

# Oral Use of an Infusion of Leaves of *Solanum paniculatum* L., *Jacaranda brasiliensis* and *Sonchus oleraceus* for Treatment of Vitiligo

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## Abstract

**Background:** A healthy normal skin is essential for a person's physical and mental well being. It is an important aspect of their sexual attractiveness, a sense of well being and a sense of self confidence. Vitiligo is an acquired depigmentation disorder of skin affecting 1% - 4% of the world population. Neither life threatening nor symptomatic (except that depigmented patches burn easily when exposed to the sun) the effects of vitiligo can be cosmetically and psychologically devastating. Because the disease is still not understood, there is a plethora of different treatments approaches, but they are largely unsatisfactory from patient's perspective. **Objective:** To report the outcomes from oral use of an infusion of leaves of *Solanum paniculatum* L., *Jacaranda brasiliensis* and *Sonchus oleraceus* for treatment of vitiligo. **Ethical issues:** Study approved by the Research Ethics Committee of Hospital Federal dos Servidores do Estado do Rio de Janeiro (CAAE: 32143314.9.0000.5252). All participants confirmed the condition of volunteer by signing the Informed Consent Form. **Methods:** From October 2014 to October 2015 twelve subjects consumed daily four glasses (800 ml) of proposed phytotherapeutic preparation. **Results:** All subjects were highly satisfied about their outcomes. Total depigmentation was considered as a positive outcome because it is cosmetically acceptable. Total depigmentation was observed in presence of 80% or

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**more of depigmented patches. Conclusions: The phytotherapeutic preparation proposed is effective on treatment of depigmented patches in vitiligo.**

## Keywords

*Solanum paniculatum* L., *Jacaranda brasiliensis*, *Sonchus oleraceus*, Vitiligo

## 1. Introduction

According to the World Health Organization (WHO), about 80% of people in developing countries employ traditional herbal medicine. Among scientifically trained professionals the interest in folk remedies, herbal medicines, and traditional belief systems for healing is an effort to rescue, understand and apply a vast anthropologic database on treatment with plant-based medicine which would be difficult if not impossible to come upon cold by experimentation alone [1] [2].

A healthy normal skin is essential for a person's physical and mental well being. It is an important aspect of their sexual attractiveness, a sense of well being and a sense of self confidence.

Vitiligo is an acquired depigmentation disorder of skin affecting 1% - 4% of the world population. Neither life threatening nor symptomatic (except that depigmented patches burn easily when exposed to the sun) the effects of vitiligo can be cosmetically and psychologically devastating [4]-[6].

In vitiligo, melanocytes, the cells that make pigment which give color to the skin, are destroyed. This results in smooth, white patches in the midst of normally pigmented skin [7].

Clinically four types of vitiligo have been described according to the extent and distribution of the involved area: localized or focal (including segmental), generalized (common symmetric), universal and acrofacial. The goal is to restore the skin's color by restoring healthy melanocytes to the skin (repigmentation) allowing the skin to regain its normal appearance [7]-[9]. However this is not always a viable goal.

Universal vitiligo describes such widespread vitiligo that there are few remaining normal patches of pigmentation. Depigmentation that involves more than 70% of the integument is an indication that attempts to regain the color will not be successful. For such individuals depigmentation should be considered [8] [9].

This article aimed to report the outcomes from oral use of an infusion of leaves of *Solanum paniculatum* L., *Jacaranda brasiliensis* and *Sonchus oleraceus* for treatment of vitiligo.

## 2. The Phytotherapeutic Elements

Jurubeba (*Solanum paniculatum* L.) is a small tree of the Solanaceae family, known as gerobeba, joa-manso and jupeba, in Brazil. It is found in almost all the national territory, mainly in the Midwest region. WOLF [10] *et al.* demonstrated the antibacterial activity by performing phytochemical analysis of the ethanol extract of *Solanum paniculatum* and verified, through diffusion method in cavity, activity against staphylococcus aureus (ATCC 12692), escherichia coli (ATCC 25922) and pseudomonas aeruginosa (ATCC 15442).

This studied species has compounds belonging to the class of alkaloids and tannins that can be potentially active in biological and pharmacological models. It is also widely used as digestive and tonic clearing; it may be gastric acid inhibitor (MESIA-VELA, 2002) [10].

Santos [11] demonstrated the gastrointestinal antinematode activity of *S. paniculatum*. Genotoxic activity was observed from the fruit of *Solanum paniculatum* L. through micronucleus test in mice.

Studies of Vieira *et al.* [12] show that low concentrations of steroidal alkaloids of *S. paniculatum* L. clearly demonstrated the ability to modulate the genotoxicity and cytotoxicity induced by MMC in bone marrow of rats. Steroid alkaloid jurubine isolated from *S. paniculatum* is responsible for antigenotoxic and anticytotoxic actions.

The carobinha (*Jacaranda brasiliensis*) is a national tree found between Minas Gerais and Rio Grande do Sul, known as caroba-do-mato, caroba, marujá, simauba-falsa, carauca, marapuaba and parapara. It is very popularly used in skin diseases, fot rheumatism, to wash wounds, anti-syphilitic and for skin cuts in general. Also known scientifically as *Jacaranda caroba* D.C. (Bignoniaceae), it reaches 2.5 to 10 meters high and has stem, flowers and elliptical fruits [13].

Its parts are used as bitter, astringent, depurative, diuretic and anti-syphilitic, and its husks and leaves are used as a tonic, anti-syphilitic and for treatment of infections [14].

Bacchi *et al.* [15], reported antiulcerogenic activity *in vivo* for the leaves of *J. caroba*. The hydroalcoholic extract and dicloromethanyc fraction arising from this showed to be active in the reduction of hydrochloric acid and ethanol-induced ulcers (100% and 70% of reduction, respectively).

Carobinha had its preclinical toxicity evaluated in rats and rabbits and the results indicated no toxic effects [16].

Serralha (*Sonchus oleraceus*) is a plant of Asteraceae Family, found almost everywhere in the world, edible, rich in vitamins A, D and E [17].

It is bitter and its taste resembles spinach and is sold in street markets, in the same stand where we find the cabbage, lettuce and bertalha. For this reason, it is difficult to find it in the form of sachets. Popularly, this vegetable is indicated for the proper functioning of the liver and gall bladder, for psoriasis, anemia and eczema, and is diuretic. It is also known as chicoria-brava, serralha-lisa, ciumo or serralheira [18].

*S. oleraceus* has effective action and can be used as a natural source of antioxidants. The lethality assay with the microcrustacean *Artemia salina*, which was developed to detect bioactive compounds in plant extracts, demonstrated the low toxicity of the plant [19].

Recent studies show the power of wound healing in Wistar rats using hydroalcoholic extract of *Sonchus oleraceus*. Postoperative showed big difference and speed healing by comparing the groups using and groups who did not use the product. Because of the ability to fight free radicals, characteristic of some of the compounds present in the extract of this plant, diseases that have the action of free radicals as cause, such as vitiligo, could be treated with this plant [20].

### 3. Methods

Observational study involving voluntary and informed participation of people with vitiligo. The study population was defined based on sampling criteria for convenience.

From October 2014 to October 2015 all subjects received monthly a supply of leaves of *Solanum paniculatum* L., *Jacaranda brasiliensis* and *Sonchus oleraceus*. The infusion was prepared by them. For better control, the subjects received the mix of leaves separated in frozen portions to be kept in a freezer. Each portion of leaves mix contained 15 g of each plant, in a total of 45 g. All leaves were separated from the stems, washed, minced lean and with the aid of scissors.

The infusion was prepared using two liters of boiling water, in an artisanal process that is rather familiar to the subjects. The preparation is valid for consume during two days and must be kept in a refrigerator. The daily consume is of four glasses of 200 ml, in a total of 800 ml. The consume is distributed all over the day.

On reach return, when they came back to receive one more month supply, they were submitted to a careful evaluation and photographic register.

The study was approved by the Research Ethics Committee of Hospital Federal dos Servidores do Estado do Rio de Janeiro (CAAE: 32143314.9.0000.5252). All participants confirmed the condition of volunteer by signing the Informed Consent Form. Confidentiality was assured, participants were identified only by initials and all were aware that they could stop participating when they wished.

### 4. Results and Discussion

Fifteen subjects started the phytotherapeutic treatment, but only twelve concluded it. The dropouts were not related to the treatment and occurred in the first month of the study.

**Table 1** presents the main characteristics of the study population and summarizes the outcomes.

Vitiligo is a hypopigmentation disorder where the loss of functioning melanocytes causes the appearance of white patches on the skin. Vitiligo affects 1% of the world population, but the prevalence has been reported as high as 4% in some South Asian, Mexican and American populations. Vitiligo can develop at any age, but several studies report that 50% of cases appear before the age of 20 [8] [9] [21].

In this study the average age was of 41.25 years (OR = 17.13). At baseline, 3 (25.0%) participants were under 20 years. Some subjects did not know the time of disease onset, suggesting long evolution. This gap prevented more precise evaluation of this aspect of the disease, but explains the high psychiatric morbidity profile detected in successive evaluations.

**Table 1.** Characteristics of the study population and respective treatment outcomes.

PATIENT	AGE (years)	SEX	COLOR OF SKIN	DEPIGMENTED PATCHES		REPIGMENTATION	OUTCOME AFTER 12 MONTHS	REMARKS FROM PATIENTS
				LOCAL	DIMENSION			
1	M.B.C. 51	F	White	Right foot Left knee	1 cm of diameter 2 cm of diameter	Second month	100%	High satisfied.
2	M.M.Q. 18	M	White	Orbital Área	5 cm of diameter per orbita	Third month	90%	High satisfied, the current treatment will be maintained until a cure is obtained.
3	T.P.B. 58	F	White	Upper lip Lower Lip	3 cm x 1 cm 4 cm x 1 cm	Third month	100% 80%	High satisfied, the current treatment will be maintained until a cure is obtained.
4	T.N.R. 18	M	Brown	Right Elbow Left elbow	12 cm of diameter 10 cm of diameter	Fourty month	70% 80%	High satisfied, the current treatment will be maintained until a cure is obtained.
5	M.G.S. 57	F	White	Lower Lip Left elbow Hand fingers	3 cm x 1 cm 5 cm of diameter 4 cm x 1 cm	Second month	100% 70% 70%	High satisfied, the current treatment will be maintained until a cure is obtained.
6	R.A.R. 38	M	White	Total face	18 cm x 20 cm	Third month	100%	High satisfied. Continue treatment when it is available in capsules.
7	J.H.A. 37	M	White	abdominal area	16 cm of diameter	Third month	60% 80%	Lower abdome 80% in side area
8	J.M.S. 40	M	White	Right and left elbow Lábio lower	6 cm of diameter 3 cm x 1 cm	Second month	70% 100%	High satisfied. Continue treatment when it is available in capsules.
9	F.S.V. 35	F	White	Left foot Right Knee	1 cm of diameter 2 cm of diameter	Third month	100%	High satisfied. He requested discharge from treatment.
10	P.C.S. 18	M	White	Right inguinal area Right and left knee Right and left elbow	4 cm x 3 cm 5 cm of diameter 4 cm of diameter	Third month	100%	High satisfied.
11	S.S.C. 65	F	Brown	All over the body	80% of corporal area	Total depigmentation	100%	High satisfied. Considers that a depgmented skin is preferable to a stained one.
12	A.S. 60	F	White	Lower lip Back Right hand Left hand	2 cm x 1 cm 30 cm x 20 cm 4 cm x 2 cm 3 cm x 1 cm	fourth month	100% 90% 70% 70%	High satisfied. Refers total remission of severe gastrointestinal symptoms.

It is known that 16% to 35% of patients with vitiligo experience significant psychiatric morbidity. Depression (10%), dysthymia (7% - 9%), sleep disturbances (20%), suicidal thoughts (10%), suicidal attempts (3.3%) and anxiety (3.3%) have been found in those affected with vitiligo [22]. Vitiligo can also lead to difficulties in forming relationships, avoidance of certain social situations, and difficulties in sexual relationships. Vitiligo can be confused with leprosy, which also causes loss of pigment, thus further stigmatizing patients [23].

Nevertheless it should be noted that in this study the progressive improvement of skin appearance contributed directly and significantly to the depressive and anxiety symptoms had a significantly reduced behavioral expression. The participants also reported an important improvement in all aspects of quality of life, including personnel and occupational dimensions.

The study population was distributed equally between the two genders, but the sample is very small so that conclusions can be formulated in this regard. Generally it is observed different trends among different studies sometimes pointing higher prevalence among women and sometimes acknowledging that there would be no significant difference [8] [9] [21].

White was the most prevalent color of skin (10; 83.33%). However it is known that the profile of the Brazilian population is high miscegenation between different races and this aspect should be considered in assessing the results in photographs displayed in sequence.

The distribution of white patches and the outcomes are recorded in **Table 1**.

Subsequent figures show the most relevant aspects.

In the first month of use of the medication, all, without exception, reported changes in white colorations to pinkness. One patient reported improvement of stomach problems. In the second month, all reported no increase in the number of patches on the body and two patients realized that it could be noticed, in some patches, some brownish spots on the edges thereof, which was verified by the researcher. In the third month, the researcher's notes were:

- Two patients with repigmentation in two-centimeter patches.
- One patient with 80% repigmentation in the bottom lip of the mouth.
- One patient with white patches more scattered over the body.
- One patient with patches in the back completely rosy.
- Three patients with total pigmentation in patches of up to one centimeter in diameter.
- Two male patients with centrally repigmentation of patches on the elbows and knees.
- One patient with visible repigmentation in the right arm and no improvement in the fingertips.
- One patient without changing in the patches and improvement of gastric problems and 100% cure of psoriasis on her elbows.

From the fourth month, the improvements were even more visible, even without the use of magnifying glasses, and a patient who had more than 70% body area with vitiligo began to present complete depigmentation, staying with the dominant white color, but without the white color, characteristic of vitiligo, but with pink coloration.

Concluding remarks after twelve months of treatment:

- Pigmentation of elbows at the ends and in the center of the patches (**Figure 1** and **Figure 2**).
- Repigmentation on the edges of patches in the groin (**Figure 3** and **Figure 4**).
- Patches on the fingers with little change (**Figure 5** and **Figure 6**).
- Total repigmentation of patch on left foot (**Figure 7** and **Figure 8**).
- Total body depigmentation (**Figures 9-16**).
- Total repigmentation of patches on the knee (**Figure 17** and **Figure 18**).
- Total repigmentation of the mouth lips (**Figure 19** and **Figure 20**).
- Total repigmentation of knees (**Figure 21** and **Figure 22**).
- Total repigmentation of elbows (**Figure 23** and **Figure 24**).
- Color change in the dorsal region (back) without repigmentation and little or no repigmentation in the patient A. M.

Recent data show that tropical forests contain more than half of the world's estimated 500.000 plant species and less than 1% of these plants have been researched for medicinal activity. Tropical plant species contain three to four times the number of active chemical constituents than their temperate counter-parts. Plantbased therapeutic preparations are returning to dermatologic therapy. They serve as therapeutic alternatives, safer choices, or in some cases, as the only effective treatment. Folk medicine tradition provides different indicators for use than the medical disease model. Advantages of a phytotherapeutic approach include multiple synergistic components of crude extracts [1] [2] [7].

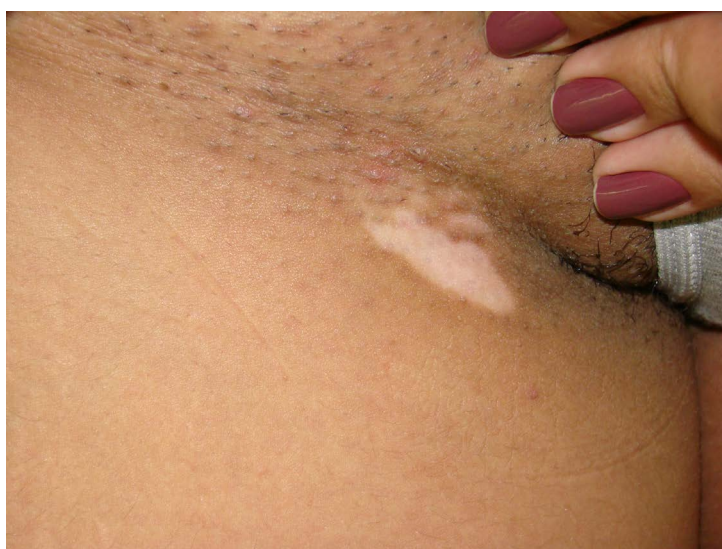




**Figure 1.** Vitiligo in the elbow area before treatment onset.



**Figure 2.** The same condition after three months of treatment.



**Figure 3.** Vitiligo in the groin area before treatment onset.



**Figure 4.** The same condition after treatment conclusion.



**Figure 5.** Vitiligo in the fingers before treatment onset.



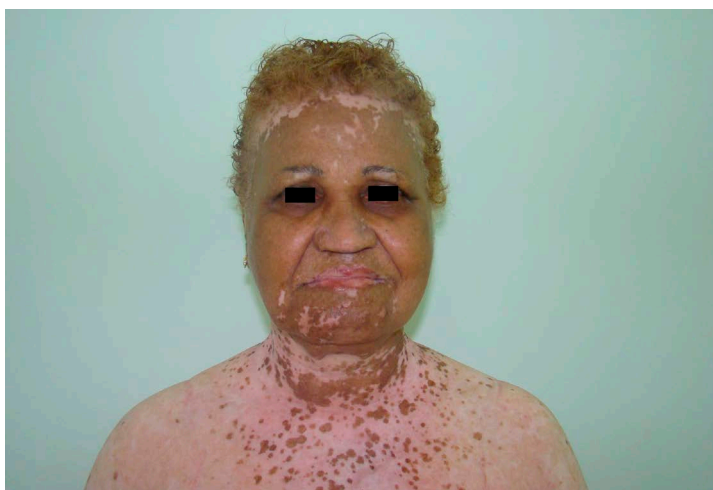
**Figure 6.** The same condition after treatments conclusion.



**Figure 7.** 1 cm vitiligo on the left foot before treatment onset.

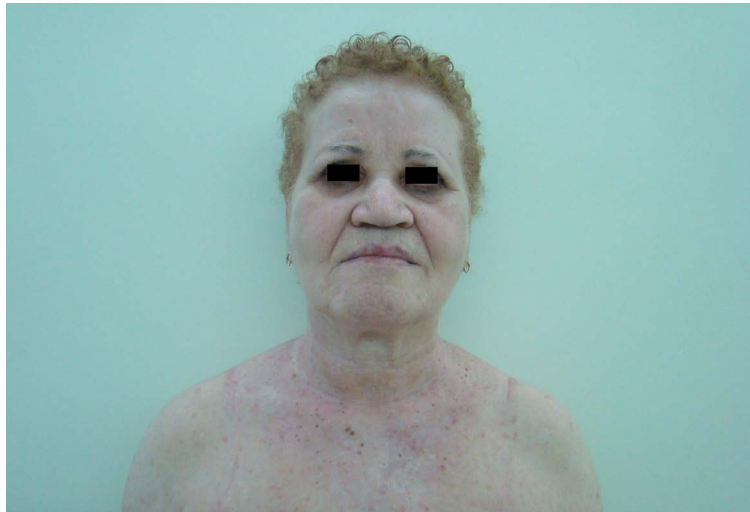


**Figure 8.** Total repigmentation after treatment conclusion.



**Figure 9.** Vitiligo in more than 70% body surface area.





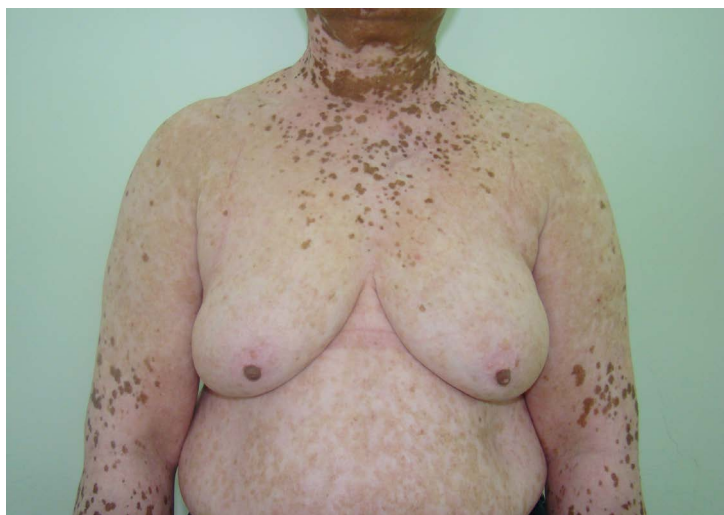
**Figure 10.** Depigmentation after treatment conclusion.



**Figure 11.** Vitiligo in the hands and wrists before treatment onset.



**Figure 12.** Depigmentation after treatment conclusion.



**Figure 13.** Vitiligo in the chest and abdomen before treatment onset.



**Figure 14.** Depigmentation after treatment conclusion.



**Figure 15.** Vitiligo on knees and legs before treatment onset.



**Figure 16.** Depigmentation after treatment conclusion.

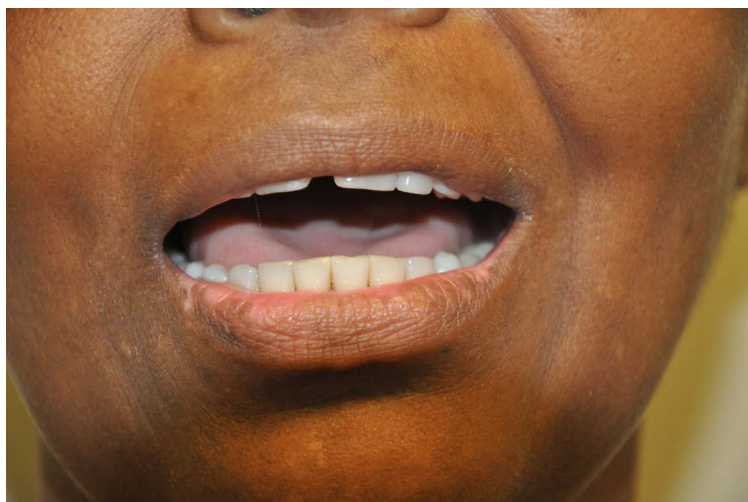


**Figure 17.** Vitiligo on the right knee before treatment onset.

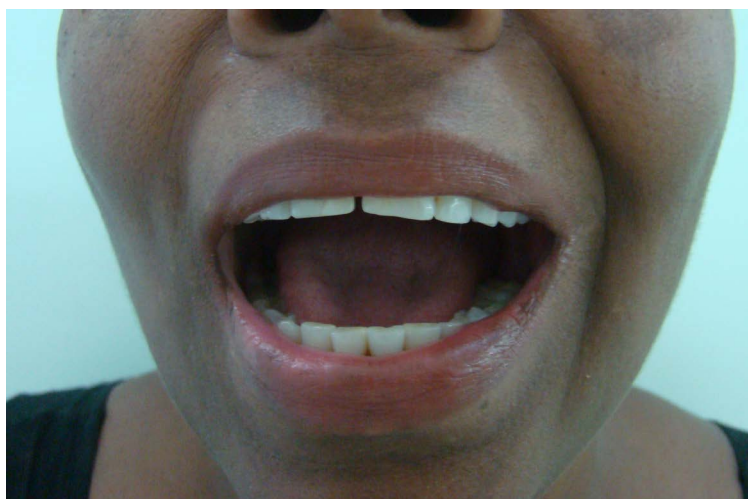


**Figure 18.** Total repigmentation after treatment conclusion.

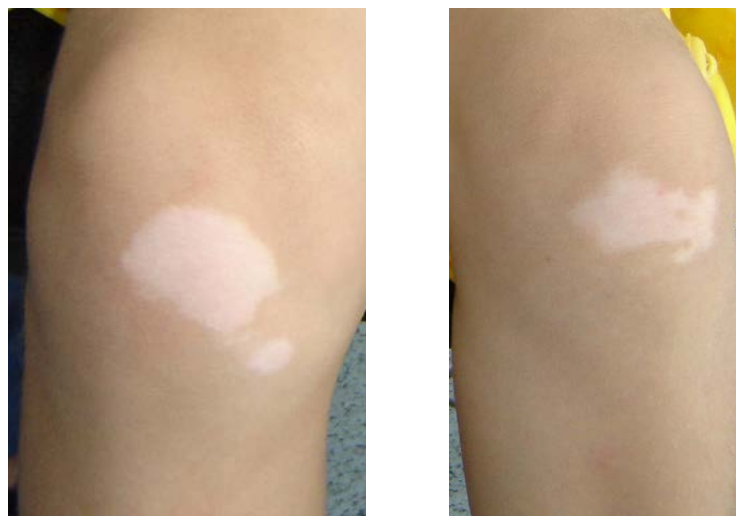




**Figure 19.** Vitiligo in the lower lip—before treatment onset.



**Figure 20.** Total repigmentation after treatment conclusion.



**Figure 21.** Vitiligo on knees before treatment onset.





**Figure 22.** Total repigmentation after treatment conclusion.



**Figure 23.** Vitiligo in right elbow before treatment onset.



**Figure 24.** Total repigmentation after treatment conclusion.

The therapeutic arrangement here presented included the main mechanisms that have been identified in the vitiligo etiopathogenesis, highlighting a specific triad of mechanisms of action: anti-inflammatory, purifying and antioxidant. The selection process also took into account the use of native plants long history of use, no reports of any adverse effects. On the contrary, it was observed the occurrence of additional beneficial effects as the case of remission of severe gastrointestinal symptoms that were reported by one of the participants.

The preparation in the form of infusion due to the fact that extracts of these plants as capsules are not available on market. However, it is not difficult to find them in street markets throughout Brazil. Although the taste of infusion is bitter, the possibility of consuming it as a cold drink makes the most acceptable.

Despite the treatment has been extended over a year, and particularly noteworthy the occurrence of tangible improvement yet in the first quarter of treatment, as shown in **Table 1**. The high level of satisfaction of the participants is also something to be emphasized.

It should further be noted that although the focus of the proposed treatment is re-pigmentation of the affected areas, this result is not possible in those where the depigmentation process has already committed area equal to or greater than 70% of body surface. Therefore, the total depigmentation was considered a positive outcome. As highlighted by one of the participants, totally depigmented skin is more tolerable than a blotchy skin, subjecting the person to all sorts of stigma and prejudice.

Feelings of worthlessness and inadequacy are recurrent in the speeches of the participants, clearly indicating the extensive psychological suffering they face. It was evident also marked traumatic etiology associated with the onset and progression of the disease, manifested either as product of physical (mechanical or surgical trauma, for example) or psychological (loss family person, for example). These findings, in turn, are in agreement with the literature reviewed here.

## 5. Conclusions

The photographic evidence presented here demonstrates that phytotherapeutic preparation proposed in this study is effective in the treatment of vitiligo.

Sun exposure is always a critical factor of attention in the management of pigmentation disorders. Thus, the universal indication of sunscreen use that is made to all dermatology patients, is especially emphasized in relation to people with vitiligo, especially those that occurred in the total depigmentation of the skin.

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