
Safety Assessment of *Houttuynia cordata*-Derived Ingredients as Used in Cosmetics

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*All interested persons are provided 60 days from the above release date [i.e., **February 14, 2026**] to comment on this safety assessment, and to identify additional published data that should be included or provide unpublished data which can be made public and included. Information may be submitted without identifying the source or the trade name of the cosmetic product containing the ingredient. All unpublished data submitted to CIR will be discussed in open meetings, will be available for review by any interested party, and may be cited in a peer-reviewed scientific journal. Please submit data, comments, or requests to the CIR Executive Director, Dr. Bart Heldreth.*

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ABBREVIATIONS

ALT	alanine transaminase
AST	aspartate transaminase
BrdU	bromo-deoxyuridine
BUN	blood urea nitrogen
CIR	Cosmetic Ingredient Review
Council	Personal Care Products Council
<i>Dictionary</i>	<i>International Cosmetic Ingredient Dictionary and Handbook</i>
DMSO	dimethyl sulfoxide
ELISA	enzyme-linked immunosorbent assay
FDA	Food and Drug Administration
HET-CAM	hen's egg test on the chorioallantoic membrane
hiPSCs	human-induced pluripotent stem cells
hpf	hours post fertilization
IFN- γ	interferon-gamma
IL	interleukin
iNOS	inducible nitric oxide synthase
LC ₅₀	median lethal dose
l.o.	leave-on
LPS	lipopolysaccharide
LTS	lipoteichoic acid
MNV-1	murine norovirus-1
MoCRA	Modernization of Cosmetics Regulation Act
MTT	3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide
NOAEL	no-observed-adverse-effect-level
NR	not reported
OECD	Organisation for Economic Co-operation and Development
Panel	Expert Panel for Cosmetic Ingredient Safety
RIFM	Research Institute for Fragrance Materials
RLD	Registration and Listing Data
r.o.	rinse-off
SARS	severe acute respiratory syndrome
SFDA	China's State Food and Drug Administration
TG	test guideline
TNF- α	tumor necrosis factor- α
US	United States

INTRODUCTION

This assessment reviews the safety of the following 6 *Houttuynia cordata*-derived ingredients as used in cosmetic formulations:

Houttuynia Cordata Extract	Houttuynia Cordata Leaf Water
Houttuynia Cordata Flower/Leaf/Stem Water	Houttuynia Cordata Powder
Houttuynia Cordata Leaf Extract	Houttuynia Cordata Water

According to the web-based *International Cosmetic Ingredient Dictionary and Handbook (Dictionary)*, the majority of these ingredients are reported to function in cosmetics as skin-conditioning; additional functions are also reported (Table 1).¹

Some of the ingredients reviewed in this safety assessment may be consumed as food, and daily exposure from food use would result in much larger systemic exposures than those from use in cosmetic products. The primary focus of the safety assessment of these ingredients as used in cosmetics is on the potential for effects from topical exposure.

The Expert Panel for Cosmetic Ingredient Safety (Panel) does not typically review ingredients that function only as fragrance ingredients, because, as fragrances, the evaluation of the safety of these ingredients is the purview of the Research Institute for Fragrance Materials (RIFM). Houttuynia Cordata Water is reported to function only as a fragrance ingredient in cosmetics, according to the *Dictionary* (see Table 1 Table 1). However, it is unknown when the safety assessment of this ingredient will be prepared, and therefore, the Panel is reviewing the safety of this ingredient.

Botanicals, such as *Houttuynia cordata*-derived ingredients, may contain hundreds of constituents. In this assessment, the Panel is evaluating the potential toxicity of each of the *Houttuynia cordata* ingredients as a whole, complex substance; toxicity from single components may not predict the potential toxicity of botanical ingredients.

This safety assessment includes relevant published and unpublished data that are available for each endpoint that is evaluated. Published data are identified by conducting an extensive search of the world's literature; a search was last conducted in December 2025. A listing of the search engines and websites that are used and the sources that are typically explored, as well as the endpoints that the Panel typically evaluates, is provided on the Cosmetic Ingredient Review (CIR) website (<https://www.cir-safety.org/supplementaldoc/preliminary-search-engines-and-websites>; <https://www.cir-safety.org/supplementaldoc/cir-report-format-outline>). Unpublished data are provided by the cosmetics industry, as well as by other interested parties.

The cosmetic ingredient names, according to the *Dictionary*, are written as listed above, without italics and without abbreviations. When referring to the plant from which these ingredients are derived, the standard scientific practice of using italics will be followed (i.e., *Houttuynia cordata*). If it is not known whether the substance being discussed is equivalent to the cosmetic ingredient, the test substance will be identified by the name used in the publication that is being cited (e.g., *Houttuynia cordata* extract). However, if it is known that the substance is a cosmetic ingredient, the *Dictionary* nomenclature (e.g., Houttuynia Cordata Extract) will be used.

CHEMISTRY

Definition and Plant Identification

The definitions of the ingredients included in this review are provided in Table 1. Most of the ingredients are obtained from either the aerial parts or leaves, and several share the generic CAS No. 164288-50-0.¹

Houttuynia cordata is a perennial herb from the family Saururaceae, that is native to China, Japan, Korea, and South East Asia, usually growing in humid and shaded areas like roadsides and slopes.^{2,3} The plant has slender, cylindrical stems that grow to be 15 - 50 cm in height, with green, heart-shaped leaves that have palmate veins and a fishy odor. *Houttuynia cordata* flowers are simple, made up of four white bracts and a yellow-green, spike-like inflorescence in the center. The plant has underground rhizomes that are white, cylindrical, and can grow up to 30 cm in length. Primary and lateral roots extend radially from the nodes which are found on the rhizomes. *Houttuynia cordata* is also known as fish wort, chameleon plant, heartleaf, Chinese lizard tail, dokudami, and Yu Xing Cao.^{3,4}

Chemical Properties

Chemical properties of *Houttuynia cordata*-derived ingredients were not found in the published literature, and unpublished data were not submitted.

Method of Manufacture

Manufacturing methods used to manufacture *Houttuynia cordata*-derived ingredients were not found in the published literature, and unpublished data were not submitted.

Composition and Impurities

Houttuynia cordata is made up of phytochemical constituents such as volatile oils, organic acids, flavonoids, alkaloids, polysaccharides, and polyphenols (Table 2).³ Some other components like proteins, tannins, salts, starches, and various vitamins are found within the plant parts. *Houttuynia cordata* is also highly prone to accumulating heavy metals such as lead and cadmium, based on the soil and environment in which it is grown.⁵

Volatile oils are the main chemical ingredient in *Houttuynia cordata* and comprise about 0.05% of the total plant composition.^{3,6} Oil content is based on growth conditions, harvest time, and area of extraction, as different parts of the plant contain different amounts of oil (leaves and stems contain 66.83 and 94.55% of volatile oil, respectively). Decanoyl acetaldehyde gives *Houttuynia cordata* leaves their distinctive fishy odor.⁵ *Houttuynia cordata* is made up of more than 30 flavonoids (flavanols and flavanol-type polyphenols) found in simple or polymeric forms, comprising of about 0.1% of the total plant composition.³ Quercetin, isoquercitrin, and rutin are the most common flavonoids found in *Houttuynia cordata* and the extract compositions of these compounds are 0.4, 5.4, and 5.4 µg/ml respectively. Studies have reported flavonoid content of stems and leaves to be 39.97 and 24.68 µg/ml respectively.

Alkaloids are present in the aerial parts of *Houttuynia cordata*, and 71 different ones have been identified in the plant; these include aporphine alkaloids (27), aristolactam alkaloids (12), amide alkaloids (15), pyridine alkaloids and other alkaloids (11).³ Polysaccharides are abundant in *Houttuynia cordata* and the most common ones are arabinose, galactose, glucose, rhamnose, galacturonic acid, glucuronic acid, mannose, xylose, and fucose.^{3,5} An aqueous extract of *Houttuynia cordata* was found to contain 7.28% acidic pectic polysaccharides.

Organic acids are mostly present in *Houttuynia cordata* leaves, and acidic content is higher in alcohol extracts as compared to water extracts, with *p*-coumaric acid being the most abundant of the organic acids.³ A total of 16 polyphenols have also been identified in *Houttuynia cordata*, and content amount varies based on plant part (e.g., stems and leaves contain 9.4 and 8.2 mg/g respectively).

USE Cosmetic

The safety of the *Houttuynia cordata*-derived ingredients addressed in this assessment is evaluated based on data received from the US Food and Drug Administration (FDA) and the cosmetics industry on the expected use of *Houttuynia cordata*-derived ingredients in cosmetics. Registration and Listing Data (RLD) obtained from the FDA report frequency of use, and responses to a survey conducted by the Personal Care Products Council (Council) indicate maximum reported concentrations of use; it is these values that define the present practices of use and concentration that are assessed by the Panel. Since 2024, as a result of the Modernization of Cosmetics Regulation Act (MoCRA) of 2022, manufacturers and processors are required to register facilities and list their products (and ingredients therein) with the FDA (i.e., RLD). An exception is made for small businesses (average gross annual sales in the US of cosmetic products for the previous 3-yr period is less than \$1,000,000, adjusted for inflation), which are exempt from MoCRA reporting for most cosmetic product categories. Eye area products, injected products, internal use products, or products that alter appearance for more than 24 h, and the facilities that manufacture these products, are not included in this exemption.⁷

According to RLD submitted to CIR in 2024 and 2025 concentration of use data submitted in response to the Council survey, *Houttuynia Cordata* Extract has the highest frequency and concentration of use; it is reported to be used in 1032 formulations at up to 1.5% in leave-on face and neck products (Table 3).^{8,9} Concentration of use data were not reported for the other 5 ingredients.

Some of these ingredients may be incidentally ingested as they are used in products used near the mouth (e.g., *Houttuynia Cordata* Extract is used in lipsticks and lip glosses; concentration not reported). In addition, these ingredients may be used near the eye area (e.g., *Houttuynia Cordata* Extract is used in eye lotion at up to 0.0027%) or result in mucous membrane exposure (e.g., *Houttuynia Cordata* Extract is used bath oils, tablets and salts at 0.004%). Lastly, these ingredients are reported to be used in baby products (e.g., *Houttuynia Cordata* Extract is used in baby lotions/oils/powders/creams; concentration not reported).

Cosmetic products containing *Houttuynia cordata*-derived ingredients may be incidentally inhaled as they are used in spray and powder formulations (e.g., *Houttuynia Cordata* Extract is used in hair sprays and face powders; concentrations not reported). In practice, as stated in the Panel's respiratory exposure resource document (<https://www.cir-safety.org/cir-findings>), most droplets/particles incidentally inhaled from cosmetic sprays would be deposited in the nasopharyngeal and tracheobronchial regions and would not be respirable (i.e., they would not enter the lungs) to any appreciable amount. Conservative estimates of inhalation exposures to respirable particles during the use of loose powder cosmetic products are 400-fold to 1000-fold less than protective regulatory and guidance limits for inert airborne respirable particles in the workplace.

Some products containing *Houttuynia cordata*-derived ingredients may be marketed for use with airbrush delivery systems. With the advent of MoCRA and the current product categories outlined by the FDA, it is now mandatory that cosmetic products used in airbrush delivery systems be reported as such for some, but not all, product categories in the RLD. In other words, a reliable source of frequency of use data regarding the use of cosmetic ingredients in conjunction with airbrush delivery systems is now available, in some instances. Some of the reported product categories for *Houttuynia cordata*-derived ingredients as listed in the RLD do require designation if airbrush application is used (e.g., foundations), but no airbrush use was indicated. Additionally, the Council currently surveys the cosmetic industry for maximum reported use concentrations of ingredients in products which may be used in conjunction with an airbrush delivery system; thus, this type

of data may also be available, when submitted. Please note that no concentration of use data were provided indicating airbrush application. Nevertheless, no consumer habits and practices data or particle size data are publicly available to evaluate the exposure associated with this use type, thereby preempting the ability to evaluate risk or safety. Without information regarding the consumer habits and practices data or product particle size data (or other relevant particle data, e.g., diameter) related to this use technology, the data profile is incomplete, and the Panel is not able to determine safety for use in airbrush formulations. Accordingly, the data are insufficient to evaluate the exposure resulting from cosmetics applied via airbrush delivery systems.

Houttuynia cordata-derived ingredients named in this report are not restricted from use in any way under the rules governing cosmetic products in the European Union.¹⁰

Non-Cosmetic

Houttuynia cordata has been consumed as part of a daily diet for centuries in many Asian countries.^{5,11} The aerial parts of the plant are eaten raw or cooked and sometimes used as an herb to season dishes, and all parts of the plant are edible, including the underground rhizomes. Concoctions of herbal tea, soup, and fermented wine are made from various parts of the plant for therapeutic purposes such as weight loss, smoking cessation, fever reduction, constipation, and more. Fermented drinks are also consumed as dietary supplements for reported immunomodulatory effects.³

In traditional Chinese medicine, the entire *Houttuynia cordata* plant is utilized for treating respiratory infections, skin diseases, wounds, swelling, and other ailments.^{12,13} It has also been incorporated into traditional hair loss treatments.¹⁴ *Houttuynia cordata* injection has been used in China to treat infectious disease, due to its anti-inflammatory and anti-viral properties, and was particularly essential as a treatment for severe acute respiratory syndrome (SARS) and COVID-19.^{5,15} However, several formulations of the injection have been suspended from use by China's State Food and Drug Administration (SFDA) due to a rise in adverse effects (e.g., respiratory symptoms, rash, anaphylactic shock, and death).¹⁵

TOXICOKINETIC STUDIES

No relevant toxicokinetic studies on *Houttuynia cordata*-derived ingredients were found in the published literature, and unpublished data were not submitted. In general, toxicokinetic data are not expected to be found on botanical ingredients because each botanical ingredient is a complex mixture of constituents.

TOXICOLOGICAL STUDIES

Acute Toxicity Studies

Details regarding the acute oral toxicity studies summarized herein may be found in Table 4. An acute toxicity assay performed using Sprague–Dawley rats (12/sex/group) treated with an ethanolic extract of *Houttuynia cordata* (2000 mg/kg) reported no mortality or signs of toxicity.¹⁶ An exploratory study conducted on 4 rats (strain not stated) administered an ethanolic extract of *Houttuynia cordata* found no mortality at a maximum dose of 50,000 mg/kg bw.¹⁷ This dose of extract was used in a formal acute oral toxicity assay performed in rats (strain not stated; 6/sex/group), which resulted in immediate symptoms of agitation, nervousness, fear, increased abdominal muscle contraction, and fatigue, but no mortality or other significant changes.

Short-Term and Subchronic Toxicity Studies

Details regarding the repeated-dose oral toxicity studies summarized herein may be found in Table 5. A 28-d toxicity study conducted in Sprague-Dawley rats (6/sex/group) treated with an ethanolic extract of *Houttuynia cordata* (250 - 1000 mg/kg/d) resulted in some mortality and several signs of liver and kidney toxicity in the higher dose groups.¹⁶ The no-observed-adverse-effect-level (NOAEL) was concluded to be 250 mg/kg/d. Another short-term toxicity study conducted in rabbits (strain not stated; 6/group) given an ethanolic extract of *Houttuynia cordata* (up to 1500 mg/kg bw/d) for 28 d reported no significant changes or signs of toxicity in the test groups, when compared to the control.¹⁷ A 2-wk preliminary feeding study performed on F344/DuCrj rats (6/sex/group), testing doses of an ethanolic extract of *Houttuynia cordata* (0.5 - 5.0%), found no significant changes or mortality in any of the treated groups.¹⁸ A subsequent 13-wk feeding study conducted in F344/DuCrj rats (10/sex/group) given the same doses of an ethanolic extract of *Houttuynia cordata* (0.5 - 5.0%) resulted in several signs of kidney toxicity in the higher dose groups. The NOAEL was determined to be 350 mg/kg/d for female rats and 999 mg/kg/d for male rats.

DEVELOPMENTAL AND REPRODUCTIVE TOXICITY STUDIES

In Vitro

Houttuynia Cordata Extract

Embryoid bodies were generated from human-induced pluripotent stem cells (hiPSCs) and placed in aqueous *Houttuynia cordata* extract concentrations of 0, 150, 250, and 350 µg/ml, and observed for 4 d (mifepristone used as positive control; replicated 3 times).¹⁹ At all extract concentrations, embryoid bodies were significantly smaller in diameter than the

control, and at 350 µg/ml, embryoid body formation was inhibited, indicating embryotoxicity of aqueous *Houttuynia cordata* extract.

Animal

Houttuynia Cordata Extract

An embryotoxicity assay was conducted with AB feral type zebrafish embryos (30/group) to test the effects of an aqueous *Houttuynia cordata* extract in accordance with the Organisation for Economic Co-operation and Development (OECD) test guideline (TG) 236.¹⁹ Embryos were treated with 0, 2000, 2500, 3000, 3500, or 4000 µg/ml of the test substance (replicated 3 times) at 0 h post-fertilization (hpf) and were observed at 24, 48, 72, 96, and 120 hpf, including assessment of hatching rates at 72 hpf. The embryos exhibited signs of dose-dependent mortality. All embryos treated with 3500 and 4000 µg/ml of a *Houttuynia cordata* extract died and had curved spines at 96 and 120 hpf. All embryos treated with 3000 µg/ml *Houttuynia cordata* extract died at 120 hpf. The median lethal concentration (LC₅₀) was found to be 2052 µg/ml at 120 hpf. Exposure to 2000 µg/ml of a *Houttuynia cordata* extract significantly decreased zebrafish embryo hatching rate. The cardiovascular system showed greatest toxicity with some indirect toxicity on the liver and intestine.

GENOTOXICITY STUDIES

Details regarding the genotoxicity studies summarized herein may be found in Table 6. A reverse mutation assay performed using a methanolic *Houttuynia cordata* leaf extract (up to 5000 µg/plate; in dimethyl sulfoxide (DMSO)), with and without metabolic activation, gave non-mutagenic results.²⁰ A chromosomal aberration assay conducted with Chinese hamster ovarian cells treated with a methanolic leaf extract of *Houttuynia cordata* (up to 5 µg/ml; in DMSO), did not result in genotoxicity, but did show a significant dose-dependent elevation in anticlastogenic effect, with and without metabolic activation. No genotoxicity was observed in a bone marrow micronucleus test conducted with ICR mice injected intraperitoneally with a methanolic leaf extract of *Houttuynia cordata* (up to 2 g/kg; in DMSO).

CARCINOGENICITY STUDIES

No relevant carcinogenicity studies on *Houttuynia cordata*-derived ingredients were found in the published literature, and unpublished data were not submitted.

OTHER RELEVANT STUDIES

Cytotoxicity

Houttuynia Cordata Extract

No cytotoxicity was observed in a cell viability assay conducted with human vaginal epithelial cells that were treated with an aqueous extract of *Houttuynia cordata* (0.025 - 0.2 mg/ml).²¹ Using a 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay, concentrations of an aqueous *Houttuynia cordata* extract (62.5 - 1000 mg/ml) and an ethanolic *Houttuynia cordata* extract (25 - 400 mg/ml) were tested for cytotoxicity in mouse macrophage cells (RAW 264.7) and human skin cells (HaCaT and NHDF).²² The aqueous extract showed slight cytotoxicity for all cell types in a dose-dependent manner, while the ethanolic extract showed none.

Several studies were conducted using ethanolic extracts of *Houttuynia cordata*, examining the effects on breast cancer cells (MCF-7, MDA-MB-231, MCF-10A; extract concentrations of 0.05 – 0.5 mg/ml), prostate cancer cells (LNCaP and PCa1; extract concentrations of 0.05 – 0.2 mg/ml), and melanoma cells (A375; extract concentrations of 0.025 – 0.2 mg/ml).²³⁻²⁶ Cytotoxic effects, such as reduced cell viability and increased apoptosis, were reported.

An assay was conducted in which rabbit erythrocytes (strain not stated) were treated with an aqueous extract (1:100) of *Houttuynia cordata* (dosing concentrations not stated).²⁷ No hemolysis was observed.

Immunomodulatory Effects

Houttuynia Cordata Extract

Several studies performed enzyme-linked immunosorbent assay (ELISA) to quantify interleukin (IL)-6, IL-8, inducible nitric oxide synthase (iNOS), and tumor necrosis factor- α (TNF- α) in HaCaT keratinocytes (lipopolysaccharide (LPS)-stimulated) and RT-7 oral keratinocytes (*Porphyromonas gingivalis* LPS-stimulated and *Staphylococcus aureus* lipoteichoic acid (LTA)-stimulated), following treatment with aqueous and ethanolic extracts of *Houttuynia cordata*.^{27,28} Results showed significant inhibition of and decreases in expression of all inflammatory factors. A multiplexed immunoassay was performed on human vaginal epithelial cells treated with an aqueous extract of *Houttuynia cordata* (0, 0.05, 0.1, 0.2 mg/ml) to measure levels of IL-1 β , IL-2, IL-4, IL-6, IL-8, IL-10, interferon-gamma (IFN- γ), and TNF- α .²¹ Secreted levels of IL-2 and IL-6 increased significantly in cells treated with the test substance (IL-2 increased in the 0.05 and 0.2 mg/ml groups; IL-6 increased in the 0.1 and 0.2 mg/ml groups), when compared to the untreated controls.

Anti-Microbial Activity

Houttuynia Cordata Extract

A biofilm formation assay conducted with an aqueous solution of *Houttuynia cordata* ethanolic extract (1, 5, and 10%) and multiple strains of bacteria, resulted in dose-dependent antibiofilm activity.²⁸ Aqueous and ethanolic extracts of *Houttuynia cordata* (0.33 and 11.54 mg/ml; in DMSO) were studied in an anti-microbial activity assay with *Cutibacterium acnes*, *Staphylococcus aureus*, and *Staphylococcus epidermidis*, with both extracts showing inhibitory effects against *C. acnes*.²² A plaque assay conducted with aqueous and ethanolic extracts of *Houttuynia cordata* (0.1, 0.25, and 0.5 mg/ml) and murine norovirus-1 (MNV-1), indicated dose- and time-dependent antiviral activity (reduction in titers), with stronger effects seen in aqueous *Houttuynia cordata* extract.²⁹

Effect on Hair Follicles

Houttuynia Cordata Extract

A 50% aqueous ethanolic extract of *Houttuynia cordata* (0, 0.001, 0.01, 0.02, and 0.05 mg/ml; minoxidil used as positive control) was tested with human dermal papilla cells (3000 cells/well) in a cell proliferation assay using bromodeoxyuridine (BrdU).¹⁴ Results showed cell proliferation increase to be dose-dependent (0.02 and 0.05 mg/ml groups had significant increases when compared to untreated control; comparable with minoxidil group results). The same study conducted a hair cycle scoring test with anagen human hair follicles (20/group) cultured for 9 d in a 50% aqueous ethanolic extract of *Houttuynia cordata* (0, 0.002, 0.02, and 0.05 mg/ml; minoxidil used as positive control). Results showed that higher percentage of hair follicles in *Houttuynia cordata* extract treated groups remained in anagen stage in a dose-dependent manner, when compared to controls (results comparable with minoxidil group).

DERMAL IRRITATION AND SENSITIZATION STUDIES

No relevant dermal irritation and sensitization studies on *Houttuynia cordata*-derived ingredients were found in the published literature, and unpublished data were not submitted.

OCULAR IRRITATION STUDIES

In Vitro

Houttuynia Cordata Extract

A hen's egg test on the chorioallantoic membrane (HET-CAM) was conducted to test the ocular irritation effects of an aqueous extract (1:100) of *Houttuynia cordata*.²⁷ A sample of *Houttuynia cordata* extract (dosing concentration not stated) was added to the blood vessels. After the 3-h observation period, no hemorrhage or coagulation of blood vessels was reported, indicating an absence of irritation.

SUMMARY

The safety of 6 *Houttuynia cordata*-derived ingredients is reviewed in this safety assessment. According to the *Dictionary*, the majority of these ingredients are reported to function as skin-conditioning agents in cosmetics, though additional functions are listed for the individual ingredients.

According to RLD submitted in 2024 and 2025 concentration of use data, *Houttuynia Cordata Extract* has the highest frequency and concentration of use. This ingredient is reported to be used in 1032 formulations at up to 1.5% in leave-on face and neck products.

An oral toxicity assay performed in rats treated with an ethanolic extract of *Houttuynia cordata* (2000 mg/kg) showed no mortality or observable toxicity. A dose-range study also conducted using rats treated with an ethanolic extract of *Houttuynia cordata* found no mortality at a maximum dose of 50,000 mg/kg bw, and this dose was subsequently used in a formal acute toxicity assay in which no mortality or significant signs of toxicity were observed.

A 28-d study performed on rats treated with an ethanolic extract of *Houttuynia cordata* (250 - 1000 mg/kg/d) resulted in a few mortalities and signs of toxicity, establishing a NOAEL of 250 mg/kg/d. No mortalities or significant changes were observed in a 28-d study performed on rabbits treated with an ethanolic extract of *Houttuynia cordata* (up to 1500 mg/kg bw/d). A preliminary feeding study performed using rats given an ethanolic extract of *Houttuynia cordata* (0.5 - 5.0%) for 2 wk did not result in any mortality or signs of toxicity. However, the subsequent 13-wk study also performed on rats at the same concentrations of the test substance, resulted in toxicological changes, with NOAEL values determined to be 350 mg/kg/d for females and 999 mg/kg/d for males.

An assay conducted using hiPSC embryoid bodies placed in aqueous *Houttuynia cordata* extract (150 - 350 µg/ml) resulted in embryotoxicity. Dose-dependent embryotoxicity was observed in an assay performed using zebrafish embryos and an aqueous extract of *Houttuynia cordata* (2000 - 4000 µg/ml). Decreased hatching rate and cardiovascular toxicity were observed.

A reverse mutation assay performed using a methanolic *Houttuynia cordata* leaf extract (up to 5000 µg/plate), with and without metabolic activation, gave non-mutagenic results. A chromosomal aberration assay conducted with Chinese hamster ovarian cells treated with a methanolic leaf extract of *Houttuynia cordata* (up to 5 µg/ml), with and without metabolic activation, gave non-genotoxic results. A bone marrow micronucleus test conducted in mice injected with a methanolic leaf extract of *Houttuynia cordata* (up to 2 g/kg) was also found to be non-genotoxic.

Several studies found that ethanolic extracts of *Houttuynia cordata* were non-cytotoxic to human and mouse cells, whereas an aqueous extract exhibited a slight, dose-dependent cytotoxicity. In contrast, ethanolic extracts of *Houttuynia cordata* were found by multiple studies to be cytotoxic to various cancer cell lines (breast, prostate, and skin cancers). No hemolysis was observed when rabbit erythrocytes were treated with an aqueous extract of *Houttuynia cordata*.

Both aqueous and ethanolic extracts of *Houttuynia cordata* showed inhibition of inflammatory markers (IL-6, IL-8, iNOS, and TNF-α) when tested in LPS- and LTA-stimulated keratinocytes. However, IL-2 and IL-6 secretion levels increased, when compared to controls, in an assay conducted using vaginal epithelial cells treated with an aqueous *Houttuynia cordata* extract.

Aqueous and ethanolic *Houttuynia cordata* extracts have exhibited dose-dependent antibiofilm and antibacterial activity against multiple bacterial strains. A plaque assay conducted with aqueous and ethanolic *Houttuynia cordata* extracts showed dose- and time-dependent antiviral activity against MNV-1.

An aqueous ethanolic extract of *Houttuynia cordata* promoted dose-dependent proliferation of human dermal papilla cells and maintained cultured human hair follicles in the anagen stage. Effects seen at higher concentrations were comparable to minoxidil results.

A HET-CAM assay using an aqueous extract of *Houttuynia cordata* (dose concentrations not stated) showed no signs of hemorrhage or coagulation in blood vessels. These results indicate the extract did not cause ocular irritation under the tested conditions.

INFORMATION SOUGHT

The following information on these *Houttuynia cordata*-derived ingredients as used in cosmetics is being sought for use in the resulting safety assessment:

- Chemical properties and method of manufacturing data
- Further composition and impurities data
- Dermal and respiratory toxicity data
- Reproductive and developmental toxicity data
- Dermal irritation and sensitization data at maximum concentration of use

TABLES

Table 1. Definitions and reported functions¹

Ingredient/CAS No.	Definition	Function(s)
Houttuynia Cordata Extract (164288-50-0)	Houttuynia Cordata Extract is the extract of the aerial parts of the herb, <i>Houttuynia cordata</i> .	Skin-Conditioning Agent - Miscellaneous
Houttuynia Cordata Flower/Leaf/Stem Water (164288-50-0)	Houttuynia Cordata Flower/Leaf/Stem Water is an aqueous solution of the steam distillate obtained from the flowers, leaves and stems of <i>Houttuynia cordata</i> .	Antimicrobial Agent Antioxidant Fragrance Ingredient Skin-Conditioning Agent - Miscellaneous
Houttuynia Cordata Leaf Extract	Houttuynia Cordata Leaf Extract is the extract of the leaves of <i>Houttuynia cordata</i> .	Antiacne Agent Antioxidant Hair Conditioning Agent Humectant Skin Protectant Skin-Conditioning Agent - Emollient Skin-Conditioning Agent - Humectant Skin-Conditioning Agent - Miscellaneous
Houttuynia Cordata Leaf Water	Houttuynia Cordata Leaf Water is an aqueous solution of the steam distillate obtained from the leaves of <i>Houttuynia cordata</i> .	Skin-Conditioning Agent - Humectant Skin-Conditioning Agent - Miscellaneous
Houttuynia Cordata Powder (164288-50-0)	Houttuynia Cordata Powder is the powder obtained from the aerial parts of <i>Houttuynia cordata</i> .	Skin-Conditioning Agent - Miscellaneous
Houttuynia Cordata Water (164288-50-0)	Houttuynia Cordata Water is the aqueous solution of the steam distillate of the whole plant, <i>Houttuynia cordata</i> .	Fragrance Ingredient

Table 2. Commonly found chemical constituents of *Houttuynia cordata*^{3,5,6}

Constituent Group	Constituent	Found in Plant Part (amount)
Volatile Oils	decanoyl acetaldehyde, methyl nonyl ketone, lauryl aldehyde, decanal, α -pinene, camphene, β -pinene, β -cinnamene, lobenyl acetate, limonene, geranyl, 4-pinoresinol, nonyl alcohol, geranyl oxide	leaves (66.83%), stems (94.55%)
Organic Acids	gallic acid, <i>p</i> -hydroxybenzoic acid, vanillic acid, butyric acid, <i>p</i> -coumaric acid, chlorogenic acid, ferulic acid, palmitic acid, oleic acid, stearic acid, ursolic acid, caprylic acid, saponins, tannins, steroidal compounds	leaves (NR)
Polyphenols	protocatechuic acid, chlorogenic acid, methyl <i>p</i> -hydroxybenzoate, vanillin, methyl vanillate, <i>trans</i> -methyl ferulate, procyanidin B, catechin, quinic acid, and houttuynamide A	leaves (8.2 mg/g), stems (9.4 mg/g)
Flavonoids	quercitrin, isoquercitrin, hyperoside, rutin, hyperin, vitexin, afzelin, narirutin, kaempferitrin, kaempferol, chrysopterin-D, 5-hydroxy-3,3,4,7-tetramethoxyflavone, kaempferol-3,7,4-trimethyl ether	leaves (24.68 μ g/ml), stems (39.97 μ g/ml)
Alkaloids	Cepharanone B, piperolactam A, aristolactam A, 4,5-dioxodehydroasimilobine, norcepharadione B, cepharadione B, aurantiamide benzoate, aurantiamide acetate, <i>N</i> -transferuloyltyramine, aurantiamide, <i>N</i> -phenethylbenzamide	aerial parts (NR)
Polysaccharides	arabinose, galactose, glucose, rhamnose, galacturonic acid, glucuronic acid, mannose, xylose, fucose	aerial parts (NR)

NR = not reported

Table 3. Frequency and concentration of use according to likely duration and exposure and by product category.^{8,9}

	RLD (2024)	% (2025)	RLD (2024)	% (2025)	RLD (2024)	% (2025)
	Houttuynia Cordata Extract		Houttuynia Cordata Flower/Leaf/Stem Water		Houttuynia Cordata Leaf Extract	
Totals*	1032	0.00001 – 1.5	10	NR	1	NR
summarized by likely duration and exposure**						
Duration of Use						
Leave-On	836	0.00008 – 1.5	7	NR	1	NR
Rinse-Off	367	0.000001	3	NR	NR	NR
Diluted for (Bath) Use	NR	0.004	NR	NR	NR	NR
Permanent Tattoo Ink	NR	NR	NR	NR	NR	NR
Unknown	22	NR	NR	NR	NR	NR
Exposure Type						
Baby Products	7	NR	NR	NR	NR	NR
Children's Makeup	NR	NR	NR	NR	NR	NR
Eye Area	9	0.0008 - 0.0027	NR	NR	NR	NR
Incidental Ingestion	28	NR	NR	NR	NR	NR
Mucous Membrane	59	0.004	NR	NR	NR	NR
Incidental Inhalation-Spray	3; 315 ^a ; 522 ^b	NR	3 ^a ; 7 ^b	NR	1 ^a	NR
Incidental Inhalation-Airbrush	NR	NR	NR	NR	NR	NR
Incidental Inhalation-Powder	4; 522 ^b ; 5 ^c	0.00008 – 1.5 ^c	7 ^b	NR	NR	NR
Dermal Contact	1026	0.00001 – 1.5	10	NR	1	NR
Deodorant (underarm)	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	126	NR	NR	NR	NR	NR
Hair-Coloring	20	NR	NR	NR	NR	NR
Nail	3	NR	NR	NR	NR	NR
Tattoo Preparations	NR	NR	NR	NR	NR	NR
Other Preparations (Unknown Exposure Type)	22	NR	NR	NR	NR	NR
as reported by product category						
Baby Products						
Baby Lotions/Oils/Powders/Creams	5	NR				
Other Baby Products	2 (r.o.)	NR				
Bath Preparations						
Bath Oils, Tablets, and Salts	NR	0.004				
Eye Makeup Preparations (not children's)						
Eye Lotion	5	0.0008 - 0.0027				
Eye Makeup Remover	2	NR				
Mascara	10	NR				
Eyelash and Eyebrow Adhesives/Glues/Sealants	2	NR				
Fragrance Preparations						
Perfumes	1	NR				
Hair Preparations (non-coloring)						
Hair Conditioners	2 (l.o.); 28 (r.o.)	NR				
Hair Sprays (aerosol fixatives)	2	NR				
Rinses (non-coloring)	3	NR				
Shampoos (non-coloring)	1 (l.o.); 64 (r.o.)	NR				
Tonics, Dressings, Other Hair Grooming Aids	10	NR				
Other Hair Preparations	12 (l.o.); 4 (r.o.)	NR				
Hair Coloring Preparations						
Hair Dyes and Colors (all types requiring caution statements and patch tests)	16	NR				

Table 3. Frequency and concentration of use according to likely duration and exposure and by product category^{8,9}

	RLD (2024)	% (2025)	RLD (2024)	% (2025)	RLD (2024)	% (2025)
Hair Shampoos (coloring)	1 (r.o.)	NR				
Other Hair Coloring Preparation	3 (r.o.)	NR				
Makeup Preparations (not eye or children's)						
Face Powders	4	NR				
Foundations	3 (traditional application)	0.00008 (traditional application)				
Lipsticks and Lip Glosses	28	NR				
Makeup Bases	10 (traditional application)	NR				
Makeup Fixatives	6	NR				
Other Makeup Preparations	2 (l.o.)	NR				
Manicuring Preparations						
Nail Creams and Lotions	3	NR				
Personal Cleanliness						
Bath Soaps and Body Washes	12	NR				
Other Personal Cleanliness Products	4 (l.o.); 15 (r.o.)	NR				
Skin Care Preparations						
Cleansing	110	NR				
Depilatories	3	0.000001				
Face and Neck (excluding shaving preps)	424 (l.o.); 39 (r.o.)	0.00008 – 1.5 (l.o.; not spray)	5 (l.o.)	NR		
Body and Hand (excluding shaving preps)	21 (l.o.); 3 (r.o.)	0.056 (l.o.; not spray)				
Moisturizing	203	0.0008 - 0.0027 (not spray)			1	NR
Night	5	NR				
Paste Masks (mud packs)	32	NR				
Skin Fresheners	18	NR				
Other Skin Care Preparations	55 (l.o.); 30 (r.o.)	NR	2 (l.o.); 3 (r.o.)	NR		
Suntan Preparations						
Suntan Gels, Creams, and Liquids	10	NR				
Other Preparations (i.e., those that do not fit another category)	22	NR				

Table 3. Frequency and concentration of use according to likely duration and exposure and by product category^{8,9}

	RLD (2024)	% (2025)	RLD (2024)	% (2025)	RLD (2024)	% (2025)
	Houttuynia Cordata Leaf Water		Houttuynia Cordata Powder		Houttuynia Cordata Water	
Totals*	4	NR	20	NR	13	NR
summarized by likely duration and exposure**						
Duration of Use						
<i>Leave-On</i>	4	NR	7	NR	12	NR
<i>Rinse-Off</i>	3	NR	15	NR	1	NR
<i>Diluted for (Bath) Use</i>	NR	NR	NR	NR	NR	NR
<i>Permanent Tattoo Ink</i>	NR	NR	NR	NR	NR	NR
<i>Unknown</i>	NR	NR	NR	NR	NR	NR
Exposure Type						
Baby Products	NR	NR	4	NR	NR	NR
Children's Makeup	NR	NR	NR	NR	NR	NR
Eye Area	NR	NR	NR	NR	NR	NR
Incidental Ingestion	NR	NR	NR	NR	NR	NR
Mucous Membrane	NR	NR	4	NR	NR	NR
Incidental Inhalation-Spray	4 ^a ; 1 ^b	NR	3 ^a ; 1 ^b	NR	1 ^a ; 11 ^b	NR
Incidental Inhalation-Airbrush	NR	NR	NR	NR	NR	NR
Incidental Inhalation-Powder	NR	NR	1 ^b ; 4 ^c	NR	NR	NR
Dermal Contact	7	NR	18	NR	13	NR
Deodorant (underarm)	NR	NR	NR	NR	NR	NR
Hair - Non-Coloring	NR	NR	NR	NR	NR	NR
Hair-Coloring	NR	NR	NR	NR	NR	NR
Nail	NR	NR	NR	NR	NR	NR
Tattoo Preparations	NR	NR	NR	NR	NR	NR
Other Preparations (Unknown Exposure Type)	NR	NR	NR	NR	NR	NR
as reported by product category						
Baby Products						
Baby Lotions/Oils/Powders/Creams			4	NR		
Other Baby Products						
Bath Preparations						
Bath Oils, Tablets, and Salts						
Eye Makeup Preparations (not children's)						
Eye Lotion						
Eye Makeup Remover						
Mascara						
Eyelash and Eyebrow Adhesives/Glues/Sealants						
Fragrance Preparations						
Perfumes						
Hair Preparations (non-coloring)						
Hair Conditioners						
Hair Sprays (aerosol fixatives)						
Rinses (non-coloring)						
Shampoos (non-coloring)						
Tonics, Dressings, Other Hair Grooming Aids						
Other Hair Preparations						
Hair Coloring Preparations						
Hair Dyes and Colors (all types requiring caution statements and patch tests)						
Hair Shampoos (coloring)						
Other Hair Coloring Preparation						

Table 3. Frequency and concentration of use according to likely duration and exposure and by product category^{8,9}

	RLD (2024)	% (2025)	RLD (2024)	% (2025)	RLD (2024)	% (2025)
Makeup Preparations (not eye or children's)						
Face Powders						
Foundations						
Lipsticks and Lip Glosses						
Makeup Bases						
Makeup Fixatives						
Other Makeup Preparations						
Manicuring Preparations						
Nail Creams and Lotions						
Personal Cleanliness						
Bath Soaps and Body Washes			2	NR		
Other Personal Cleanliness Products			1 (l.o.); 1 (r.o.)	NR		
Skin Care Preparations						
Cleansing	2	NR	3	NR	1	NR
Depilatories						
Face and Neck (excluding shaving preps)	1 (l.o.)	NR	1 (l.o.); 2 (r.o.)	NR	10 (l.o.)	NR
Body and Hand (excluding shaving preps)						
Moisturizing	3	NR	1	NR	1	NR
Night						
Paste Masks (mud packs)			3	NR		
Skin Fresheners						
Other Skin Care Preparations	1 (r.o.)	NR	4 (r.o.)	NR	1 (l.o.)	NR
Suntan Preparations						
Suntan Gels, Creams, and Liquids						
Other Preparations (i.e., those that do not fit another category)						

NR – not reported

l.o. – leave-on; r.o. – rinse-off

**The sum of all exposure types or for all product categories may not equal the sum of total uses because each ingredient may be used in cosmetics with multiple exposure types and because each formulation may be reported for multiple product categories.

**Likely duration and exposure are derived from survey data based on product category (see Use Categorization <https://www.cir-safety.org/cir-findings>)

^a It is possible these products are sprays, but it is not specified whether the reported uses are sprays.

^b Not specified whether a spray or a powder, but it is possible the use can be as a spray or a powder, therefore the information is captured in both categories

^c It is possible these products are powders, but it is not specified whether the reported uses are powders.

Table 4. Acute oral toxicity studies

Test Article	Vehicle	Animals/Group	Concentration/Dose	Protocol	Results	Reference
a <i>Houttuynia cordata</i> extract (95% ethanol)	deionized water	Sprague-Dawley rats (12/sex/group)	2000 mg/kg	OECD TG 423; treatment administered by gavage; control group treated with water	No mortality or toxicity observed; no significant difference between test and control groups	¹⁶
a <i>Houttuynia cordata</i> extract (70% ethanol)	none stated	Rats (strain not stated; 4 total)	50,000 mg/kg bw	Exploratory assay; treatment administered by gavage; observed for 72 h	No mortality observed	¹⁷
a <i>Houttuynia cordata</i> extract (70% ethanol)	none stated	Rats (strain not stated; 6/sex/group)	0 and 50,000 mg/kg bw	Treatment administered by gavage; observed for 14 d	Mild agitation, fear, fatigue, increased abdominal muscle contractions in first 30 min; no mortality or significant weight changes between test and control groups	¹⁷

OECD = Organisation for Economic Co-operation and Development; TG = test guideline

Table 5. Repeated-dose oral toxicity studies

Test Article	Vehicle	Animals/Group	Study Duration	Dose/Concentration	Protocol	Results	Reference
a <i>Houttuynia cordata</i> extract (95% ethanol)	deionized water	Sprague-Dawley rats (6/sex/group)	28 d	250, 500 and 1000 mg/kg/d	OECD TG 407; treatment administered by gavage; control group treated with water	No significant changes during first week of treatment; test groups exhibited piloerection and decreased activity in second week; mortalities observed were 2 males in 500 mg/kg/d group, 2 males and 1 female in 1000 mg/kg/d group; relative liver weight of male rats in 1000 mg/kg/d group was significantly higher than the control; all rats in the 1000 mg/kg/d group had significant increase in ALT and AST; liver vacuolar degeneration, infiltration of the inflammatory cells in the liver, and focal necrosis of renal epithelial cells were observed in the 1000 mg/kg/d group; NOAEL was concluded to be 250 mg/kg/d	¹⁶
a <i>Houttuynia cordata</i> extract (70% ethanol)	none stated	Rabbits (strain not stated; 6/group)	28 d	300 and 1500 mg/kg bw/d	Treatment administered once daily; control group treated with water	No significant changes observed between test and control groups	¹⁷
a <i>Houttuynia cordata</i> leaf extract (50% ethanol)	none stated	F344/DuCrj rats (6/sex/group)	2 wk	0, 0.5, 1.5 and 5.0%	Preliminary feeding study; treatment was mixed into diet and administered orally	No significant changes observed in any of the groups	¹⁸
a <i>Houttuynia cordata</i> leaf extract (50% ethanol)	none stated	F344/DuCrj rats (10/sex/group)	13 wk	0, 0.5, 1.5 and 5.0%	Feeding study; treatment was mixed into diet and administered orally	No mortality observed for any groups; serum BUN levels increased significantly in the 5.0% female group; significant change in kidney weight in 5.0% male and female groups; significant mineralization at the cortico-medullary junction of the kidneys of females in 1.5 and 5.0% groups, and males in the 5.0% group, when compared to control; NOAEL was calculated to be 350 mg/kg/d for females and 999 mg/kg/d for males	¹⁸

ALT = alanine transaminase; AST = aspartate transaminase; BUN = blood urea nitrogen; NOAEL = no-observed-adverse-effect-level; OECD = Organisation for Economic Co-operation and Development; TG = test guideline

Table 6. Genotoxicity studies

Test Article	Vehicle	Concentration/Dose	Test System	Protocol	Results	Reference
IN VITRO						
a <i>Houttuynia cordata</i> leaf extract (80% methanol)	DMSO	312.5, 625, 1250, 2500, and 5000 µg/plate	<i>Salmonella typhimurium</i> TA98, TA100, TA1535, and TA1537 and <i>Escherichia coli</i> WP2uvrA ⁻	Reverse mutation assay; performed with and without metabolic activation; appropriate positive and negative controls used	Non-mutagenic	²⁰
a <i>Houttuynia cordata</i> leaf extract (80% methanol)	DMSO	1.25, 2.5, and 5 µg/ml	Chinese hamster ovary cells	Chromosomal aberration assay; performed with and without metabolic activation; appropriate positive and negative controls used	Non-genotoxic; anticlastogenic effects observed in treatment groups with and without metabolic activation	²⁰
IN VIVO						
a <i>Houttuynia cordata</i> leaf extract (80% methanol)	DMSO	0.5, 1, and 2 g/kg	Male ICR mice (5/group)	Bone marrow micronucleus assay; mice injected intraperitoneally with test substance; appropriate positive and negative controls used	Non-genotoxic	²⁰

DMSO = dimethyl sulfoxide

REFERENCES

1. Nikitakis J, Kowcz A. 2025. wINCI: *International Cosmetic Ingredient Dictionary and Handbook*. <https://incipedia.personalcarecouncil.org/>. Date Accessed: October 23, 2025.
2. Gao S, Wang W, Li J, Wang Y, Shan Y, Tan H. Unveiling polysaccharides of *Houttuynia cordata* Thunb.: extraction, purification, structure, bioactivities, and structure-activity relationships. *Phytomedicine*. 2025;138:156436.
3. Wei P, Luo Q, Hou Y, Zhao F, Li F, Meng Q. *Houttuynia cordata* Thunb.: a comprehensive review of traditional applications, phytochemistry, pharmacology and safety. *Phytomedicine*. 2024;123:155195.
4. U.S. Department of Agriculture. Dr. Duke's Phytochemical and Ethnobotanical Databases - *Houttuynia cordata* (Saururaceae). <https://phytochem.nal.usda.gov/plant-houttuynia-cordata> . Date Accessed: November 13, 2025.
5. Huang X, Yu P, Luo Y, et al. The nutritional value, application status and challenges of *Houttuynia cordata* Thunb (*H. cordata*). *Phytochem Rev*. 2025;24(6):5463–5485.
6. Yang Z, Ji P, Li C, et al. Research progress on the chemical constituents and pharmacological effects of *Houttuynia cordata* Thunb and a predictive analysis of quality markers. *Current Issues in Molecular Biology*. 2025;47(1):18.
7. United States Food and Drug Administration. Federal Food, Drug, and Cosmetic Act Section 612 Title 21.
8. U.S. Food and Drug Administration, Office of the Chief Scientist. 2024. Registered Listing Data. [Obtained under the Freedom of Information Act from the Division of Freedom of Information; requested as "Frequency of Use Data" July 17, 2024; received July 30, 2024].
9. Personal Care Product Council. 2025. Concentration of use by FDA product category - *Houttuynia cordata*-derived ingredients. [Unpublished data submitted by Personal Care Products Council on December 12, 2025].
10. EUR-Lex. 2022. Commission implementing decision (EU) 2022/677 of 31 March 2022 laying down rules for the application of Regulation (EC) no 1223/2009 of the European Parliament and of the Council as regards the glossary of common ingredient names for use in the labelling of cosmetic products (text with EEA relevance). <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022D0677>. Date Accessed: Dec 12, 2025.
11. Pradhan S, Rituparna S, Dehury H, Dhall M, Singh YD. Nutritional profile and pharmacological aspect of *Houttuynia cordata* Thunb. and their therapeutic applications. *Pharmacological Research-Modern Chinese Medicine*. 2023;9:10031.
12. Kumar M, Prasad S, Hemalatha S. A current update on the phytopharmacological aspects of *Houttuynia cordata* Thunb. *Pharmacognosy Reviews*. 2014;8(15):22–35.
13. Wu Z, Deng X, Hu Q, et al. *Houttuynia cordata* Thunb: an ethnopharmacological review. *Front Pharmacol*. 2021;12:714694.
14. Kim J, Shin JY, Choi Y, et al. Hair growth promoting effect of *Houttuynia cordata* extract in cultured human hair follicle dermal papilla cells. *Biological and Pharmaceutical Bulletin*. 2019;42(10):1665–1673.
15. Wang L, Cui X, Cheng L, et al. Adverse events to *Houttuynia* injection: a systematic review. *Journal of Evidence-Based Medicine*. 2010;3(3):168–176.
16. Chen H, Sha X, Luo Y, et al. Acute and subacute toxicity evaluation of *Houttuynia cordata* ethanol extract and plasma metabolic profiling analysis in both male and female rats. *J Appl Toxicol*. 2021;41(12):2068–2082.
17. Hung TV, Thang PNT, Phuong NTT, Hien HM, Pham DT, Huynh DTM. Extractions, standardizations, and in-vivo toxicological investigations of the Vietnamese fish mint (*Houttuynia cordata* Thunb.). *Tropical Journal of Natural Product Research*. 2023;7(10):4215–4225.

18. Yoshino H, Imai N, Nabae K, et al. Thirteen-week oral toxicology study of dokudami extract (*Houttuynia cordata* Thunb.) in F344/DuCrj rats. *Journal of Toxicologic Pathology*. 2005;18(4):175–182.
19. Liu Y, Yang G, Yang C, et al. The mechanism of *Houttuynia cordata* embryotoxicity was explored in combination with an experimental model and network pharmacology. *Toxins (Basel)*. 2023;15(1):73.
20. Kang CK, Hah DS, Kim CH, Kim. E., Kim. J. S. Evaluation of genotoxicity of extracts of *Houttuynia cordata* Thunb. *American Journal of Chinese Medicine*. 2012;40(5):1019–1932.
21. Sathakarn S, Hladik F, Promsong A, Nittayananta W. Vaginal innate immune mediators are modulated by a water extract of *Houttuynia cordata* Thunb. *BMC Complementary and Alternative Medicine*. 2015;15(1):183.
22. Phosri S, Kiattisin K, Intharuksa A, Janon R, Na Nongkhai T, Theansungnoen T. Anti-aging, anti-acne, and cytotoxic activities of *Houttuynia cordata* extracts and phytochemicals analysis by LC-MS/MS. *Cosmetics*. 2022;9(6):136.
23. Inthi P, Pandith H, Kongtawelert P, Banjerdpongchai R. Anti-cancer effect and active phytochemicals of *Houttuynia cordata* Thunb. against human breast cancer cells. *Asian Pac J Cancer Prev*. 2023;24(4):1265–1274.
24. Subhawa S, Chewonarin T, Banjerdpongchai R. The effects of *Houttuynia cordata* Thunb and *Piper ribesoides* wall extracts on breast carcinoma cell proliferation, migration, invasion and apoptosis. *Molecules*. 2020;25(5):1196.
25. Subhawa S, Naiki-Ito A, Kato H, et al. Suppressive effect and molecular mechanism of *Houttuynia cordata* Thunb. extract against prostate carcinogenesis and castration-resistant prostate cancer. *Cancers (Basel)*. 2021;13(14):3403.
26. Yanarajana M, Nararatwanchai T, Thairat S, Tancharoen S. Antiproliferative activity and induction of apoptosis in human melanoma cells by *Houttuynia cordata* Thunb extract. *Anticancer Res*. 2017;37(12):6619–6628.
27. Song Z, Fang J, Wang D, et al. Inhibition of LPS-induced skin inflammatory response and barrier damage via MAPK/NF- κ B signaling pathway by *Houttuynia cordata* Thunb fermentation broth. *Foods*. 2024;13(10):1470.
28. Sekita Y, Murakami K, Yumoto H, et al. Preventive effects of *Houttuynia cordata* extract for oral infectious diseases. *BioMed Research Intl*. 2016;2016(1):2581876.
29. Cheng D, Sun L, Zou S, et al. Antiviral effects of *Houttuynia cordata* polysaccharide extract on murine norovirus-1 (MNV-1)-a human norovirus surrogate. *Molecules*. 2019;24(9):1835.