

CONCLUSION

In conclusion, xanthone, sesamin and *Andrographis paniculata* extract inhibited cytokine storm and induced immune cells in influenza type A H1N1-induced peripheral blood mononuclear cells (PBMCs). These 3 phytochemicals inhibited cytokine storm by reducing the release of IL-1 β and TNF- α and enhancing the activity of immune cells via increasing of IL-2 mRNA expression and protein release. Therefore, these phytochemicals are of interest to use for further study and might be the new pharmacological agents for prevention and treatment immune induced inflammatory disorders. The effect of these phytochemicals on other cytokines using PCR array will be further investigated including their involved signaling pathways.