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Hops beyond beer

UFRGS' s researcher from the Faculty of Dental Sciences obtains patent about hops usage and seeks for funding to start developing products

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Hops is a climbing plant with European origins and a member of the *CANnabaceae* family. Its flower is used in brewing, giving it bittering and specific aromas. There are studies that suggest that low or moderate consumption of alcoholic beverages may have a protective effect against inflammation and cardiovascular diseases. From those studies, *Eduardo*, professor at UFRGS Dentistry Faculty, obtained a patent on the use of hops in oral health products. The purpose is to add the antioxidant and anti-inflammatory properties of the flower – observed by Eduardo in 2017 – in oral health products of daily use, to prevent and reduce gingivitis and periodontitis effects, which are really prevalent inflammations in the population in general.

Eduardo' s research works are in the periodontal field, a dentistry area that studies the support system and teeth implantation (gum and bone tissues from the region), working on diagnosis, prevention and treatment of gingivitis and periodontitis, caused by the bacteria accumulation on teeth and gum as a result of poor hygiene. The researcher explains that gingivitis is a first inflammation that does not damage the structures of the region, but brings bad breath, bleeding and pain during brushing, making hygiene difficult. Over time, if not treated, it can become chronic and develop into periodontitis. This one has the destruction of gingival and bone tissues as consequences, which can lead to the loss of teeth and even cause other problems related to the cardiovascular system.

Professor Eduardo conducted a study in 2017, at Hospital de Clínicas de Porto Alegre (HCPA), in which he observed an antioxidant effect present in hopped beers that can help control inflammation. The research was made with Wistar rats that were divided into four groups: a control group (with no alcohol ingestion); a second one with Indian Pale Ale (IPA) beer consumption (with a high concentration of hops); a third one with Pilsen beer (less hopped) consumption; and fourth that was given an alcoholic solution without hops. All beverages had the same concentration of alcohol. Then, periodontal inflammation was induced in mice, which led to periodontitis, with destruction of bone tissue. The experimental groups, except the control group, daily ingested the alcoholic beverage made available for twelve hours, returning then to the normal diet with water. The intention was to analyze the tissue destruction in each group through moderate consumption of the beverage – the connection between the benefit and harm of alcohol use involves some variables, such as number of doses ingested, body weight, gender, age, diet, etc., which makes moderate consumption the study key piece.

As a result, the groups that ingested beer showed less damage to their tissues, even if the total inhibition of inflammation has not occurred. And the group that consumed IPA beer, the more hopped kind, presented even less damage. These results were taken to Michigan University in the United States in 2018 so that the research could be tested at the epigenetic level – to try to explain what happened genetically regarding periodontal tissue damage. Comparing mice that did not ingest alcohol with those that ingested the IPA beer, there is a lot of difference in genetic markers. Eduardo says that " the presence of IPA beer has caused changes to the chromatin, and this probably explains why these animals had less inflammation and destruction of bone tissue." On the other hand, he states that with the model applied so far it is not possible to assert whether the protective effect works locally, in the gum, or systemically, via the bloodstream, or even jointly. Nevertheless, the idea of patenting the injection of hops in oral health products arose, since the results are interesting in the dentistry area. With the patent, further research on this field can continue. "It's important [to get the patent], because it intellectually protects this developing product," says Eduardo. Brazilian patents are granted by the National Institute of Industrial Property (INPI), and the researcher wrote the request mentioning examples of oral health products in which hops and its extracts can be used, such as toothpastes, domestic application gels and mouthwashes. In process since May 2019, the patent was issued in December of the same year in the "invention patent" category, and the next step is to make an international registration.

Next Steps

The pandemic of the new coronavirus has brought postponement to some stages of the research. It is also necessary to identify better whether hops act locally or systemically and which active ingredients of the plant are specifically controlling the inflammations, and to proceed with the investigation until it reaches the clinical phase. On the other hand, Eduardo says that he is taking entrepreneurship courses and considering the opening of a startup to produce hops-based dental products, if the findings remain positive.



Hops flower is used for brewing - Photo: Pixabay

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