

Journal of Applied Pharmaceutical Science

Available online at: <https://japsonline.com>

***Morus alba* leaf extracts prevent indomethacin-induced intestinal ulcers via suppression of endoplasmic reticulum stress**

Cherdsak Boonyong^{1,2}, Wannee Angkhasirisap³, Nonthalert Lertnitikul⁴, Kanchana Kengkoom³, Rutt Suttisri⁴, Suree Jianmongkol²

¹Pharmacology and Toxicology Unit, Department of Medical Sciences, Faculty of Science, Rangsit University, Pathum Thani, Thailand.

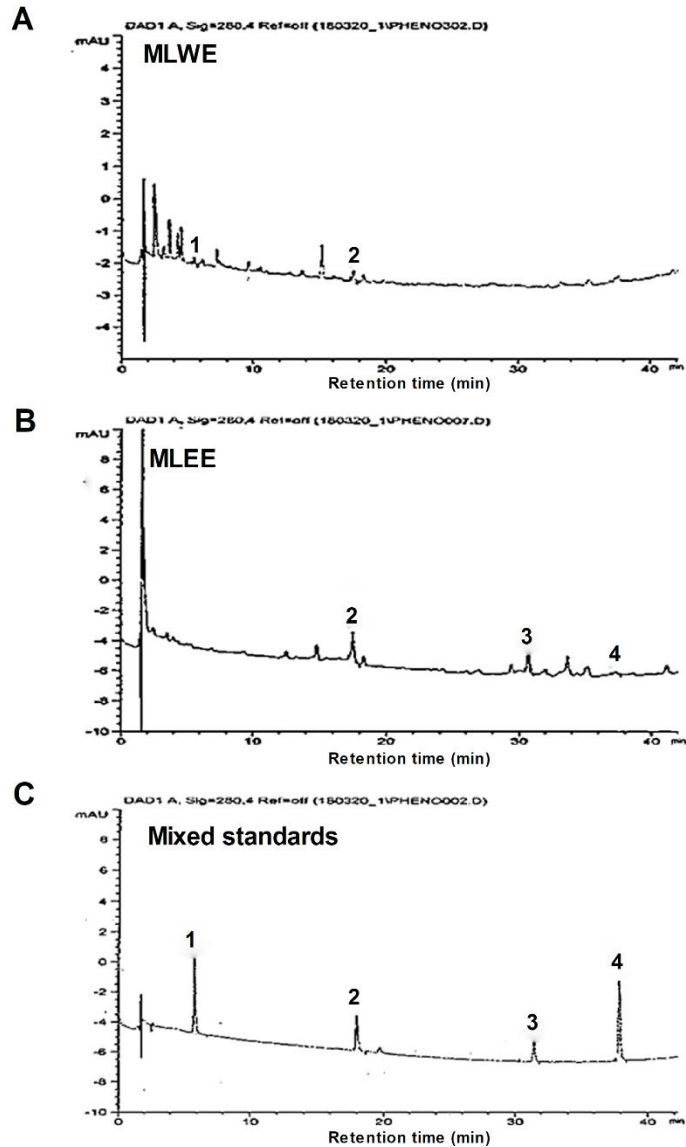
²Department of Pharmacology and Physiology, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok, Thailand.

³Academic Service Division, National Laboratory Animal Center, Mahidol University, Nakorn Pathom, Thailand.

⁴Department of Pharmacognosy and Pharmaceutical Botany, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok, Thailand.

doi: <https://doi.org/10.7324/JAPS.2025.210080>

SUPPLEMENTARY MATERIAL



Supplementary Figure 1: HPLC analysis of chemical constituents of *Morus alba* leaf water and ethanol extracts (MLWE and MLEE). HPLC chromatograms of MLWE (A), MLEE (B) and mixed standards (C) at 280 nm; gallic acid (peak 1; retention time 5.839 min), chlorogenic acid (peak 2; retention time 18.011 min), naringenin (peak 3; retention time 31.444 min) and rutin (peak 4; retention time 37.870 min).

Supplementary Table 1: Total phenols, total flavonoids, gallic acid, chlorogenic acid, naringenin and rutin contents in water and ethanol extracts (MLWE and MLEE) of *Morus alba* leaves.

Content µg per g of plant extract	MLWE	MLEE
Total polyphenols (as GAE)	3359 ± 36	5875 ± 67
Total flavonoids (as QE)	3718 ± 120	6144 ± 47
Gallic acid	453 ± 4	N/A
Chlorogenic acid	1440 ± 2	2584 ± 52
Naringenin	N/A	1362 ± 42
Rutin	N/A	347 ± 3

Data are expressed as mean ± S.D. ($n = 3$). N/A; not available.

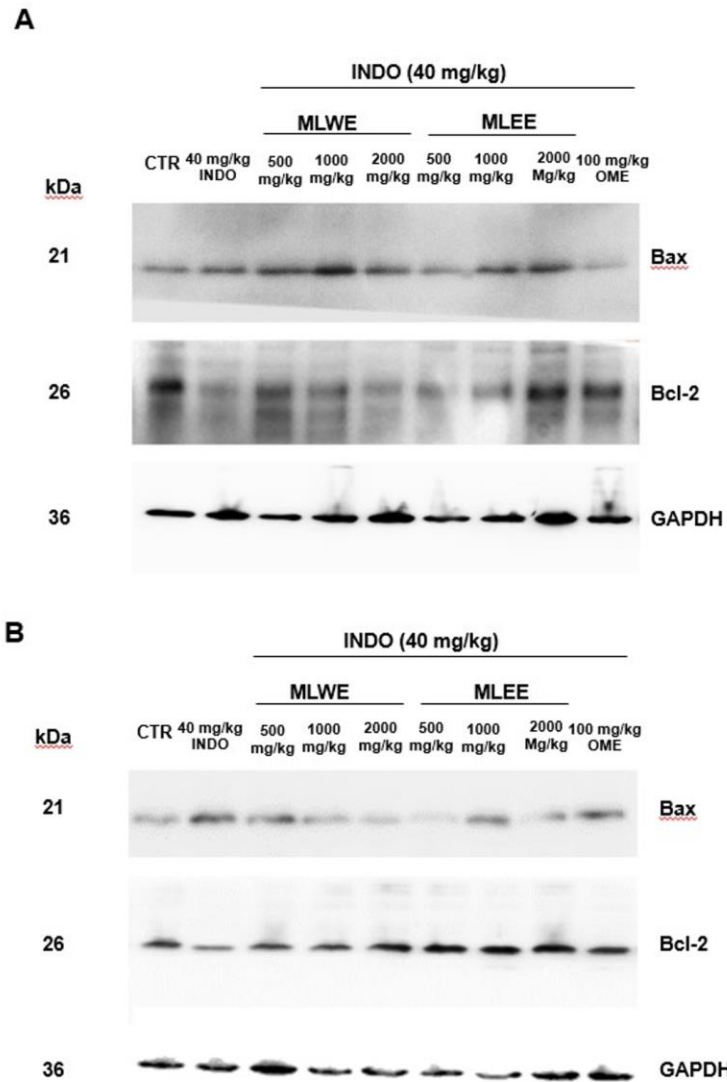
Supplementary Table 2: Antioxidant effect (EC_{50}) on DPPH radical scavenging of *Morus alba* leaf water and ethanol extracts (MLWE and MLEE).

Compounds	EC_{50} (µg/ml)
MLWE	637 ± 4
MLEE	1003 ± 6
Ascorbic acid	64 ± 4

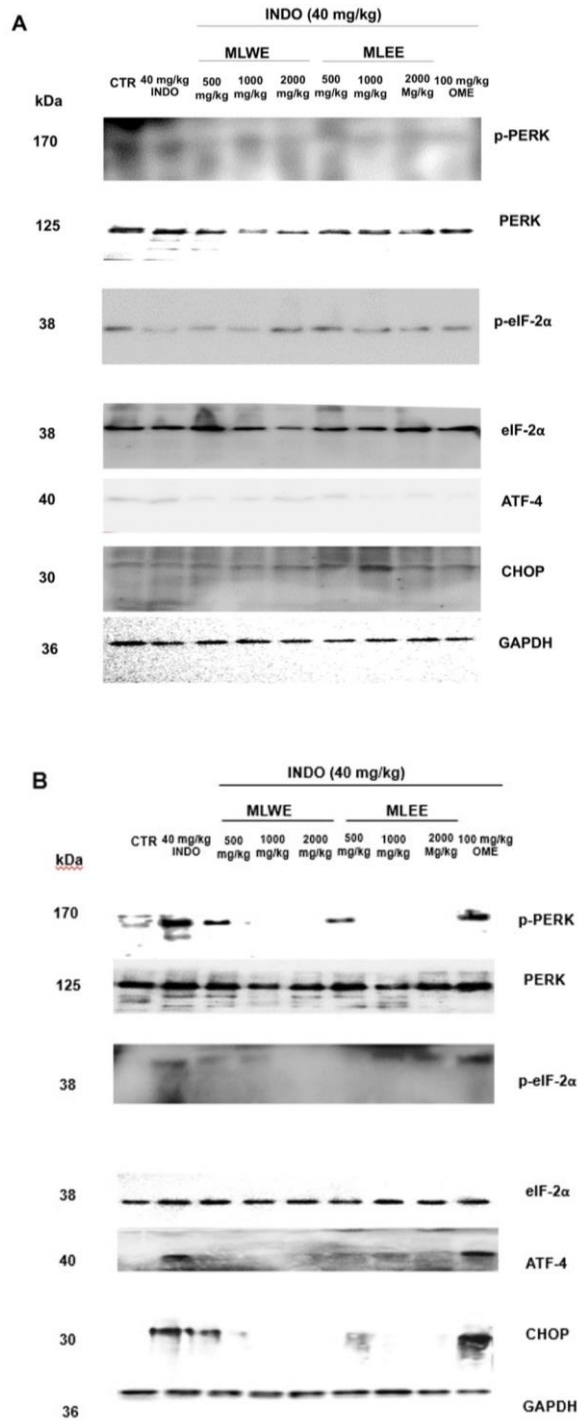
Data are represented as mean ± S.D. ($n = 3$). Regression values of each compound were:

MLWE ($Y = 0.0217X + 36.188$, $R^2 = 0.9875$), MLEE ($Y = 0.009X + 40.977$, $R^2 = 0.9749$),

ascorbic acid ($Y = 0.3715X + 25.87$, $R^2 = 0.9847$).



Supplementary Figure 2: Raw western blot data of Figure 3. Expression of Bax and Bcl-2 in rat stomach (**A**) and jejunum (**B**) after 24-h treatment with indomethacin (INDO; 40 mg/kg) in the absence and presence of mulberry leaf water (MLWE) or ethanol extract (MLEE) or omeprazole (OMP; 100 mg/kg).



Supplementary Figure 3: Raw western blot data of Figure 4. Expression of PERK/eIF-2 α /ATF-4/CHOP proteins in rat stomach (**A**) and jejunum (**B**) after 24-h treatment with indomethacin (INDO; 40 mg/kg) in the absence and presence of mulberry leaf water (MLWE) or ethanol extract (MLEE) or omeprazole (OMP; 100 mg/kg).