Evaluation of the antidiabetic potential of medicinal plants of Salvia genus

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Diabetes Mellitus and Medicinal Plants

- Disease characterized by elevated plasma glucose concentrations and results from insufficient insulin secretion, insulin resistance or both.
- Can lead to complications such as cardiovasculatde diseases, retinopathy and nephropathy.

The World Health Organisation has estimated that there will be around 300 million diabetics by 2025. Type 2 diabetes mellitus (T2DM) represents around 90% of this and its prevalence is increasing due to a combination of factors: excessive intake of high energy foods, sedentary lifestyle, increasing lifespan and increasing prevalence of obesity.

A growing interest in natural products and their applications in disease treatment and prevention, has led to an increment in the search and biotechnological exploitation of medicinal plants.

Our Work and Biotechnological Applications

- Plants in nature
- Biotechnological improvement of production
- Biomass of Medicinal Plants (ex. S. officinalis)
- Extracts
  - Tea
  - Phenolic enriched extracts
- Isolated Compounds
  - Phenolic compounds
  - Essential oil
  - Triterpenoids

Plant cell cultures and Cell suspensions under controlled conditions
- Production of plant biomass enriched in some compounds (ex: rosmarinic acid)

EVALUATION OF ANTIDIABETIC POTENTIAL

In Vivo and In Vitro Tests

- Post Diabetic Complications
  - Antioxidant properties
  - Antihypertensive properties
- LIVER
  - Inhibition of gluconeogenesis
  - Increase of insulin sensitivity
  - Induction of glycogenesis
- INTESTINE
  - Inhibition of glucose transport
  - Inhibition of α-amylase and α-glucosidase
- PANCREAS
  - Stimulation of insulin secretion
  - Increase of insulin sensitivity

PERIPHERIC TISSUES

Select bioactive compounds for biotechnological production

Some of our results

- Salvia officinalis tea showed to have hypoglycemic effects in hepatocytes from normal rats, (Glucose consumption was increased in hepatocytes from tea drinking rats.)
- Tea drinking decreased glucagon induced gluconeogenesis in fasted rat hepatocytes...
- In co-incubations with essential oil there was a potentiation of the effect of insulin on glucose consumption, and inhibition of glucagon’s effect on gluconeogenesis.
- Despite the effects on normal rat hepatocytes, our results show that sage tea has no effect at the levels of the inhibition of gluconeogenesis and stimulation of glucose consumption by insulin in hepatocytes from STZ-induced diabetic rats. Due to its glucose lowering effects in normal animals, sage tea may be of use in the prevention of T2DM.
- In addition, 5, fructose tea seems to have effects on the inhibition of intestinal glucose transport by regulating the expression of sodium/glucose co-transporter (SLGT1).
- Sage tea has also phenolic compounds that showed strong antioxidant properties.

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