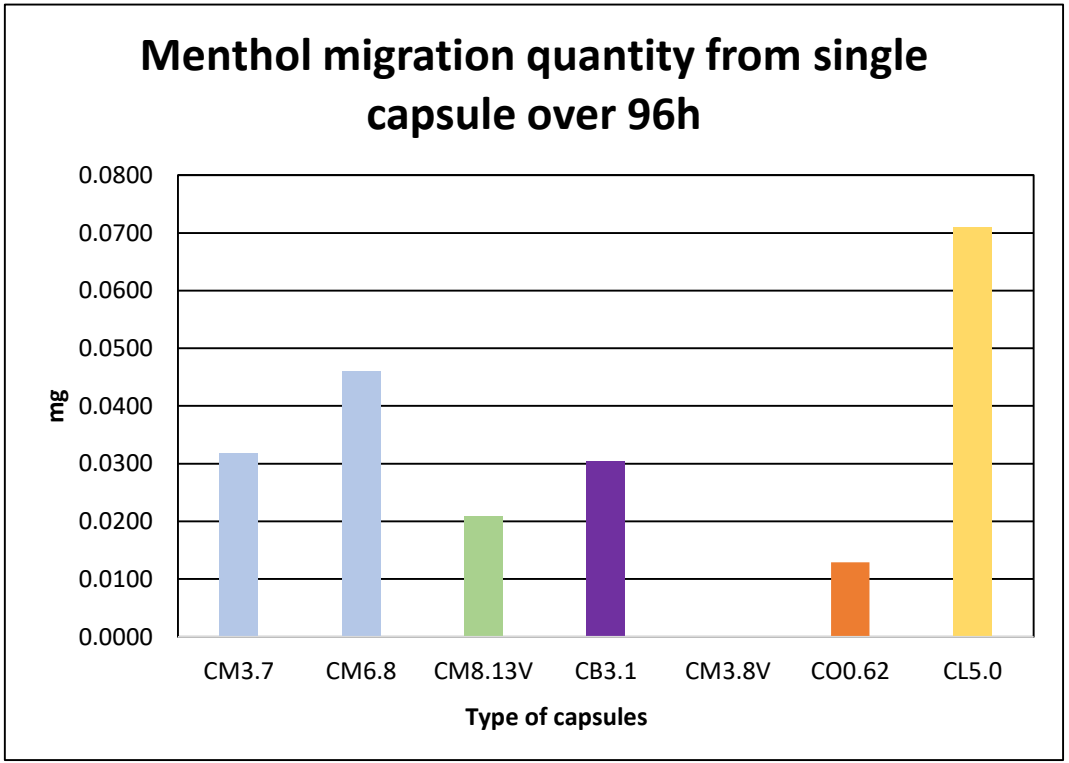
Results and discussion



Menthol based capsules CM3.7 and CM6.8 show similar results to Berry flavoured CB3.1.

CL5.0 have highest migration compared to others.

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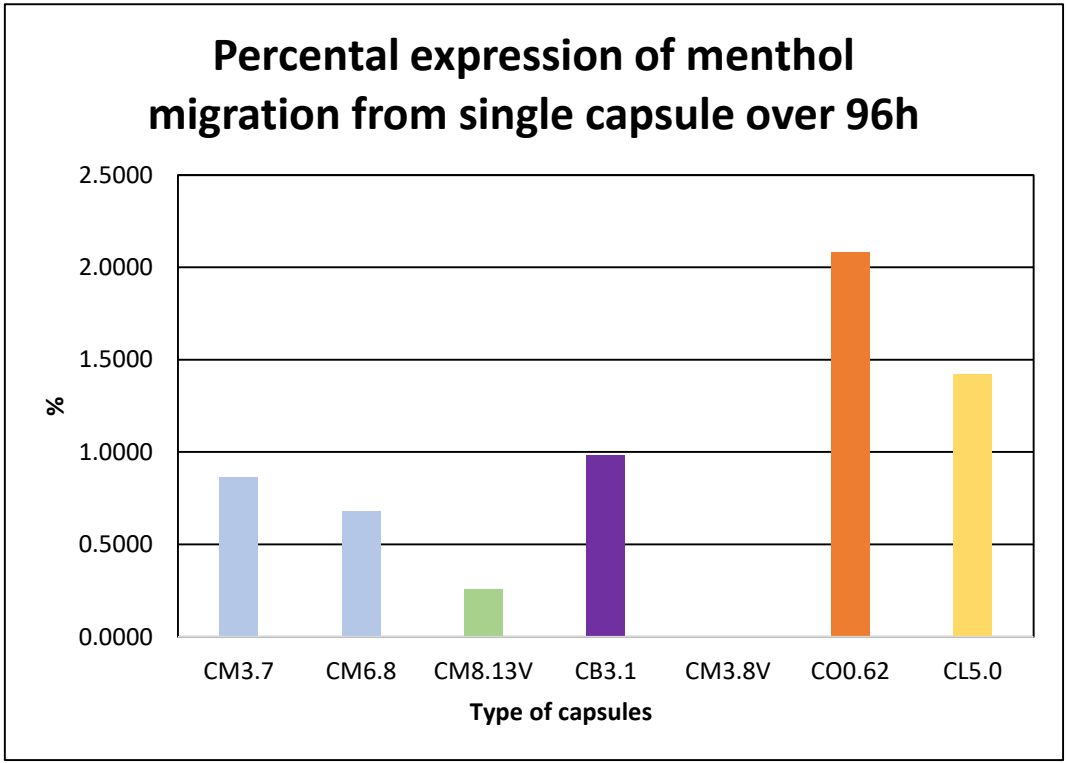
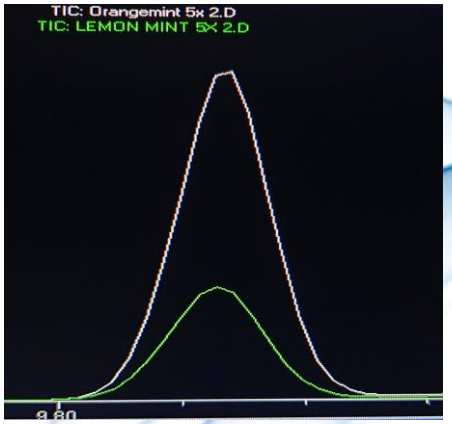
Results and discussion



CO0.62 capsule shows highest percentage menthol migration compared to others though menthol loading is lowest.

CO0.62 capsule have high D-limonene quantity.

D-limonene spectra from CO0.62 and CL5.0



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Conclusions

- Menthol migration in gelatin capsules depends on menthol quantity in the capsule.
- Vegetarian shell has better barrier properties compared to gelatin based shell with menthol migration more than two times lower.
- Citrus flavors give high menthol migration through shell in gelatin capsules. D-limonene highly affects capsule shell barrier properties.

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Thank you for your attention!