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RESEARCH ARTICLE

Cultivation and Comparison study of Pharmacognostical and Phytochemical Properties of White and Black Mustard Plants Grown Under semi-Arid Conditions in Iraq.

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Abstract

Introduction : Mustard plant which belongs to the Brassicaceae family, the main species of this plant are white (*B. alba* L.)and (*B. nigra* L.) , the fixed oil of both species used for industrial and medicine purposes .

Objective : There are no studies about the Pharmacognostical and phytochemical of mustard leaves in Iraq and little studies in all the world, therefore this study was conducted to investigated the Pharmacognostical or morphological with phytochemical characteristic of leaves of both white and black species were cultivated at medicinal plants garden of college of pharmacy of Al- Mustansiriyah University in Baghdad .

Material and methods: The plants were cultivated at first of october at 2014 and when plants were reach at pre flowering stage the leaves of both species were collected ,washing and drying at room temperature in laboratory . chemical investigation was tested while the visual and microscopical investigated were carried out of fresh leaves

Results and discussion : The Pharmacognostical study was showed the differences of stoma shape of both white and black mustard and referred to presence trichomes in *B. nigra* species with absence in *B. alba* species . The phytochemical results were referred to both species contained different active compounds . The leaves of black mustard were contained alkaloid and flavonoids while the white mustard leaves were contained terpenoid, saponin, glycoside and tannins.

Conclusion: The presence of important active compounds of both species especially flavonoids and alkaloids of *B. nigra* lead to need more studies in determination and isolation of these active compounds .

INTRODUCTION

A proper health care system can be established supplying low cost medicine to population by using various medicinal plants . Medicinal plants are usually used for ayuevedic , unani and other treatment in rural areas . The medicinal importance of these plants are due to presence of chemical substances in them . Some of the important bioactive compounds are alkaloids , glycosides , phenols , tannins , saponins and steroids . Among the medicinal plants mustard which belong to the Curciferae or Brassicaceae family [1]. Black mustard (*Brassica nigra* L.) and white mustard (*Brassica alba* L.) are worldwide cultivated and the origin region of these plants its around the mediterranean sea and the middle east [2]. The dried ripe seed of both species are contain about 30% fixed oil and used commercially for fixed oil production which used in food industry and herbal medicine [3,4] .

Seeds powder and oil mustard are many used as a spices and one of its food adjuvant is a preparation containing acetic acid , sugar , and flavor . Its digestive , antiseptic and stomachic because of its irritant property its used

externally in rheumatism and neuralgia in the form of plaster or ointment . It used in bronchitis and pneumonia . Use of volatile oil requires great care and in higher doses or used over long period it causes irreversible damage to the skin . Also used as emetic in poisoning [5,6,7].

There are not or little field practice of both species cultivation , pharmacognostical and phytochemical studies of both leaves in Iraq and other neighboring countries , therefore this study was conducted to cultivation both species with comparative study of Pharmacognostical and phytochemical properties between them .

MATERIALS AND METHODS:

Plants cultivation : The cultivation process was done at medicinal plants garden of Pharmacognosy and medicinal plants department of college of pharmacy of Al-Mustansiriyah university during 2014/ 2015.

Two month old seedling of black and white mustard with an average height of 10 cm were transplanted from plantation to open plots . the area of each plot was $2*3m^2$, leaving 50 cm between row and 30 cm between plants . All field practice such as fertilization , irrigation and weed control were applied during growing season .

Collection of plant materials :

Fresh leaves of both species were collected at pre flowering stage from field and authentified by the national herbalsim of ministry of agriculture of Iraq .

Pharmacognostical study .

Fresh leaves of black and white mustard were collection and examined under light microscope in order to show the differences between them.

Extraction of plant

The leaves of each species were shade dried and pulverized 100 g of the powder material was packed in soxhlet apparatus and subjected to continuous hot percolation for 8 hr . using 400 ml of ethanol (70% v/v) as a solvent . The ethanol extract was filtered and concentrated under reduced pressure in rotary evaporator . The extracts of both species were subjected to phytochemical screening .

Phytochemical screening:

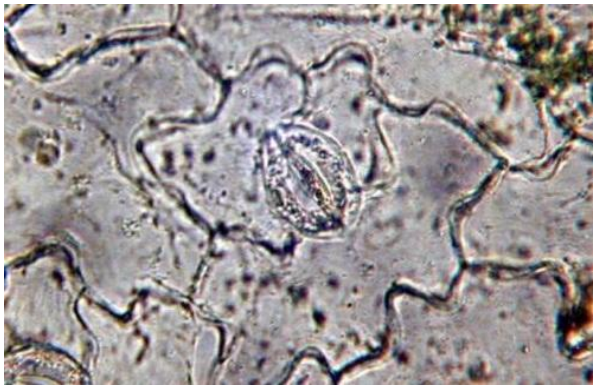
The preliminary qualitative phytochemical study of ethanolic leaves extract of both black and white mustard plants were carried out by standard methods of phytochemical screening such as mayer's , dragendroff's , borntrager's tests for alkaloids and glycosides . The foam Test , lead acetate test: ferric chloride test , alkaline reagent test and salkowski test were used for saponins , tannins , flavonoids and terpenoids examination respectively [8, 9, 10, 11].

RESULTS AND DISCUSSION:

The results of pharmacognostical study or under light microscope examination were refered to differences between black and white mustard in the shape of stomata . The shape of stomata in black mustard was anisocytic stomata while the shape in white mustard was anomocytic stomata, both shapes were occurred in plates (1 and 2) . Also the results were refered to presence multicellular trichomes non-glandular in black mustard only while not presence any trichomes in white mustard . The multicellular trichomes of black mustard was occurred in plate (3). The results of phytochemical study or screening were presented in table (1) and these results were refered to the black mustard was contained different active compounds such as saponin , flavonoids , alkaloids and terpenoids while the white mustard was contained saponin and terpenoids . The difference in present or absence of trichomes of both species were cultivated under similar field and environmental condition may be belong to genetic diversity of them . The black mustard was contained the active compounds more than white mustard may belong to two factors the first factor was include ability of black mustard on absorption different mineral or nutrients from soil compared with white mustard , the second factor was related with genetic diversity of both species .

Conclusion

The results in this study showed that leaves of black mustard were rich in alkaloids , flavonoids , saponin and terpenoids . These results are lead to increase the scientific research about black mustard leaves in different fields such as a agronomy , pharmacology , alternative medicine and etc .



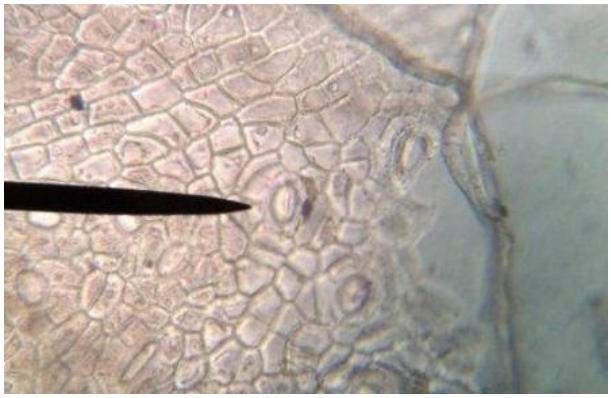


Plate (1) Anisocytic stomata in black mustard Plate (2) Anomocytic stomata in white mustard

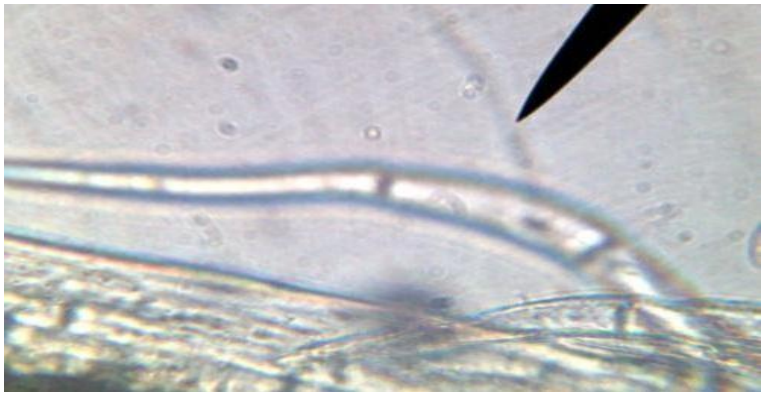


Plate (3) Multicellular trichomes non-glandular in black mustard

TABLE (1) : RESULTS OF PHYTOCHEMICAL SCREENING

Test for	White mustard	Black mustard
Anthraquinone glycoside	-	-
Saponin	+	+
Flavonoids	-	+
alkaloids	-	+
Tannins	-	-
Terpenoids	+	+

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