

Table 9. Recommendations for insole materials for certain compositions: upper and lining.

Upper and lining combination	Insole material	Discomfort index ratio	Recommendation
L1 – MP2	SPP1 vs MPP2	0.76	SPP1
L1 – MP42	SPP1 vs MPP2	0.77	SPP1
L2 – MP1	MPP1 vs MPP2	0.71	MPP1
L4 – MP2	SPP1 vs MPP2	0.81	SPP1
L4 – MP42	SPP1 vs MPP1	1.18	MPP1
L4 – MP42	SPP1 vs MPP2	0.81	SPP1
L5 – MP1	MPP1 vs MPP2	0.75	MPP1

of temperature and humidity conditions inside footwear. In the case where all materials create a barrier against circulation between the foot and the environment, the temperature inside rises rapidly, the foot sweats intensely, and fungi and other microorganisms appear.

In accordance with the methodology described in [14], during a simulation of exertion, differences between the dorsum and sole fluctuate between 21% and 76%. This fact shows that in certain environmental conditions it is necessary to drain the moisture from the sole surface. In this case, the role of insole materials is pivotal.

Based on previous analysis, we can highlight the best insole materials for specific combinations of upper and lining materials which can reduce the discomfort index for users (Table 9).

Results obtained from the analysis above correspond to a commonly known fact that from the user's point of view natural leather has better hygienic properties than other materials, like cellulose material or leather from recovery. But when footwear manufacturers want to use alternative, often cheaper materials, it is possible to create other combinations which could be equally healthy and comfortable for consumers [15].

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